N500 Auto-Steering System
User Manual

NST Co.,Ltd.

NST株式会社 | NST Co.,Ltd. 千葉県千葉市中央区登戸1-13-21シティファイブB棟2F 〒260−0032
Email:info@nst-c.co.jp | URL: https://www.nst-c.co.jp | Tel:043-306-4375 FAX:043-306-4375

Thank you for purchasing our company's automatic driving system. Please read this manual carefully before use to facilitate your quick, correct and safe use of this product.

User instructions:

·For tractors without a cab, the instrument should be kept away from exposure to the sun/rain, and care should be taken to prevent the instrument from falling to the ground or being strongly impacted by other objects.

·Be sure to cut off the power supply before disassembling and assembling each cable;

·It is prohibited to use hard objects when operating the display screen;

·When supplying power, please pay attention to the power supply requirements of the equipment.

·Pay attention to taking appropriate lightning protection measures to prevent lightning strikes;

·Equipment damaged due to force majeure (lightning strike, high voltage, collision, etc.) is not within the company's free maintenance scope;

·It is prohibited to disassemble this product by yourself, otherwise the warranty will be void;

·This system should be used in an open area away from obstructions;

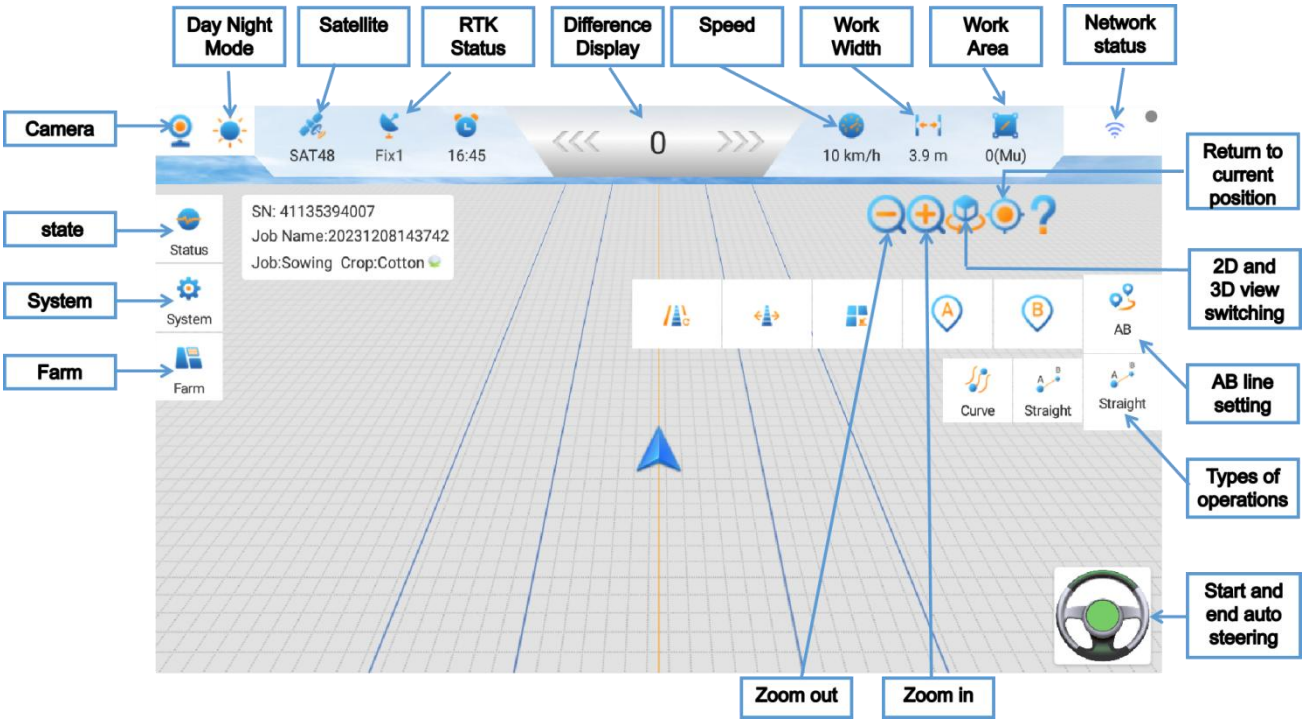
·When using the equipment, please stay away from interference sources such as strong electric fields, magnetic fields, high-voltage lines, and broadcast signal towers.

Our company will continue to optimize our products, and product specifications and instructions may change at any time without further notice. If there are any differences between the instructions, icons, pictures, etc. and the actual product, please refer to the actual product.

Table of contents

1. Software main interface

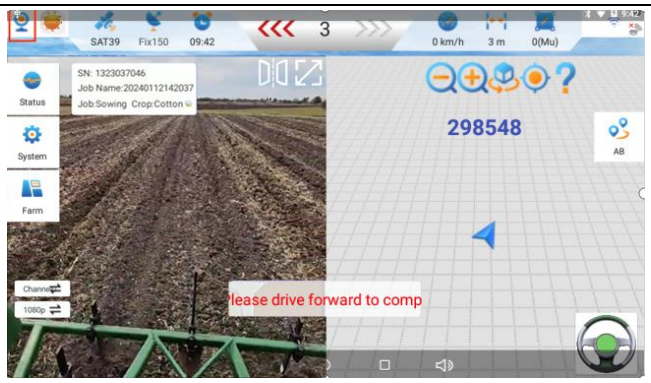
1.1. Main interface diagram



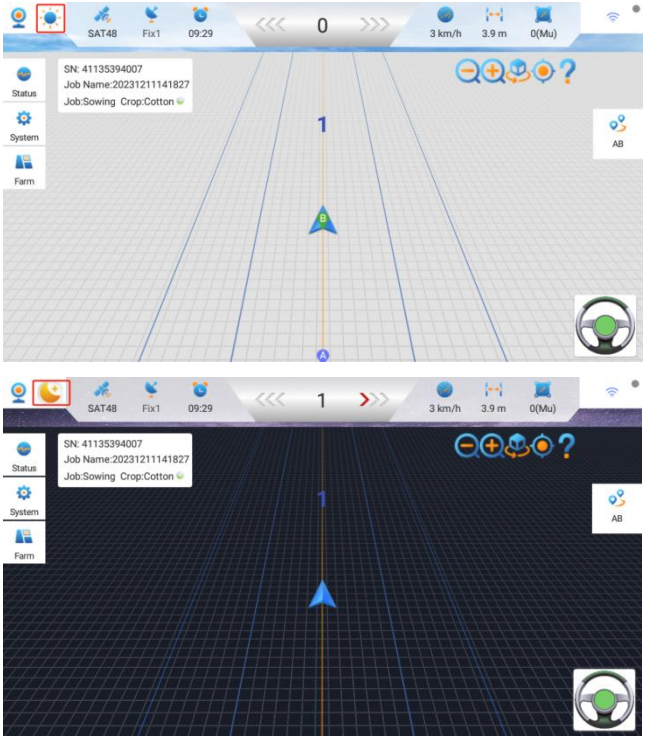
1.2. Commonly used function keys

1.2.1. title

Camera: After clicking, you will enter the camera and you can observe the working conditions behind it. If it is not displayed, first we need to check whether the camera model matches the tablet model. If they match, you can switch the channel and resolution on the tablet; channel: 0, resolution 720p ; If it does not match, you can contact the dealer to replace the camera.



Day Night Mode: Can switch between day and night mode.



Satellite: Indicates the current number of receiving satellites.

RTK Status: There are 4 statuses: single point, floating, pseudo-range, and fixed. The number displayed next to it represents the differential delay (seconds).

Single point: Indicates that the base station is not connected and needs to be connected to the nearest nearby base station.

Floating: The satellite signal has been received, but the signal is not fixed. The quality of the data collected at this time is not good.

Pseudorange: The mobile station does not receive satellite signals at all, and the measured coordinate data is invalid.

Fixed: Base station connection completed.

Difference Display: The deviation distance to the left or right from the center line.

Speed: Indicates the speed of the tractor during operation.

Work width: Indicates the width of agricultural tools

Work Area: Indicates the current working area
Network status: Indicates the network signal used by the current device

1.2.2. function button

Zoom out: can zoom out the map.
Zoom in: You can zoom in on the map.
Switching angle: You can switch between 2D and 3D views of the main interface.
Position the car model: The image can be corrected to the position of the car model.
Tutorial: Click "?" to see how to use the navigation.

1.2.3. Status

Software Version: software version number.
Lat: represents the longitude value of the vehicle's location.
Lon: Indicates the latitude value of the vehicle's location.
Height: Altitude, the distance from sea level to the antenna.
AB: Indicates the length of the AB line currently used (total length from point A to point B).
HEAD: Indicates the distance between the vehicle head and the center of line AB.
FOOT: Indicates the distance between the rear of the vehicle and the center of line AB.
Included angle: Indicates the tangent angle between the vehicle's forward straight line and line AB, which is called the included angle.
Attitude: Displays the current attitude sensor data.
Target angle: The angle value that the tire needs to rotate for the upper line center.
Actual angle: The angle value of the actual tire rotation.
Foresight distance: represents the value of the forward-sight distance setting for automatic navigation in the system.
Roll angle: A value indicating the left and right tilt of the vehicle body. The greater the deviation from zero, the more the vehicle body tilts left and right.
Pitch angle: represents the value of the front and rear tilt of the vehicle body. The greater the deviation from zero, the more the vehicle body tilts forward and backward.
Straightness: Indicates the proportion of the vehicle running in a straight line during operation.
Motor Firmware: Displays the current motor version number.
Motor Mode: divided into CAN and serial port, manual selection
Motor Status: Whether the current motor is normal.
Motor Error Code: Normal. If a problem occurs, the alarm code will be displayed according to the corresponding problem.
Engine Speed: Only available after connecting the engine module.
Zone: positioning zone.
Step: Check whether there is any delay in communication. It is always 100. If there is an abnormality, it is not 100.
P-RMS: A value after connecting to the base station. The higher the value, the worse the signal.

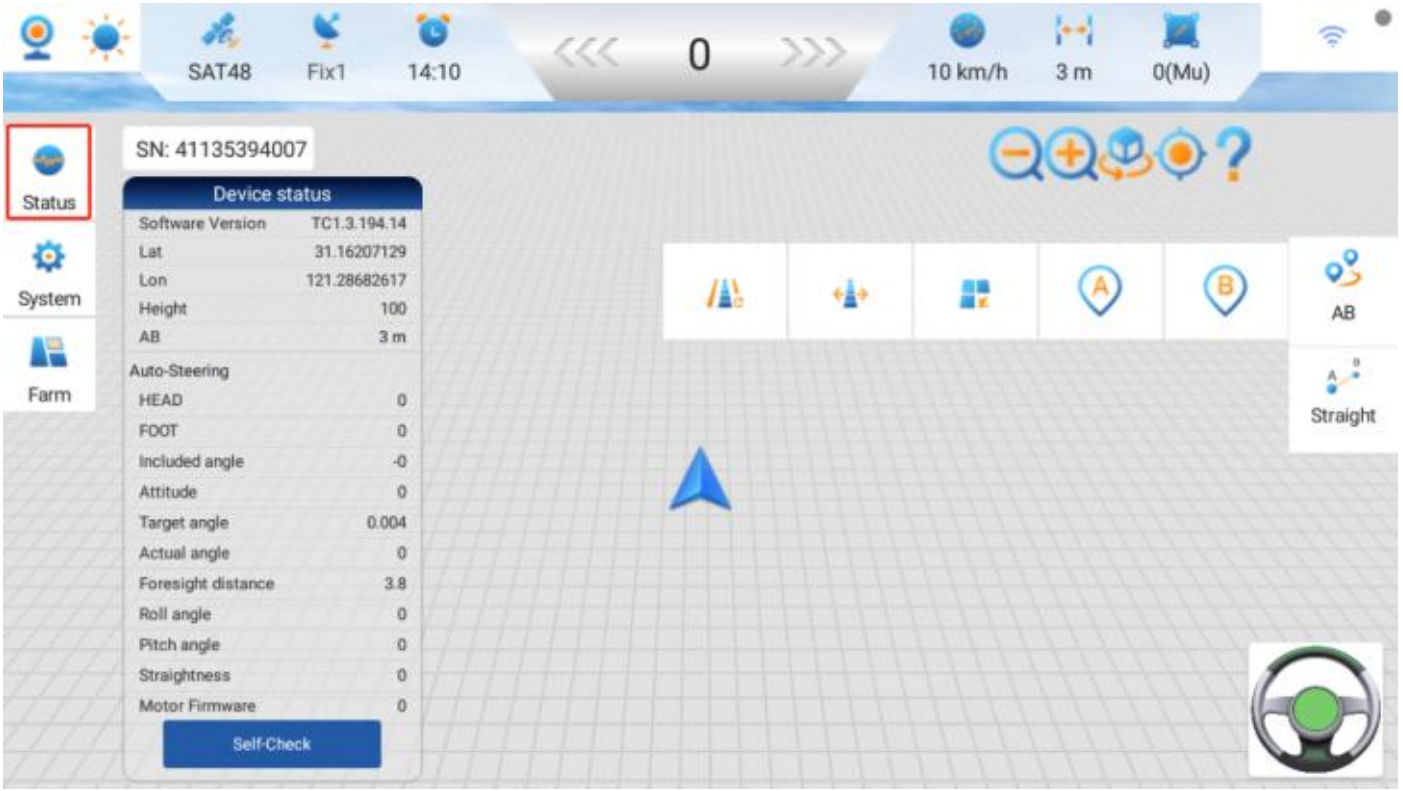
GYRO: The compensation value of the gyro. For example, if the gyro has zero drift and the angular rate is 1, then after the gyro is stationary, the gyro will be around 1, and the attitude will jump to 0~0.1.

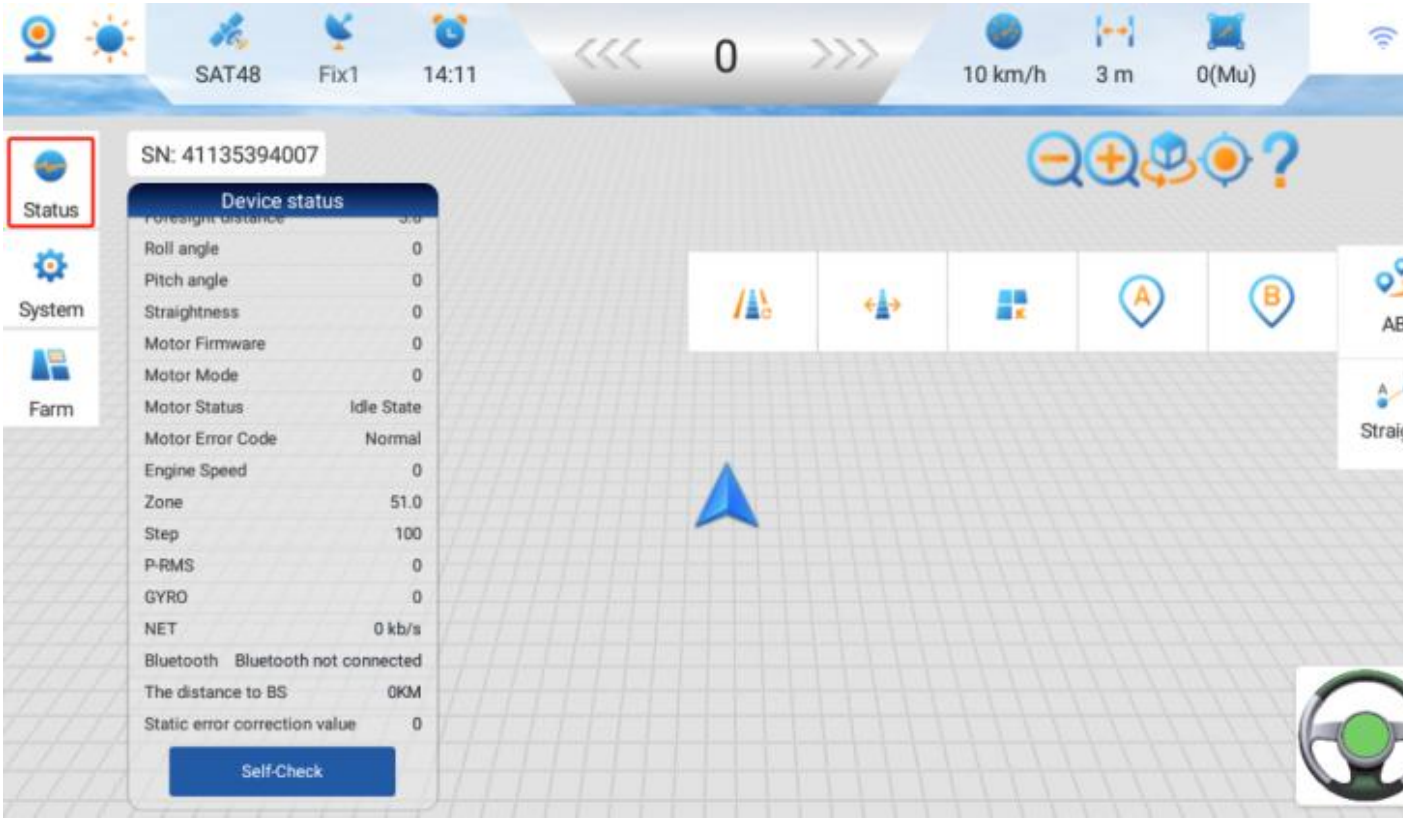
NET: Indicates the current network uplink and downlink speed.

Bluetooth: Indicates whether Bluetooth is connected.

The distance to BS: Indicates the distance from the base station to the current device.

Static error correction value: Correction value of the system error estimate of the final angle such as the correction value.





1.2.4. Autopilot switch button

Click to turn on or off automatic driving.

Manual

Auto

2. System

2.1. Satellite

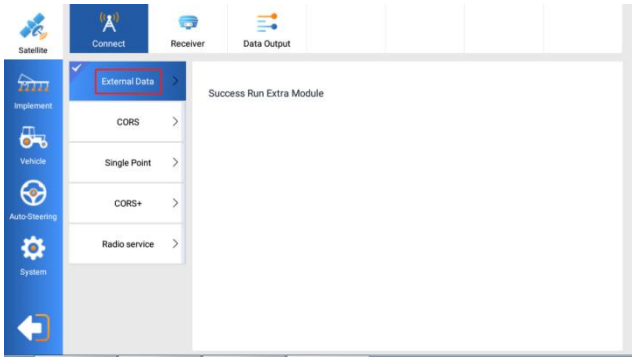
2.1.1. Connect

First check the RTK status on the main interface. If Fix is displayed and the differential delay is within 2, you can proceed to the next step. If it is displayed as "Single Point",

perform base station selection operation.
Currently, two main base station connection methods, CORS and Radio service, are provided. After selecting the corresponding base station connection method, return to the main interface to check whether the RTK is in a fixed state and the differential delay is within 2. If yes, you can proceed to the next step.
Single Point is a single point positioning mode, does not receive differential data from the base station, and the positioning accuracy is ±30CM.

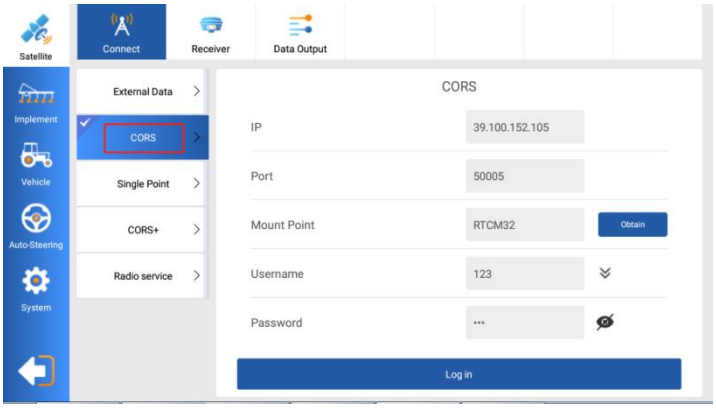
2.1.1.1. External Data

This function requires the purchase of an external radio module. After setting the frequency and protocol of the radio module, it can be connected to the base station to achieve a fixed solution state.



2.1.1.2. CORS

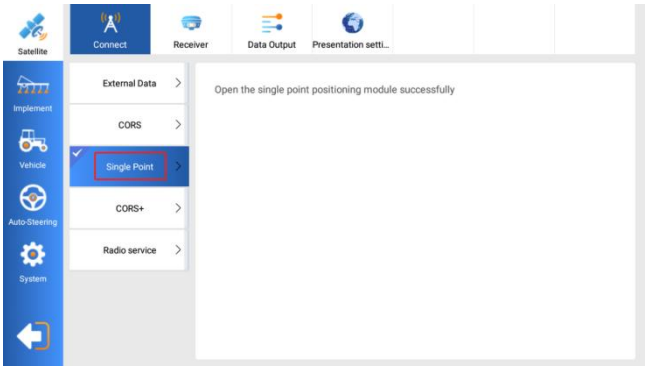
This function is a network base station,fill in the IP, Port, Mount Point, Username, and Password of the CORS account, and click Log In. (Note: Customers need to have their own CORS account, and the tablet needs to be connected to 4G or Wifi or mobile phone hotspot to ensure that the tablet is connected to the Internet).



2.1.1.3. Single Point

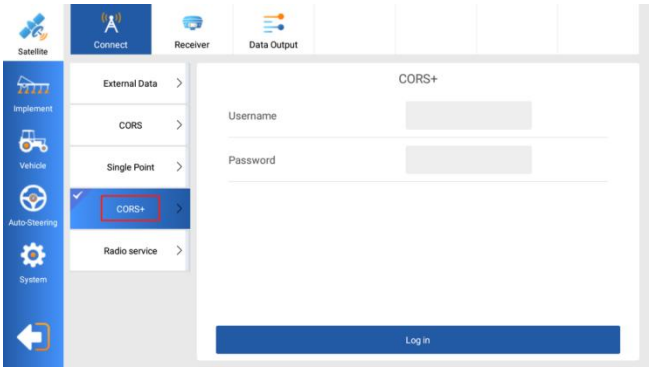
Select System on the home page, then select Satellite→Connect→Single Point, and wait until the system displays 'Open the single point positioning module successfully'. (This

function is in single-point positioning mode, does not receive differential data from the base station, and the positioning accuracy is ±30CM).



2.1.1.4. CORS+

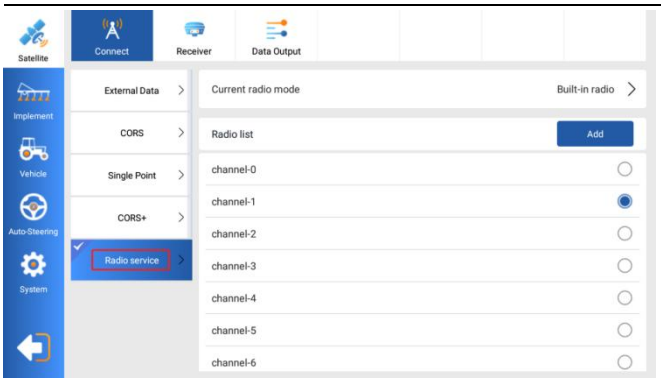
This function is a network base station function and is currently only available in China.

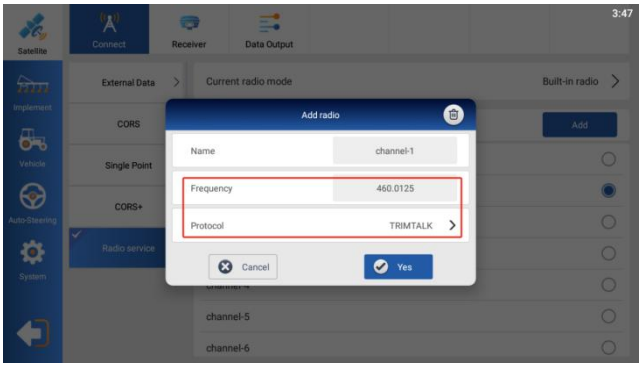


2.1.1.5. Radio service

Select System on the homepage, then select Satellite → Connect → Radio service, select Built-in radio, and select the radio channel. (The default radio protocol for Channel 1-8 is TRIMTALK, and the frequencies are 460.0125, 461.0125, 462.0125, 463.0125, 464.0125, 465.0125, 466.0125, 467.0125MHZ).

If you need to modify the radio protocol and frequency, click the channel number to enter the modification interface, select the appropriate radio protocol and frequency, and click yes. (Note: Currently supported radio protocols include TRIMTALK, TRIMMK3, and TRANSEOT, and the supported frequency range is 410-470MHZ).





2.1.2. Receiver

Receiver

GNSS TABLET: Select this option for dual antenna products (AG300).
SMART ANTENNA: Select this option for single antenna products (AG400, AG500).
Simulation demo: Select this item to enter simulation demonstration mode.
T100 (Single antenna): Select this option for auxiliary navigation products (AG100).

Star-Fill

After disconnecting from the base station, high-precision navigation can be maintained for ten minutes, and the main interface of the system will display a countdown to disconnection from the base station. At this time, you need to check whether the connection status with the base station is stable.

PPP

This function is a high-precision single-point positioning function. It takes 10-15 minutes to converge the satellite signal after turning on the receiver. The RTK status on the main interface displays PPP to indicate successful convergence. Currently, it can only be used in or near China. The positioning accuracy is about 5 -10CM.

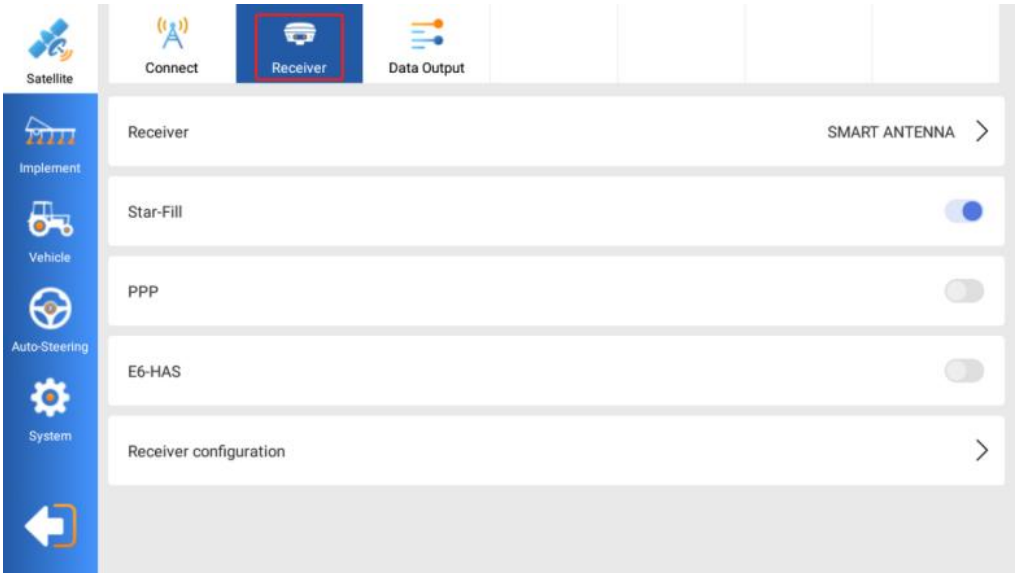
E6-HAS

This function is a high-precision single-point positioning function that can be used worldwide. It

takes 10-15 minutes to converge the satellite signal after turning on the receiver. The RTK status on the main interface displays PPP, indicating successful convergence, and the positioning accuracy is about 5-10CM.

Receiver configuration

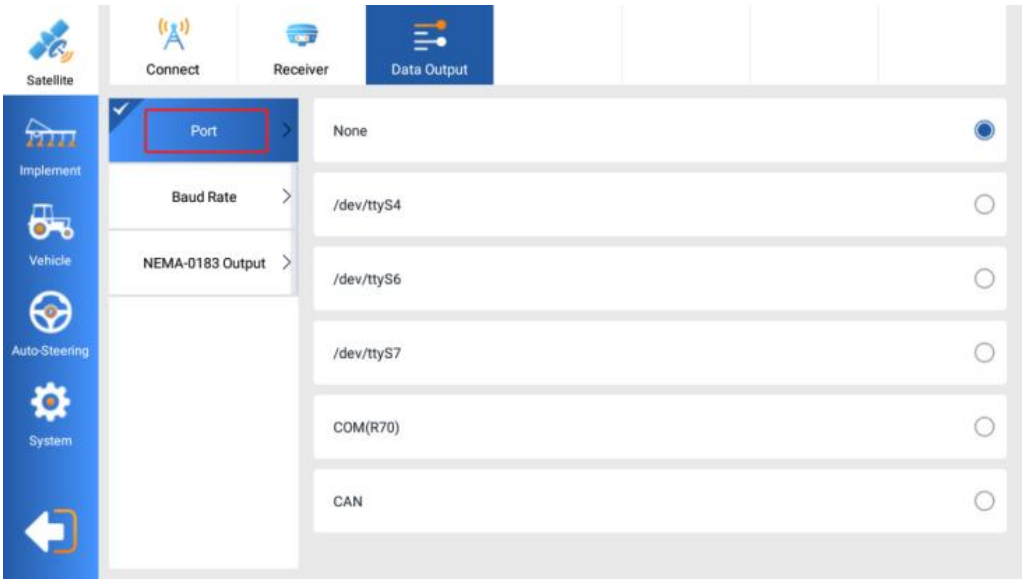
Click to reconfigure the receiver instructions and reset the receiver instructions.



2.1.3. Data Output

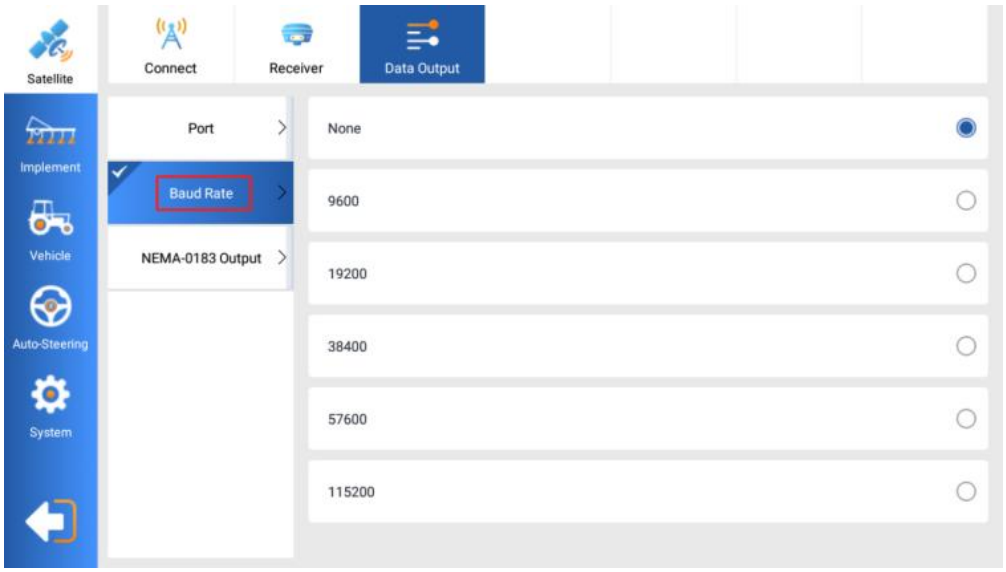
Port

This function is a data communication serial port, /dev/ttyS4 is a motor communication serial port, /dev/ttyS6 is an external board serial port, /dev/ttyS7 is a radio serial port, COM (R70) is a single antenna receiver serial port, and CAN is a CAN communication interface.



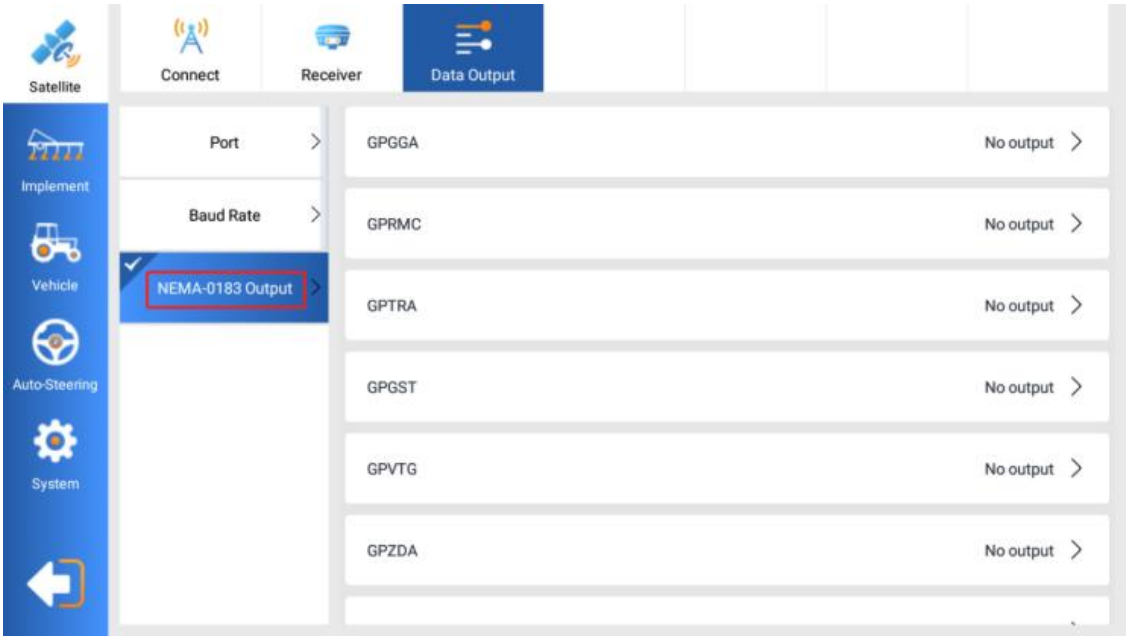
Baud Rate

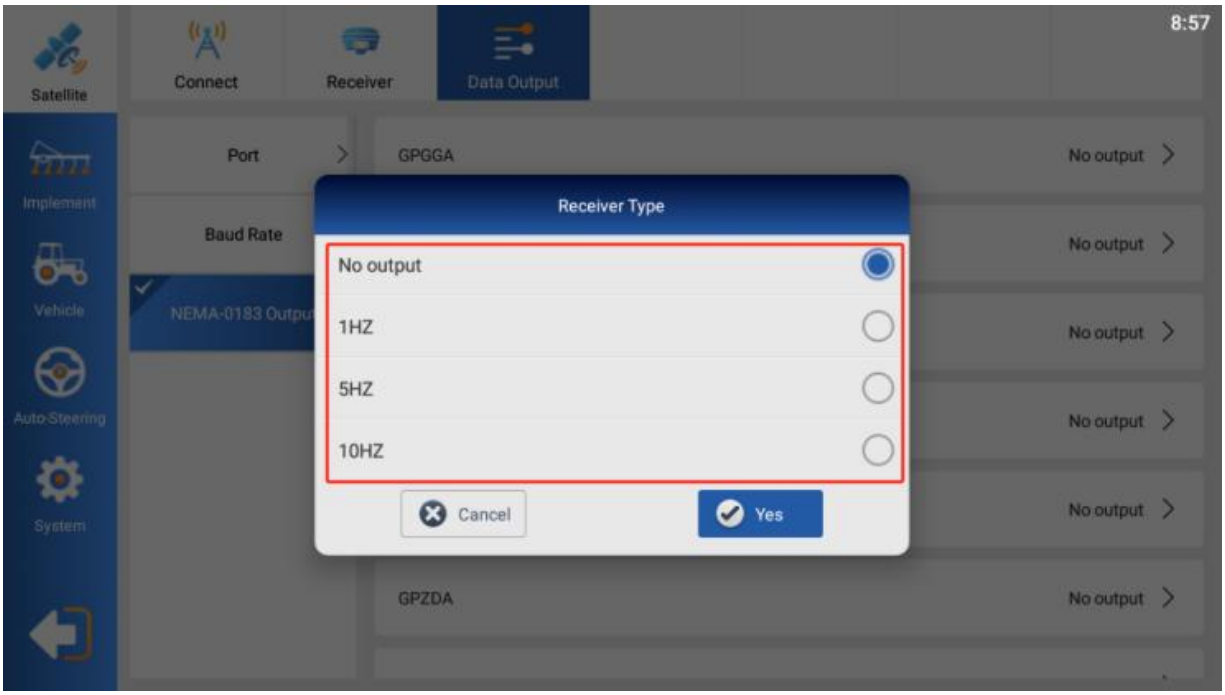
Serial port output baud rate selection, currently available options are 9600, 19200, 38400, 57600, and 115200.



NMEA-0183 Output

NMEA data output options include GPGGA, GPRMC and other data. The data output rate can be selected as 1/5/10HZ output, which can be selected according to actual needs.

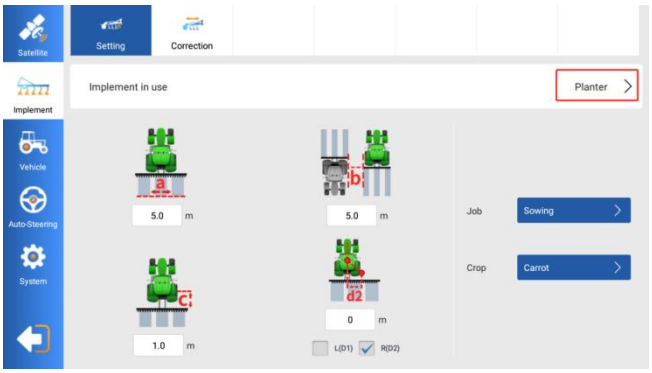


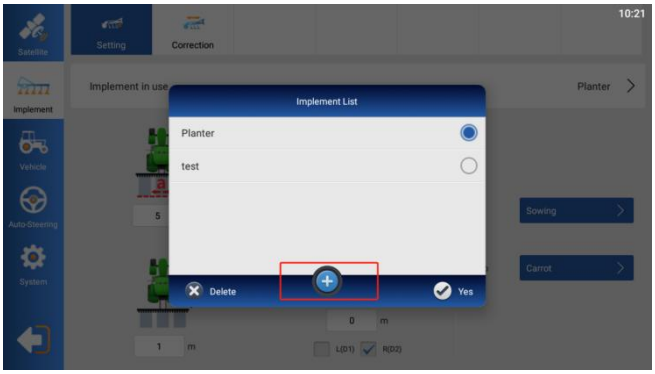


2.2. Implement

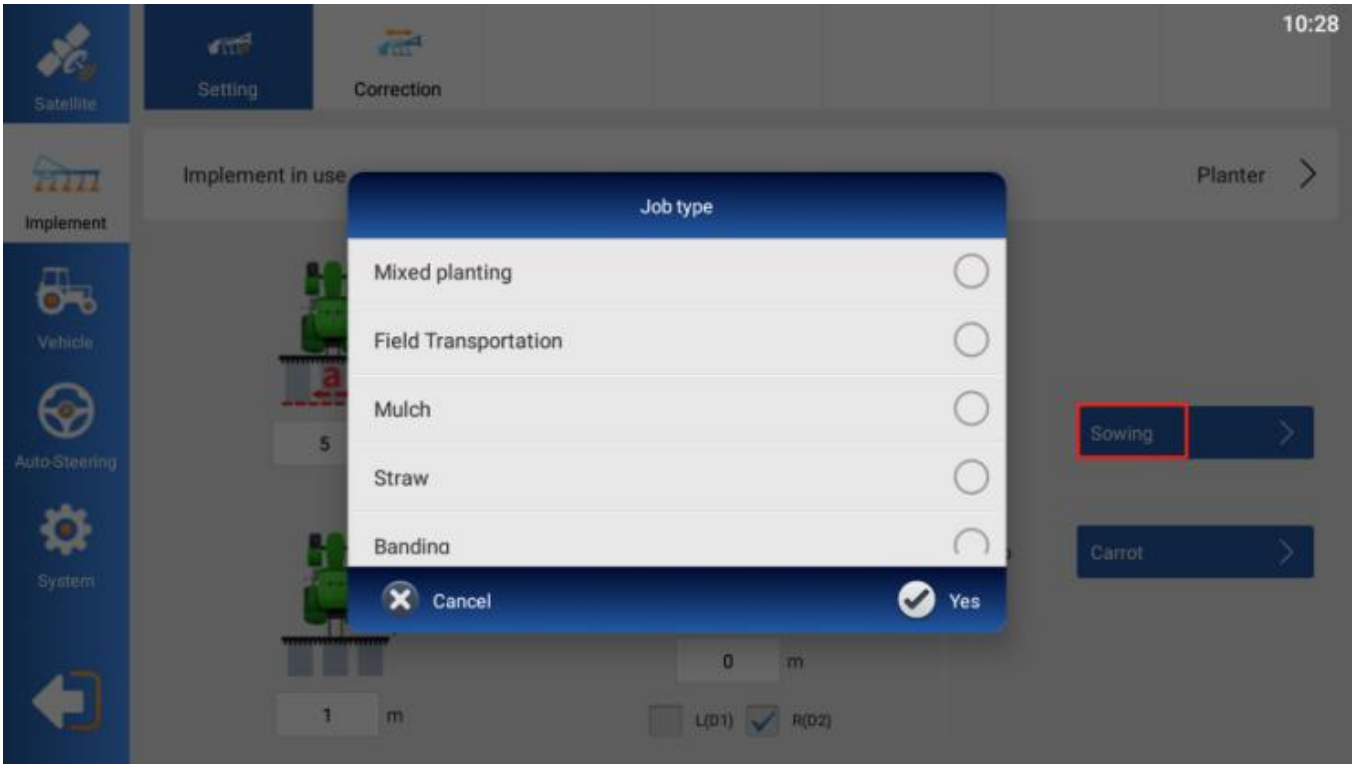
2.2.1. Setting

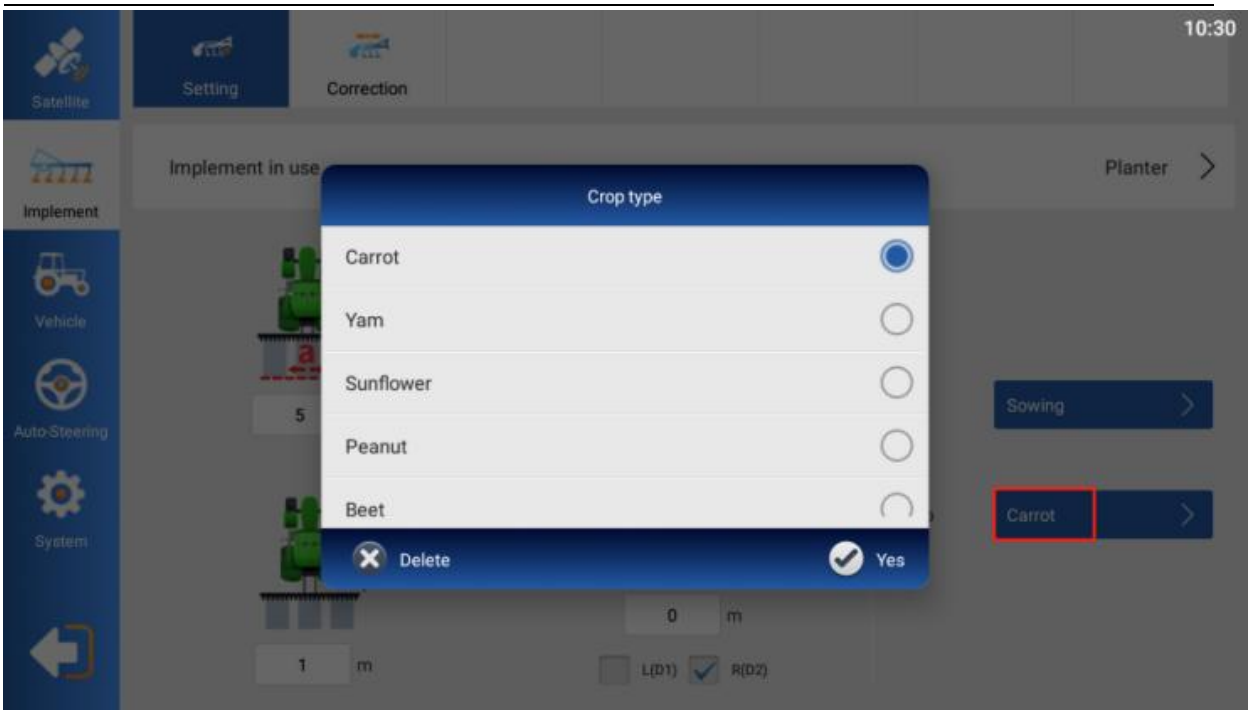
Click Planter to enter the setting interface, click "+" to set the planting type. Generally, just keep the default.



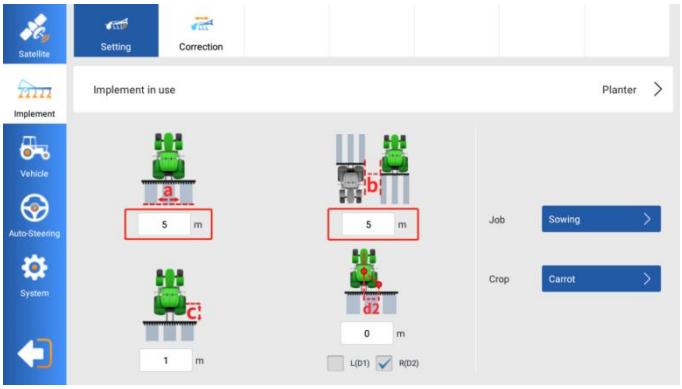


Click to select the job type and job item type.





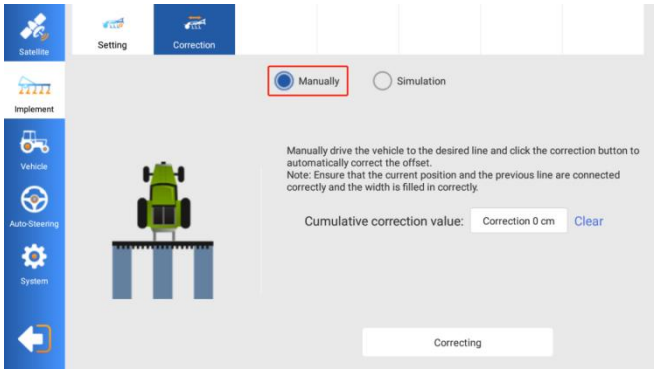
"a" is the actual working width of the agricultural implement, "b" is the spacing between crop rows, c is the straight-line distance from the center of the rear wheel of the vehicle to the agricultural implement, "d" is the offset distance from the center of the agricultural implement to the central axis of the vehicle, generally the values of c and d remain default .
Implement width (distance between the two most seed rows) Joint (distance between adjacent seed rows)。



2.2.2. Correction

Manually

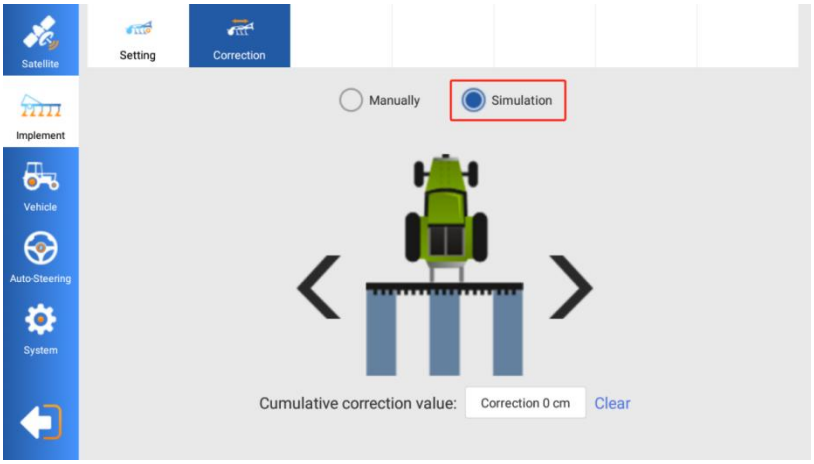
Manually drive the vehicle to the desired line and click the correction button to automatically correct the offset.
Note: Before using this function, make sure that the vehicle operating width is filled in correctly and the distance between the current position of the vehicle and the previous row is correct.

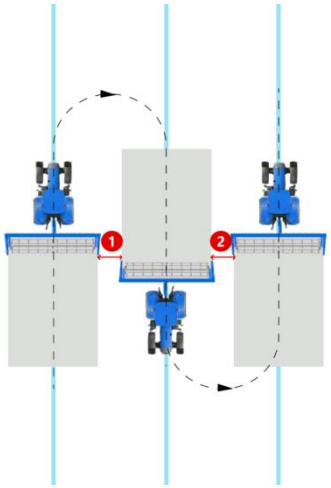


Silumation

Adjustment of the joint: Click System→Implement→Correction→Simulation, click the left and right arrows to adjust the joint (based on the forward direction of the tractor, determine the left and right joints). To use this function, you need to mark the AB line, set the width of the implement and the distance between the joints, run back and forth three times, and measure the distance between the two joints in the three trips.
Calculation method: The difference between the joints divided by 4 is the distance that needs to be adjusted.Adjustment direction: If the joint on the left is larger, adjust to the left; if the joint on the right is larger, adjust to the right. For example, if the left

joint is 4cm wider than the right, then it will be offset by 1cm to the left.

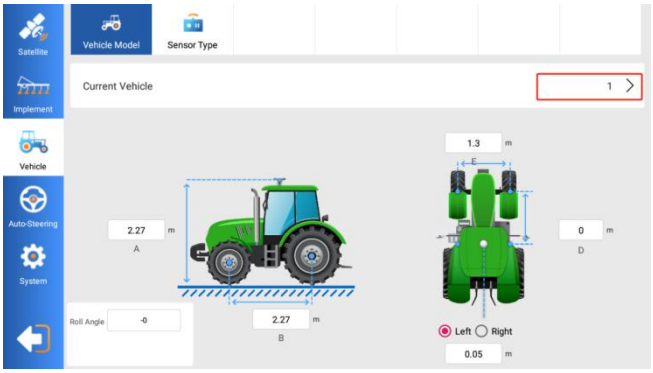


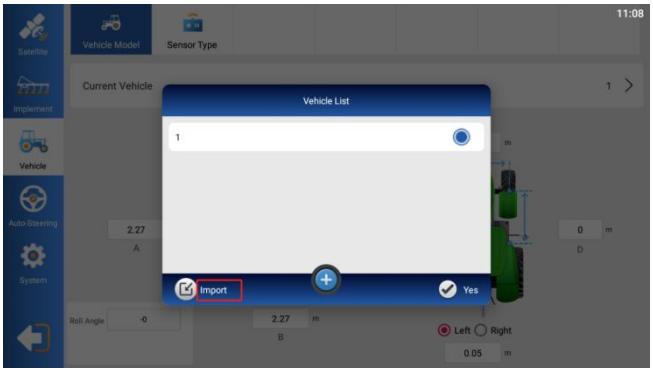


2.3. Vehicle

2.3.1. Vehicle Model

Click "1" and click "Import" to import the vehicle type. Just keep the system default vehicle type here.

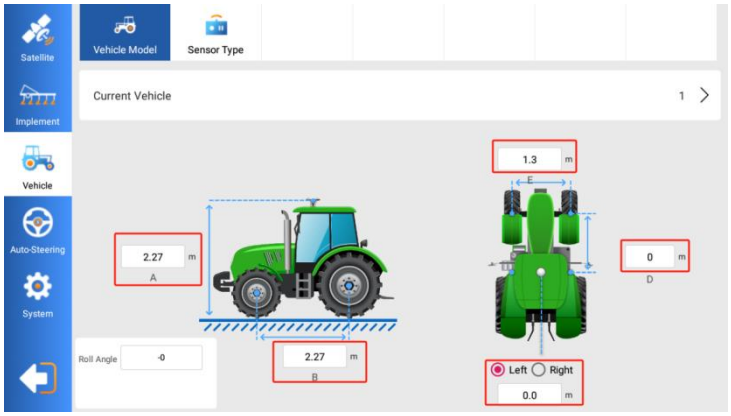




Use a meter ruler or other measuring tools to actually measure the vehicle parameters and fill them in. Make sure to measure the vehicle parameters on a flat ground as much as possible. (Inaccurate filling of vehicle parameters will affect the accuracy of autonomous driving).

A: The vertical distance from the receiver to the ground B: The wheelbase distance between the center of the tractor's front wheels and the center of the rear wheels C: The offset distance from the center of the receiver to the central axis of the vehicle (default is 0) D: The center of the receiver to the center of the tractor's front wheels Horizontal distance of the axis (for a tractor with rear wheel steering, measure the horizontal distance from the center of the receiver to the center axis of the tractor's rear wheel E: Horizontal distance from the center of the tractor's front wheel.

Roll Angle: Receiver roll angle value, indicating the left and right tilt angle value of the receiver, just keep the default value.



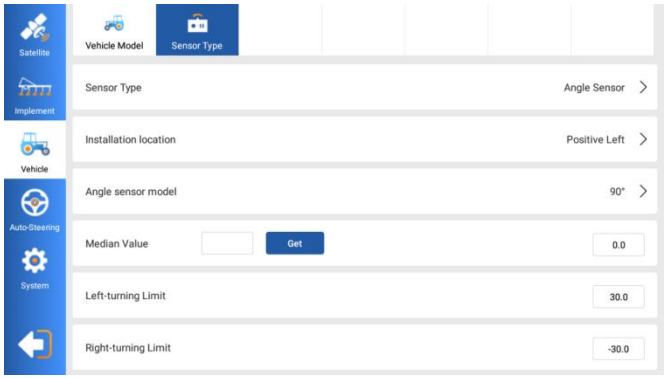
2.3.2. Sensor Type

AG300 selects the corresponding sensor type based on whether it is an Single Gyro Sensor or an angle sensor. AG400 and AG500 select Single Gyro Sensor by default. If an additional front gyro is installed, select dual gyro sensor.

2.3.2.1. Angle Sensor

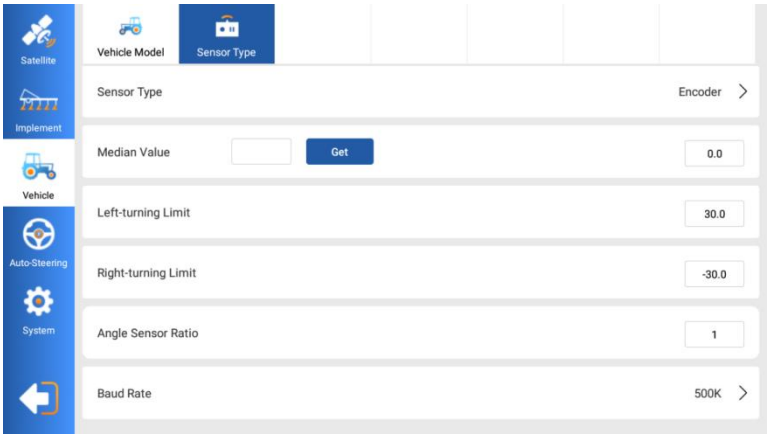
Installation location: Select based on the actual installation location of the angle sensor. There are

four installation locations: Reverse Left, Positive Left, Reverse Right, and Positive Right.
Angle sensor model: Choose one of 90°, 120°, 180°, and 360° according to the angle sensor model.
Median Value: Vehicle tire centering angle value, just keep the default value.
Left-turning Limit: Left-turning tire angle limit, just keep the default value.
Right-turning Limit: right-turning tire angle limit, just keep the default value.
Angle Sensor Ratio: Angle sensor ratio, just keep the default value.
Baud Rate: Sensor interface baud rate, the default is 500K.



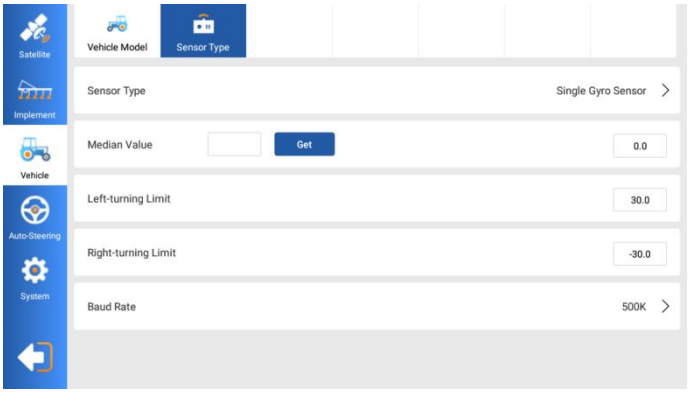
2.3.2.2. Encoder

This function is an unconventional function. After the sensor is damaged, the motor angle value is used. It is not recommended to be used during normal operations. If you use simulated autonomous driving, you can select this sensor.
Median Value: Vehicle tire centering angle value, just keep the default value.
Left-turning Limit: Left-turning tire angle limit, just keep the default value.
Right-turning Limit: right-turning tire angle limit, just keep the default value.
Angle Sensor Ratio: Angle sensor ratio, just keep the default value.
Baud Rate: Sensor interface baud rate, the default is 500K.



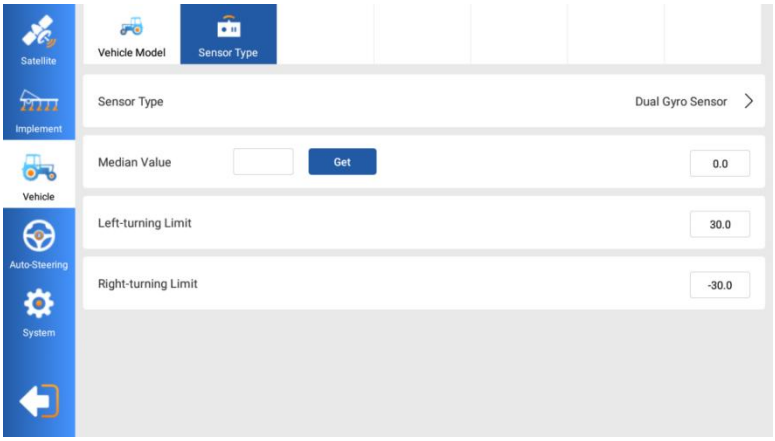
2.3.2.3. Single Gyro Sensor

Median Value: Vehicle tire centering angle value, just keep the default value.
Left-turning Limit: Left-turning tire angle limit, just keep the default value.
Right-turning Limit: right-turning tire angle limit, just keep the default value.
Baud Rate: Sensor interface baud rate, the default is 500K (AG500). For other product models, choose 250K.



2.3.2.4. Dual Gyro Sensor

Median Value: Vehicle centering angle value, just keep the default value.
Left-turning Limit: left turning angle limit, just keep the default value.
Right-turning Limit: Right turning angle limit, just keep the default value.



2.4. Auto-Steering

2.4.1. Setting

Foresight Distance

This value can be adjusted after the Fixed Mode button is turned on. The larger the value, the smaller the angle that needs to be adjusted is calculated by the software, and the motor correction error will be milder, and the opposite will be more intense. The greater the tractor operating speed, the greater this value. The lower the tractor operating speed, the smaller this value is. You can maintain the software default value, and then adjust the value if the steering wheel swings violently or too slowly.

Sensitivity

This value can be adjusted after the Fixed Mode button is turned off. The larger the value, the more intense the motor error correction. On the contrary, the smaller the value, the gentler the motor response. The greater the tractor operating speed, the smaller this value is. The smaller the tractor's operating speed, the larger this value will be. The software default value can be maintained. If the steering wheel swings violently or too slowly, the value can be adjusted.

Transmission Coefficient

Adjust the amplitude and frequency of the steering wheel swing. Start driving automatically under the default value. If you want to modify the value, you need to stop and modify it. The amplitude value for each modification is 10. The larger the value, the greater the amplitude and frequency of the steering wheel swing. The smaller the value, the smaller the amplitude and frequency of the steering wheel swing.

Fixed Mode

A value calculated based on vehicle speed and related to the angle of motor adjustment.

Lateral Slope Compensation

This function can be turned on to provide terrain compensation when the working conditions are severe.

Auto-Calibration

Through the software's control algorithm, the sensor centering value is automatically corrected in real time to improve the straightness of the vehicle's progress.

Low Speed Mode

Open when the operating speed is lower than 1KM/H.

Control Mode

There are 4 control modes. Each mode corresponds to a different algorithm of the motor. Mode 4 is recommended.If using dual gyroscopes, it is recommended to use mode 3.

Navigation line mode

The line types currently supported by autonomous driving are: Straight, Curve, Path, Turn Around, Harrow, U, Span, Pivot, 90°, Single Line, A+.

Online Value

The center of the front of the vehicle is 0, and the center of the rear is 9. In order to reflect the status of the farm implement as much as possible, the center of the vehicle is set to 9, which is the default value and does not need to be changed.

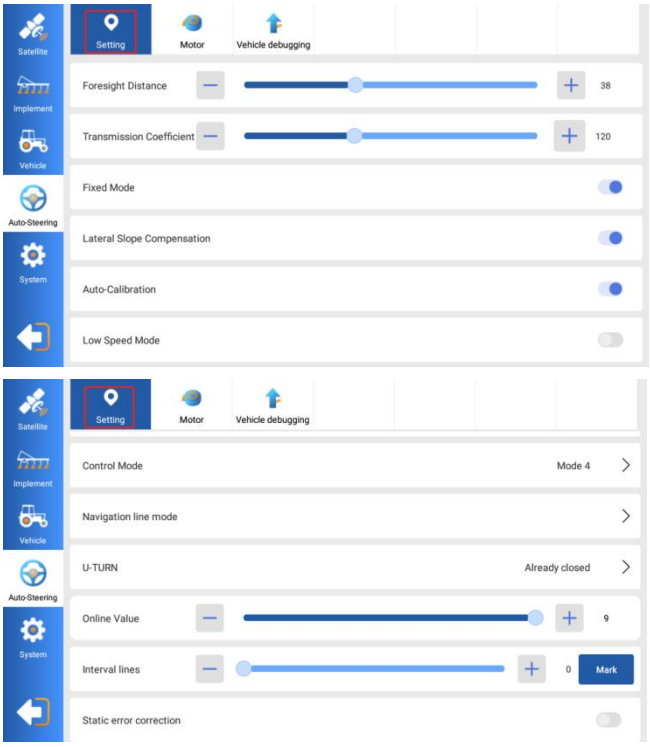
Interval lines

After the navigation lines are generated, the number of navigation lines separated by

the autonomous driving path.

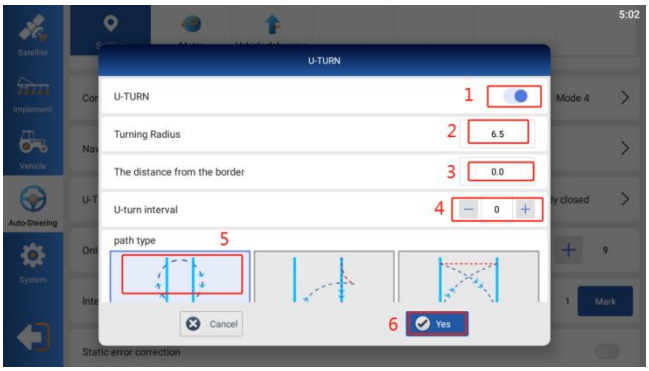
Static error correction

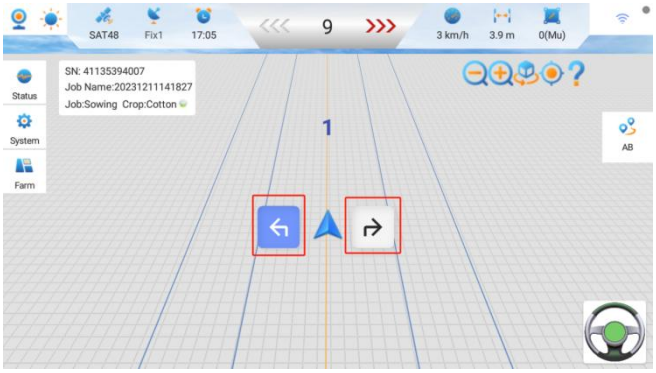
Satellite receiver error correction, just keep it off by default.



U-TURN

To use this function, sufficient turning distance must be reserved at the beginning and end of the field.Click to turn on the U-TURN switch, set the turning radius (it is recommended to set the turning radius of a large tractor to more than 6.5 meters), set the boundary distance, set the number of interval lines (default is 0), select the U-turn method, and then click Confirm. When you need to make a U-turn, click the left arrow and the tractor will automatically turn to the left. Click the right arrow and the tractor will start to automatically turn to the right.





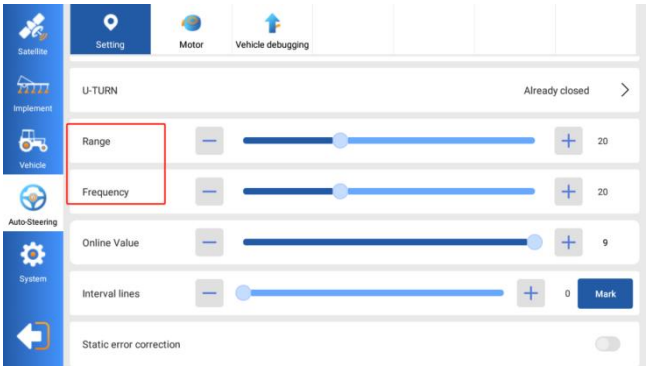
New parameters for modes 1 and 2

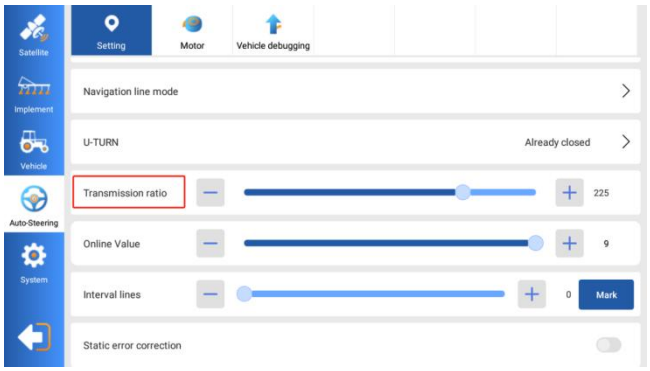
Range: Increasing the value can increase the steering wheel control speed and amplitude. The recommended value is 15-20. The larger the value, the greater the steering wheel swing. The smaller the value, the smaller the steering wheel swing.

Frequency: If the steering wheel swing is too large, the frequency limit swing can be reduced. The recommended parameter is 15-20. The smaller the value, the smaller the swing frequency, the larger the value, the higher the swing frequency.

New parameters in mode 3

Transmission ratio: adjust the size of the steering wheel swing and the deviation correction speed. Carry out automatic driving at the default value first. If you want to modify the value, you need to stop and modify it. The amplitude value of each modification is 10. The larger the value, the larger the swing float. The smaller the value, the smaller the swing float.





2.4.2. Motor

Rotating Speed

Corresponding to the motor rotation speed, the default value is 15. If the motor speed is too fast, this value can be lowered. Generally, when driving at high speed (greater than 8KM/H), this value can be lowered.

Motor Control Mode

There are two motor control methods: Speed Control and Position Control. The default is Speed Control, just keep it as default.

Manual Steering Override

This function is used to manually hold the steering wheel to release the automatic driving state. The lower the value, the easier it is to manually release the automatic driving state. Just keep the default value.

Firmware Upgrade

The current motor version number is displayed. Click to upgrade the motor firmware. If you need to upgrade, please contact technicians in advance, otherwise unsuccessful upgrade will cause the device to become unavailable.

Convert communication

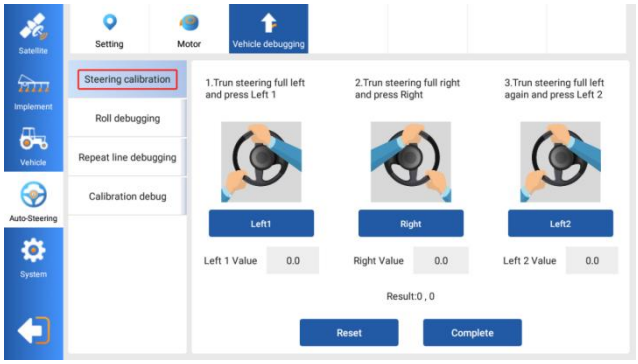
Motor control mode Serial port, Can. Just keep the default.

2.4.3. Vehicle debugging

If the sensor selects a single gyro, vehicle debugging can be performed in sequence. If the sensor selects dual gyros, only Roll debugging and Repeat line debugging are required.

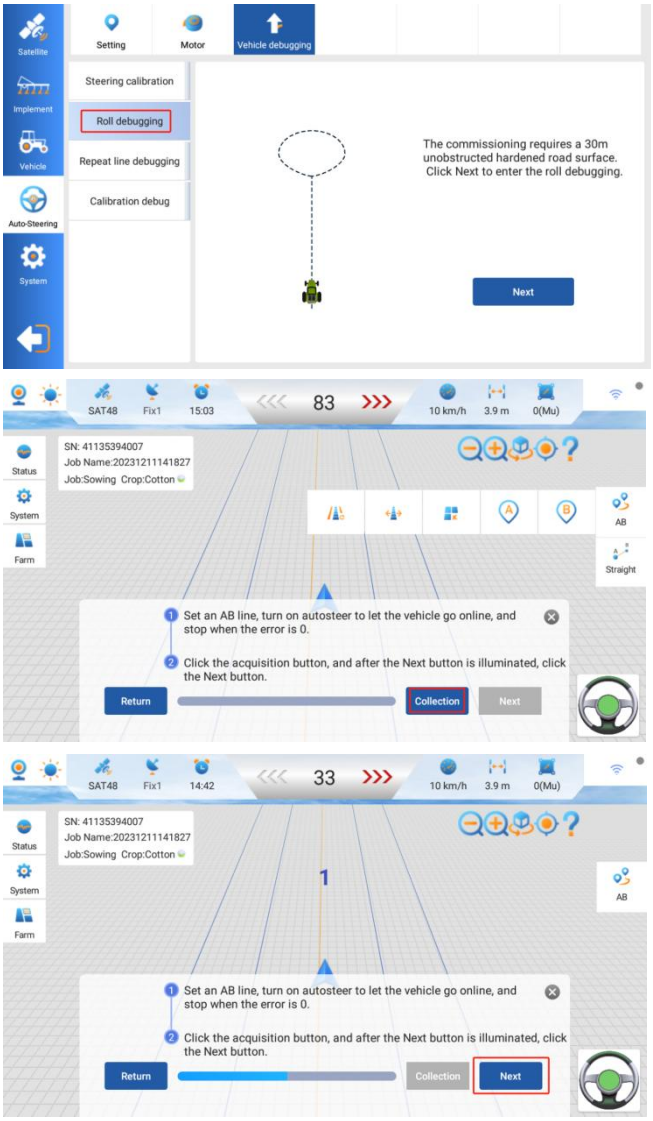
2.4.3.1. Steering calibration

First, return the tractor's steering wheel to the straight position,turn the steering wheel to the left to the maximum angle, click Left1, turn the steering wheel to the right to the maximum angle, click Right, turn the steering wheel to the left again to the maximum angle, click Left2， and click “Finish”.

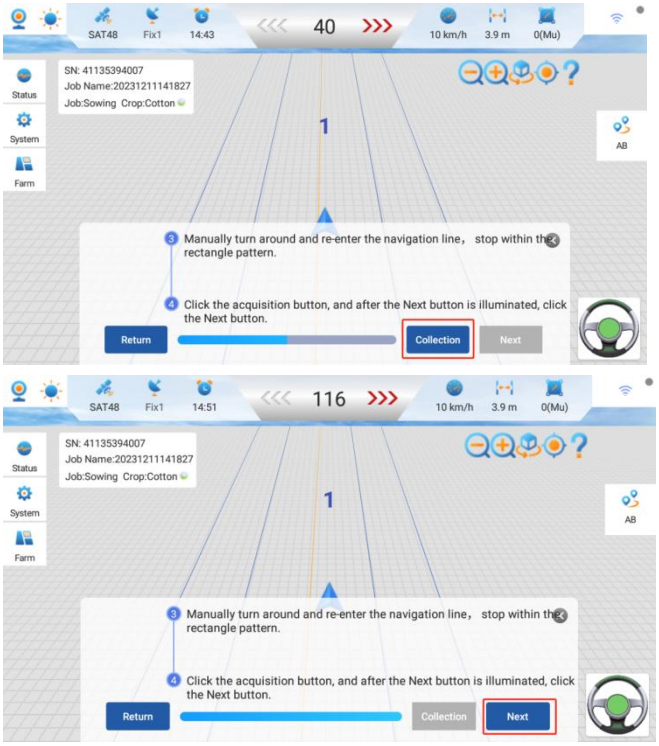


2.4.3.2. Roll debugging

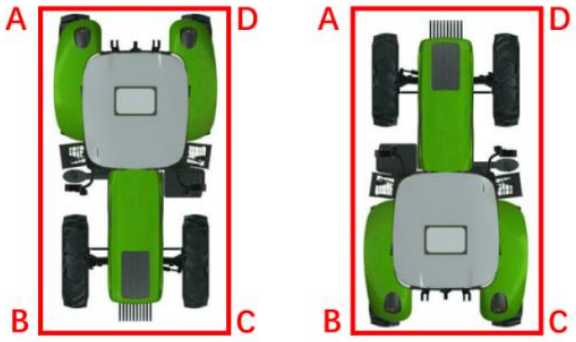
Roll debugging is mainly used to calibrate the up and down tilt errors caused by irregular receiver installation.The commissioning requires a 30m unobstructed hardened road surface.
1,Click Next to enter the roll debugging.
2,Set an AB line, turn on autosteer to let the vehicle go online, and stop when the error is 0.Click the acquisition button, and after the Next button is illuminated, click the Next button.

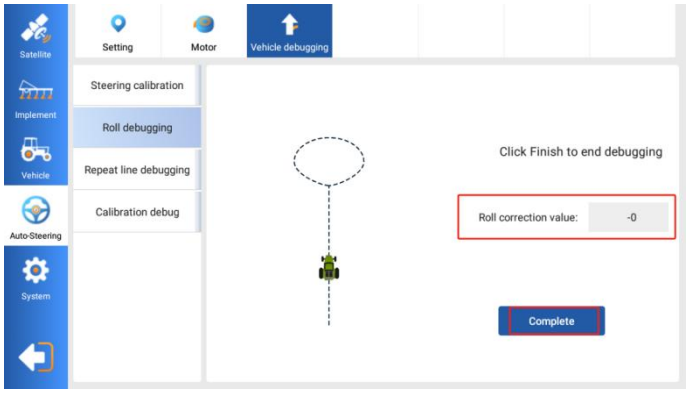


3,Manually turn around and re-enter the navigation line， stop within the rectangle pattern.Click the acquisition button, and after the Next button is illuminated, click the Next button.



4,The system will calculate the Roll correction value by itself, click Complete to end debugging.





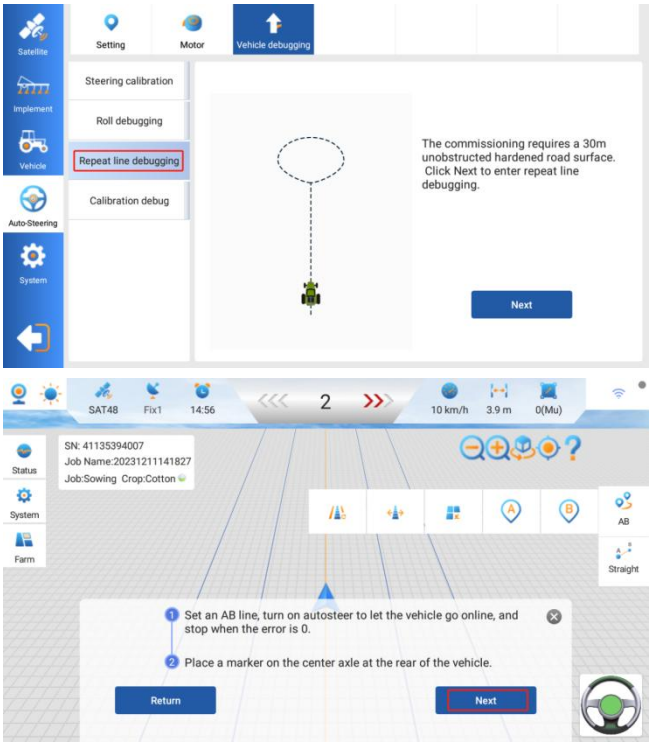
Note: It is best to debug twice in a row to ensure that the difference between the two results does not exceed 0.3, and the result range is between -1~1.

2.4.3.3. Repeat line debugging

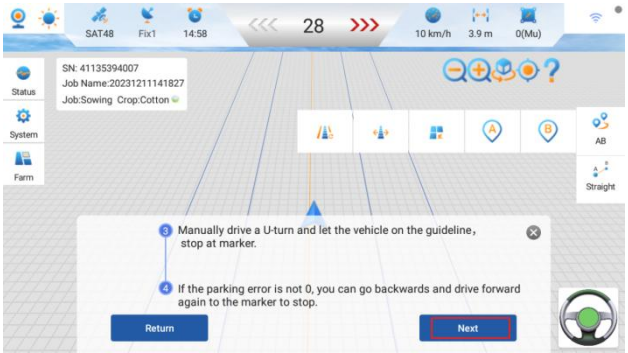
Repeat line debugging is mainly used to calibrate the left and right offset errors caused by irregular receiver installation.The commissioning requires a 30m unobstructed hardened road surface.

1,Click Next to enter repeat line debugging.

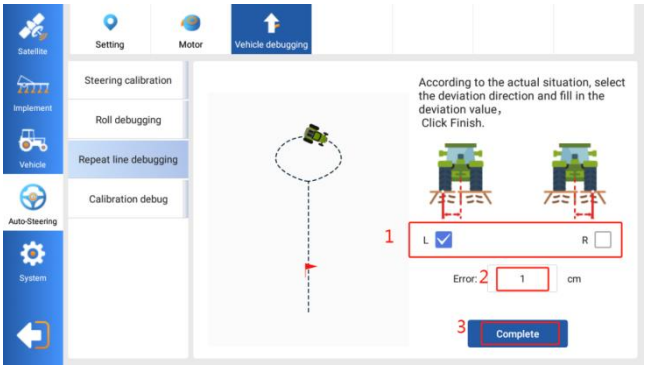
2,Set an AB line, turn on autosteer to let the vehicle go online, and stop when the error is 0.Place a marker on the center axle at the rear of the vehicle.

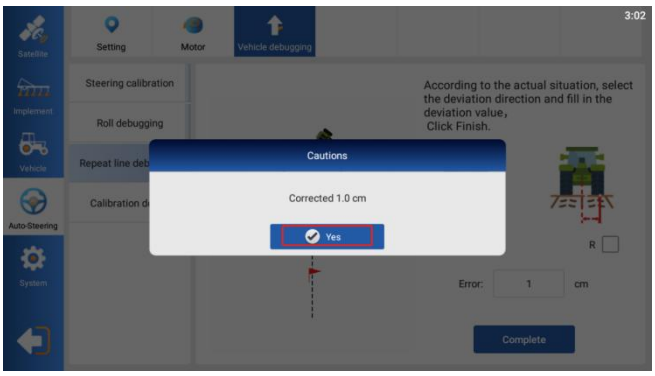


3,Manually drive a U-turn and let the vehicle on the guideline,stop at marker。If the parking error is not 0, you can go backwards and drive forward again to the marker to stop.



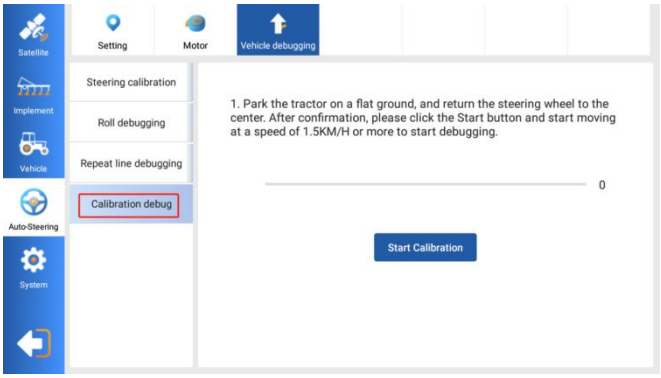
4,According to the actual situation, select the deviation direction and fill in the deviation value,click "Yes" to complete debugging.

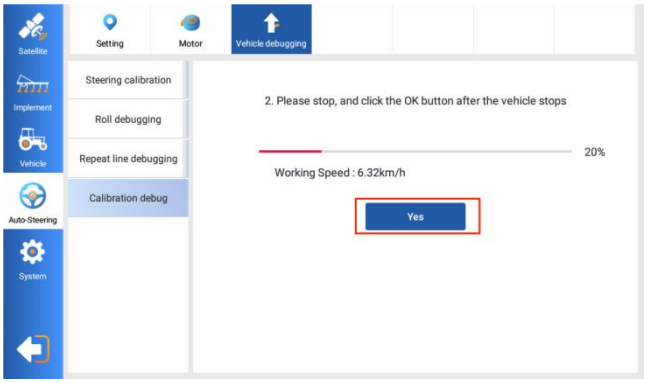




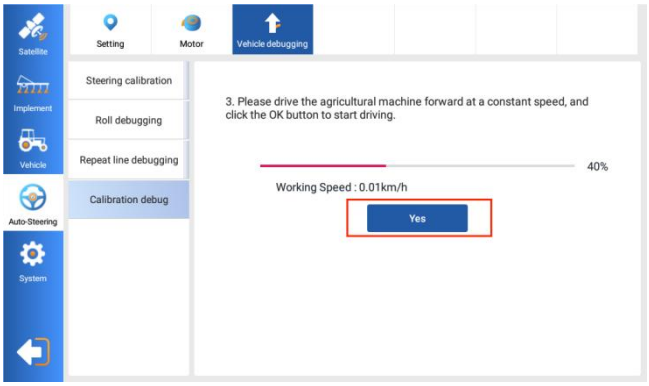
2.4.3.4. Calibration debug

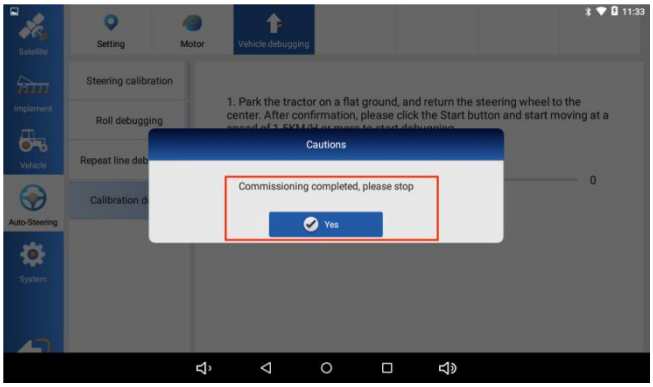
1,Park the tractor on a flat ground, and return the steering wheel to the center. After confirmation, please click the Start Calibration button and start moving at a speed of 2KM/H or more to start debugging.(Enough testing space must be reserved, the testing speed is 2-5Km/h, the recommended speed is 2Km/h).
2,Stop tractor, and click the Yes button after the vehicle stops.





3,Drive the tractor forward at a constant speed, and click the Yes button to start driving.
4,Commissioning completed, stop tractor.



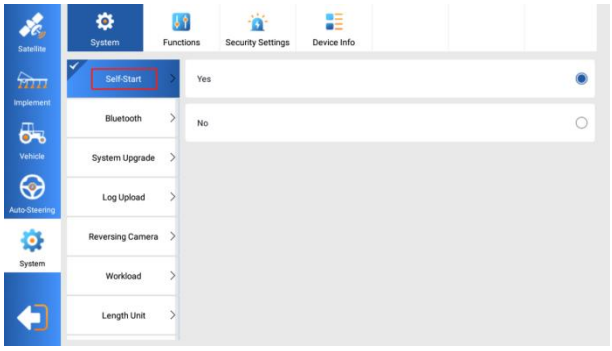


2.5. System

2.5.1. System

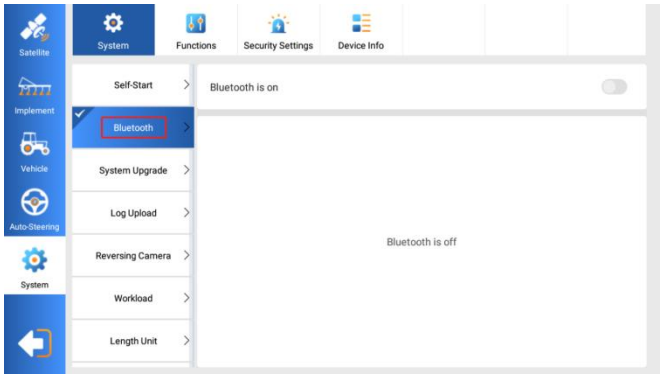
2.5.1.1. Self-Start

This interface allows you to choose whether to start the autonomous driving software automatically after powering on. The default is on.



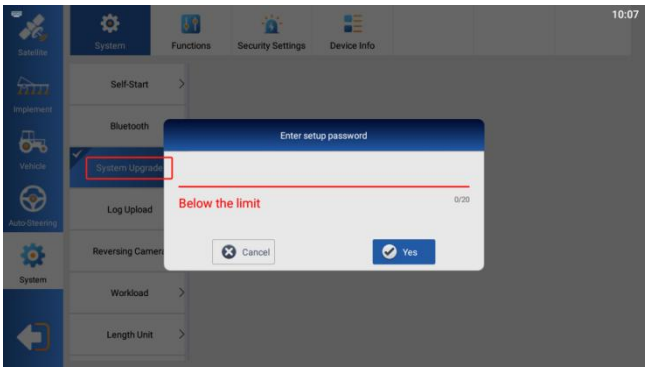
2.5.1.2. Bluetooth

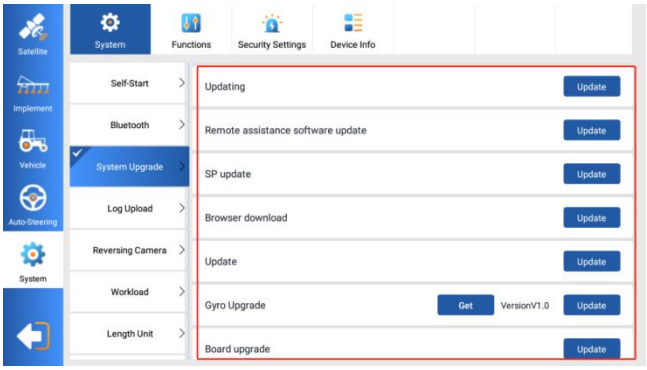
Bluetooth switch, just keep it off by default.



2.5.1.3. System Upgrade

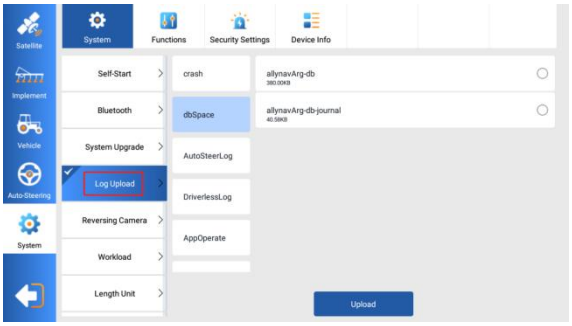
Click to enter the password to enter the upgrade interface. You can ask our company's sales or technical personnel for the password. The upgrade content includes Updating, Remote assistance software update, Gyro Upgrade, Board upgrade and other upgrade projects.
Note: When purchasing equipment, the software can be continuously upgraded for free, but before upgrading, be sure to ask the company's technical staff whether it can be upgraded to avoid unnecessary errors.





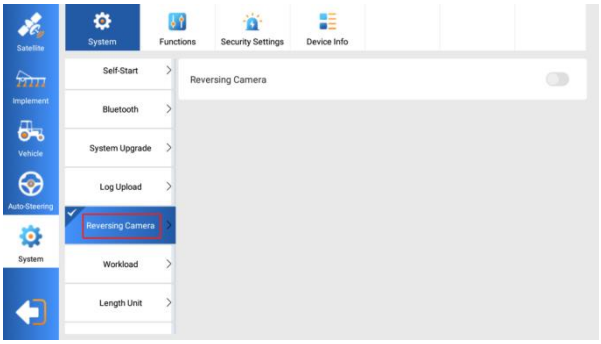
2.5.1.4. Log Upload

This function allows you to upload logs to check the status of the software when an abnormality occurs in the autonomous driving software. Please contact the company's technical personnel before use.



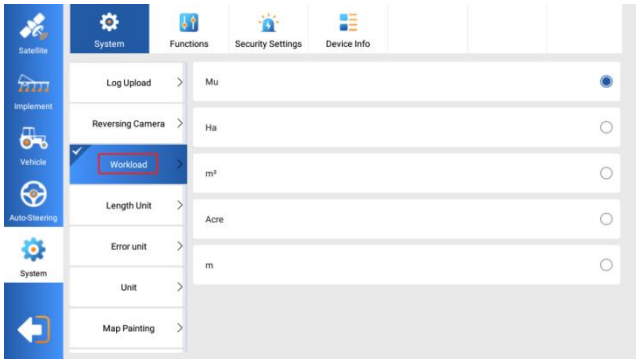
2.5.1.5. Reversing Camera

Turn on the reversing camera, automatically turn on the camera when reversing, and project it to the screen. It is turned off by default.



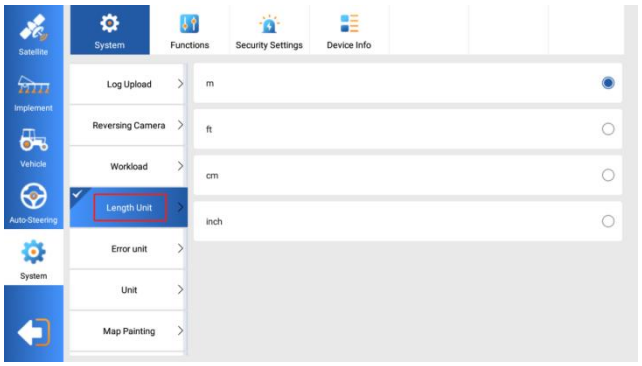
2.5.1.6. Workload

This interface allows you to set the working area unit. The current options are Mu, Ha, ㎡, Acre, and m. The default is Mu.



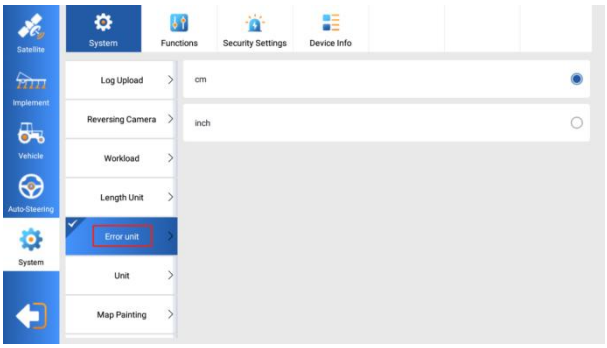
2.5.1.7. Length Unit

The length unit can be selected on this interface. The current options are m, ft, cm, and inch. The default is m.



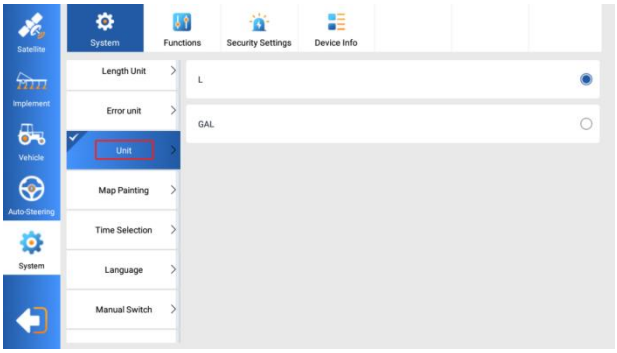
2.5.1.8. Error unit

This interface allows you to select the navigation error length unit. The current options are cm and inch. The default is cm.



2.5.1.9. Unit

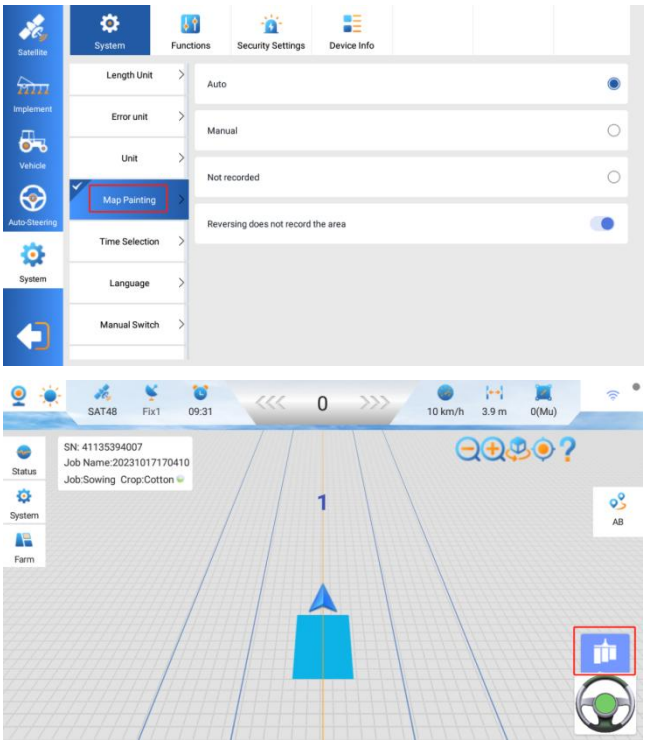
The volume unit can be selected on this interface. The current options are L and GAL. The default is L.



2.5.1.10. Map Painting

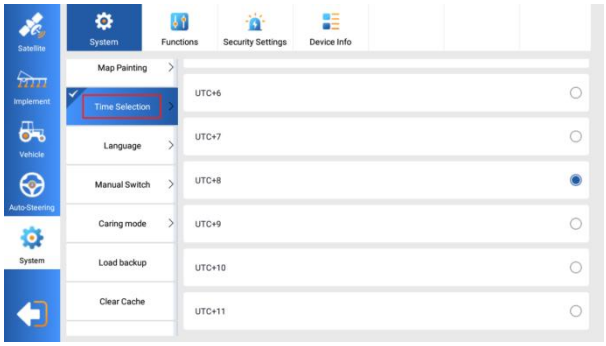
Here you can choose to record the working area manually or automatically. Select the automatic mode and click to start automatic driving. The system automatically records the operating area.

After selecting manual mode, you can manually click the job recording button on the main interface to turn on or off recording the job area.



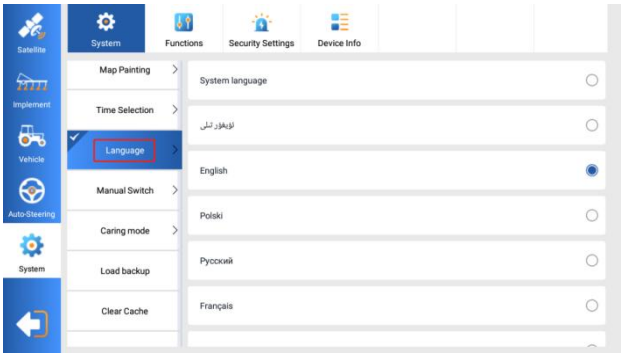
2.5.1.11. Time Selection

Select the time zone, the default is UTC+8. Customers can select the corresponding time zone based on their country location.



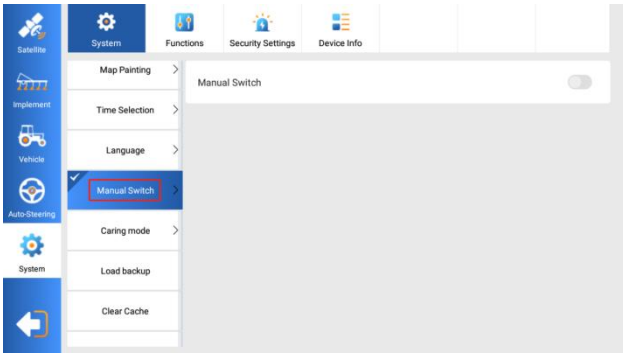
2.5.1.12. Language

Select the software language, the default is to follow the system language. Polish, Russian, French, Spanish and other languages are also available.
Note: If other languages are needed, the company can provide Chinese and English language packs for customers to choose, and then translate the required languages according to the language packs.



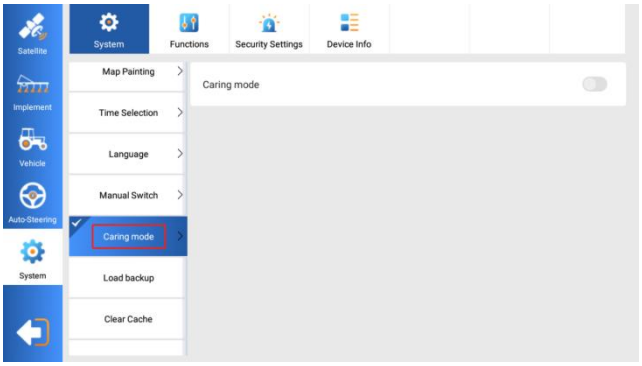
2.5.1.13. Manual Switch

This function turns automatic driving on or off through a manual switch. Click to turn on or off the manual switch function, which is off by default. If you need to use it, click to open it.



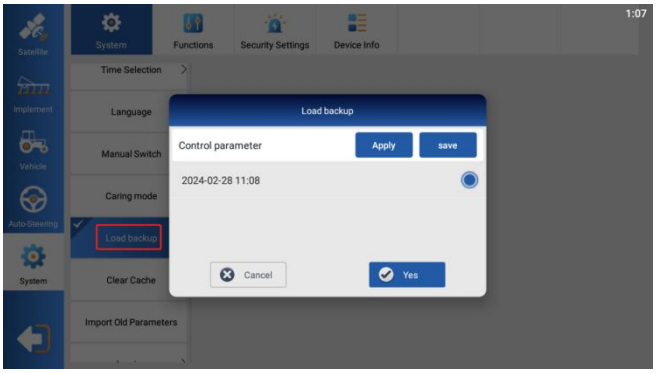
2.5.1.14. Caring mode

This function can enlarge the font of the main interface and display it more clearly. It is turned off by default.



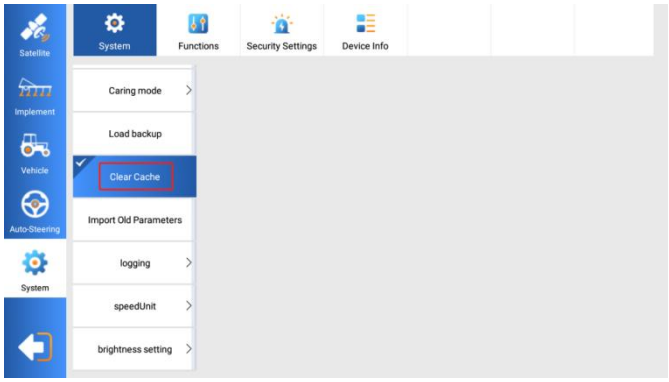
2.5.1.15. Load backup

Click "save" to save the Control parameter, click "Apply" to apply the Control parameter.



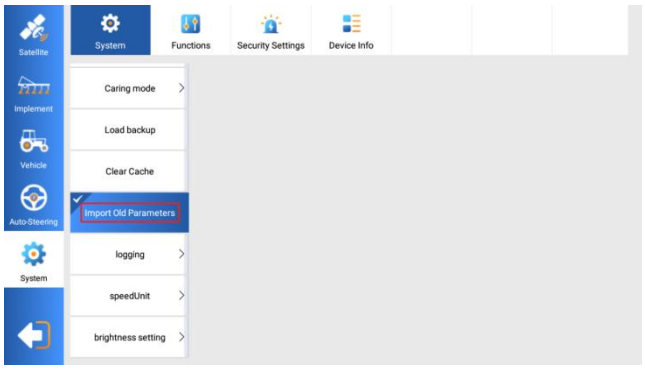
2.5.1.16. Clear Cache

Clear all local navigation lines and log data and use them with caution.



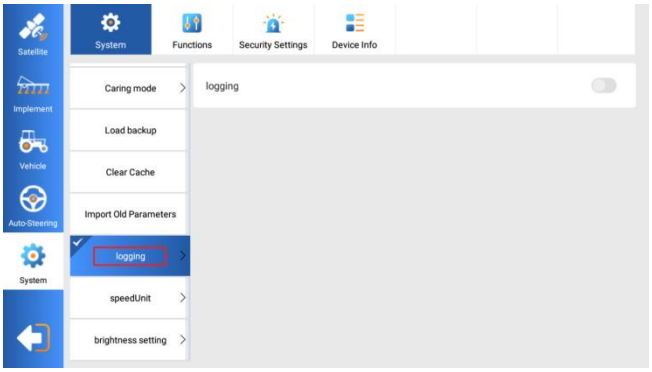
2.5.1.17. Import Old Parameters

Parameters for importing classic software.



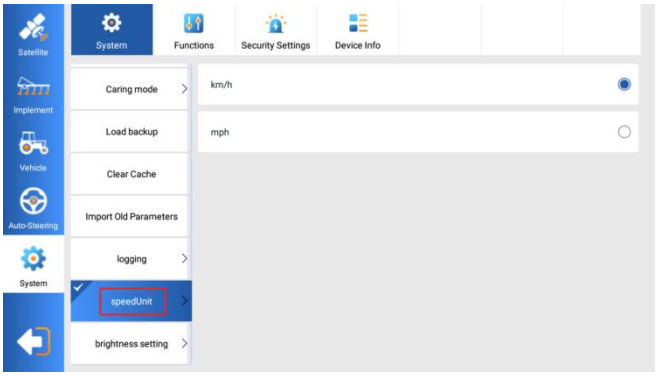
2.5.1.18. Logging

Generate daily log files.



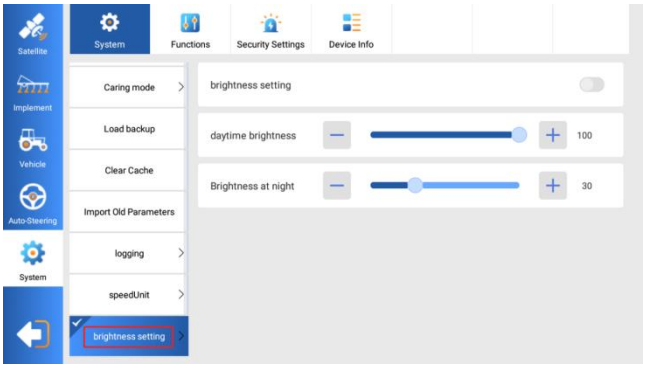
2.5.1.19. speedUnit

You can select the speed unit on this interface. The current options are km/h and mph. The default is km/h.



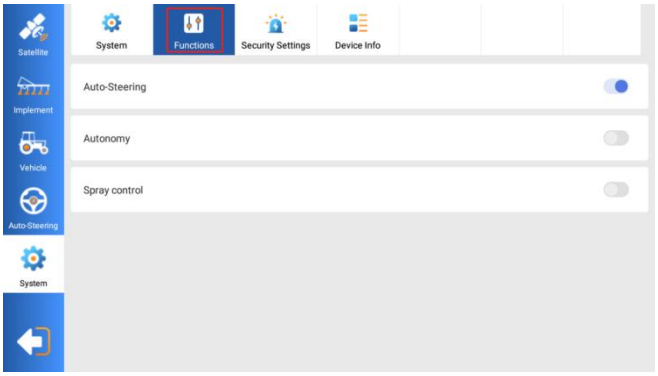
2.5.1.20. brightness setting

Brightness settings: Adjust the brightness of the tablet. Daytime brightness: The brightness display of the tablet in daytime mode. Night brightness: The brightness display of the tablet in night mode.



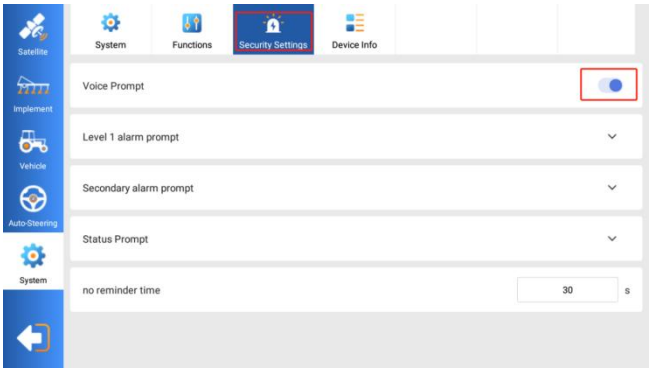
2.5.2. Functions

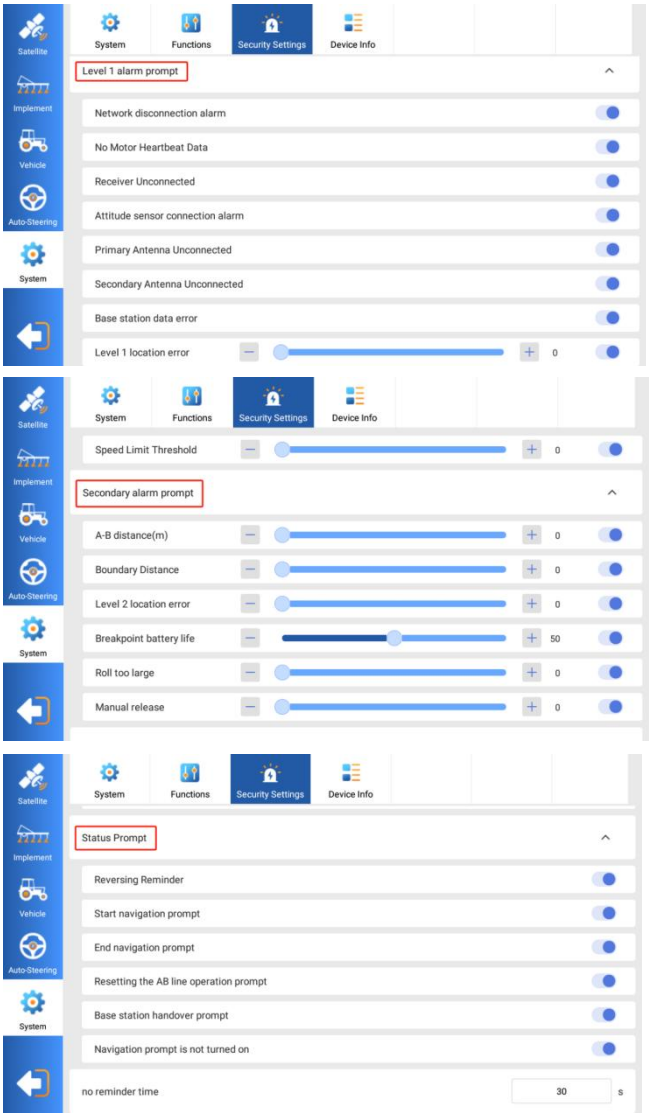
When using the automatic driving function, make sure the Auto-Steering switch is turned on.



2.5.3. Security Settings

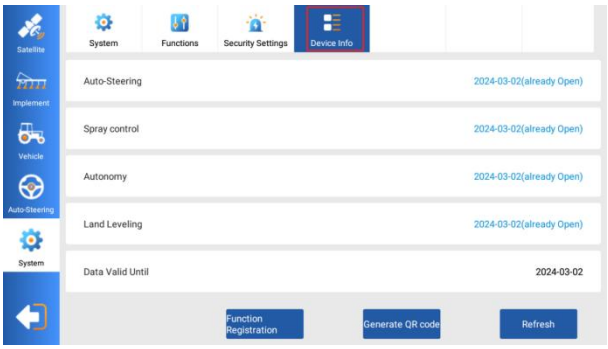
Buzzer sound on: prompts a red alarm and has a buzzer sound. You can choose to turn it off or on according to the desired function. Just turn it off by default.





2.5.4. Device Info

You can check whether Auto-Steering, Spray control, Autonomy, and Land Leveling are enabled.
Data Valid Until: This date shows the expiration time of the user's traffic fee.
Payment: You can make traffic payment.
Function registration: You can fill in the registration code to complete the software registration.
Generate QR code: Scan this QR code to view the navigation information.
Refresh: Refresh this interface.

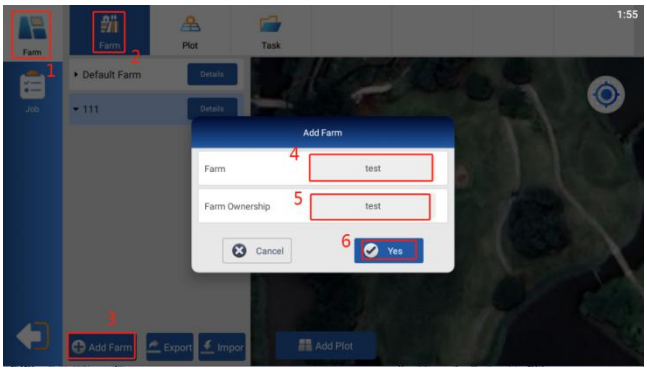


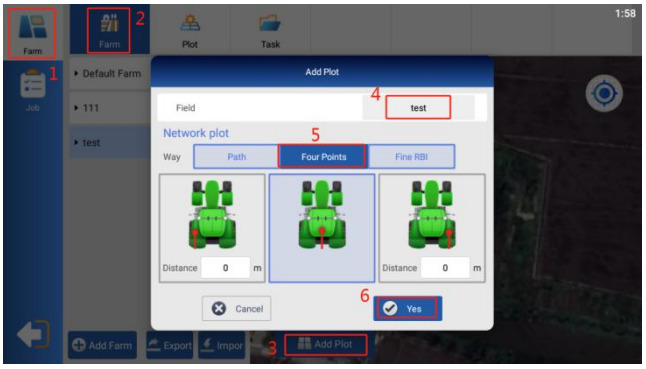
3. Farm

3.1. Set up farms and plots

Set up the farm

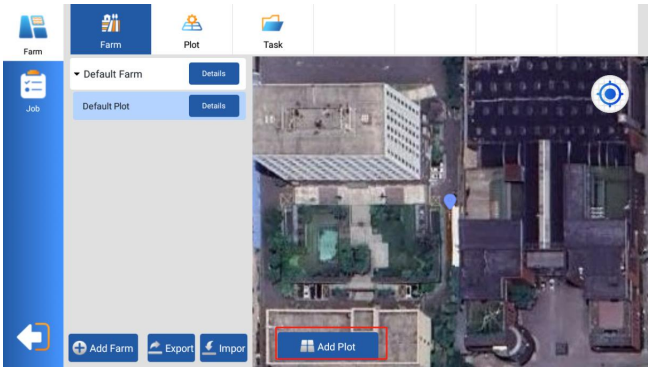
Farm、Farm Ownership

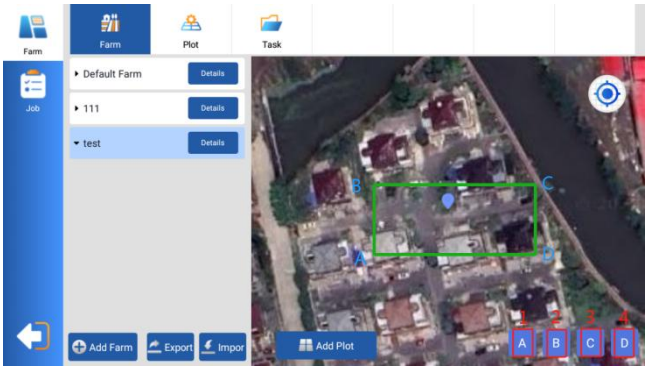




Set up plots（Four Points）

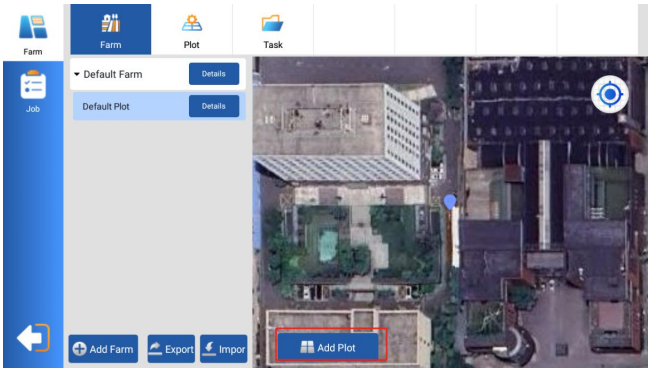
Select Add Plot，Select Four Points，Click A, B, C, D on the four boundary points of the plot in sequence to form a plot.

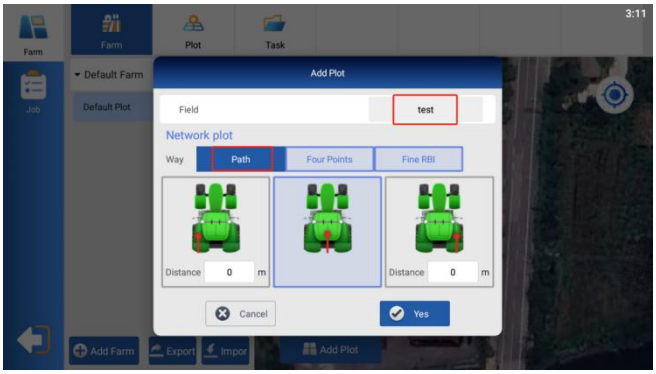




Set up plots（Path）

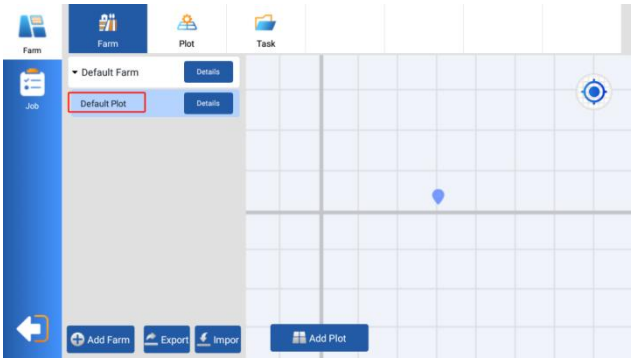
Select Add Plot, select Path, and drive the tractor around the plot. The path formed by the tractor will form the plot.

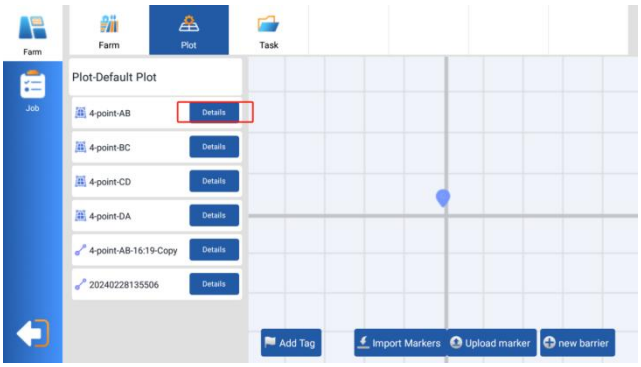


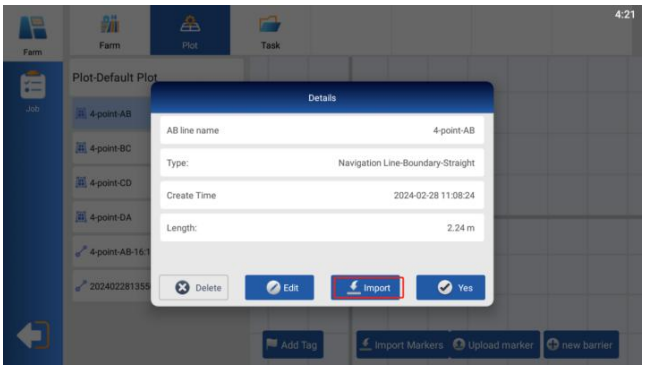


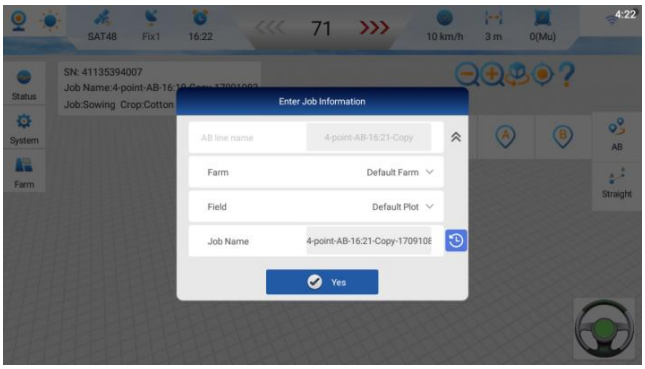
3.2. Set parcel boundaries as navigation lines

This feature requires setting parcel boundary lines using Four Points mode. Select the plot that has been set up, select the plot boundary, and click import to generate a navigation line.

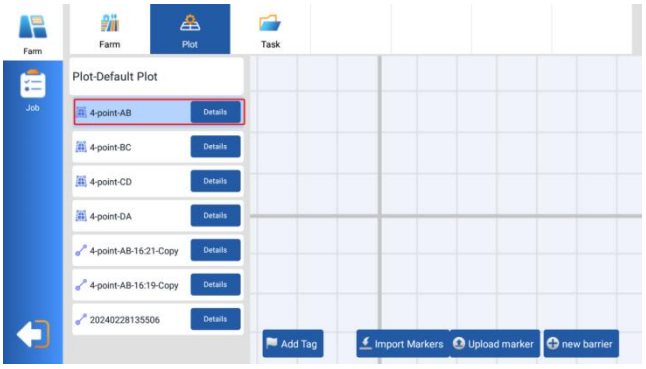


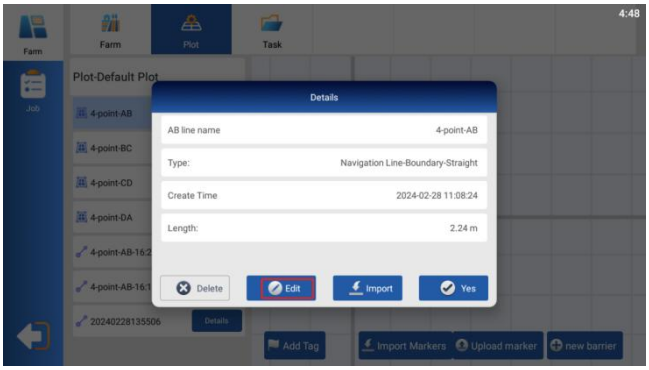


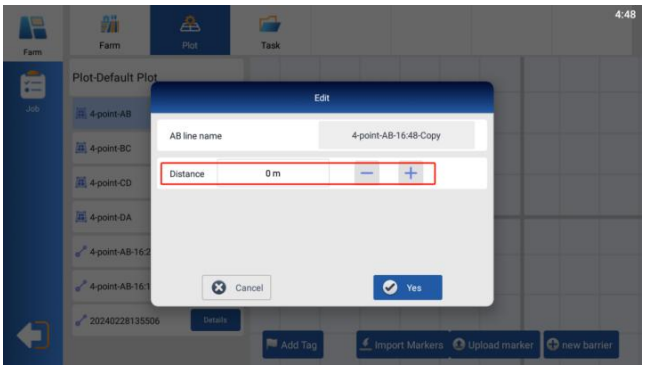




Click Edit to offset the boundary line.



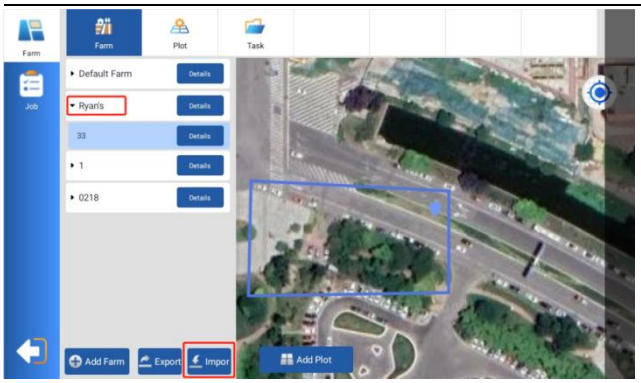


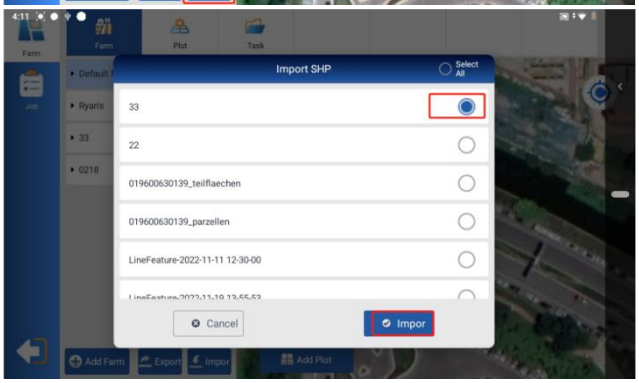


3.3. Import and export boundary lines

3.3.1. Import boundary lines

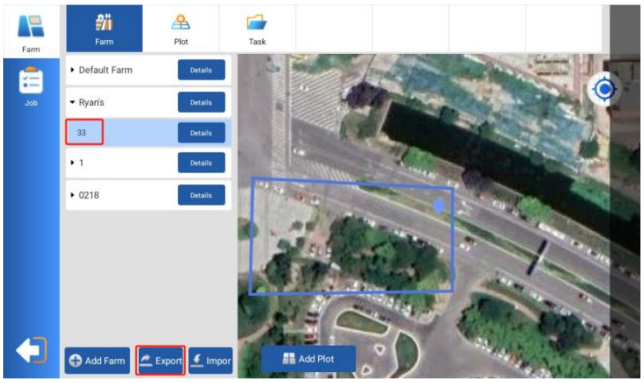
Select the farm where you want to import the plot, click Import, and the plot boundary lines can be imported.(Supports Trimble shp format)

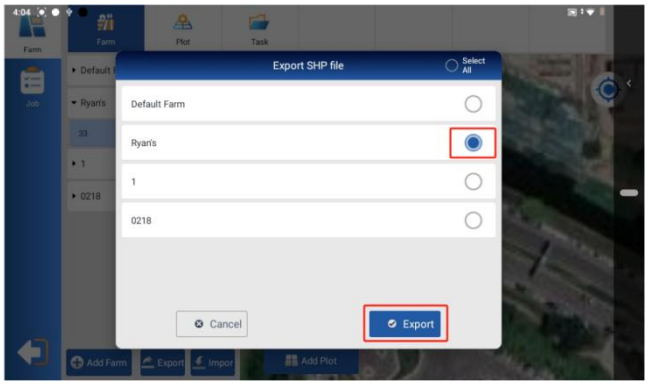




3.3.2. Export boundary lines

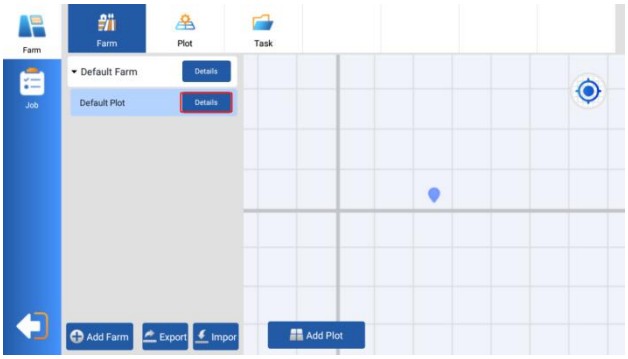
Select the plot to be exported, click Export, and the plot boundary lines can be exported to the USB flash drive.

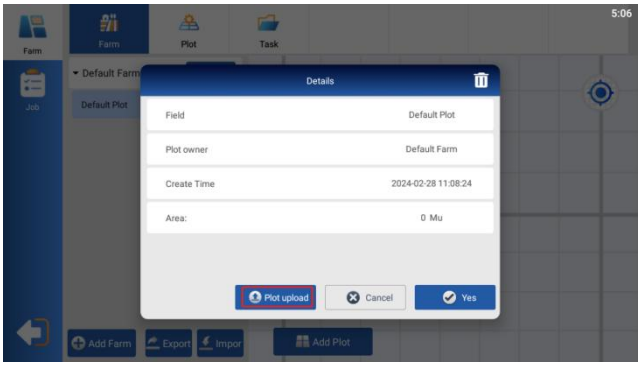




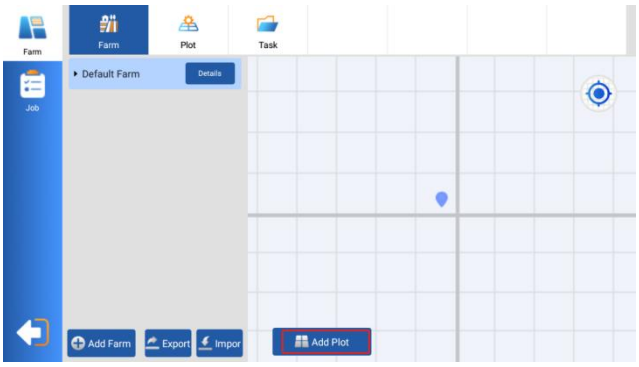
3.4. Cloud upload and cloud import plot boundary lines

Cloud upload plot boundary lines



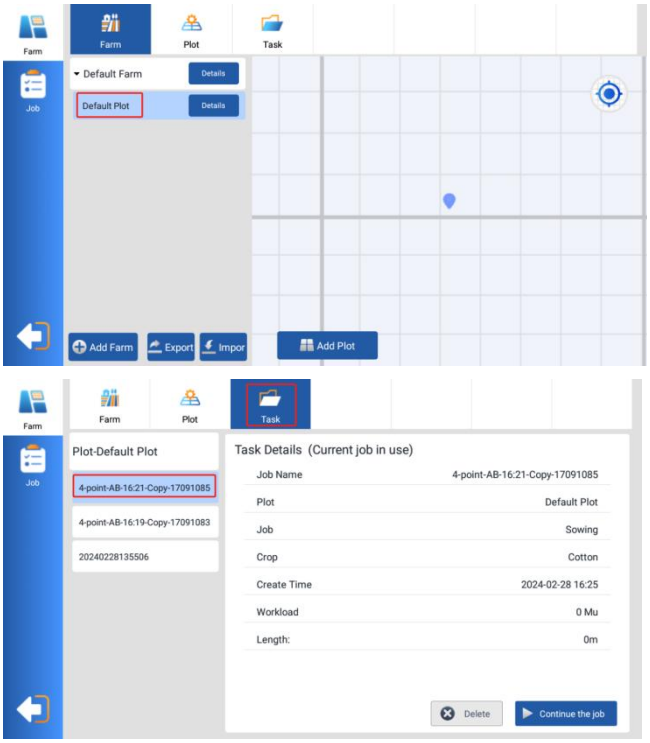


cloud import plot boundary lines(Only supports plots created and uploaded by the NST system)

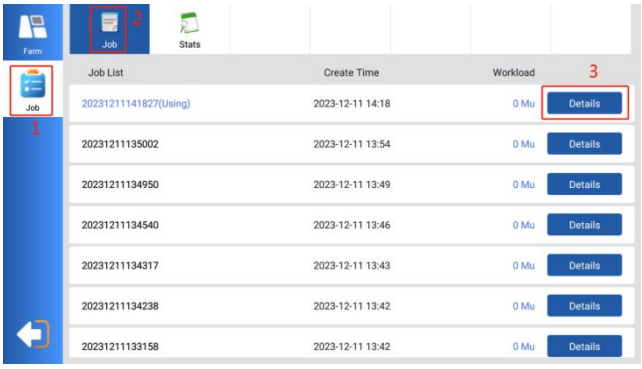


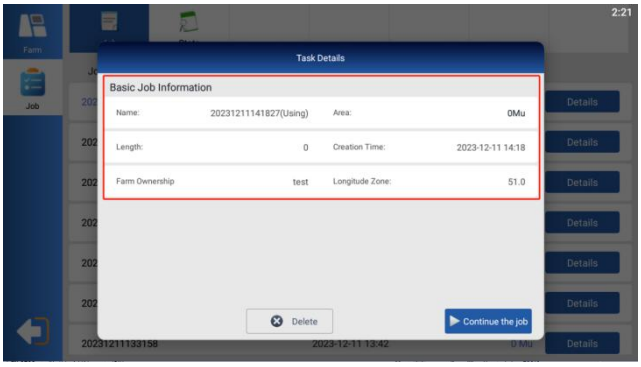
3.5. Work record

Select the plot of land you are working on and select Task to view the work records of the current navigation line.

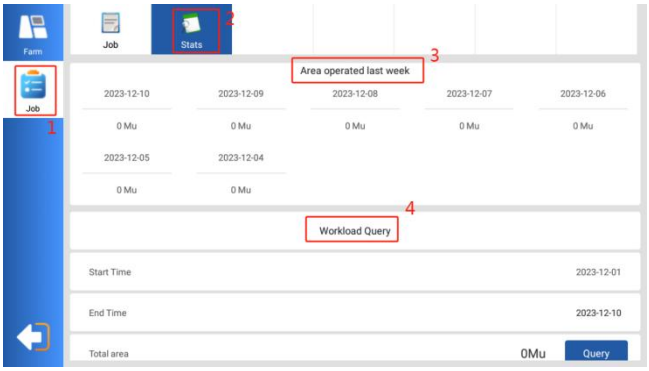


View current work records.





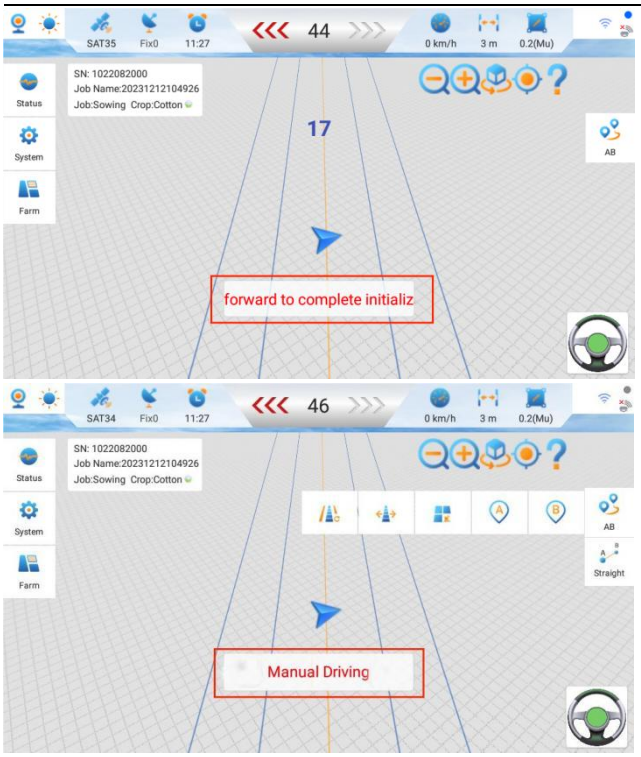
You can query the work records of the last week, or enter the query date to query the work records of a certain period of time.



4. Set navigation lines

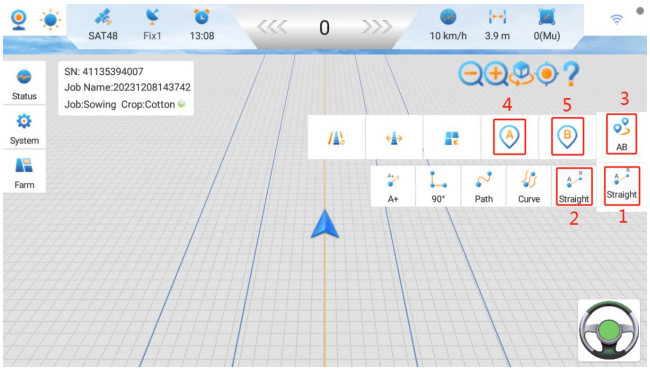
4.1. Initialization

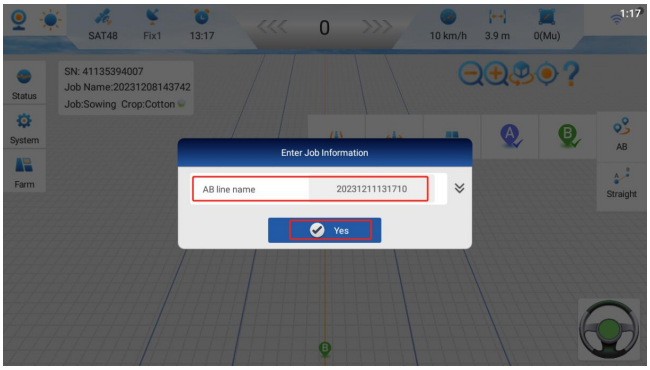
The tractor moves forward to complete the initialization, and the tractor speed must be greater than 3km/h.The main interface prompts manual driving to indicate that initialization is completed.(Note: After each power outage and restart, you need to manually drive forward to complete the initialization).



4.2. Straight

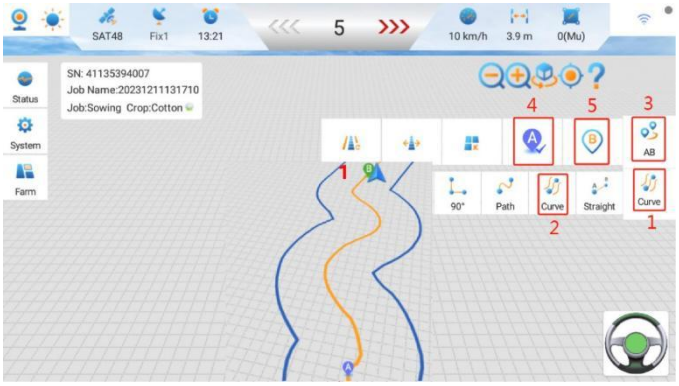
Click "Point A" at one end of the field, and manually drive the tractor to the other end of the field and click "Point B". The navigation name can be modified according to your own needs. If not modified, the default name is the time when point B was clicked (year, month, day, hour, minute, second).

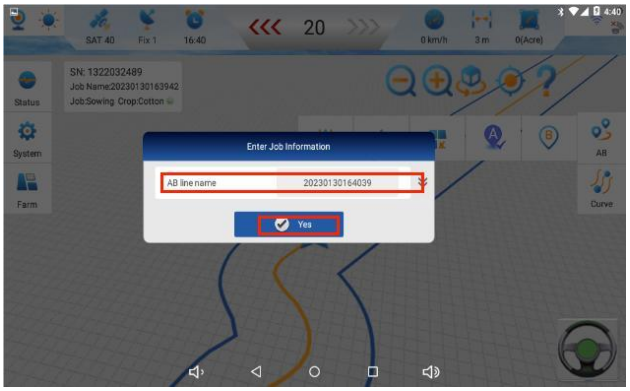




4.3. Curve

Click "Point A" at one end of the field, and manually drive the tractor to the other end of the field and click "Point B". The system automatically records the path traveled by the tractor.The navigation name can be modified according to your own needs. If not modified, the default name is the time when point B was clicked (year, month, day, hour, minute, second).

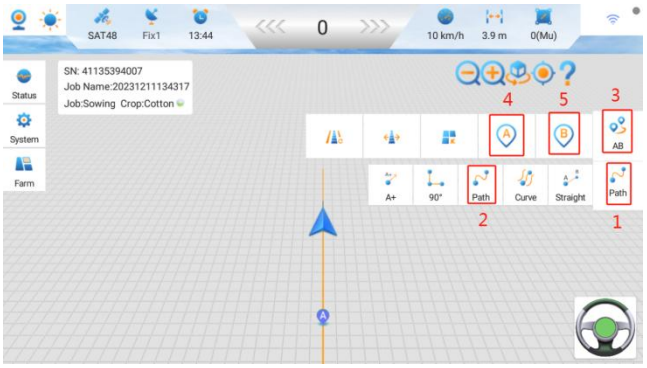


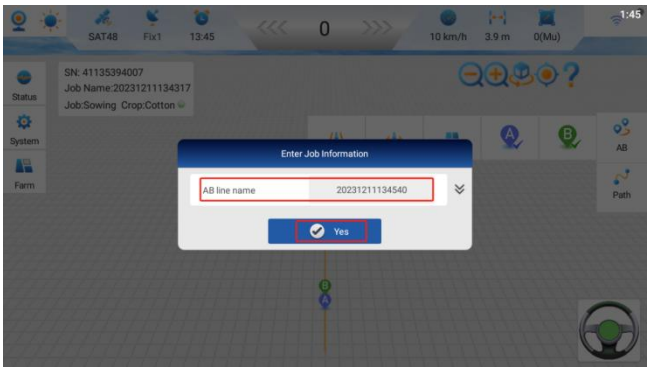


4.4. Path

Click "Point A" at one end of the field, and manually drive the tractor to the other end

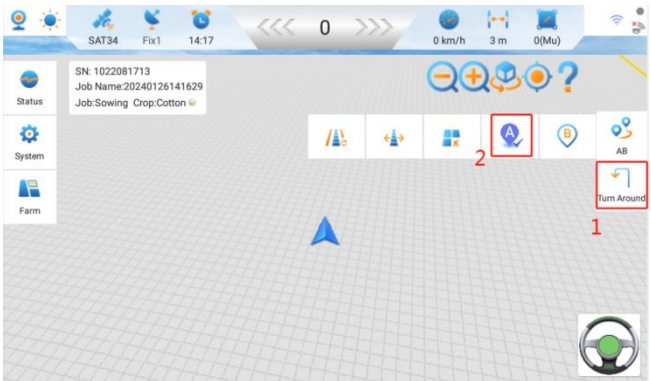
of the field and click "Point B". The system automatically records the path traveled by the tractor.This function forms a single line.The navigation name can be modified according to your own needs. If not modified, the default name is the time when point B was clicked (year, month, day, hour, minute, second).

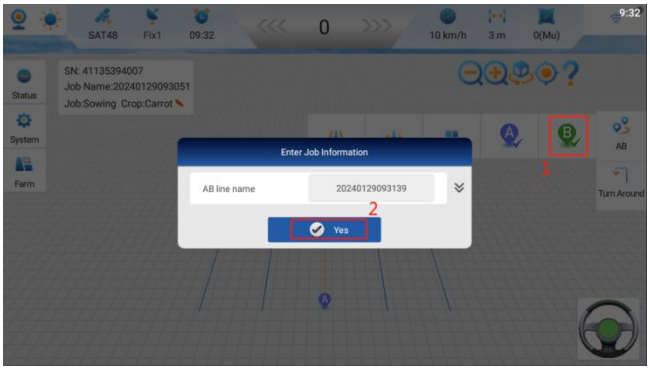




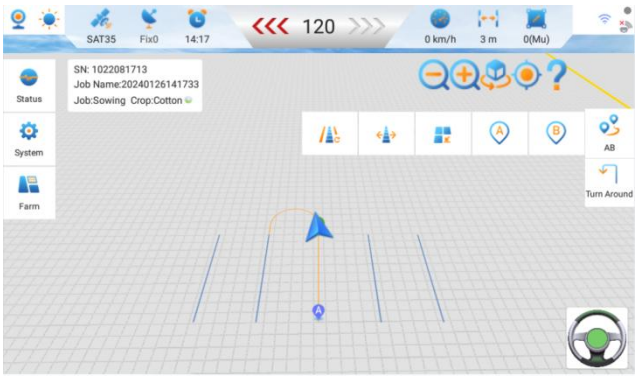
4.5. Turn Around

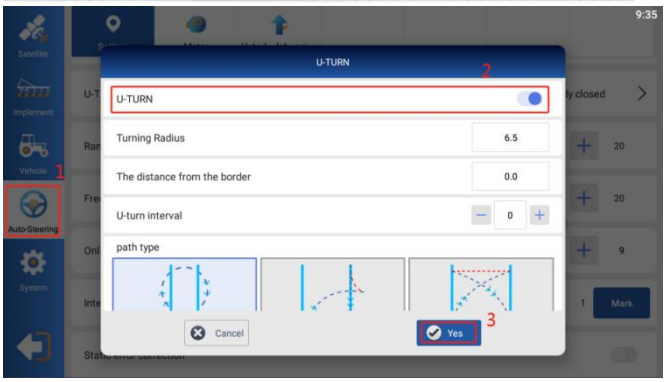
First select the Turn Around line type,click "Point A" at one end of the field, and manually drive the tractor to the other end of the field and click "Point B". The navigation name can be modified according to your own needs. If not modified, the default name is the time when point B was clicked (year, month, day, hour, minute, second).

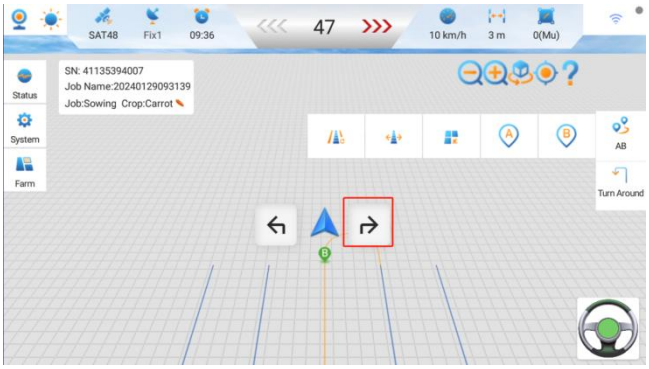




The system will automatically form turning lines.If you need to control the turning direction, you can turn on the U-Turn switch and click the left and right arrows to select the turning direction.

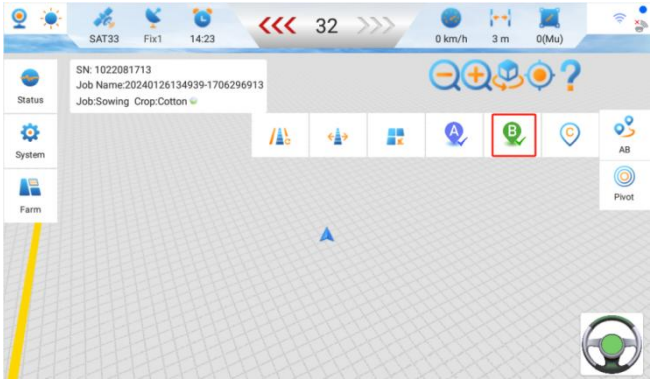


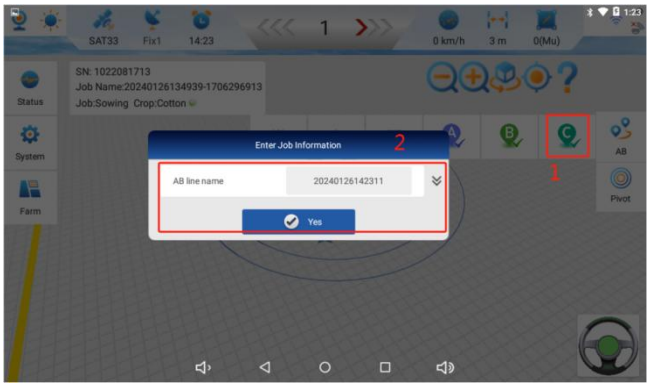




4.6. Pivot

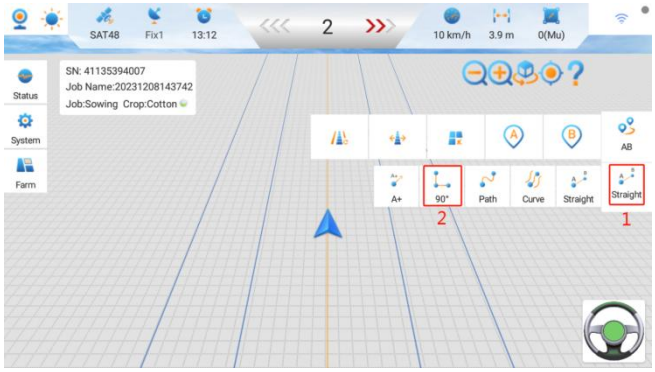
The Pivot line type needs to set three equidistant points A, B, and C, and the distance between the three points must not be less than 10m. First select the Pivot line type and set point A、B and C,the navigation name can be modified according to your own needs. If not modified, the default name is the time when point C was clicked (year, month, day, hour, minute, second).





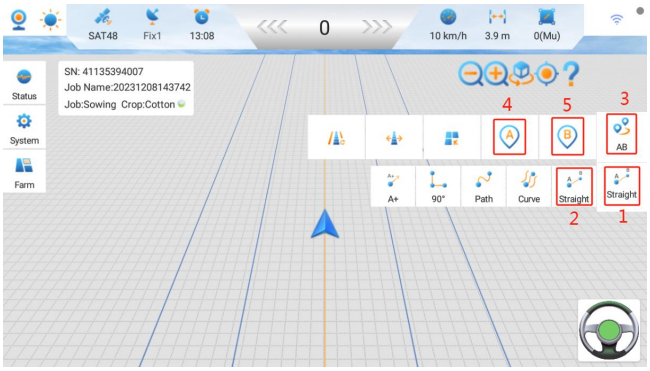
4.7. 90°

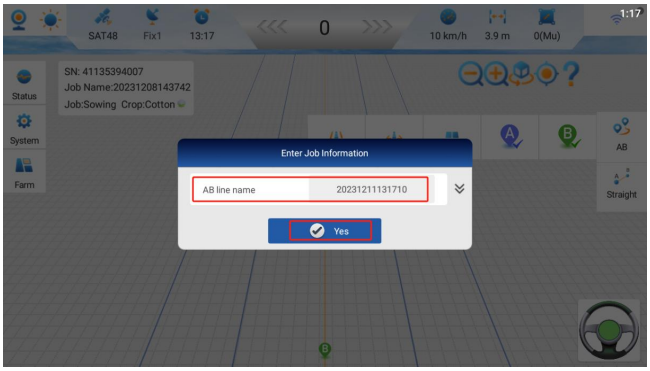
If you select 90° on the basis of a straight line, the system will rotate the original route 90° according to the direction of the vehicle for route planning.

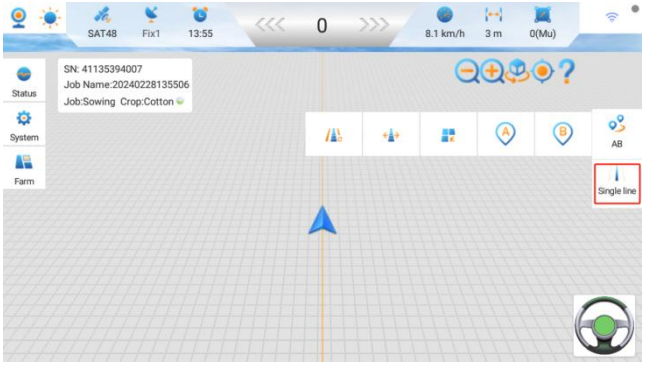


4.8. Single line

Click "Point A" at one end of the field, and manually drive the tractor to the other end of the field and click "Point B". The navigation name can be modified according to your own needs. If not modified, the default name is the time when point B was clicked (year, month, day, hour, minute, second).Click on the single line and only one navigation line will be displayed on the screen.

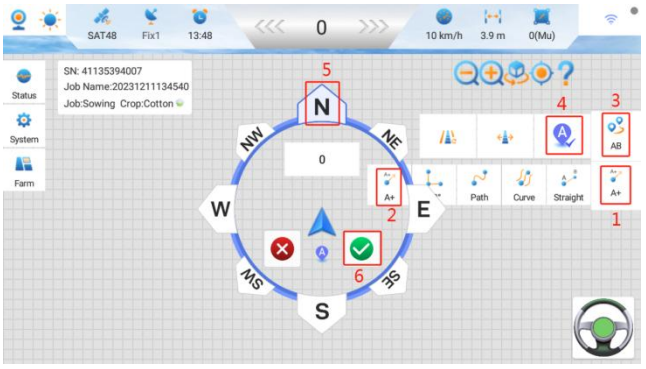


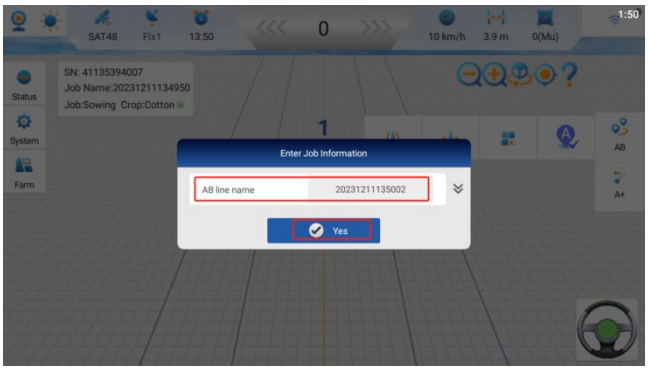




4.9. A+

Set point A at the edge of the field, select the direction of the navigation line, and click Confirm to form the navigation line.The navigation name can be modified according to your own needs. If not modified, the default name is the time when point B was clicked (year, month, day, hour, minute, second).

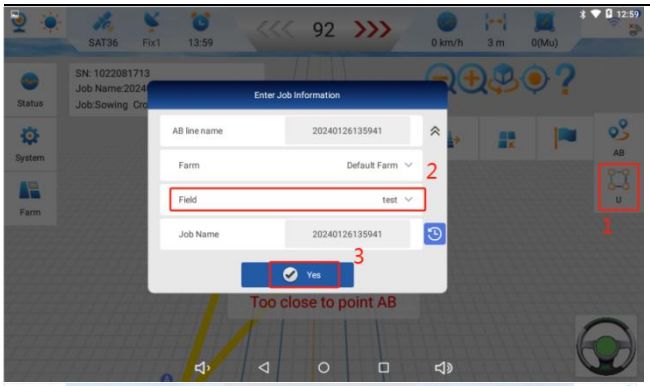


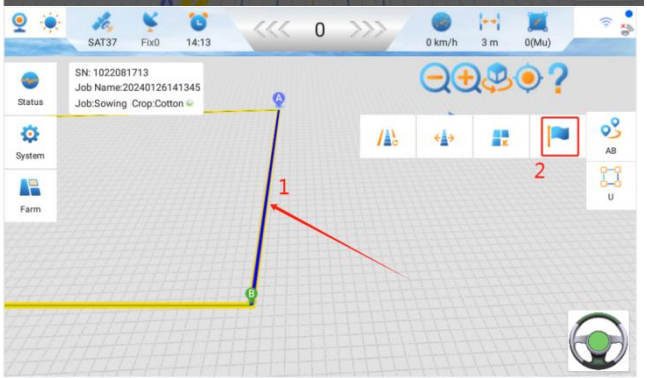


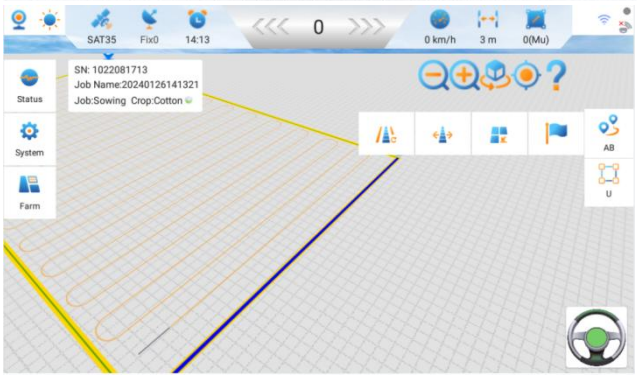
4.10. U

This function requires setting up the plot in advance. First select the U-line shape, then select the planned plot and click Yes.

First, select the edge of the ground where the path starts. The color of the edge turns blue to indicate that the selection is complete, and then click the Generate Path button.



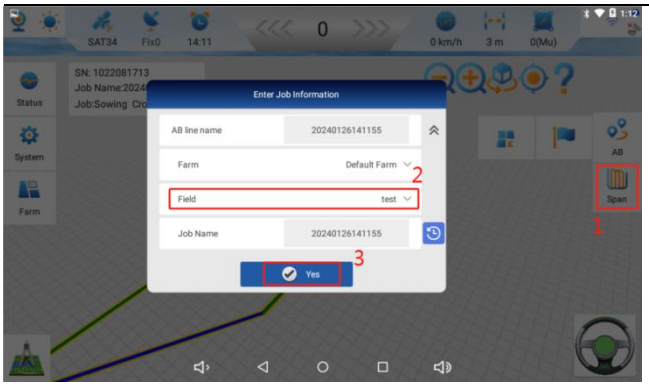


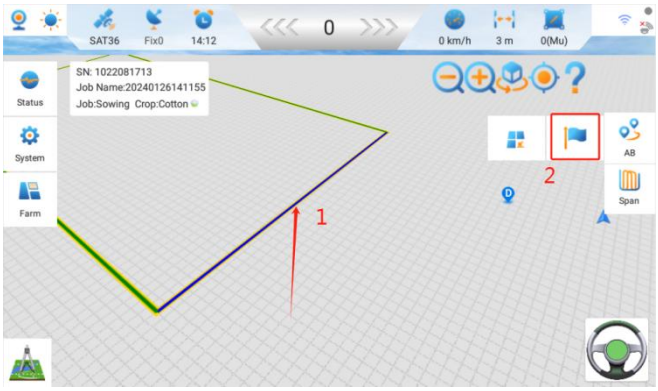


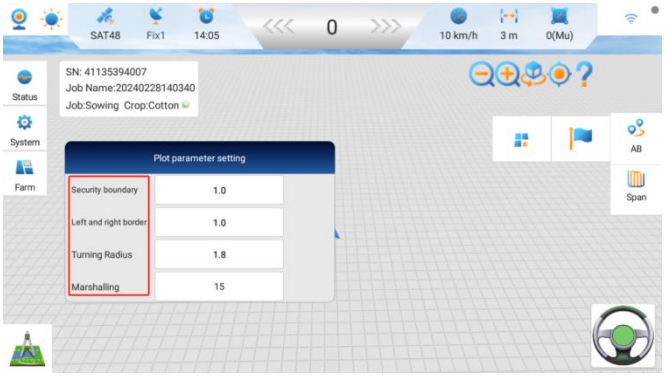
4.11. Span

This function requires setting up the plot in advance. First select the Span line type, then select the planned plot and click Yes.

First, select the edge of the ground where the path starts. The color of the edge turns blue to indicate that the selection is complete, and then click the Generate Path button.Click the button in the lower left corner to setSecurity boundary、Left and right border、Turning Radius、Marshalling





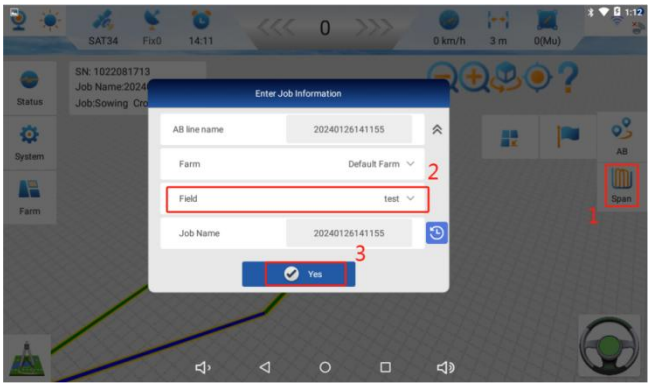


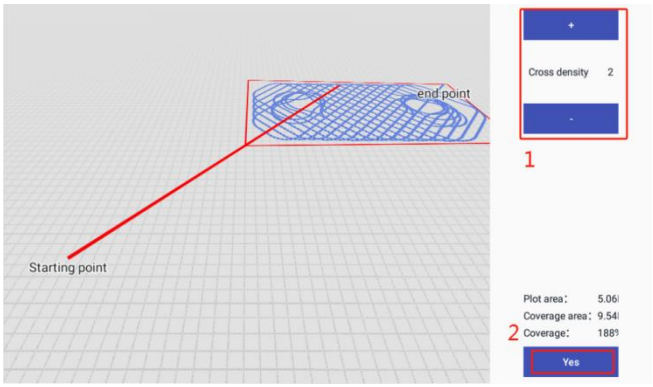
4.12. Harrow

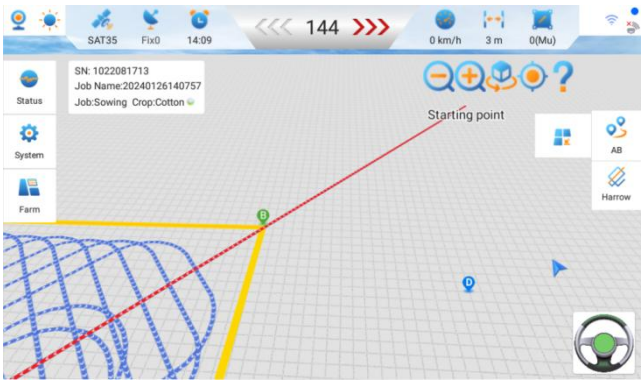
This function requires setting up the plot in advance. First select the Harrow line type, then select the

planned plot and click Yes.

Click "+" or "-" to adjust Cross density, then click Yes.





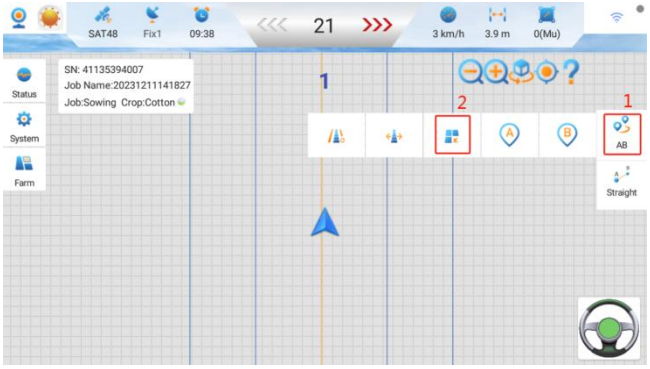


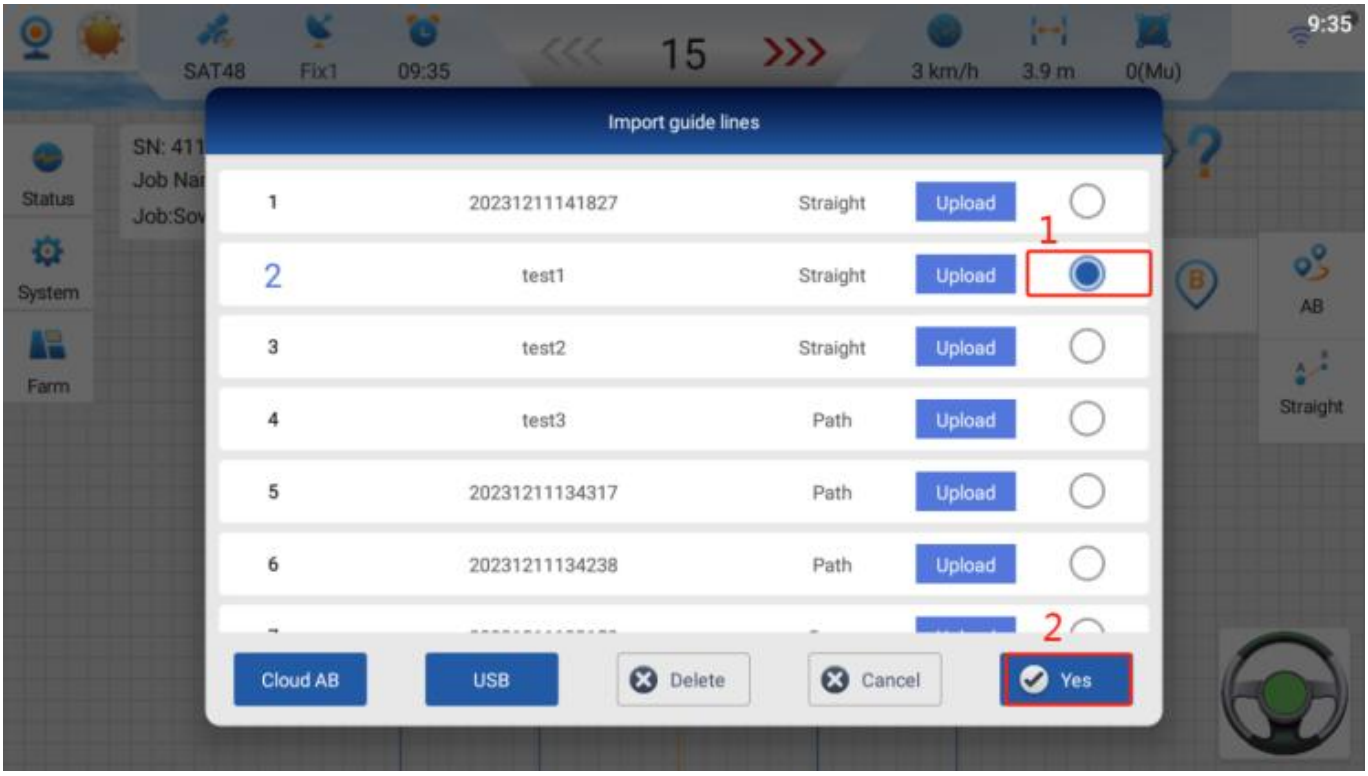
5. Common Functions

5.1. Import AB line

5.1.1. NST navigation line

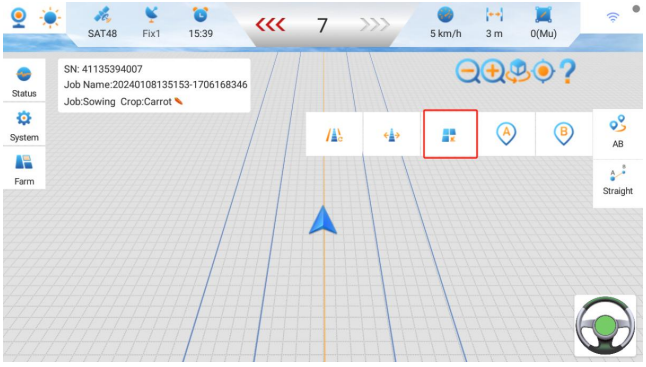
When working on the same land parcel, the AB lines set in previous operations can be imported.According to the plot name, select the corresponding plot and click Yes.

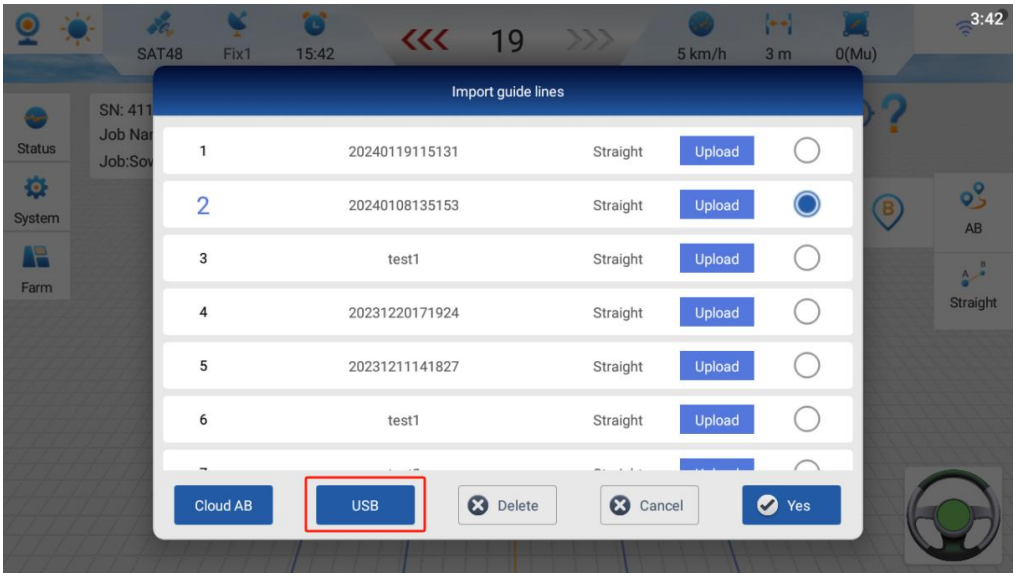




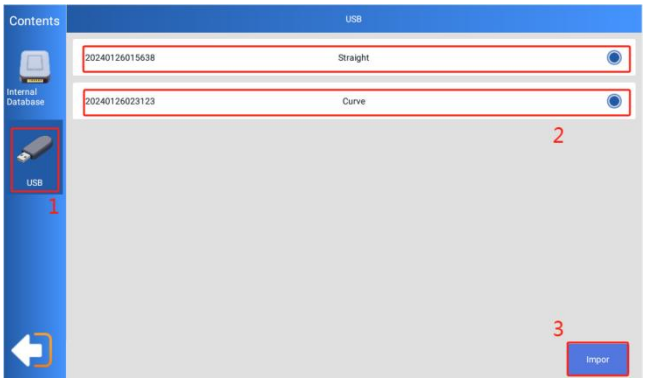
5.1.2. Other brand navigation lines

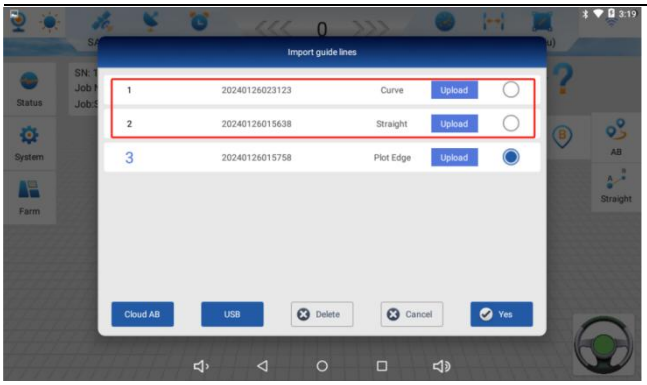
Click the Import AB line icon(Currently, the navigation line formats that can be imported include shp, dats, kml and Topcon’s ini format).Click on the USB icon.





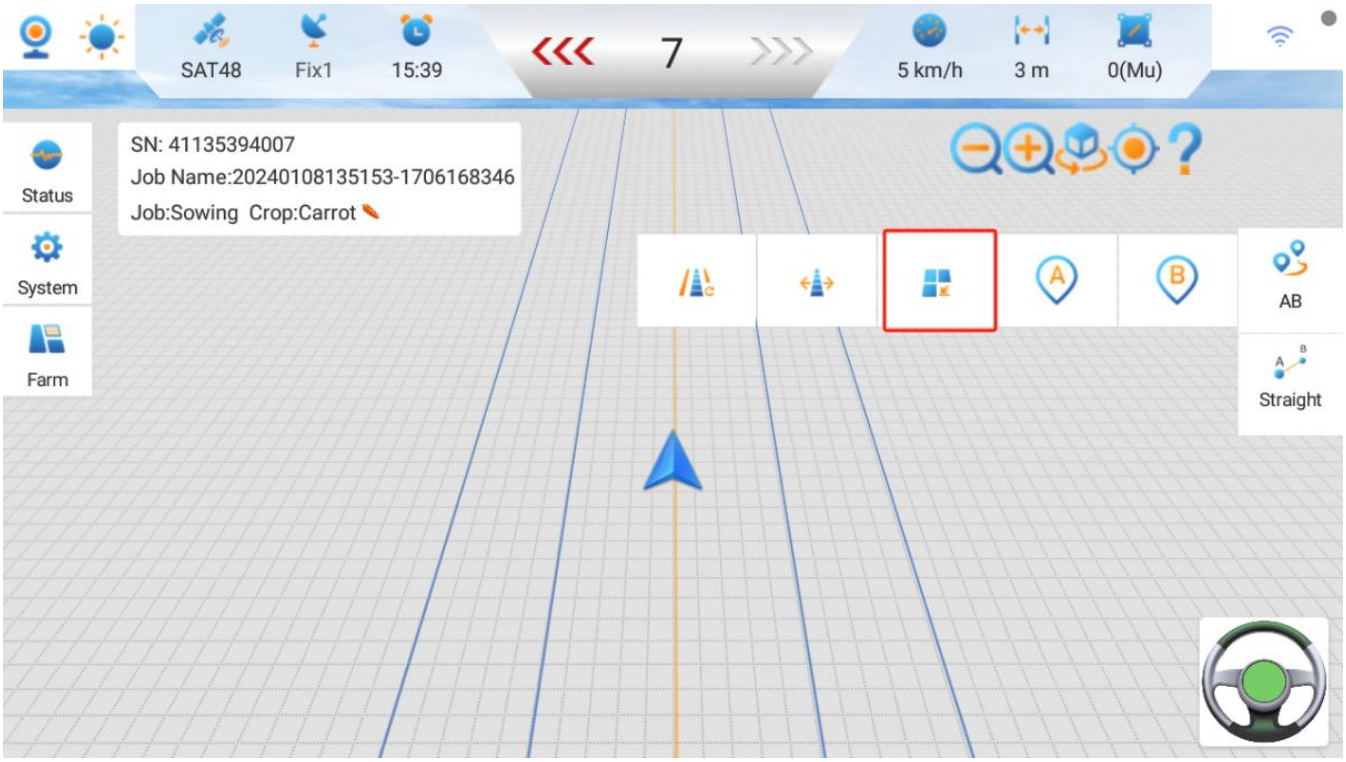
Select USB, select the navigation line to be imported, and click yes.After the import is successful, you can view it on the import guide lines interface.

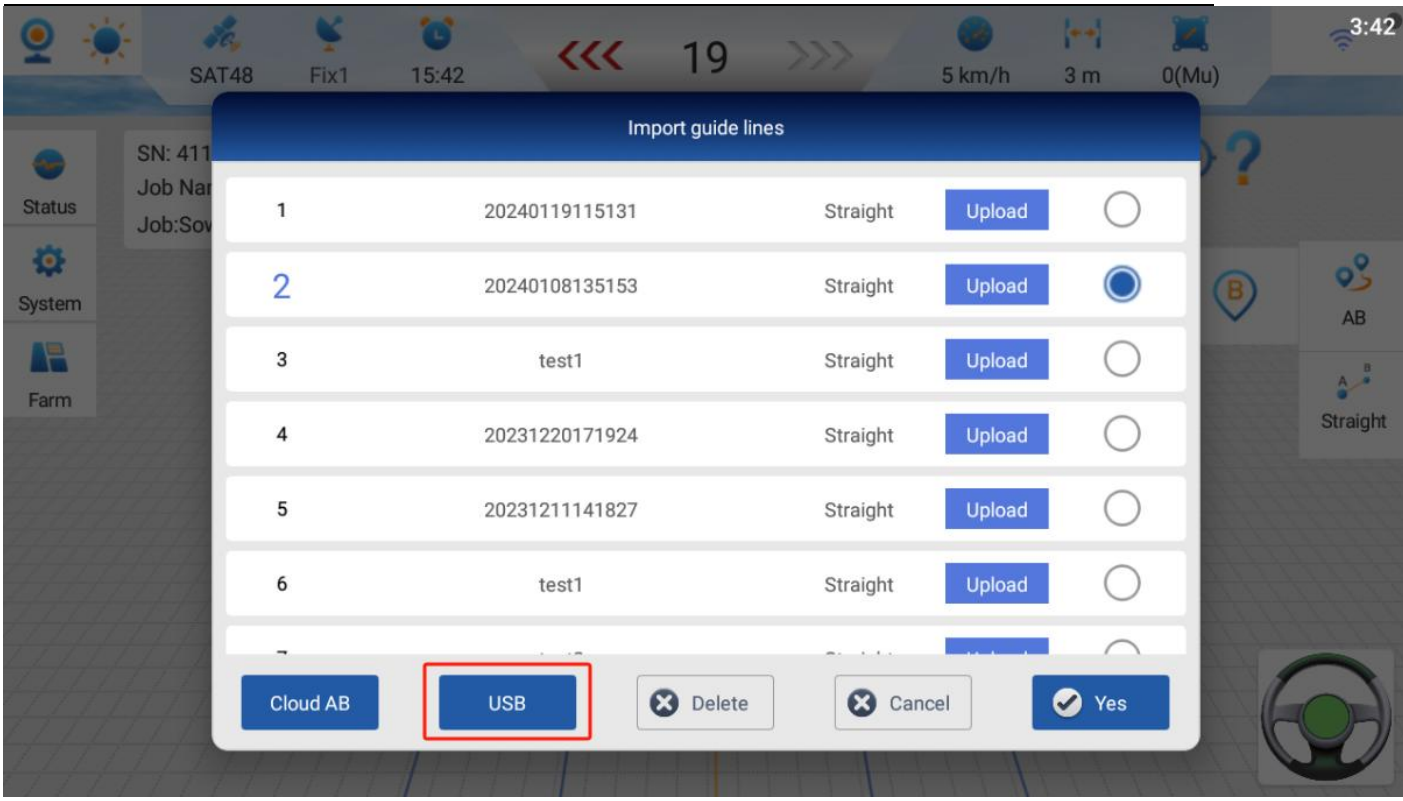




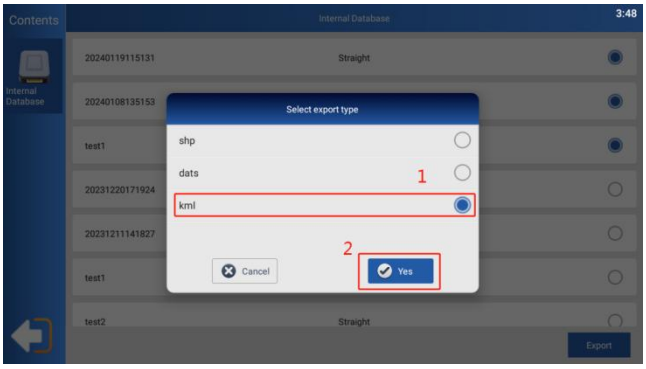
5.2. Export AB line

Click the Import AB line icon(Currently, the navigation line formats that can be exported include shp, dats, and kml).Click on the USB icon.





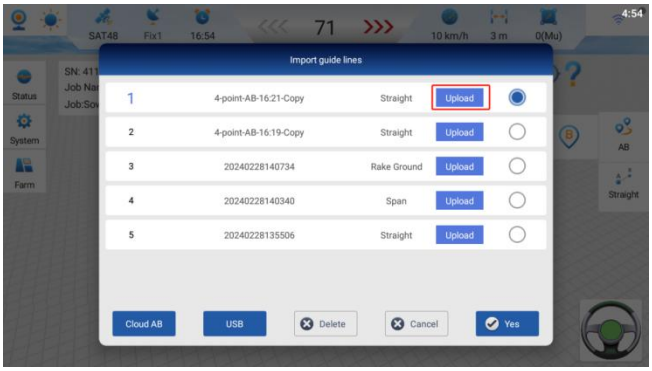
Select the AB line you want to export, and then click Export.Select the navigation line format and click yes to import the navigation line into the main directory of the USB flash drive.



5.3. Cloud upload and cloud import navigation lines

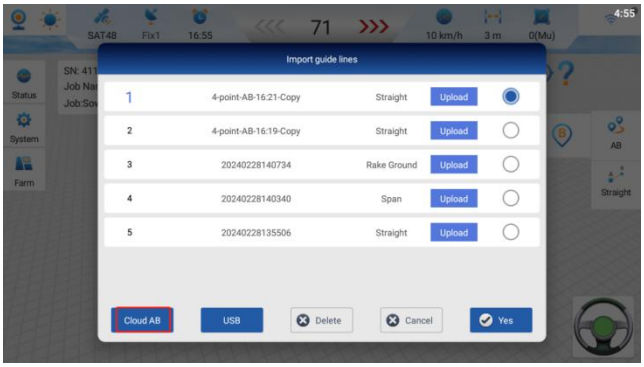
Cloud upload navigation line

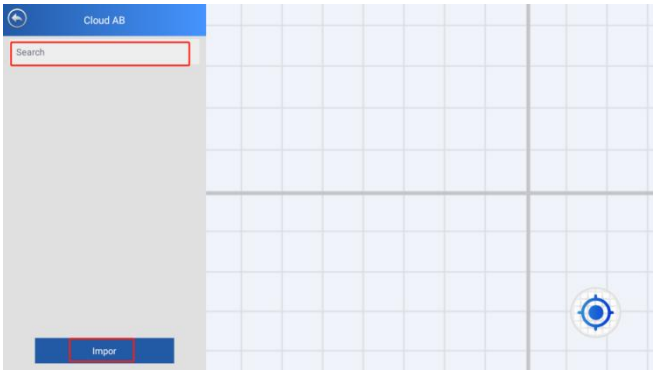
Click Upload to upload the navigation line to the server



Cloud import navigation line

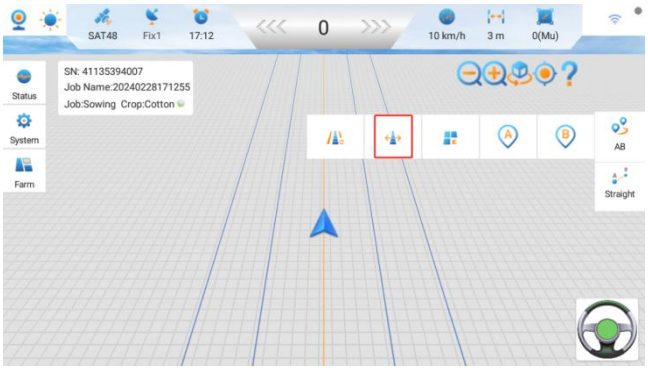
Click Cloud AB, enter the name of the navigation line, and then click Import. (Only supports navigation lines created and uploaded by the NST system)

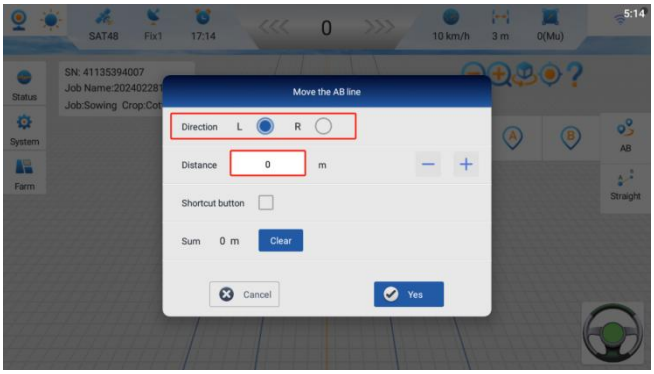




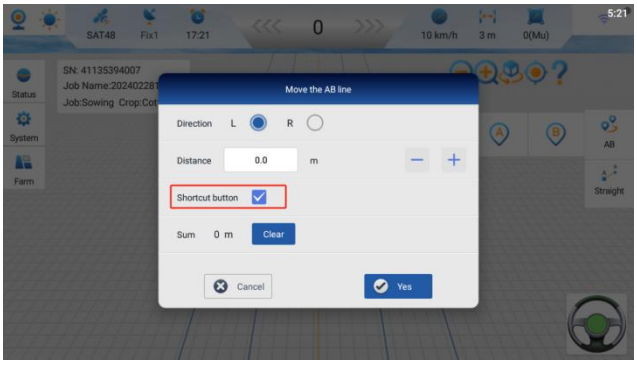
5.4. Offset navigation line

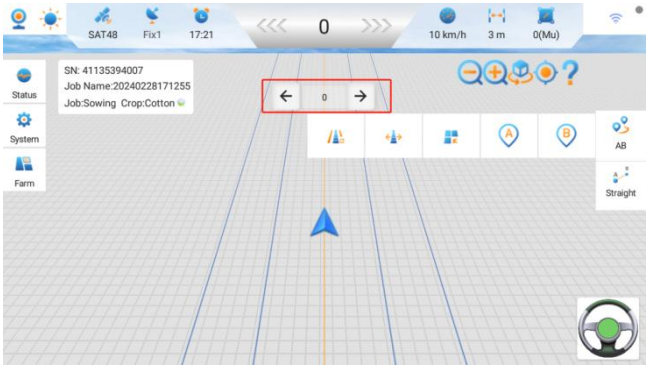
Click to set the left and right offset of the navigation line.





Click the Shortcut button to display the total translation value of the navigation line on the main interface.





5.5. Reset the AB line

To reset the AB line, you need to confirm the location of the tractor and the joint distance, and then click to reset the AB line (the AB line will move to the center of the tractor)