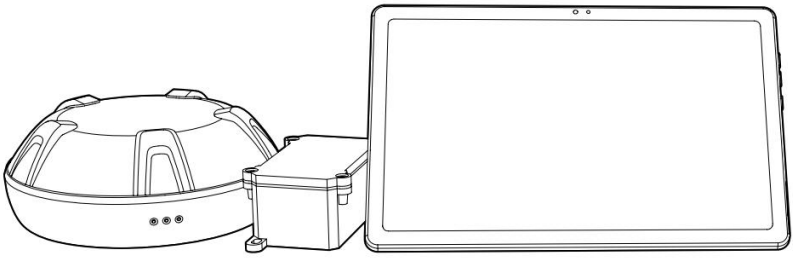
SMAJAYU



Guidance System

Software User Manual

May 2024 | V23.105.0

Copyright Notice:

Revisions:

Version	Date	Description
V23.105.0	2024.5	First release

Read Before Use:

Operate in strict accordance with this manual.

If you have any questions during use, contact our customer service.

Disclaimer:

- The purchased products, services, and features are stipulated by the contract. All or part of the products, services, and features described in this manual may not be within the scope of your purchase or usage. Unless otherwise specified in the contract, all the content in this manual is provided "AS IS" without warranties of any kind, express or implied.
- The content of this manual is subject to change due to product upgrades and other reasons. SMAJAYU reserves the right to modify the content of this manual without notice.
- This manual only provides guidance for use of this product. Every effort has been made in the preparation of this manual to ensure accuracy of the content, but no information in this manual constitutes a warranty of any kind, express or implied.

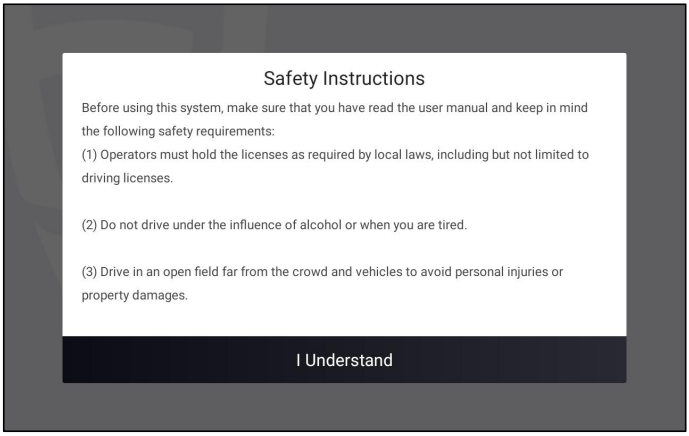
For detailed information on installation, use and function updates, please contact us at tech@smajayu.com and support@smajayu.com.

Safety Instructions

Before using this product, ensure that you have read and understood all the operation instructions and precautions in this *Guidance System Software User Manual*.

Safety Instructions

Once the control terminal is started, the following popup appears, informing you of safety risks to which you must pay more attention.



Operator

1. People under eighteen or not meeting the age requirement of local laws and regulations are not allowed to operate this product.
2. Do not drive under the influence of medicines, alcohol, and drugs.
3. Do not drive when feeling tired.
4. Operators must hold the driving licenses as required by local laws and regulations.

Operating Environment

1. Drive in an open field far from the crowd and ensure that there are no irrelevant personnel or vehicles in the operation area.
2. Stay away from people, livestock, obstacles, wires, tall buildings, airports, and signal towers to avoid interference with signals.

3. Do not operate in extreme weathers such as heavy rain, thick fog, snow, lightning, and strong wind.

Operation

1. Do not get on or off the vehicle during operation.
2. Monitor the operation condition in real time during operation to ensure timely intervention when necessary.

Inspection

1. Ensure that there is sufficient oil in the fuel tank of the vehicle.
2. Ensure that all cables are intact. If any damage is found, stop the operation and replace the cable.

Others

1. Disassembling the product housing without authorization may invalidate the warranty.
2. Damage caused by force majeure events, such as lightning strikes, overvoltage, and collision, is not covered by the warranty.
3. Connect the devices strictly in accordance with this manual. When connecting cables such as data cables, hold the end of the plug and gently plug or unplug it. Do not pull the plug by force or twist it, which may break the pins.
4. Follow the power supply requirements for this product (system). The supply voltage for the control terminal and the electric steering wheel is 9 V–36 V.

Preface

Use of Manual

This manual describes how to use Guidance System in concise, simple, and clear language, so that users can master each operation procedure easily, quickly, and accurately.

Contents

Chapter 1 Product Overview

1 Main Components

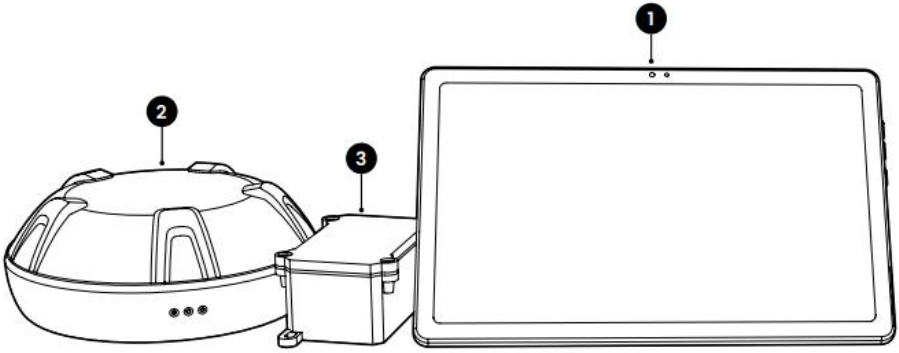


Figure 1. Main components

1	Control terminal	Serves as the human-machine interface, and vehicle control and communication terminal.
2	GNSS receiver	Receives satellite signals to obtain the vehicle location.
3	ISOBUS module(optional)	Wireless communication of ISOBUS data with the control terminal.

2 Control Terminal Ports

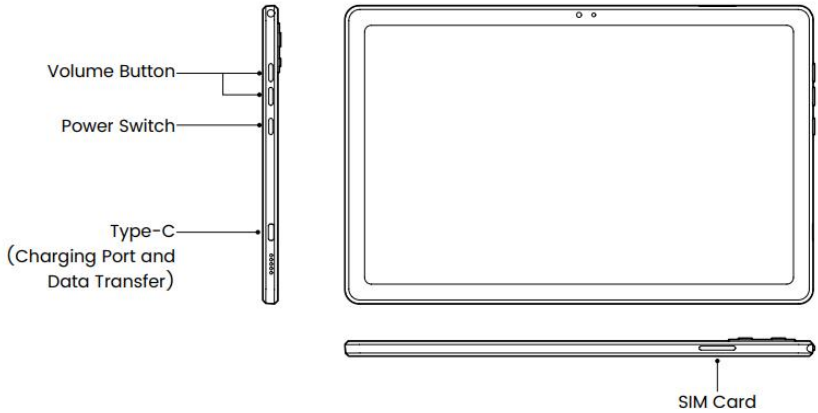


Figure 2. Control terminal ports

Chapter 2 Software Operation Instructions

1 Workflow Overview

This chapter describes the main operation processes and related functions of Guidance System. Before using the system for the first time, you need to complete the installation, commissioning, and preparations to start the operation successfully.

2 Installation and Commissioning

Use the following workflow to install and commission the system for the first time:
Select a language → Sign up and log in → Enter installation information → Connect to a GNSS Receiver → Connect to a signal source → Obtain heading* → Set the vehicle parameters→ Calibrate the implement → Complete

* Drive the vehicle straight ahead for a while, and the heading is obtained automatically. If not, choose **MENU** > **SYSTEM** > **Heading calibration**.

2.1 Selecting a Language

Power on the control terminal, select a language, and tap **Next** to open the sign-up/login screen.

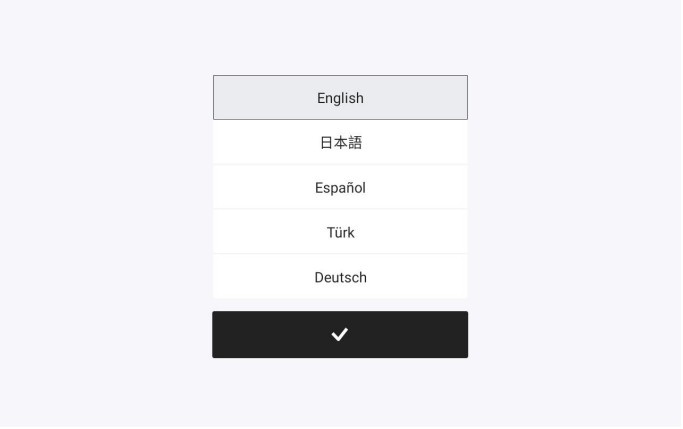


Figure 3. Select a language

2.2 Sign-up/Login

The sign-up/login screen is displayed in the language you selected.

Sign up: For the first time use, you need to sign up. Tap **Register** to open the sign-up screen, enter your email address, verification code, and password, and then read and agree to the User Privacy Agreement.

Log in: If you have an account already, you can log in directly by entering your username (email address) and password.

Forgot password: If you forgot your password, tap **Forgot Password** to reset the password. Enter your email address, verification code, and new password, and then tap **Login** to enter the home screen of the system.

Select country/region: The system automatically selects the country or region based on your location, or you can tap in the lower left corner and select your country or region. Ensure that the country or region you selected is true, and we bear no responsibility for any consequences arising from your wrong selection.

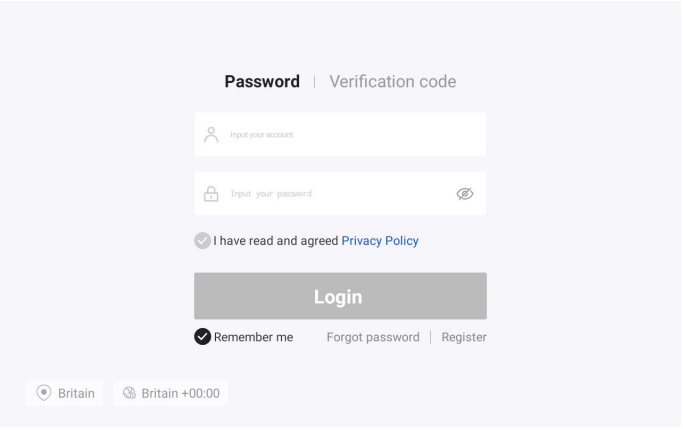


Figure 4. Sign-up or login screen

2.3 Entering Installation Information

For the first time use, you need to enter the user information and installation information. Note that the information you entered may have an impact on your aftersales service, so strictly follow the following procedure:

Step 1: Enter the user information, and tap **Next**.

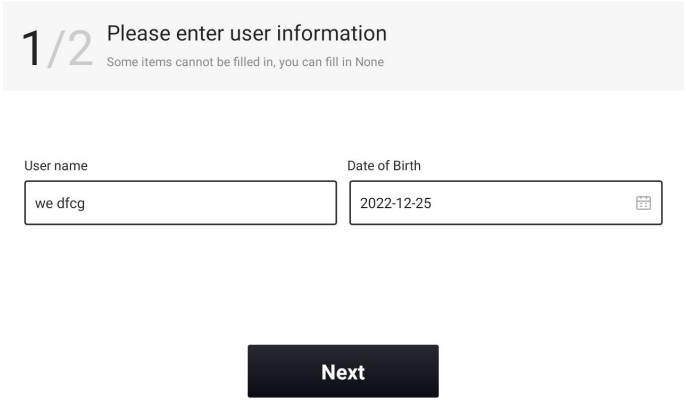


Figure 5. Enter the user information

Step 2: Enter the installation information, and tap **Confirm**.

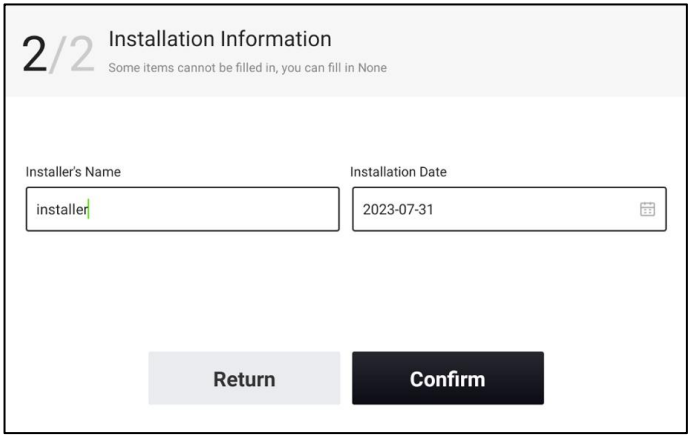


Figure 6. Enter the installation information

2.4 Home Screen

The home screen is displayed upon login. You can view the network connection and operation status in real time. For convenience, your account information is automatically saved locally, so that you are logged in automatically to open the home screen every time the system is powered on. Refer to section 4.1 "Home Screen Elements" for details.

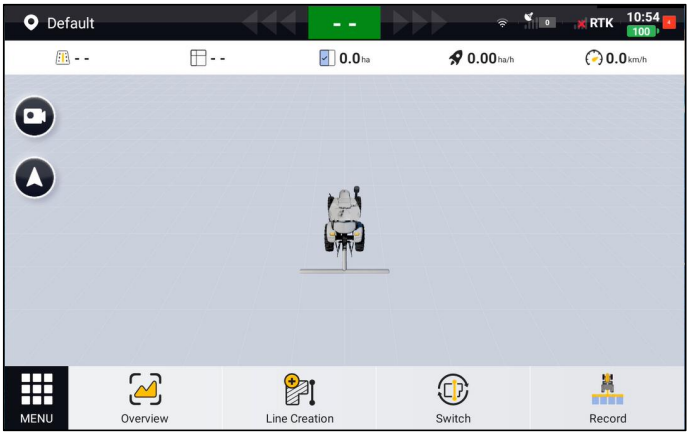


Figure 7. Home screen

2.5 Connecting to a GNSS Receiver

After entering the home screen first time, it will prompt "GNSS Receiver Antenna not connected", you need to connect the GNSS Receiver 's Bluetooth before you start the other operations.

Step 1: Tap the Connect button, it will automatically jump to the Bluetooth Devices.

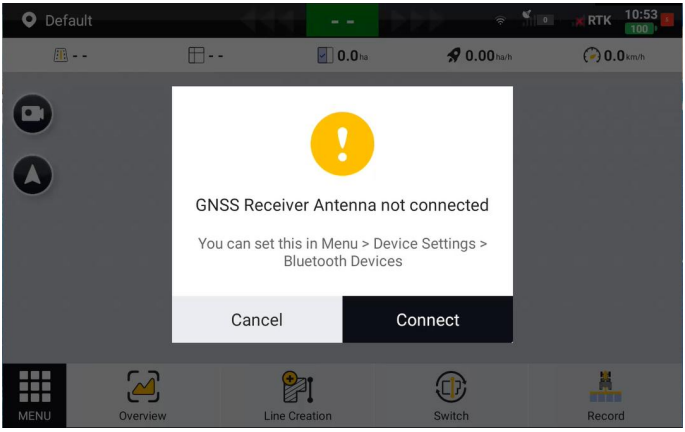


Figure 8. Connecting to a GNSS Receiver prompt

Step 2: Switch on Bluetooth and select the Bluetooth of GNSS Receiver (GNSS Receiver_xxxxx) to pair and connect from the nearby devices.

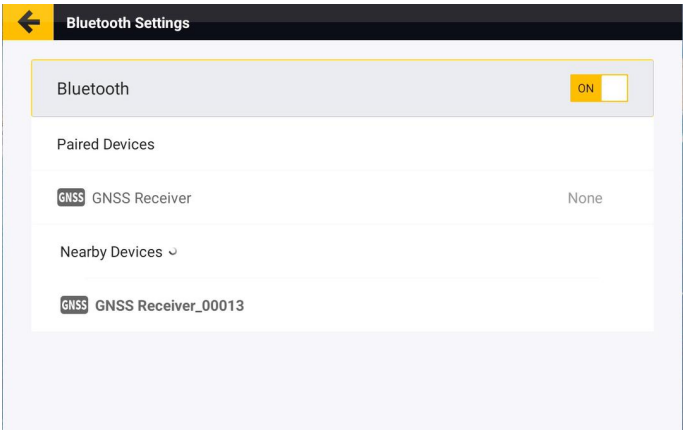


Figure 9. Pair and connect a GNSS Receiver prompt

If the pairing and connection fails, verify that the GNSS Receiver is not too far away or is receiving signal interference and try to re-pair the connection.

●

2.6 Connecting to a Signal Source

After the GNSS Receiver is connected, connect to a correction signal source.

Step 1: Choose **MENU** > **DEVICE SETTINGS** > **Correction Source**.

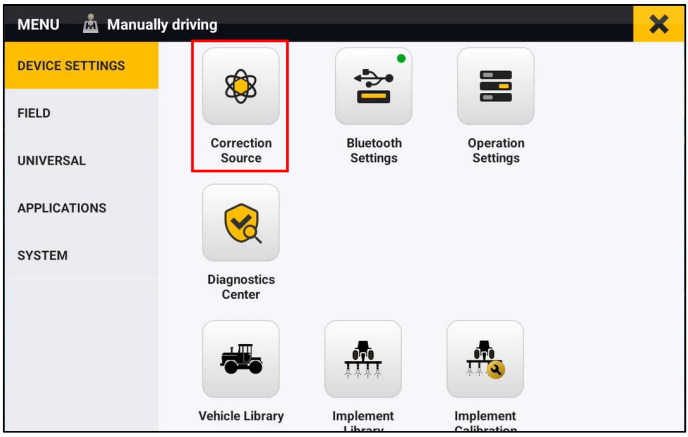


Figure 10. Select Correction Source

Step 2: Tap **Network RTK**, **Mobile Base Station RTK**, **SBAS**, **PPP** or **Bluetooth RTK** to initiate a connection request or set connection parameters. The connection mode you enabled is selected automatically the next time you log in.

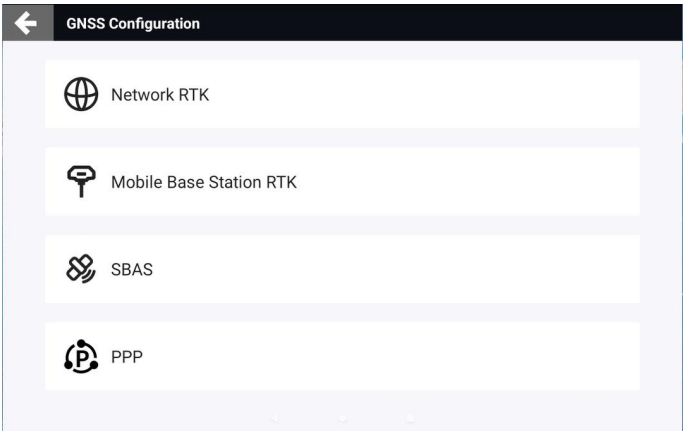


Figure 11. Connect to a signal source

2.6.1 Network RTK

To enable the network RTK mode, tap **Network RTK**, and the **NTRIP** and **NRTK** options are displayed.

NTRIP

Tap **NTRIP**, and enter information in the popup dialog.

NTRIP host: Enter the host and port, and tap **Get Source**. The node with the strongest signal strength is displayed automatically in the **Source Node** box.

NTRIP account: Enter your account and password, and tap **OK** to complete the connection.

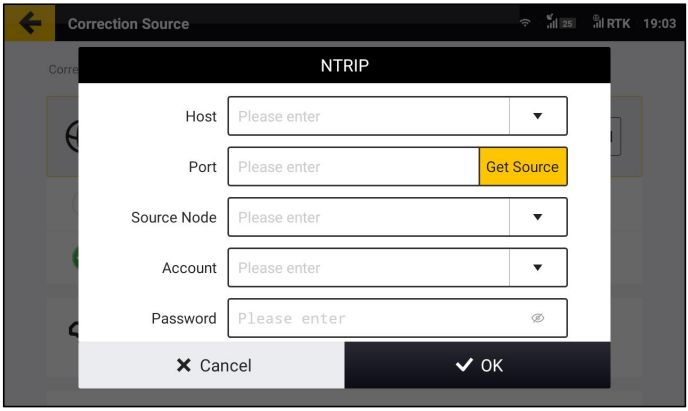


Figure 12. Enter NTRIP information

NRTK

Tap **NRTK**, and the NRTK account bound is automatically logged in.

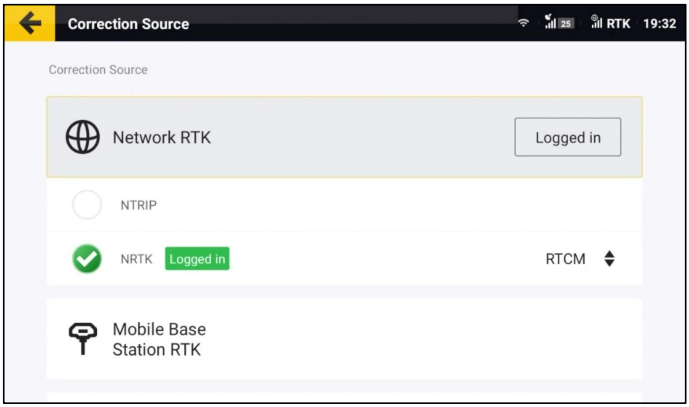


Figure 13. Select NRTK

Note:

Check whether the mode is available in your region by contacting the local dealer.

2.6.2 Mobile Base Station RTK (Not supported in current version)

For the mobile base station RTK mode, the connection method is selected depending on the base station type.

Pairing via Code

Tap **Mobile Base Station RTK**, and select **Pairing via Code**. In the popup dialog, enter the frequency code of the base station and tap **OK**. For details about the base station's frequency code, refer to its user manual.

Applicable base stations: mobile base stations whose service codes start with BS or BSA.

You can also set public frequencies in the popup dialog. The frequencies must be 410 MHz to 470 MHz with a maximum of five decimal places. If the base station's service code starts with BSA, public frequency settings are not supported.

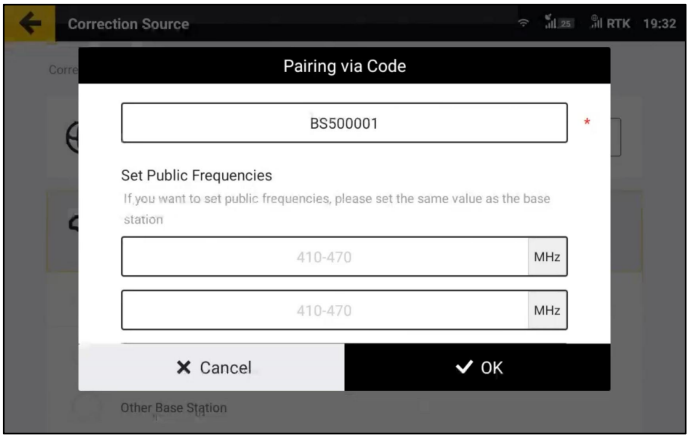


Figure 14. Pair via code

Pairing via Frequency

Tap **Mobile Base Station RTK**, and select **Pairing via Frequency**. In the popup dialog, enter the frequency of the base station and tap **OK**. The frequency must be 410 MHz to 470 MHz with a maximum of five decimal places. For details about the base station's frequency, refer to its user manual.

Applicable base stations: high-power base stations whose service codes start with FQ.

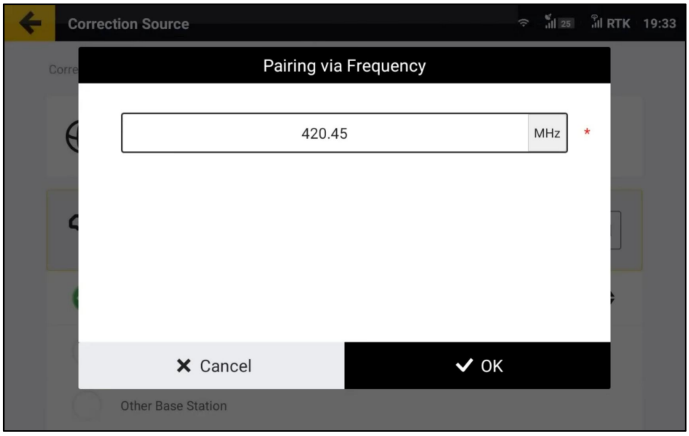


Figure 15. Pair via frequency

Pairing with Base Stations of Other Brands

Power on the base station, and set its frequency, over-the-air baud rate, and radio communication protocol on the base station. Tap **Mobile Base Station RTK**, and select **Other Base Station**. In the popup dialog, set the same frequency, over-the-air baud rate,

and radio communication protocol, and then tap **OK**. For details about the parameter settings of the base station, refer to its user manual.

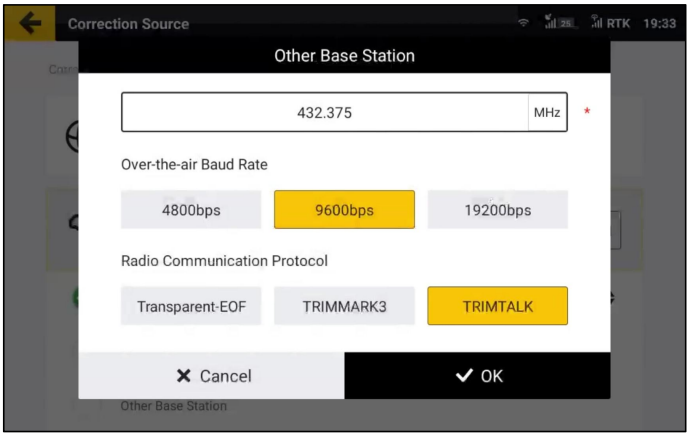


Figure 16. Pair with base stations of other brands

Base stations of other brands must support the following features:

Frequency: 410–470 MHz

Baud rate: 4,800 bps/ 9,600 bps/ 19,200 bps

Radio communication protocol: Transparent-EOT/ TRIMMARK3/ TRIMTALK

Differential data format: RTCM 2.X / 3.X

Note:

1. Base station pairing may take up to 3 minutes.
2. If RTK connection keeps failing, try switching the RTK connection mode a few times.

2.6.3 SBAS

Tap **SBAS**, and select **WAAS**, **MSAS**, **EGNOS**, **GAGAN**, or **SDCM**. The operation cannot be started until **connected** is displayed at the right of **SBAS**. To switch to a different signal source, tap the source, and then tap **OK** in the popup dialog.

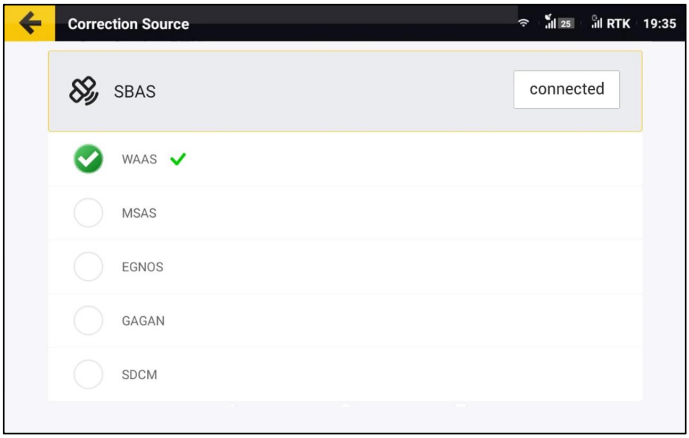


Figure 17. SBAS connection established

Note: The operation cannot be started when **RTK Status** is 1 in **Diagnostics Center** > **Scenario**. Once the connection is established, **RTK Status** becomes 2 and the signal source icon in the upper right corner becomes "S00-S20".

2.6.4 PPP

Tap the PPP option. The operation cannot be started until the PPP has completed configuration and convergence.

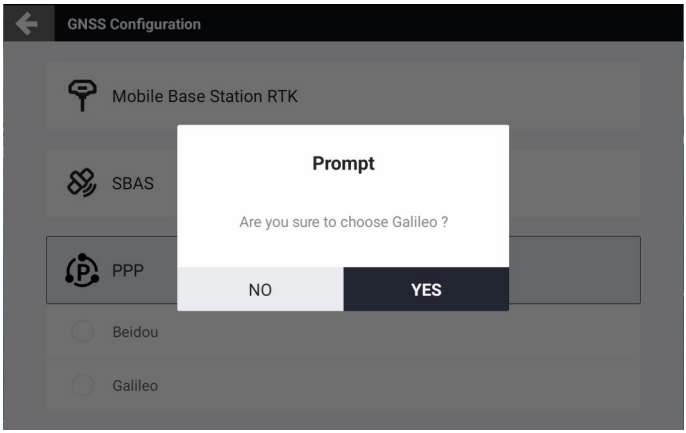


Figure 18. Connecting to a PPP

PPP connection status

Phase	Correction Source	Status bar	Prompt
Configuring	PPP	PPP	

Configured	PPP Configured	PPP	Configuration completed
Converging	PPP Configured	PPP	PPPConfigured Convergence takes time, please wait patiently. OK(0s)
Converged		PPP	Convergence completed

Note: The convergence time is about 20min, please wait patiently.

2.6.5 Bluetooth RTK (Not supported in current version)

Note: This mode is only available in Japan.

2.7 Setting Vehicle Parameters

To add, delete, modify, check, upload and synchronize the vehicle information, choose **MENU** > **DEVICE SETTINGS** > **Vehicle Library**.

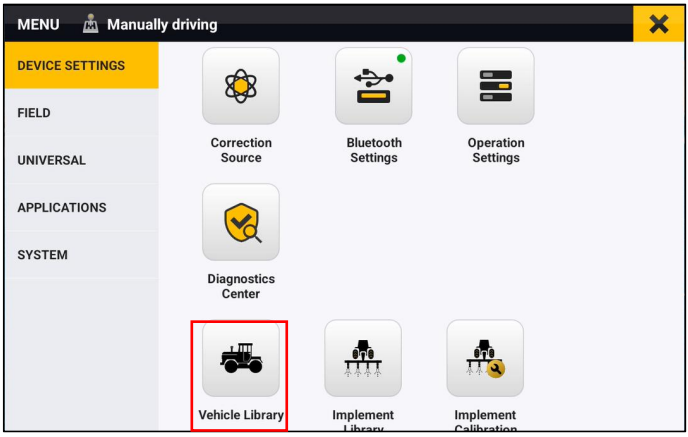


Figure 19. Select Vehicle Library

2.7.1 Parameter Settings

To enter the vehicle settings screen, tap **New** or **Edit**. Enter the basic information on the **Information** tab, and then tap **Next**. Measure and enter the vehicle parameters on the **Parameters** tab, and then tap **Next**. Check the vehicle information on the **Summary** tab, and then tap **Save**.

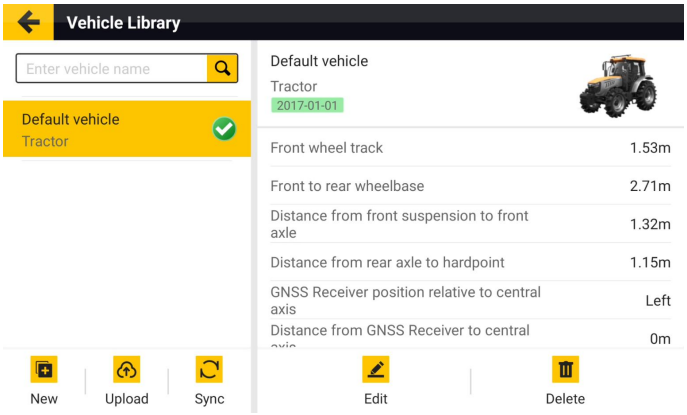


Figure 20. Vehicle library

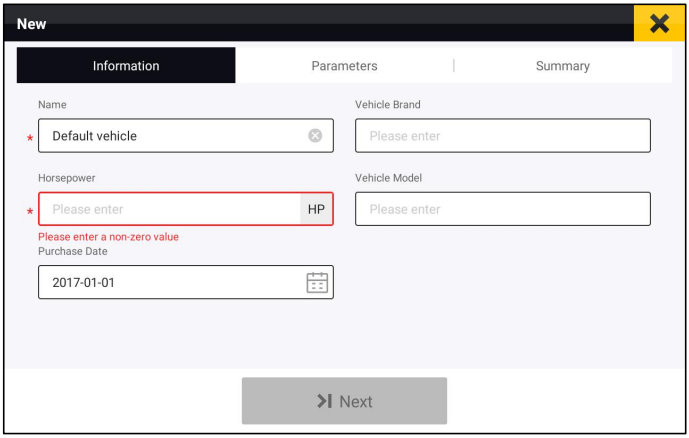


Figure 21. Information tab

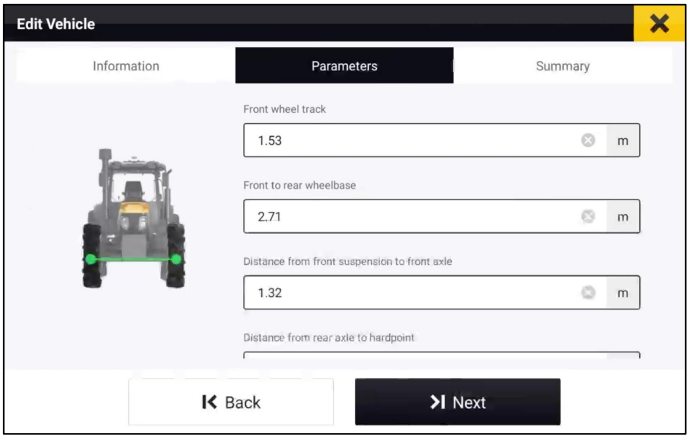


Figure 22. Parameters tab

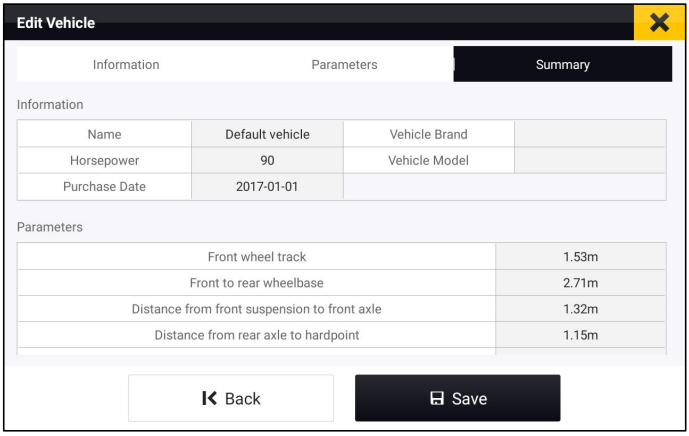


Figure 23. Summary tab

2.7.2 Other Actions

Delete

To delete the vehicle information, tap a vehicle, and then tap **Delete**. The deleted information cannot be restored. This action is unavailable when there is only one vehicle in the vehicle library.

Upload

To upload the vehicle information from the control terminal to the cloud, tap **Upload**.

Synchronize

To download the vehicle information from the cloud to the control terminal, tap **Sync**.

2.8 Setting Implement Parameters

To add, delete, modify, check, upload, synchronize, and calibrate the implement information, choose **MENU** > **DEVICE SETTINGS** > **Implement Library**.

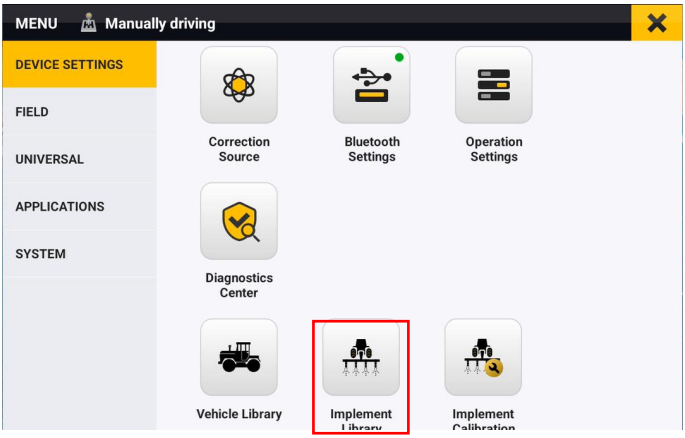


Figure 24. Select Implement Library

2.8.1 Parameter Settings

To enter the implement settings screen, tap **New** or **Edit**. Select the implement type on the **Type** tab, and then tap **Next**. Enter the basic information on the **Information** tab, and then tap **Next**. Measure and enter the implement parameters on the **Parameters** tab, and then tap **Next**. Check the implement information on the **Summary** tab, and then tap **Save**.

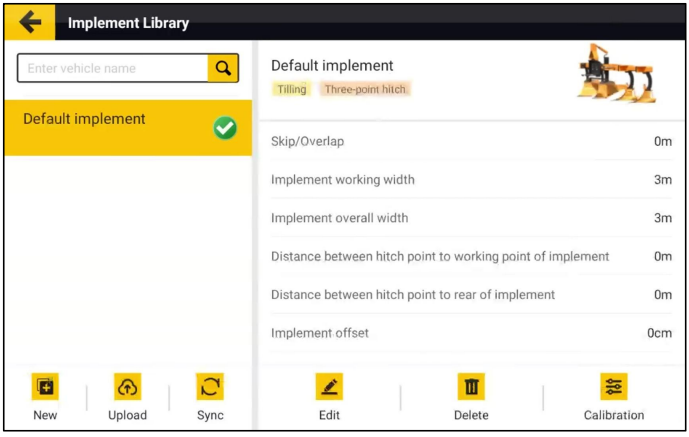


Figure 25. Implement library

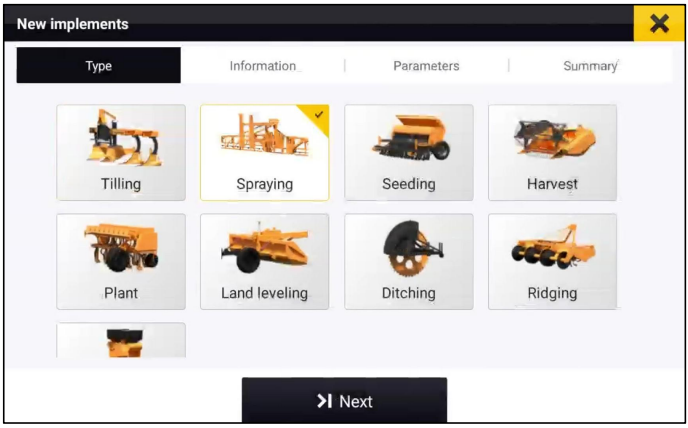


Figure 26. Type tab

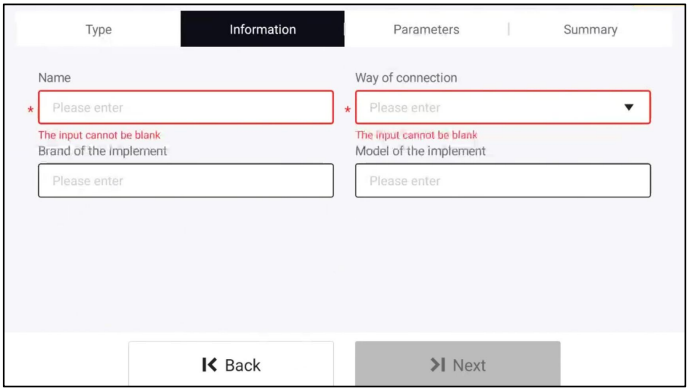


Figure 27. Information tab

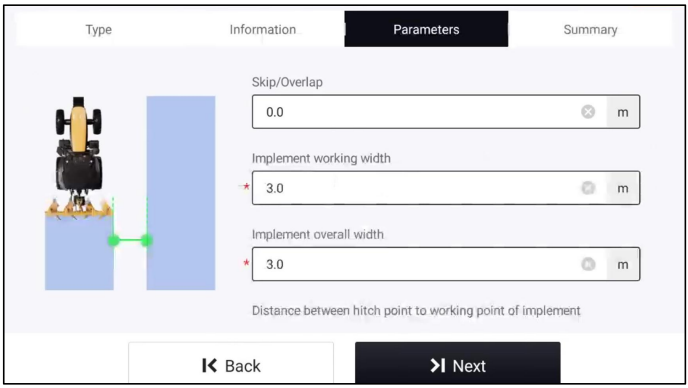


Figure 28. Parameters tab

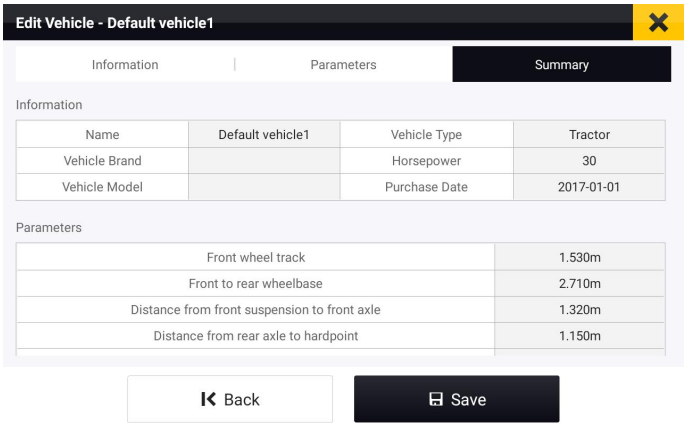


Figure 29. Summary tab

2.8.2 Calibration

To enter the implement calibration screen, tap **Calibration**. Refer to section 2.9 "Calibrating the Implement" for details.

2.8.3 Other Actions

Delete

To delete the implement information, tap an implement, and then tap **Delete**. The deleted information cannot be restored. This action is unavailable when there is only one implement in the implement library.

Upload

To upload the implement information from the control terminal to the cloud, tap **Upload**.

Synchronize

To download the implement information from the cloud to the control terminal, tap **Sync**.

2.9 Calibrating the Implement

Calibrate the implement if there is any skip or overlap between adjacent trajectories.

Choose **MENU** > **DEVICE SETTINGS** > **Implement Calibration**.

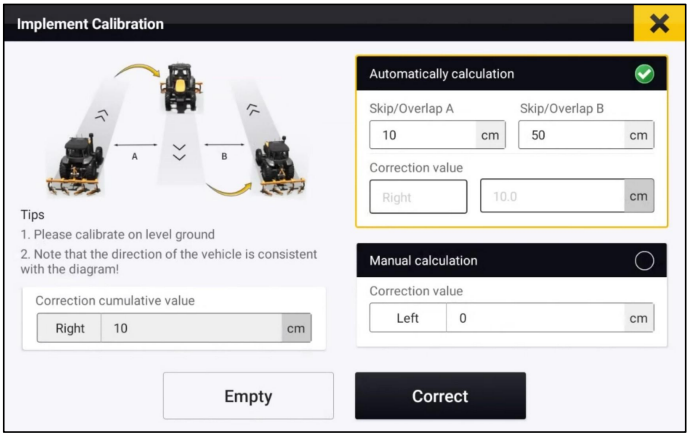


Figure 30. Calibrate the implement

Automatic calculation of correction value

The system works out the correction value automatically based on the skip or overlap values you entered.

Manual calculation of correction value

Alternatively, you can calculate and enter the correction value based on your experience or demand.

Correct

Tap **Correct**, and the correction value is added to the cumulative correction value. You can tap **Correct** repeatedly.

Empty

To clear the automatic or manual correction value, as well as the cumulative correction value, tap **Empty**.

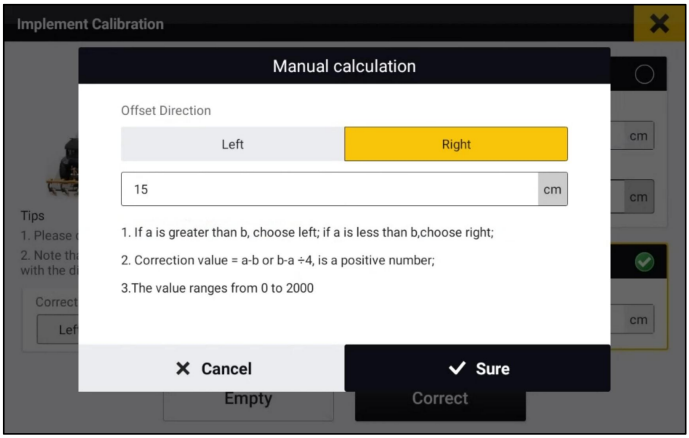


Figure 31. Manual calculation

The above installation and commissioning aims to ensure high-accuracy navigation. Before any operation, you still need to make the following preparations.

3 Preparations

Make the following preparations before any operation:

Check the signal source connection → check the task configuration (create or select a field → create or select a task → create or select a boundary → create or select a guidance line) → check the implement configuration → obtain heading → start the operation.

3.1 Checking the Signal Source Connection

Before any operation, check the signal source connection. Refer to section 2.6 "Connecting to a Signal Source" for details.

3.2 Checking the Task Configuration

To preview and switch the fields, tasks, boundaries, guidance lines, and implements, tap **Overview** on the home screen. Refer to section 6.2 "Field" for details on how to add, delete, modify, check, and manage the fields, tasks, boundaries, and guidance lines.

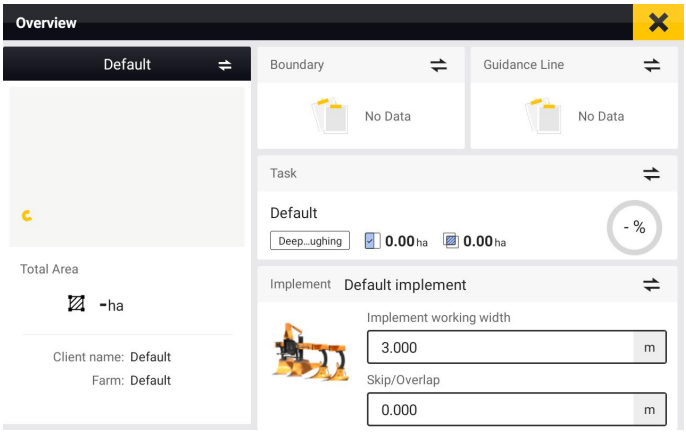


Figure 32. Overview

3.2.1 Creating or Selecting a Field

The field name, field map, field area, client name, and farm name are displayed on the left of the **Overview** screen. Tap ⇌ to switch to another field or create a field.

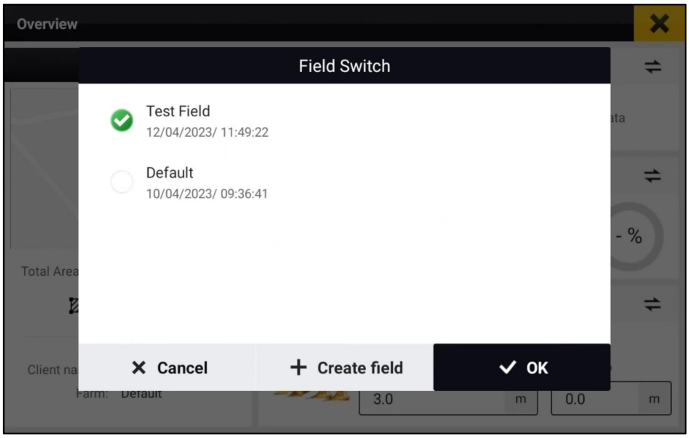


Figure 33. Switch the field

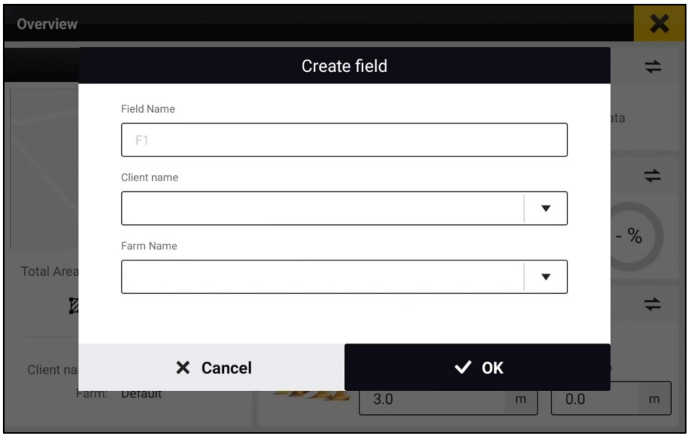


Figure 34. Create a field

3.2.2 Creating or Selecting a Task

The task name, task type, operation area, and completion rate are displayed in the **Task** section on the right of the **Overview** screen. Tap ⇌ to switch to another task bound to the same field or create a task.

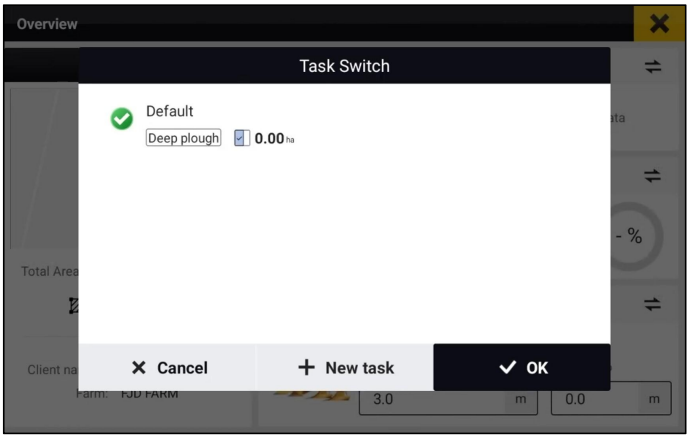


Figure 35. Switch the task

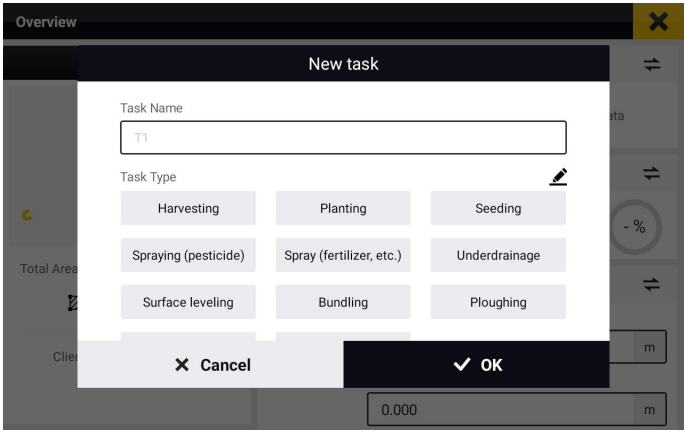


Figure 36. Create a task

3.2.3 Selecting a Boundary

The boundary name, signal source used, and creation time are displayed in the **Boundary** section on the right of the **Overview** screen. Tap ⇌ to switch to another boundary bound to the same field. If no boundary is required for the operation, keep the boundary part empty. Refer to section 3.3 "Creating a Boundary and Guidance Line" for details on boundary creation.

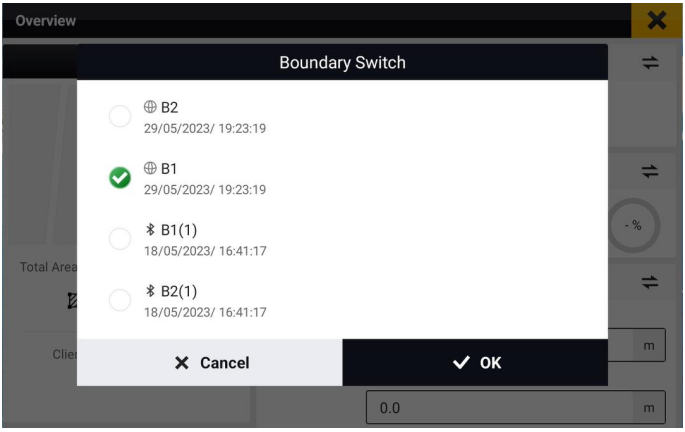


Figure 37. Switch the boundary

3.2.4 Selecting a Guidance Line

The guidance line name and type, signal source used, and creation time are displayed in the **Guidance Line** section on the right of the **Overview** screen. Tap ⇌ to switch to another guidance line bound to the same field. If no guidance line is required for the operation, keep the guidance line part empty. Refer to section 3.3 "Creating a Boundary and Guidance Line" for details on guidance line creation.

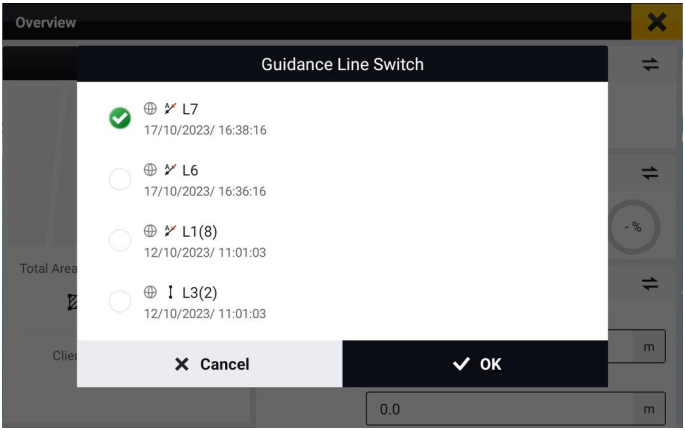


Figure 38. Switch the guidance line

3.2.5 Checking the Implement Configuration

The implement name, working width, and skip/overlap are displayed in the **Implement** section on the right of the **Overview** screen. Tap ⇌ to switch to another implement. Refer to section 2.8 "Setting Implement Parameters" for details on implement creation.

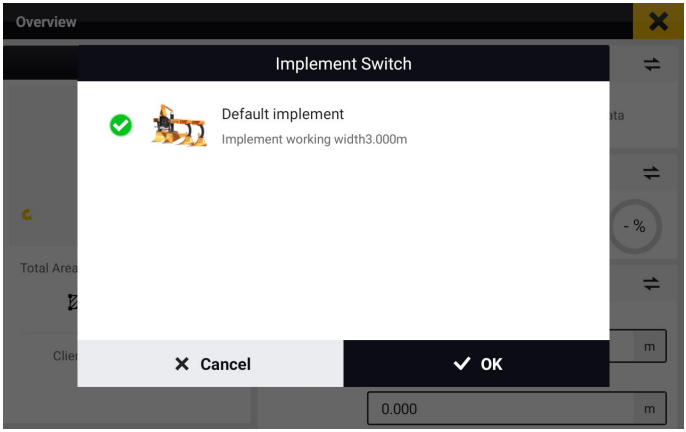


Figure 39. Switch the implement

3.3 Creating a Boundary and Guidance Line

To record the boundary or create four types of guidance lines, tap **Line Creation** on the home screen. Tap in the lower left corner to record the operation while the boundary and guidance line are created.

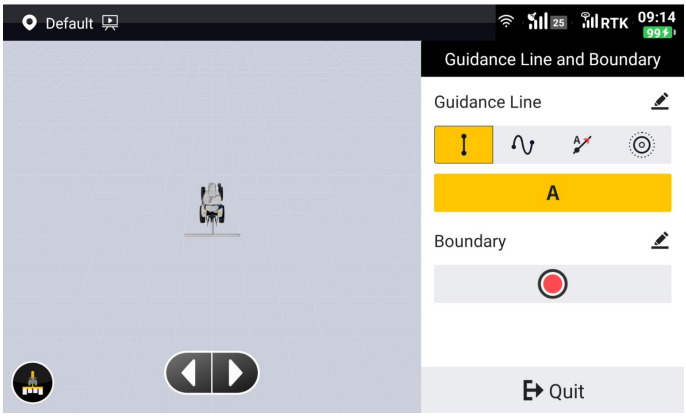


Figure 40. Create a guidance line

3.3.1 Creating a Boundary

Tap on the right, and select the leftmost, center, or rightmost position as the reference based on the boundary and implement position relation.

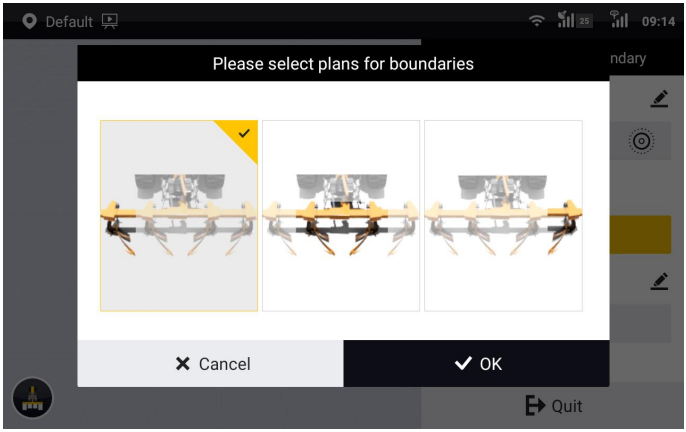


Figure 41. Select the boundary recording reference

Drive around the field and return to the start point to record a complete boundary.

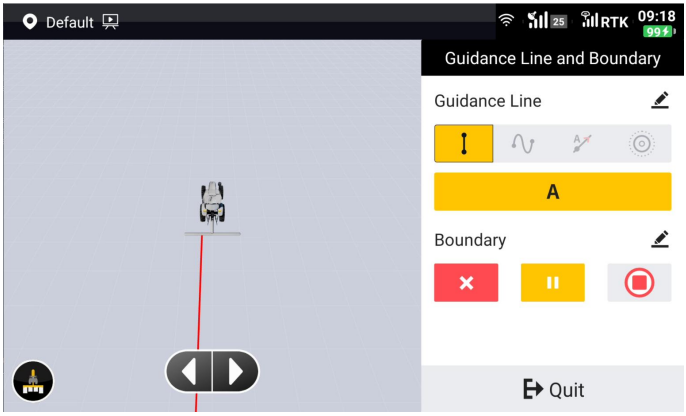


Figure 42. Record the boundary

When recording the boundary, you can tap in the upper right corner of the **Boundary** section to edit the boundary name, headland distance and offset direction.

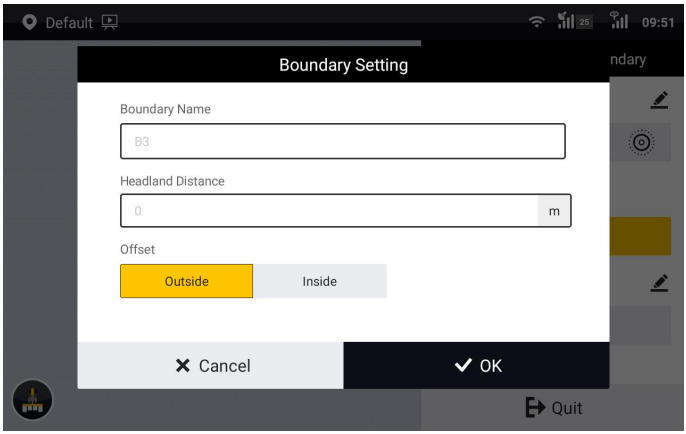
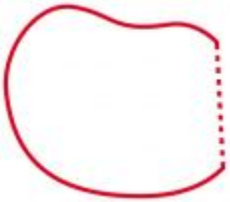


Figure 43. Set the boundary

The system determines whether the boundary recorded can be used. If the boundary cannot be used directly, the system processes it as follows.

Boundary		System Processing	Illustration
Distance x from the start point to the end point	x ≤50 m	Connect the start point and the end point with a straight line.	
	50 m < x	Resume the recording.	
Special boundary	Boundary length < 80 m	Resume the recording.	
	Boundary too narrow	Record the boundary again.	
	Multiple sub-areas within the boundary		

3.3.2 Creating a Guidance Line

The process to create a guidance line depends on the guidance line mode you select. Four modes are the straight line mode, the A+ line mode, the curve mode, and the pivot mode.

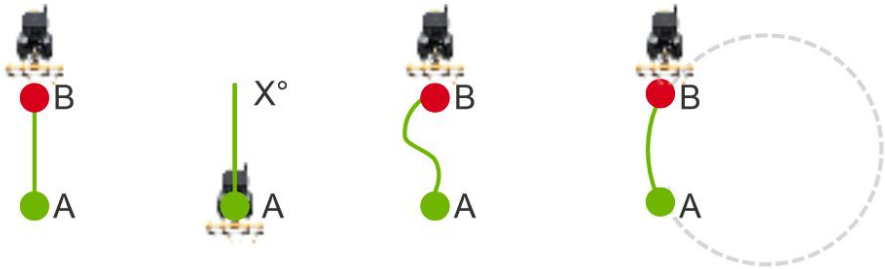


Figure 44. Four guidance line modes

AB straight line mode

Set point A and point B to create a straight line. This mode is applicable to regularly shaped fields.

Access the boundary and guidance line creation screen, and tap to select the AB straight line mode. Drive the vehicle to the start point, and tap to set the current position as point A.

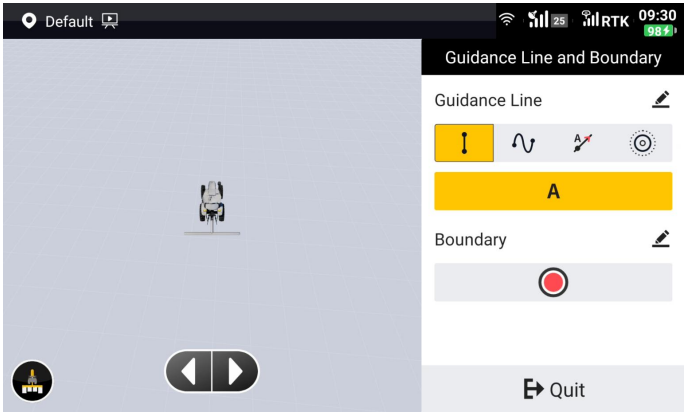
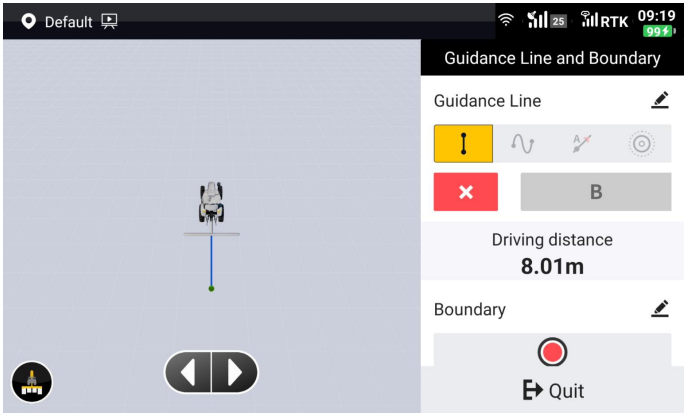


Figure 45. Set point A

Then drive the vehicle for at least 10 m, and tap to set the current position as point B, or tap to cancel point A.



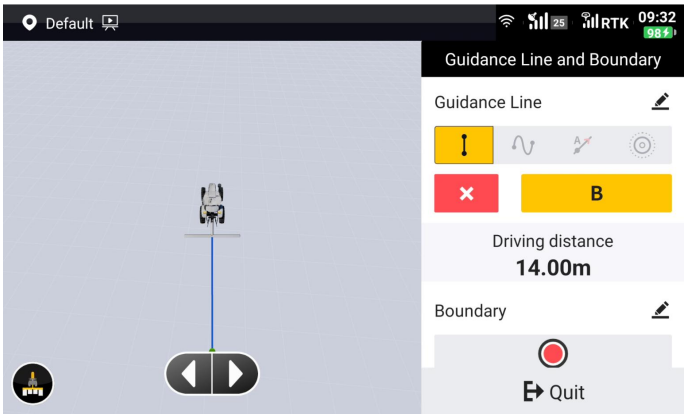


Figure 46. Set point B

Tap to generate and import the AB line, and the system goes to the home screen and uses the AB line automatically. You can also keep driving the vehicle to another point and tap to change point B to the new position, or tap to cancel the guidance line creation.

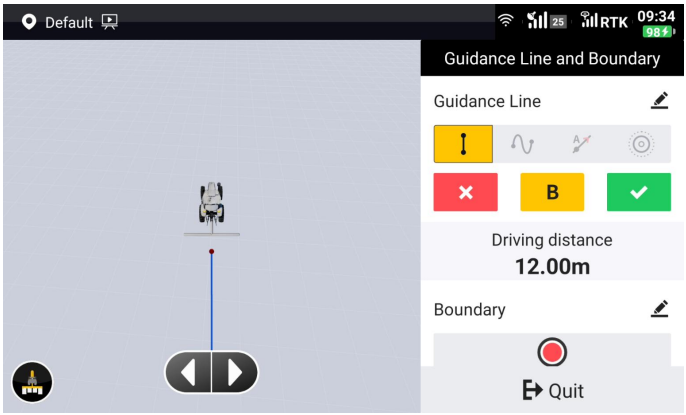


Figure 47. Import the guidance line

When creating a guidance line, you can tap in the upper right corner of the **Guidance Line** section to set the guidance line name.

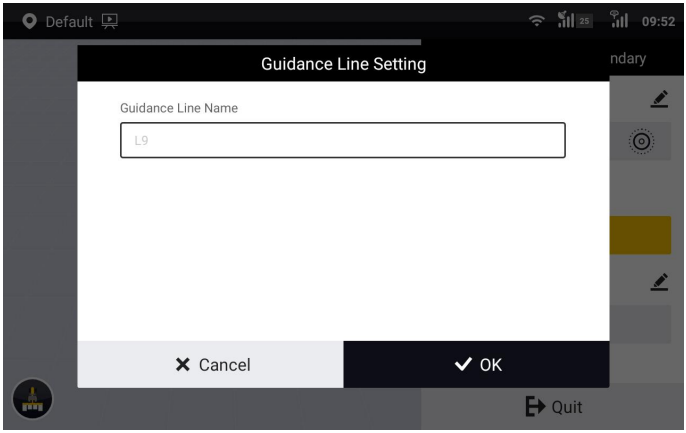


Figure 48. Change the guidance line name

A+ line mode

Set point A and the heading of the vehicle to create a straight guidance line. This mode is applicable to large fields and operations by multiple operators.

Access the guidance line creation screen, and tap to select the A+ line mode. Drive the vehicle to the start point, and tap to set the current position as point A.

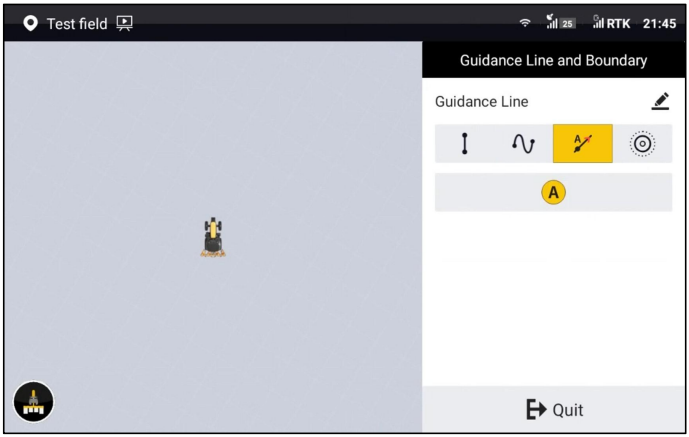


Figure 49. Set point A

You can use your current heading as the heading for creating an A+ line, or enter the heading manually.

a. Tap on the map to set the current heading as the heading of the A+ line.

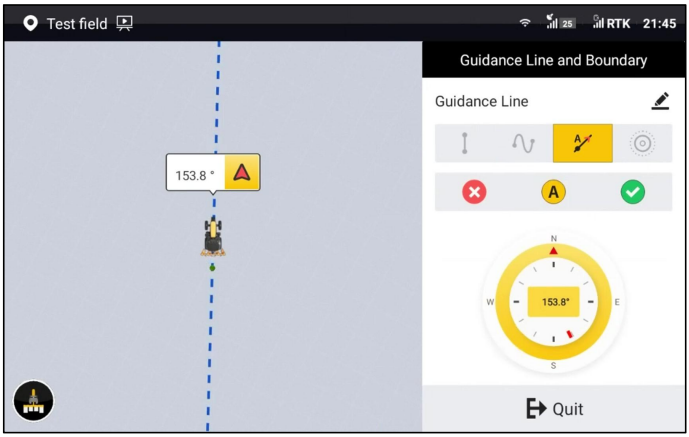


Figure 50. Use the current heading

b. To enter a heading manually, tap on the right panel, and a popup window appears. Enter a heading relative to the true north in a clockwise direction. The heading must be in the range of 0–360°, with a maximum of four decimal places.

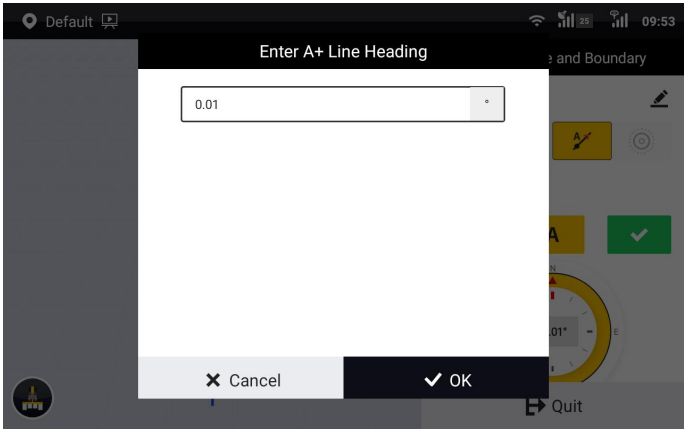


Figure 51. Enter the heading manually

Tap to generate and import the A+ line, and the system goes to the home screen and uses the A+ line automatically. You can also keep driving the vehicle to another point and tap to change point A to the new position, or tap to cancel the line creation.

When creating a guidance line, you can tap in the upper right corner to change the guidance line name.

Curve mode

Use the curved trajectory between point A and point B to generate a guidance line. This mode is applicable to irregularly shaped fields or special fields.

Access the guidance line creation screen, and tap to select the curve mode. Drive the vehicle to the start point, and tap to set the current position as point A.

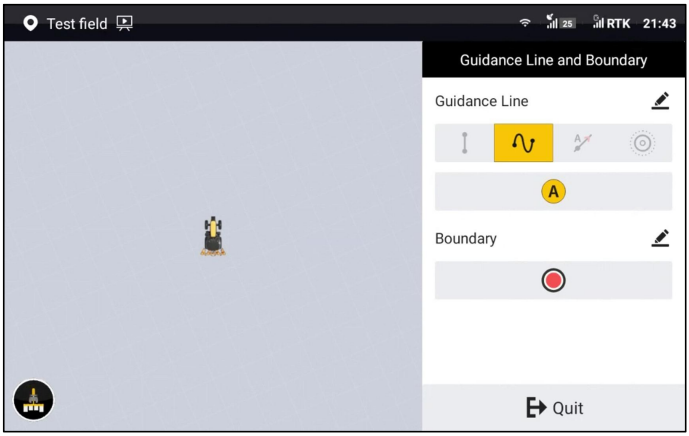


Figure 52. Set point A

Then drive along a curve for at least 50 m, and tap B to set the current position as point B, or tap to cancel point A.

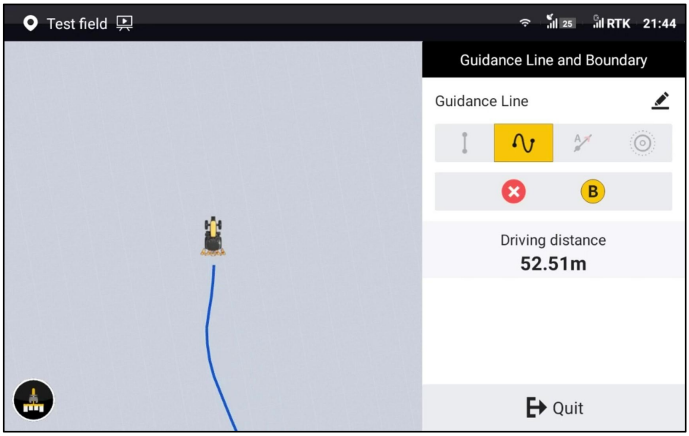


Figure 53. Set point B

When creating a guidance line, you can tap in the upper right corner to change the guidance line name.

Tap to import the curve line, and the system goes to the home screen and uses the curve line automatically. You can also tap to cancel the line creation.

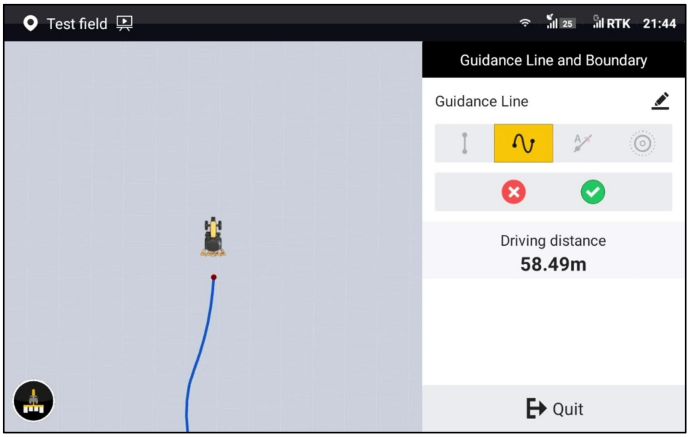


Figure 54. Confirm the curve line

Note:

1. Point A is the start point and point B is recommended to be a point on the headland at the other side of the field.

2. The system automatically extends the line segments beyond the two end points along the tangent directions of the two end points, so the line segments beyond the end points are straight lines.

Pivot mode

Record an arc AB to determine the pivot point and radius. This mode is applicable to fields using the center-pivot irrigation method.

Access the guidance line creation screen, and tap to select the pivot mode. Drive the vehicle to the start point, and tap to set the current position as point A.

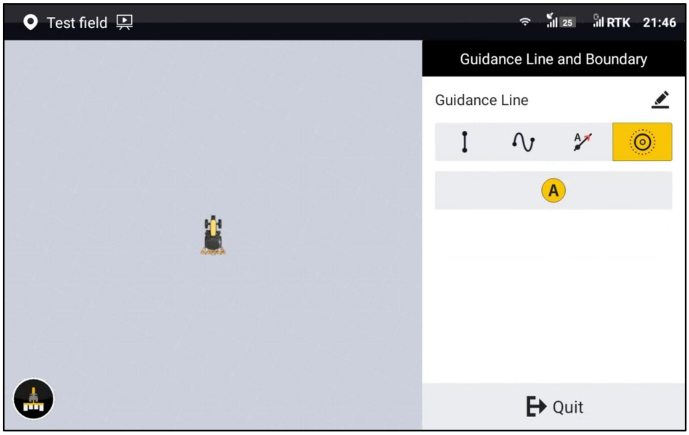


Figure 55. Set point A

Then drive along the circular field edge for at least 20 m, and tap B to set the current position as point B.

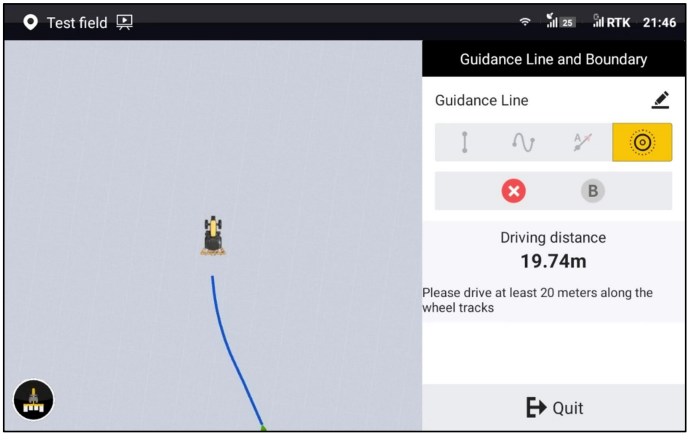


Figure 56. Set point B

Tap to generate the pivot circle, or tap to cancel the guidance line creation.

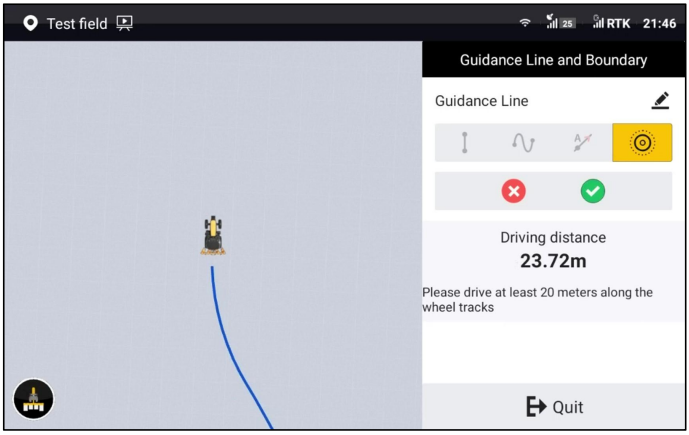


Figure 57. Generate the pivot circle

After you tap , a popup window appears. Enter the distance from the implement edge to the field edge in the popup window, and tap **OK** to import the pivot circle. The system goes to the home screen and uses the pivot circle automatically. When creating a guidance line, you can tap in the upper right corner to change the guidance line name and the distance to the field edge.

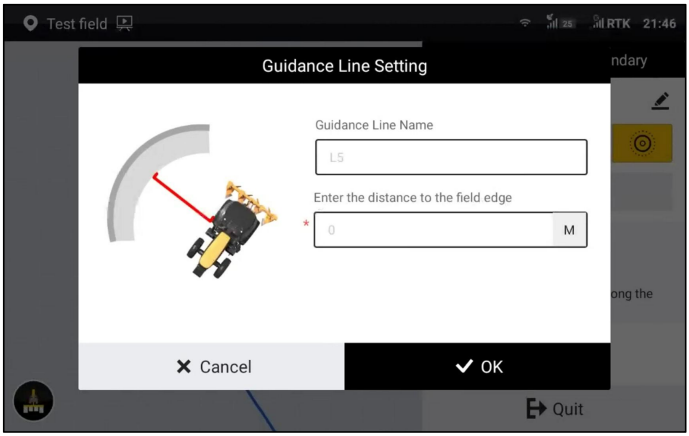


Figure 58. Enter the distance to the field edge

Note: During a task operation with a pivot pattern, when you are returning to the start point after finishing one circular path, you may drive to the next circular path as instructed 20 m away from the start point, and repeat the above steps until operations along all circular paths are completed.

4 Starting the Task

4.1 Home Screen Elements

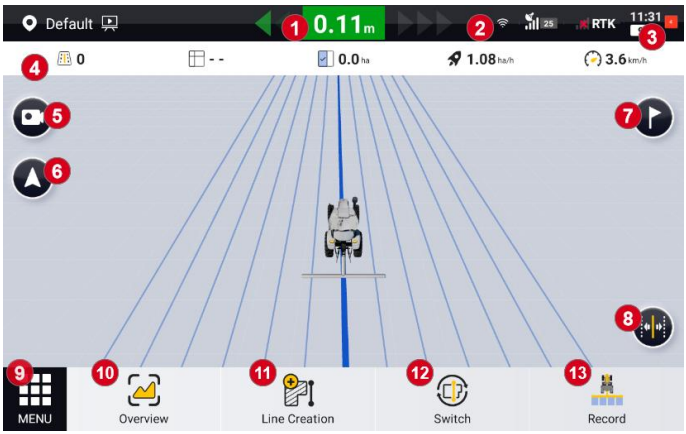


Figure 59. Home screen elements

1. **Offset value:** Displays the offset of the current path relative to the guidance line.

2. **Signal strength icons:** Shows the strength of the satellite signal (satellite tracking), RTK correction signal, or other correction source signals.
3. **Error Messages:** On the home screen, tap the red square with a number in the upper right corner to view the error messages.
4. **Real-time task operation data:** Shows the current task operation data, including, from left to right, the guidance line number, the total field area, the operated area, the completion ratio, the operation efficiency, and the current speed.
5. **Camera button:** Tap to turn on the Wi-Fi camera. Refer to section 4.2.9 "Turning on the Wi-Fi Camera" for details.
6. **View switch button:** Tap to switch between the 2D view and the 3D view.
7. **Headland marking button:** Marks the headlands at both ends of a field when the boundary is not set. The two headlands must be at least 50 m away. Refer to section 4.2.8 "Marking Headlands" for details.
8. **Guidance line translation button:** Tap to move the guidance line to the vehicle position or to the left or right by the set distance. Refer to section 4.2.4 "Translating a Guidance Line" for details.
9. **MENU**: Tap to access the device settings, the field management, the general settings, the applications, and the system settings.
10. **Overview**: Tap to access or change the task configuration, such as the field, boundary, guidance line, task, or implement.
11. **Boundary/guidance line creation button:** Tap to create a boundary or guidance line.
12. **Boundary/guidance line switch button:** Tap to switch the boundary or guidance line. Refer to section 4.2.3 "Switching Boundaries or Guidance Lines " for details.

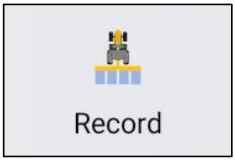
13. **Operation recording button:** Tap to turn on or off the operation recording. Refer to section 4.2.1 "Turning On or Off Operation Recording" for details.

4.2 Task Operations

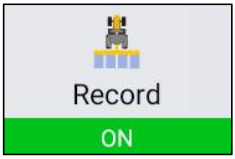
An operation can be started after the installation, commissioning, and task preparation processes. During a task operation, you can turn on or off the operation recording, switch the boundary or guidance line, translate the guidance line or boundary, scale up or down a pivot guidance line or boundary, mark the headlands, switch the view, and turn on the Wi-Fi camera.

4.2.1 Turning On or Off Operation Recording

Tap **Record** in the lower right corner of the home screen to turn on or off the operation recording.



Operation recording off: In this status, the task operation data is not recorded and the operated area is not shown on both the home screen and the task records screen.



Operation recording on: In this status, the task operation data is recorded and the operated area is shown on both the home screen and the task records screen.

4.2.2 Guiding Line for Resuming a Task Operation

You can start the same task for several times, and the task operation data recorded each time is saved under the task. In case that a task has historical operation data, when the system is powered on or when you resume the task, the system loads the last operation data of that task, and in addition to the operated areas rendered in colors, the mapping guidance panel shows a red dash line to guide you to the end point of the last operation. This line is only for guidance, and you can resume the operation anywhere.

Note: The red guiding line disappears after the operation recording is turned on.

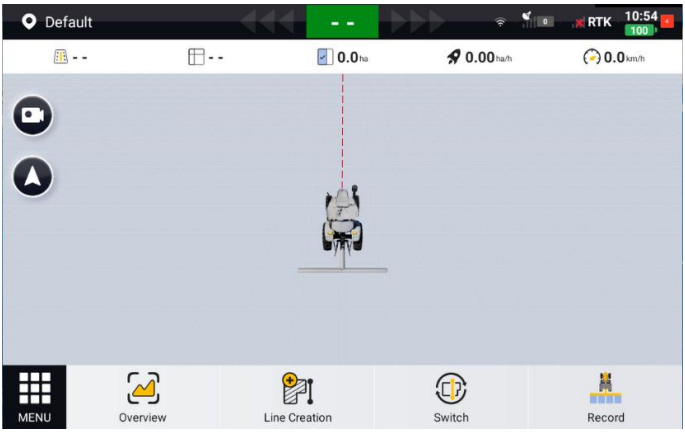


Figure 60. Guiding line for resuming a task operation

4.2.3 Switching Boundaries or Guidance Lines

Tap **Switch** at the bottom of the home screen, and change the current boundary or guidance line to another boundary or guidance line under the same field.

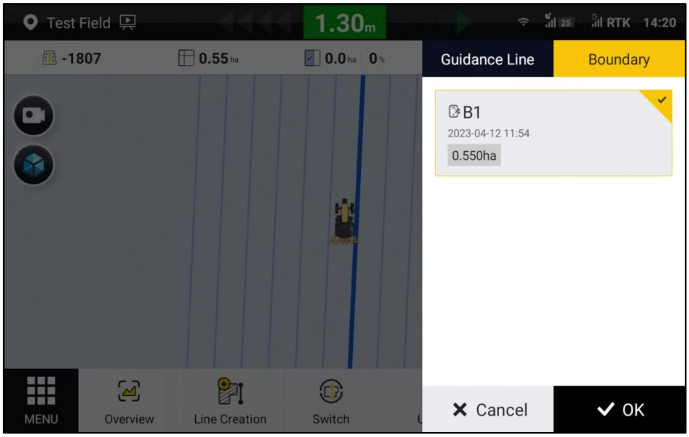


Figure 61. Switch the boundary

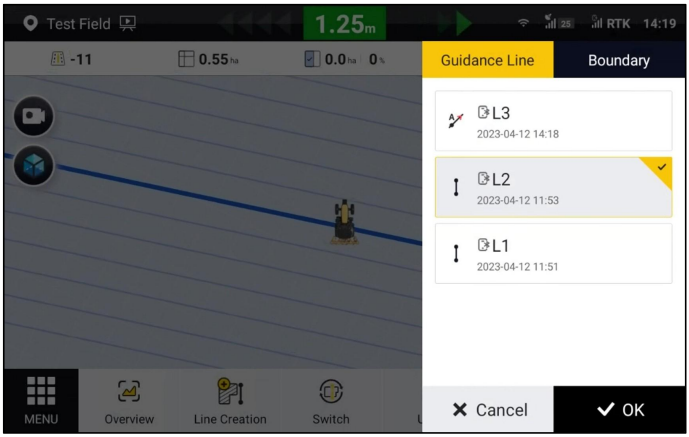


Figure 62. Switch the guidance line

4.2.4 Translating a Guidance Line

For a straight guidance line, such as an AB line or A+ line, you can translate the guidance line to the left or right in a perpendicular direction to the guidance line you are currently engaging. For a curved guidance line, such as the curve line or pivot circle, you can translate the guidance line to the front, back, left or right relative to your current heading.

Figure 63. Translate a guidance line

Translating an AB line or A+ line

When you are using a straight guidance line, tap in the lower right corner of the mapping guidance panel, and select **Translate to the current position** or **Guidance Line Translation** as required.

- **Translate to the current position**: Drive the vehicle to an appropriate position, select **Translate to the current position**, and tap **OK** to translate the guidance line to the vehicle position.
- **Guidance Line Translation**: Select **Guidance Line Translation**, set the moving direction and distance, and then tap **OK** to translate the current guidance line to an appropriate position.

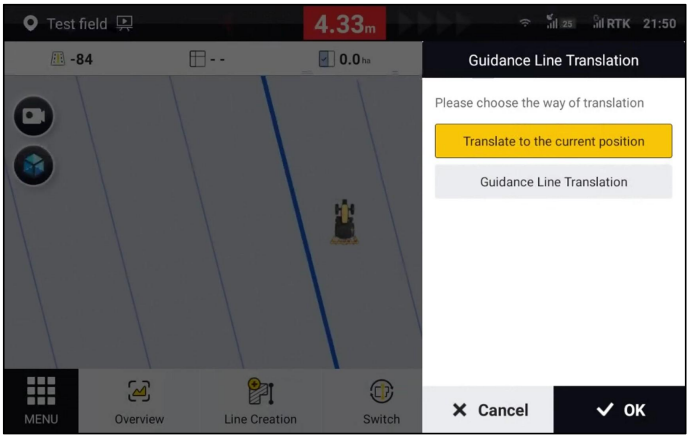


Figure 64. Translate to the current position

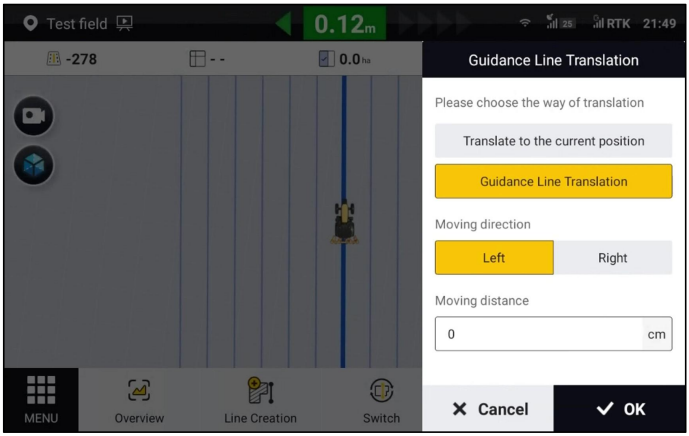


Figure 65. Translate a straight line

Translating a curve line or pivot circle

When you are using a curved guidance line, such as a curve line or pivot circle, tap in the lower right corner of the mapping guidance panel, enter the translation distance, and tap a direction button to move the guidance line to an appropriate position. You can use different direction buttons to translate the guidance line for multiple times. Tap **Close** to end the guidance line translation.

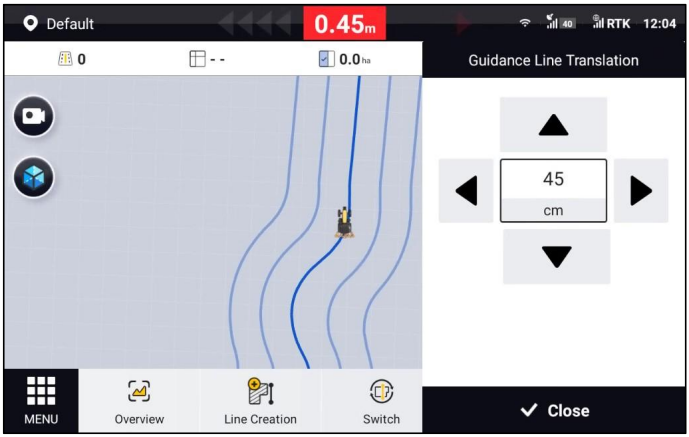


Figure 66. Translate a curve line

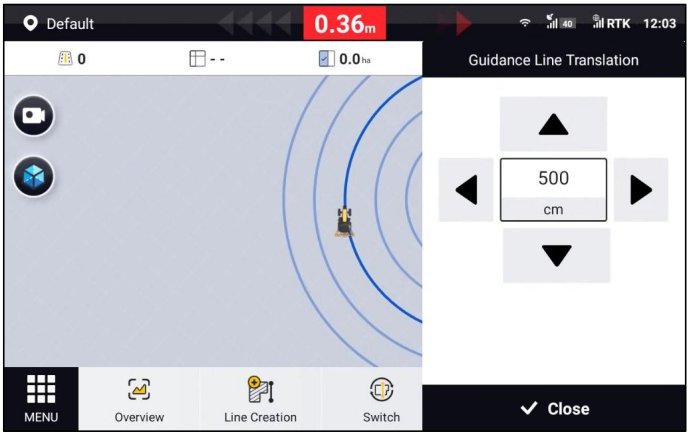


Figure 67. Translate a pivot circle

4.2.5 Shifting the Boundary

To shift the boundary during a task operation, choose **MENU** > **FIELD** > **Field** > **Boundary**, tap at the bottom, and the system goes to the home screen and displays the boundary shift panel automatically.

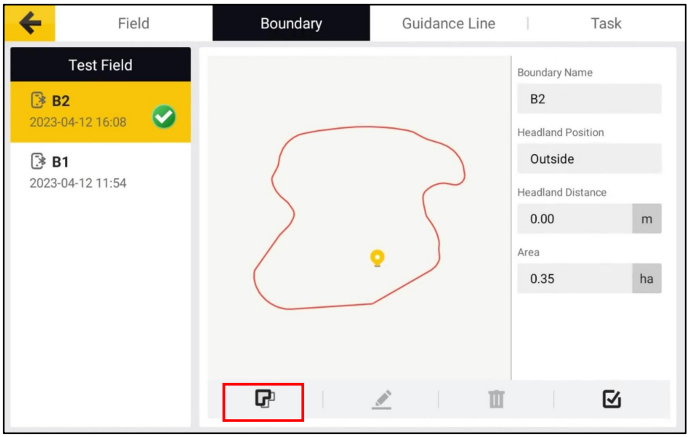


Figure 68. Boundary

Enter the boundary shift distance, and tap a direction button to shift the boundary by the set distance. You can shift the boundary in different directions for multiple times to an appropriate position. Tap **Close** to end the boundary shift.

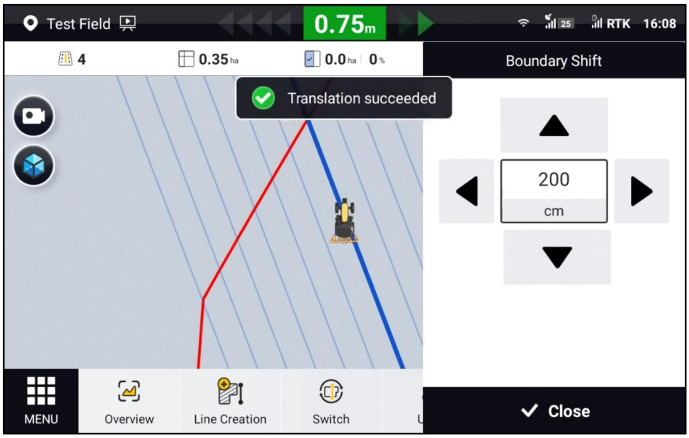


Figure 69. Shift the boundary

4.2.6 Scaling Up or Down a Pivot Circle

When you are using a pivot circle, you can use the scaling feature to adjust the radius. Tap in the lower right corner of the mapping guidance panel, and select **Scale to current position** or **Scale by specified distance** as required.

Figure 70. Scaling button

- **Scale to current position**: Drive the vehicle to the target point, select **Scale to current position**, and tap **OK** to scale the pivot circle to the vehicle position.
- **Scale by specified distance**: Select **Scale by specified distance**, set the scaling direction and distance, and then tap **OK** to scale the pivot circle to an appropriate position.

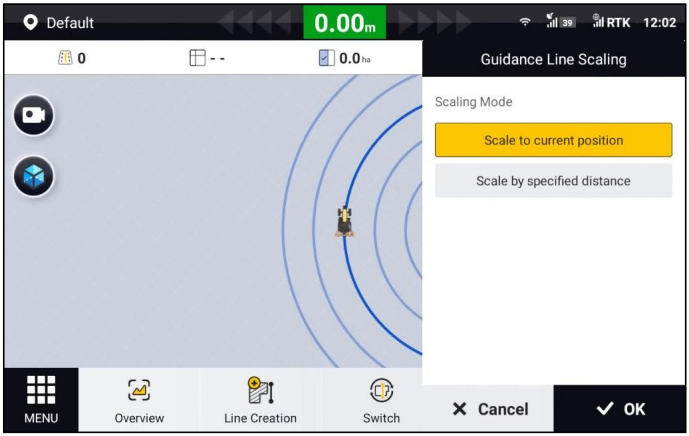


Figure 71. Scale to current position

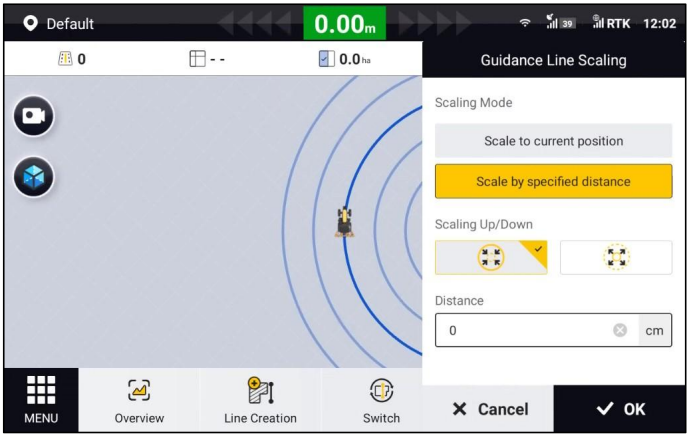


Figure 72. Scale by specified distance

4.2.7 Scaling Up or Down the Boundary

During a task operation, to scale up or down the boundary according to the actual headland positions, choose **MENU** > **FIELD** > **Field** > **Boundary**, tap at the bottom, and set the scaling direction and distance in the popup window.

Note: To edit the current applied boundary, tap in the lower right corner to cancel the application, edit the boundary as required, and apply this boundary again.

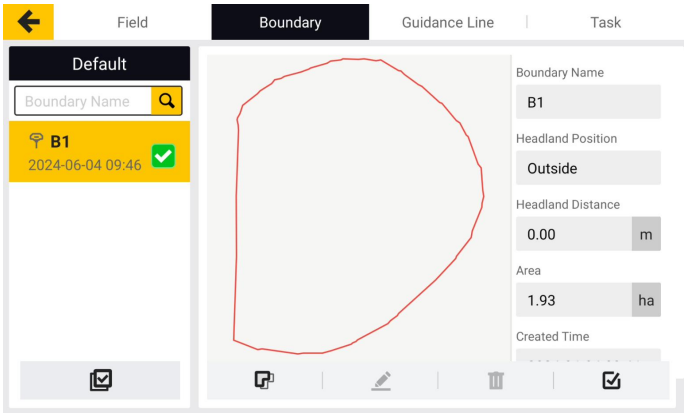


Figure 73. Boundary

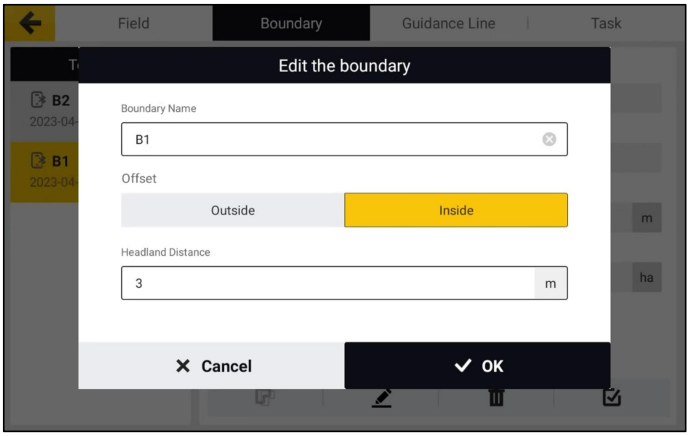


Figure 74. Edit the boundary

A new black boundary appears on the map on both the boundary information screen and the home screen, and the system plans the operation path and records the operation data based on the new boundary. The original red boundary is displayed only for reference.

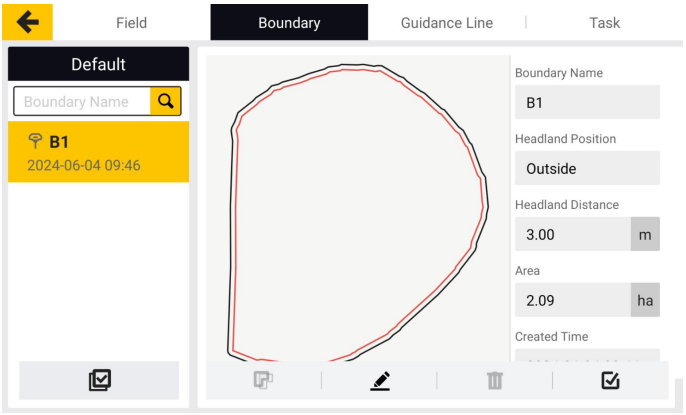


Figure 75. New boundary

4.2.8 Marking Headlands

The headlands marked is used to display the field head position on the interface to avoid safety accidents, especially when operating at night.

Figure 76. Headland marking button

When a guidance line is imported, drive the vehicle to the headland position, tap in the upper right corner of the mapping guidance panel to mark the current position as the headland. The headland line appears as a line perpendicular to the current guidance line.

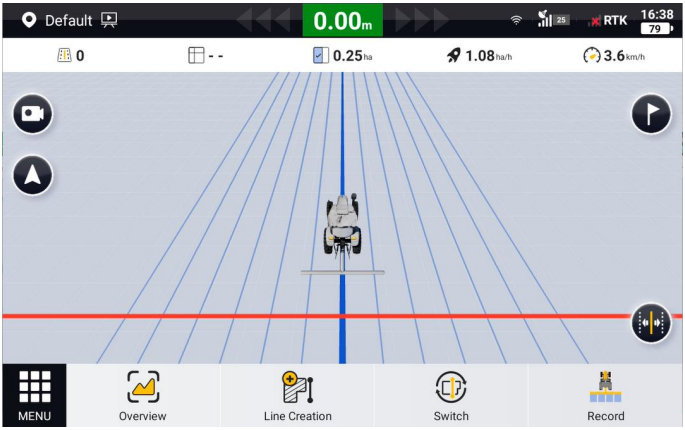


Figure 77. Headland 1

To mark the next headland, tap again, and appears.

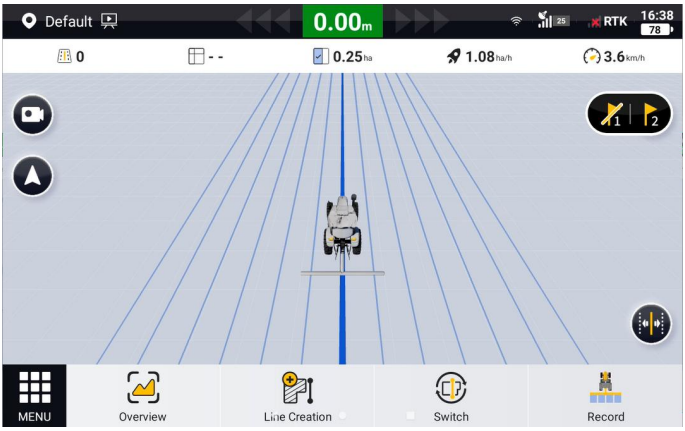


Figure 78. Mark the next headland

Drive the vehicle along the current guidance line for at least 50 m, and tap  to mark the current position as headland 2.

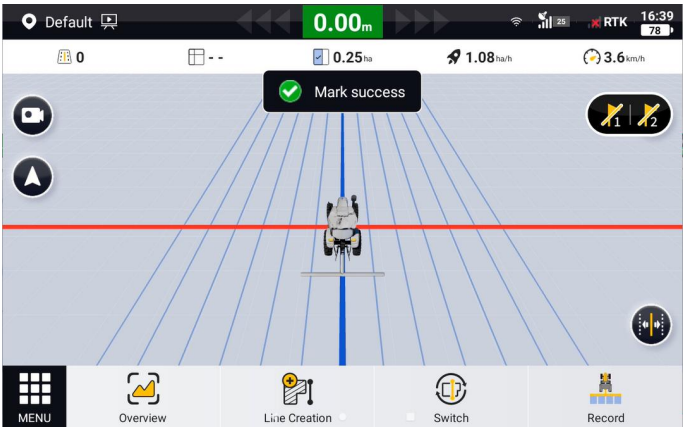


Figure 79. Headland 2

Note:

1. A maximum of two headlands are allowed.
2. When no guidance lines are imported, headland marking is not supported.
3. The marked headlands are canceled when a new guidance line is used.

4.2.9 Turning on the Wi-Fi Camera

A Wi-Fi camera installed on the vehicle body helps to monitor the real view of the

operation site, and assists with reversing if installed on the back of the vehicle. When a Wi-Fi camera is turned on, the system splits the screen to show the mapping guidance panel and the camera image.

Figure 80. Wi-Fi camera button

When no Wi-Fi cameras are connected, tap **Add a camera** on the camera panel, and follow the instructions in section 5.3 "Wi-Fi Camera (Optional)" to connect the camera.

When two Wi-Fi cameras are connected, you can tap the number at the bottom of the camera image panel to switch to another camera image.

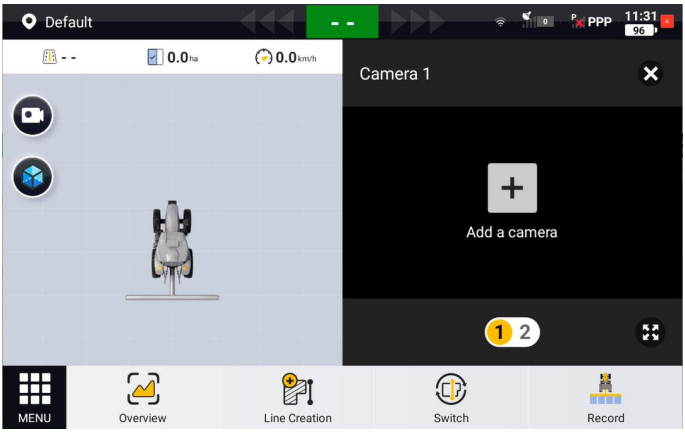


Figure 81. Screen splitting

Tap ⛶ at the bottom to expand the camera image to full screen. Tap ⛶ to restore the screen splitting.

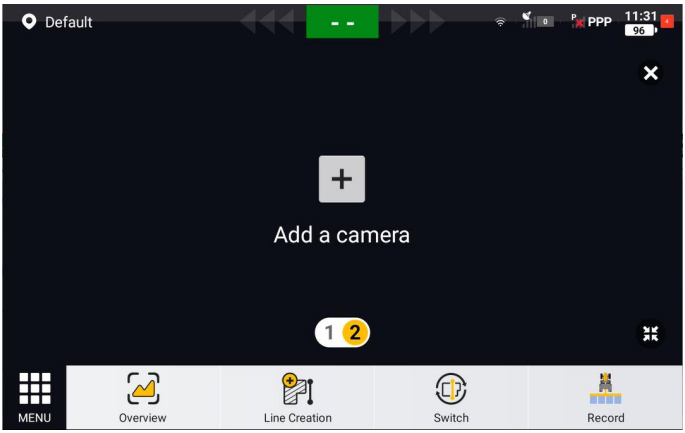


Figure 82. Full screen

Tap ✕ in the upper right corner or in the upper left corner of the mapping guidance screen to close the camera image.

5 Applications

Choose **MENU** > **APPLICATIONS** to access all the application features.

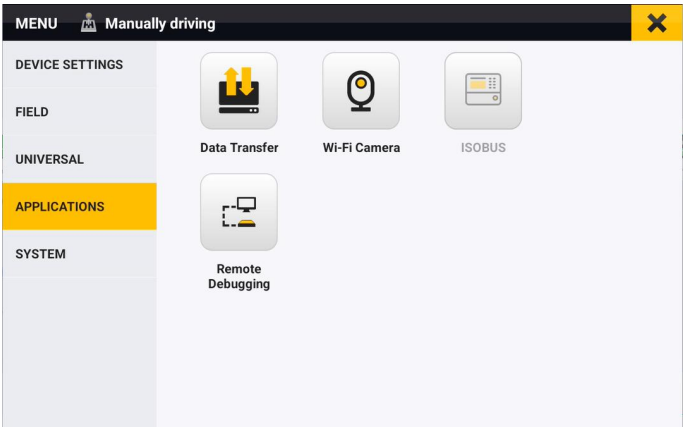


Figure 83. Applications

5.1 Remote Debugging

Remote debugging, supported by the background control program, enables the service personnel to remotely control the screen to perform debugging.

Turn on the **Remote Debugging** switch, and the following popup appears when the service person initiates a debugging request remotely. Tap **Agree** before the countdown ends, and then tap **START NOW** to start remote debugging.

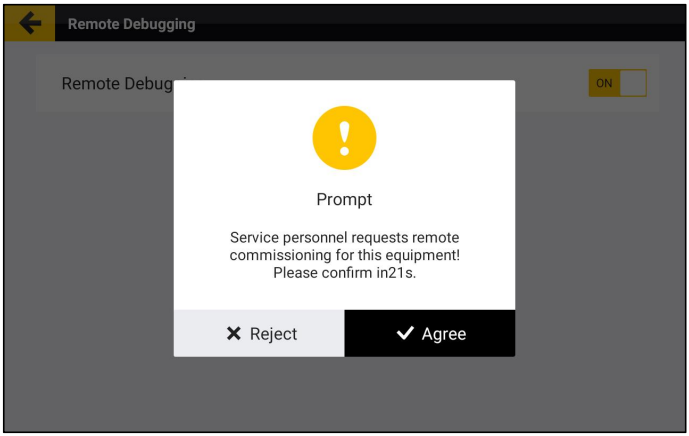


Figure 84. Remote debugging request

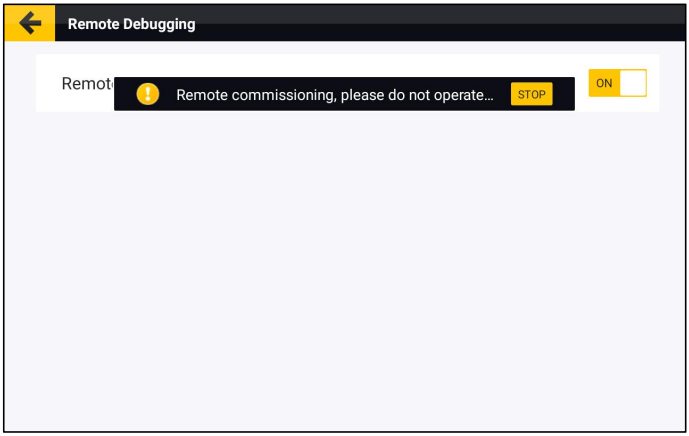


Figure 85. Remote debugging in progress

5.2 Wi-Fi Camera (Optional)

Complete the hardware connection of the Wi-Fi camera and power it on. Tap **WiFi Camera** on the **APPLICATIONS** screen to open the camera binding screen, and the hotspot is turned on automatically. Use the camera to scan the QR code to identify and bind the camera (refer to the instructions on the screen for details). The bound camera is displayed on the right side of the screen. You can tap the delete icon to unbind the camera.

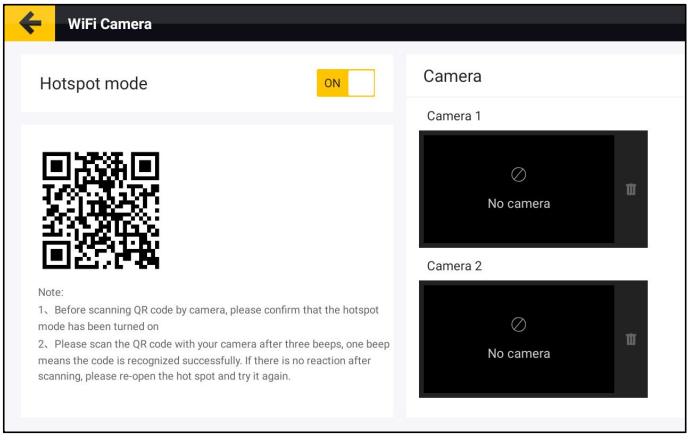


Figure 86. Bind Wi-Fi cameras

After the camera is bound, tap the back arrow to return to the home screen to turn on the camera. Refer to section 4.2.9 "Turning on the Wi-Fi Camera" for details.

Note:

1. The Wi-Fi camera is an optional accessory and must be purchased separately.
2. A maximum of two Wi-Fi cameras can be bound.

5.3 Data Transfer

Through the Internet or USB, the task files can be exported and shared with other control terminals, and the task files from other control terminals can be imported into the system. The current version supports the sharing of boundary files and guidance line files.

5.3.1 Via the Internet

You can transfer data to other users of drive systems via the Internet.

Tap **Data Transfer** on the **APPLICATIONS** screen, and then select the files to be transferred.

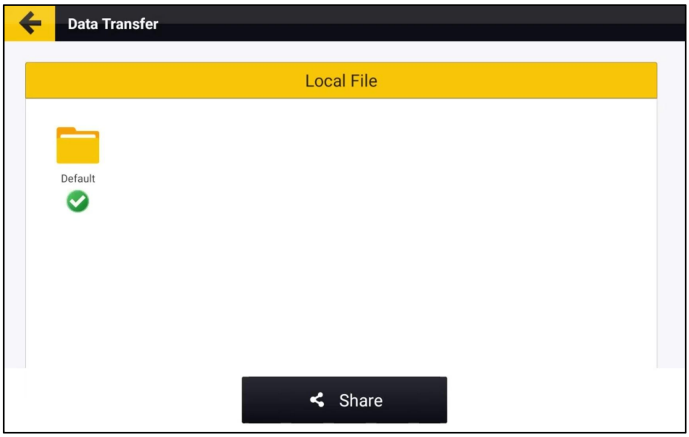


Figure 87. Select the files

Note:

1. Each field folder represents a field and contains all the task information of the field. Tap the circle below the folder to select all the boundary files and guidance line files in the folder.
2. Tap the field folder to open it, and then tap the circle below either the boundary folder or the guidance line folder to select all the files in the folder.
3. Tap the boundary folder or the guidance line folder to open it, and then select one or multiple files in the folder.
4. Task data cannot be shared online.

- Tap **Share**, and a popup appears. Enter the user account of the recipient, select the SN of the target device, and tap **OK**.

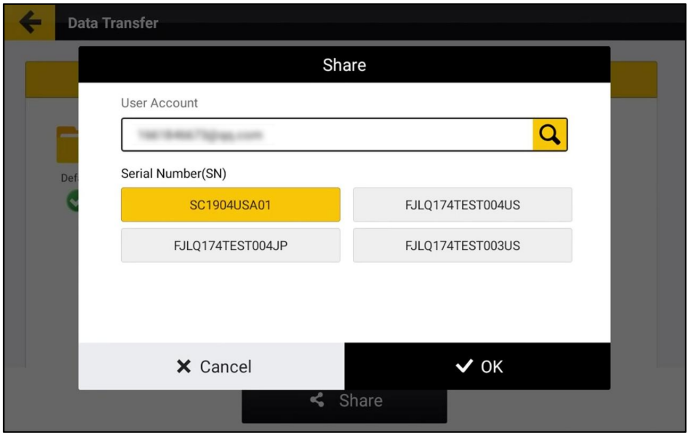


Figure 88. Enter the user account and select the SN

A confirmation popup appears on the screen of the target device.

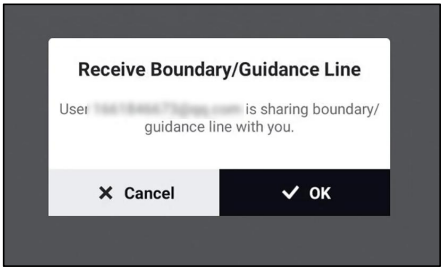


Figure 89. Confirmation popup

The recipient may tap **OK** to receive the files, and after the files are received successfully, choose **MENU** > **FIELD** > **Field** > **Boundary** or **Guidance Line** to check the boundaries or guidance lines received. Boundaries and guidance lines shared via the Internet are marked with in front of the name.

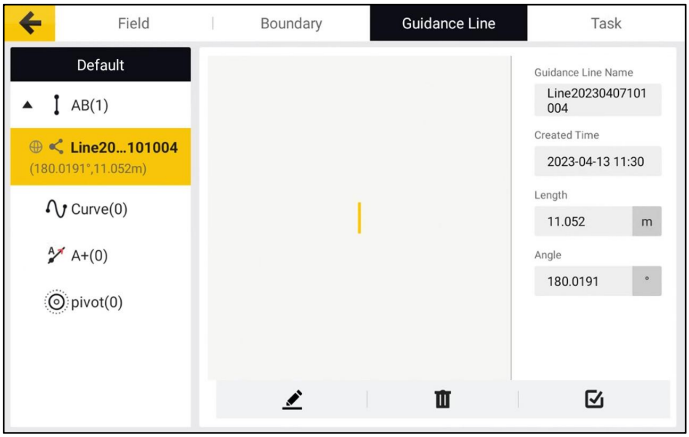


Figure 90. Check received boundaries and guidance lines

5.3.2 Via USB

You can import and export task files via USB. The current version only supports the transfer of SHPFILE, ISOXML, KML, and KMZ files.

Transmittable content includes datums (AB straight lines, curves and line groups; ISOXML format can also transmit A+ straight lines, pivots), boundaries and task data.

Connect the USB flash drive to the Type-C port of the control terminal. An adapter is required if the USB flash drive uses a Type-A connector.

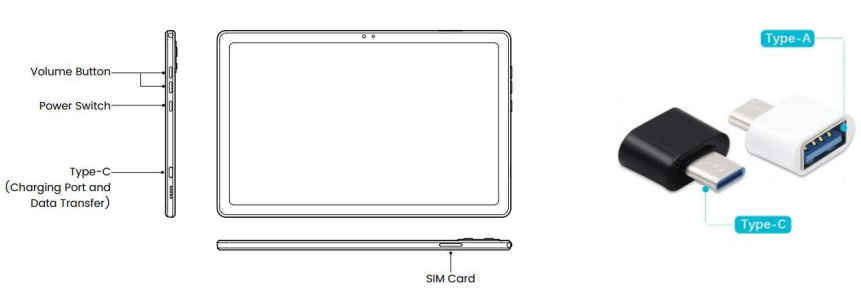


Figure 91. Connect the USB flash drive to the control terminal

Export files

Select the local files to be exported on the left, tap **Export**, select the format, and tap **OK**. Then, the selected files are exported to the folder named "Output_DATA" on the right.

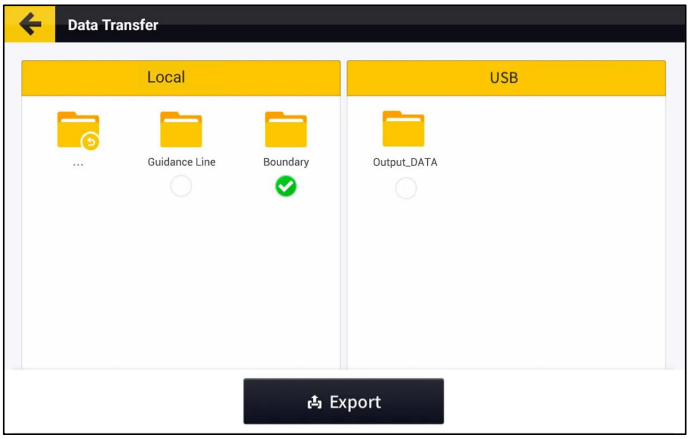


Figure 92. Export files

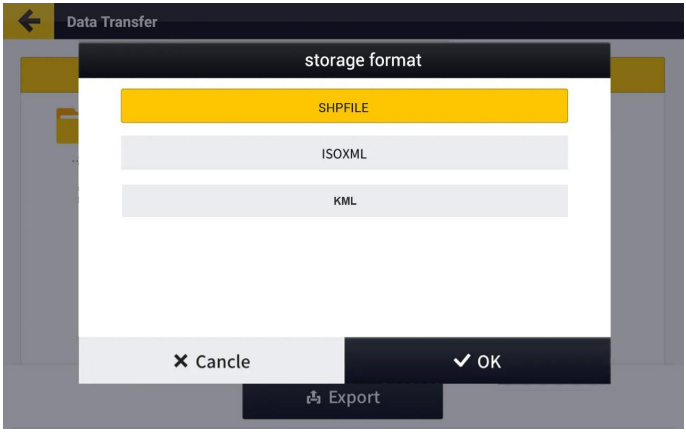


Figure 93. Select the format

Import files

Select the external files to be imported on the right, tap **Import**, and tap **OK**. Then, the selected files are imported into the local field folder with the same name as that of the original field folder. If such local field folder cannot be found, the system automatically creates one.

Note:

1. After the USB flash drive is connected to the control terminal, you can only transfer files via USB.
2. When Shapefile imports a line group, you need to make sure that the line group objects have been synthesized into one object.

6 Others

6.1 Device Settings

Choose **MENU** > **DEVICE SETTINGS** to access features regarding Correction Signal Source, Vehicle Library, Implement Library and diagnosis, as shown below.

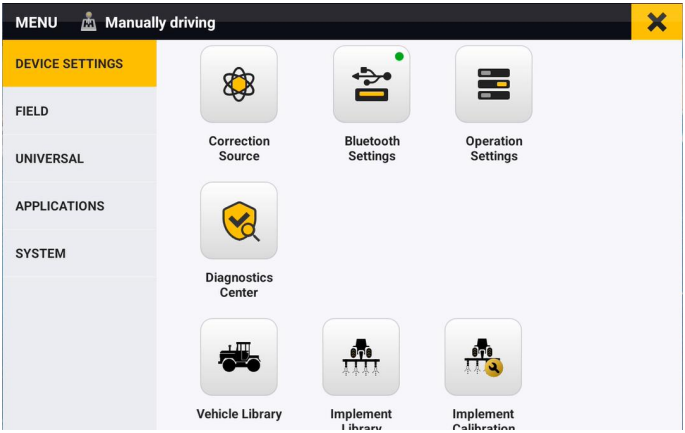


Figure 94. DEVICE SETTINGS screen

6.1.1 Bluetooth Settings

Tap **Bluetooth Settings** on the **DEVICE SETTINGS** screen to connect, rename and unpair Bluetooth devices.

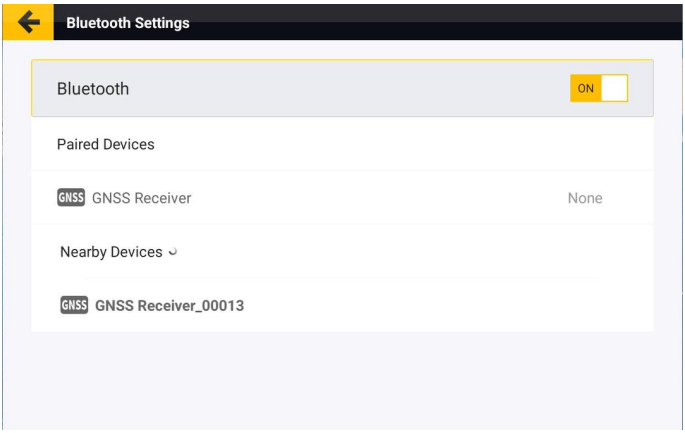


Figure 95. Bluetooth Connection

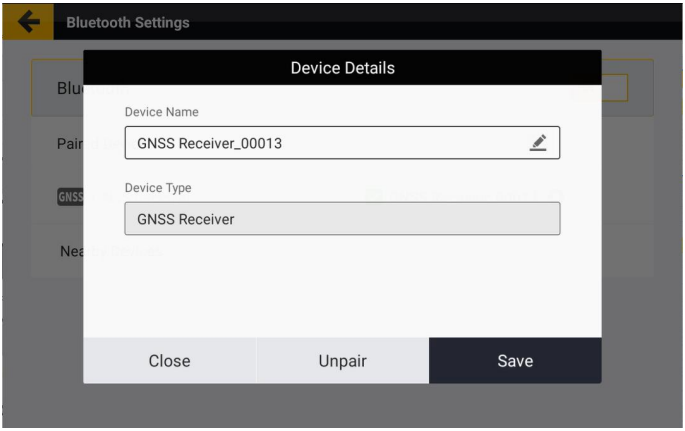


Figure 96. Bluetooth Setting

6.1.2 Implement Calibration

Tap **Implement Calibration** on the **DEVICE SETTINGS** screen to calibrate the implement. Refer to section 2.9 "Calibrating the Implement" for details.

6.1.3 Operation Settings

Tap the **Operation Settings** button on the **DEVICE SETTINGS** screen to set the task settings.

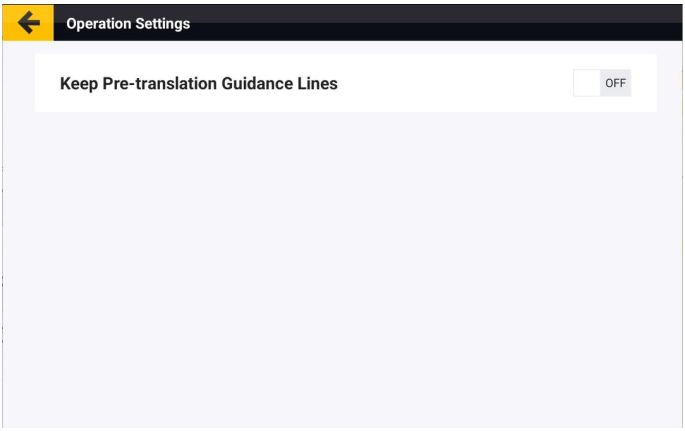


Figure 97. Operation Settings

Keep Pre-translation Guidance Lines: Enable this function, the guidance line after translating will be used as a new guidance line, and the original guidance line will be retained; Disable this function, the original guidance line will be directly replaced after translating.

6.1.4 Correction Source

Tap **Correction Source** on the **DEVICE SETTINGS** screen to configure the correction source. Refer to section 2.6 "Connecting to a Signal Source" for details.

6.1.5 Diagnostics Center

Tap **Diagnostics Center** on the **DEVICE SETTINGS** screen to view the version information, scenario information, hardware status, and parameter information.

Version information

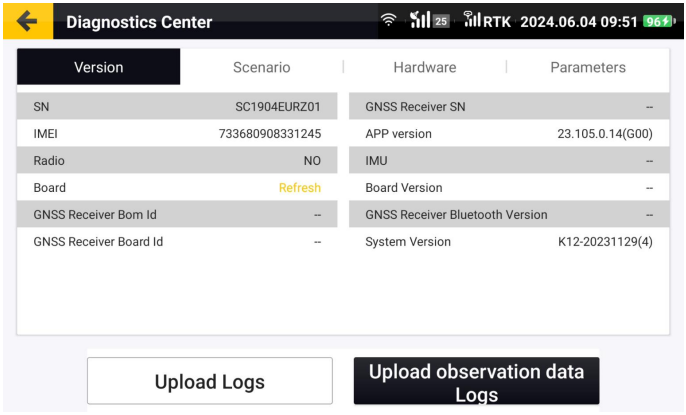


Figure 98. Version tab

Scenario information

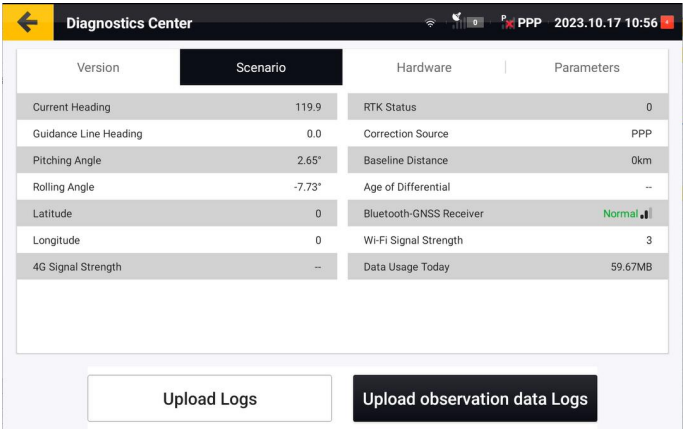


Figure 99. Scenario tab

Hardware status

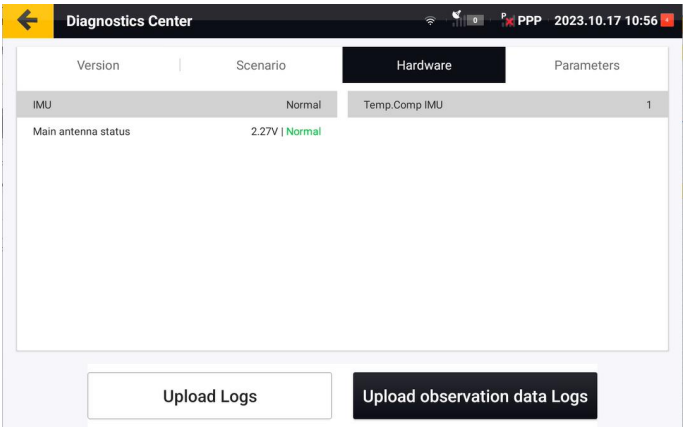


Figure 100. Hardware tab

Parameter information

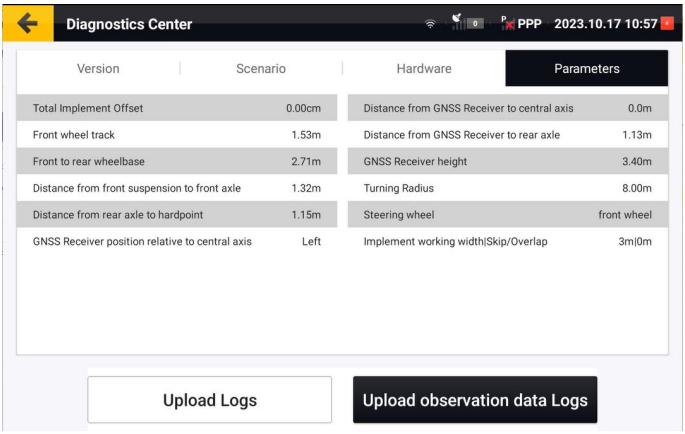


Figure 101. Parameters tab

Upload logs

When a software or system fault occurs, upload the logs immediately to facilitate the troubleshooting of the service personnel.

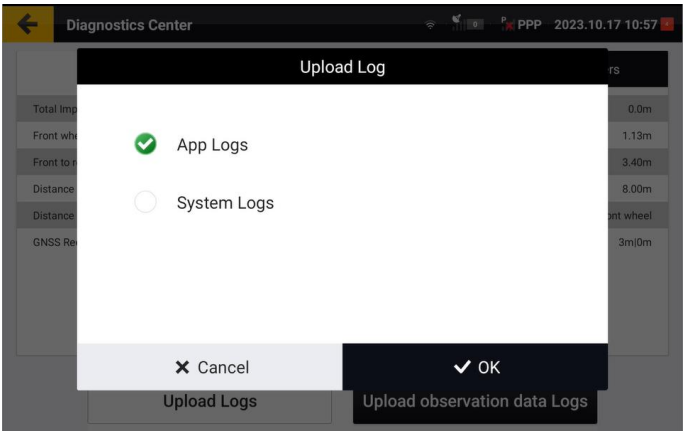


Figure 102. Upload logs

Upload observation data logs

At the request of the service personnel, upload observation data logs to facilitate the analysis of technical problems regarding satellite positioning.

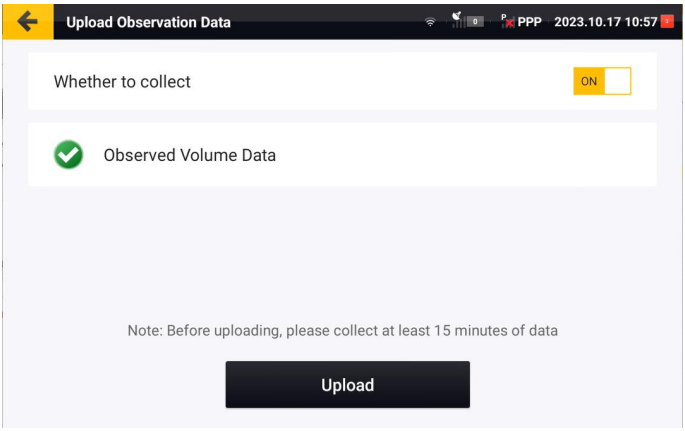
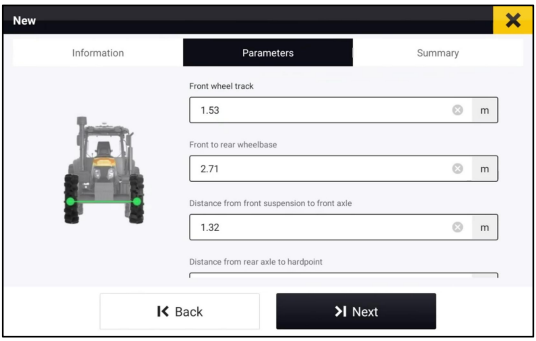


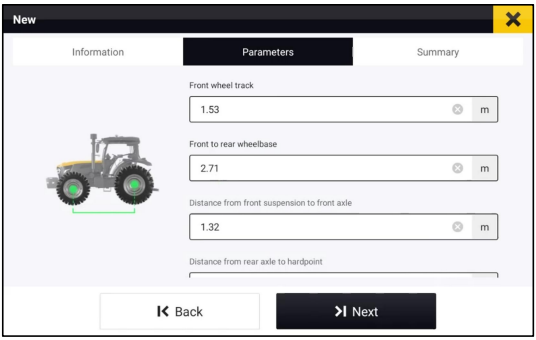
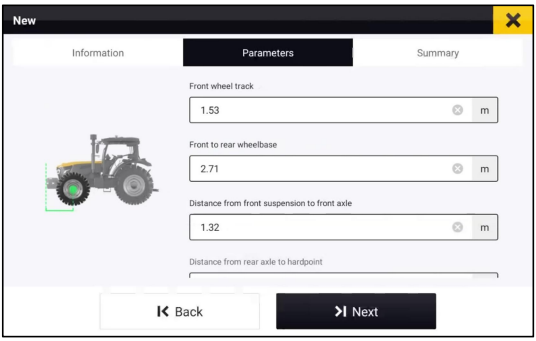
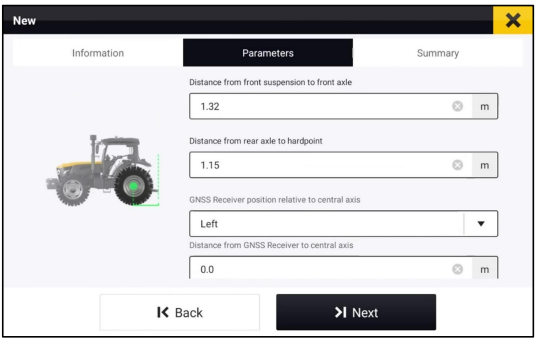
Figure 103. Upload observation data logs

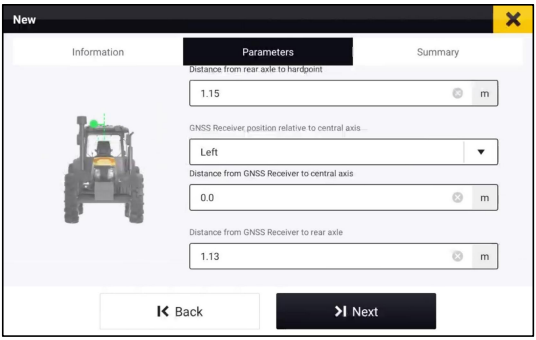
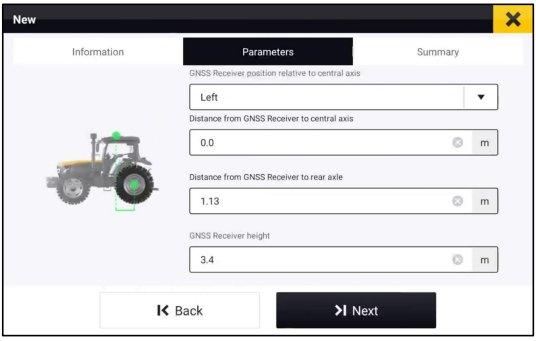
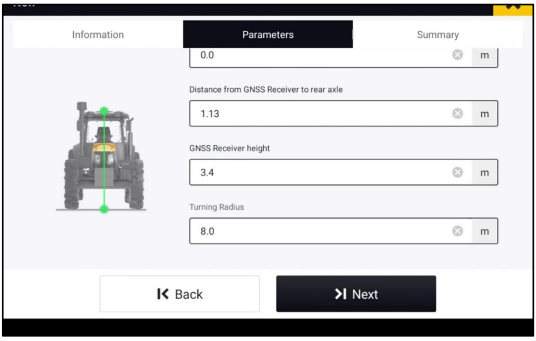
6.1.6 Vehicle Library

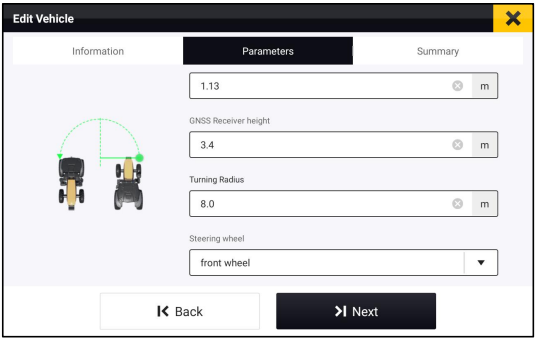
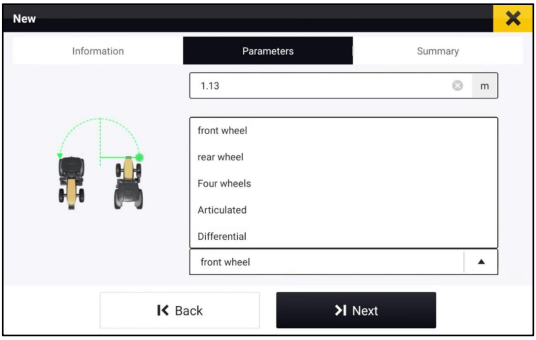
Tap **Vehicle Library** on the **DEVICE SETTINGS** screen to configure vehicle parameters. Refer to section 2.7 "Setting Vehicle Parameters" for details.

Vehicle Parameters

Parameter	Illustration
Front wheel track	

Parameter	Illustration
Front to rear wheelbase	
Distance from front suspension to front axle	
Distance from rear axle to hardpoint	

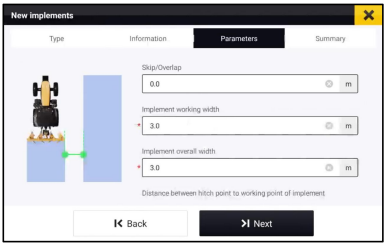
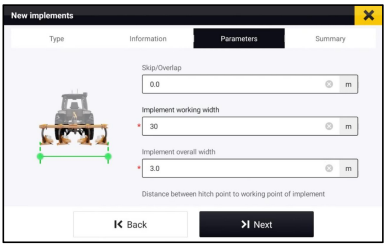
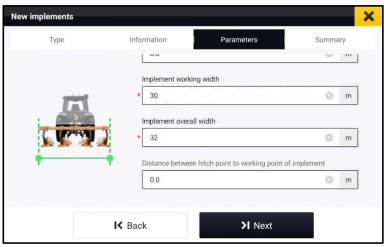
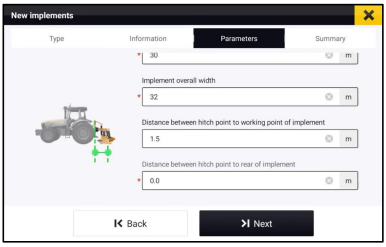
Parameter	Illustration
GNSS receiver position relative to central axis; Distance from GNSS receiver to central axis	
Distance from GNSS receiver to rear axle	
GNSS receiver height	

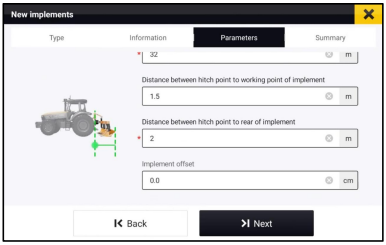
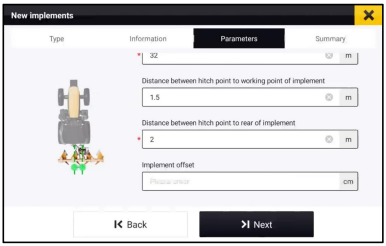
Parameter	Illustration
Turning radius	
Steering wheel	

6.1.7 Implement Library

Tap **Implement Library** on the **DEVICE SETTINGS** screen to configure implement parameters. Refer to section 2.8 "Setting Implement Parameters" for details.

Implement Parameters

Parameter	Description	Illustration
Skip/Overlap	The spacing between two adjacent rows.	
Implement working width	The actual working width of the implement. It is used to plan the guidance line spacing.	
Implement overall width	The total width of the implement. It is used to reserve the safety distance during automatic path planning.	
Distance between hitch point to working point of implement	The vertical distance between the working point of the implement and the hitch point of the tractor. It is used to determine the accurate position of the working point.	

Parameter	Description	Illustration
Distance between hitch point to rear of implement	The total length of the implement. It is used to reserve the safety distance during automatic path planning.	
Implement offset	Offset from the implement centerline to the tractor centerline. It is used to determine the accurate position of the working point.	

6.2 Field

Choose **MENU** > **FIELD** > **Field** to view and manage fields, boundaries, guidance lines, and tasks.

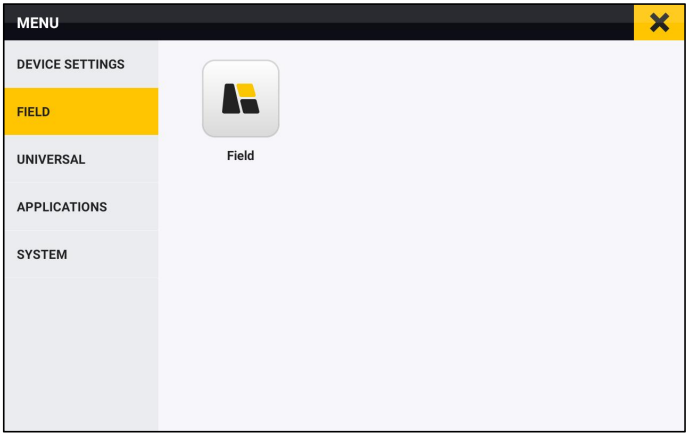


Figure 104. Select Field

6.2.1 Field

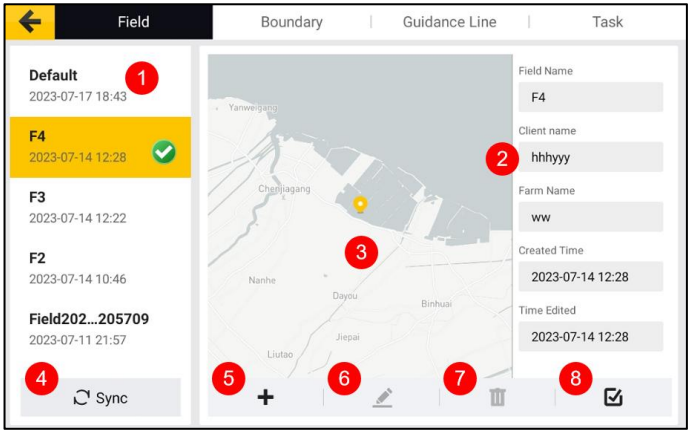


Figure 105. Field tab

Boundaries, guidance lines, and tasks are bound with fields. On the **Field** tab, you can view, create, modify, delete, and apply a field, and synchronize field information.

1. **Field list:** Shows all the fields, including the name and the creation time.
2. **Basic information of field:** Shows the field name, client name, and farm name.
3. **Field map:** Shows the locations of the vehicle and the applied boundary and guidance line.
4. **Synchronize field information:** Tap **Sync** to synchronize field information in the cloud to the control terminal.
5. **Create a field:** Tap +, and enter the field name, client name, and farm name.
6. **Modify field information:** Tap to modify the field name, client name, and farm name.
7. **Delete a field:** Tap to delete the field and all the associated boundaries, guidance lines, and task data, and they **cannot be restored**.
8. **Apply a field:** Tap to apply the field to the operation.

6.2.2 Boundary

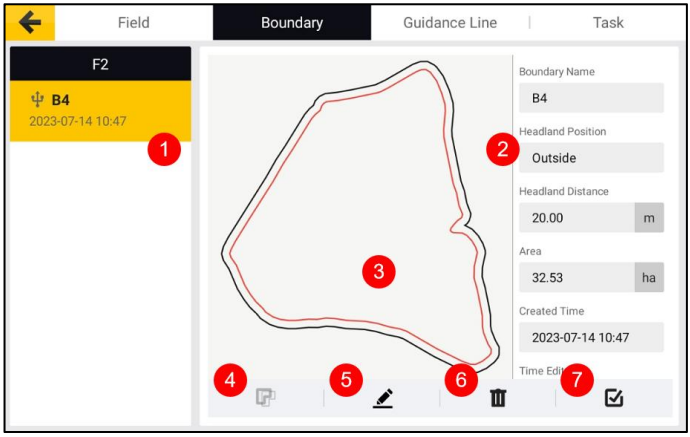


Figure 106. Boundary tab

1. **Boundary list:** Shows all the boundaries, including the name and the creation time.
2. **Basic information of boundary:** Shows the boundary name, headland position, headland distance, and area.
3. **Boundary map:** Shows the boundary location.
4. **Shift the boundary:** Refer to section 4.2.5 "Shifting the Boundary" for details.
5. **Modify boundary information:** Tap to modify the boundary name, and move the boundary inside or outside by the set distance to mark the position to turn around or the real position of the headland. Refer to section 4.2.7 "Scaling Up or Down the Boundary" for details
6. **Delete a boundary:** Tap to delete the boundary. Deleted boundaries can be restored in the recycle bin within 30 days. Refer to section 6.4 "System" for details about the recycle bin.
7. **Apply a boundary:** Tap to apply the boundary to the operation.

Note: To create a boundary, tap **Line Creation** on the home screen.

6.2.3 Guidance Line

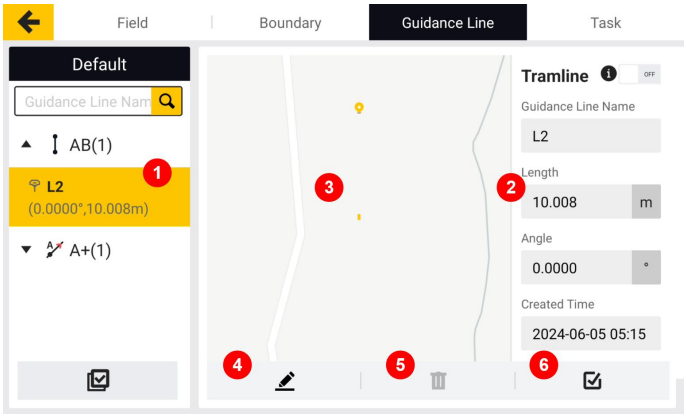


Figure 107. Guidance Line tab

1. **Guidance line list:** Shows all the guidance lines of different types, including the name, angle, and length.
2. **Basic information of guidance line:** Shows the guidance line name, creation time, length, and angle.
3. **Guidance line map:** Shows the guidance line location.
4. **Modify guidance line information:** Tap to modify the guidance line name.
5. **Delete a guidance line:** Tap to delete the guidance line. Deleted guidance lines can be restored in the recycle bin within 30 days. Refer to section 6.4 "System" for details about the recycle bin.
6. **Apply a guidance line:** Tap to apply the guidance line to the operation.

Note: To create a guidance line, tap **Line Creation** on the home screen.

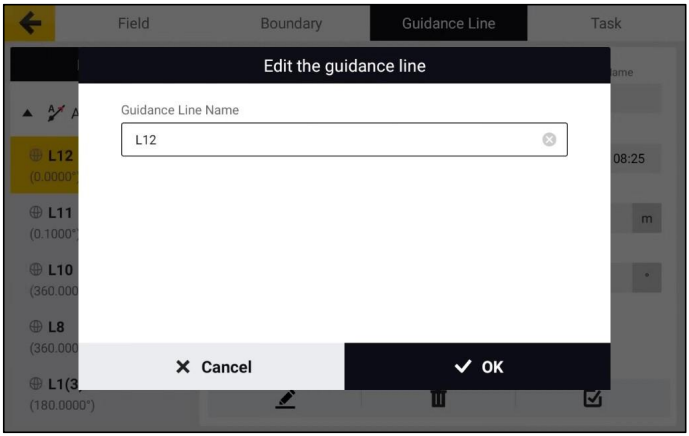


Figure 108. Modify the guidance line name

6.2.4 Task

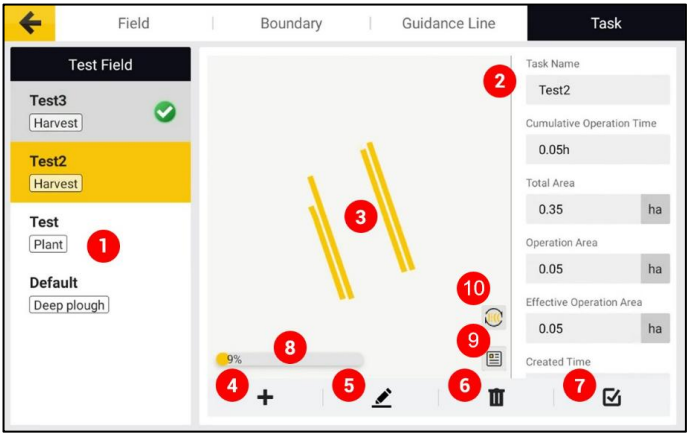


Figure 109. Task tab

1. **Task list:** Shows all the tasks, including the name and type.
2. **Basic information of task:** Shows the task name, cumulative operation time, total area, operation area, effective operation area, creation time, start time, and end time.
3. **Task map:** Shows the operation trajectories.
4. **Create a task:** Tap +, and then enter the task name and select a task type.

5. **Modify task information:** Tap to modify the task name and type.
6. **Delete a task:** Tap to delete the task. Deleted tasks can be restored in the recycle bin within 30 days. Refer to section 6.4 "System" for details about the recycle bin.
7. **Apply a task:** Tap to apply the task to the operation.
8. **Task progress:** Shows the percentage of operated area to the total area enclosed by the applied boundary.
9. **Operation data:** Tap to view the historical data of each operation.

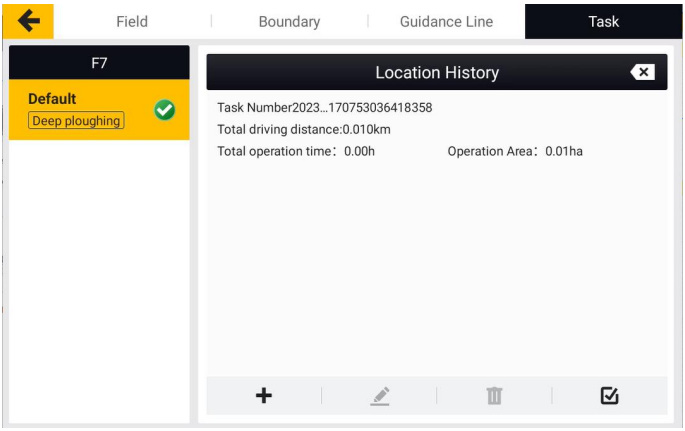


Figure 110. Historical operation data

10. **Tasks into Line Groups:** Tap to convert a task track into a line group for use. After successful conversion, it can be found in the list of line groups of guidance lines.

6.3 Universal

Choose **MENU** > **UNIVERSAL** to access the **User Information**, **System Upgrade**, **Board Upgrade**, and **Add to Farm Management System** features.

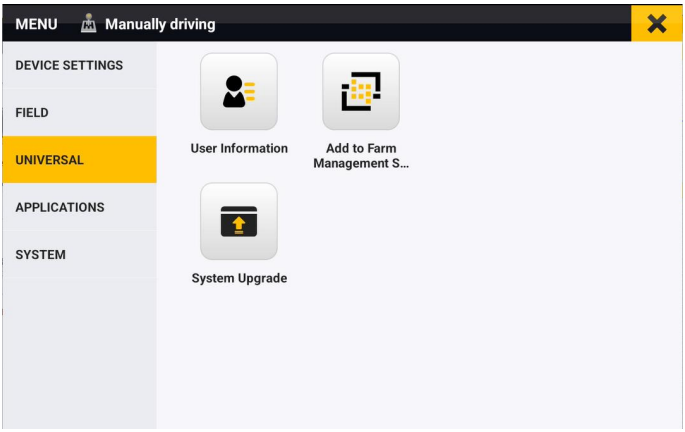


Figure 111. UNIVERSAL screen

6.3.1 User Information

Tap **User Information** on the **UNIVERSAL** screen to view the user information, installation information, and account and security information. Tap **Sign Out** to log out.

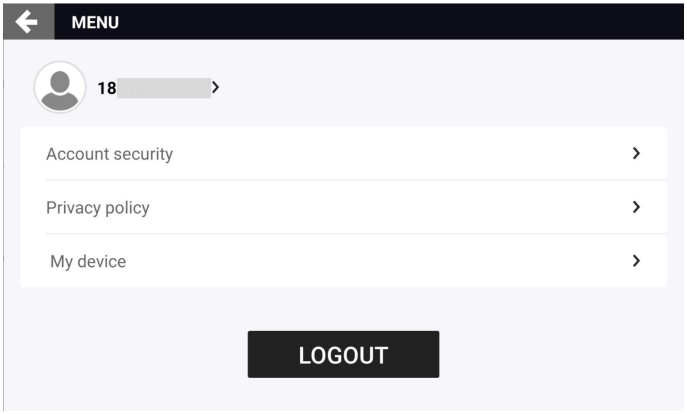


Figure 112. User Information tab

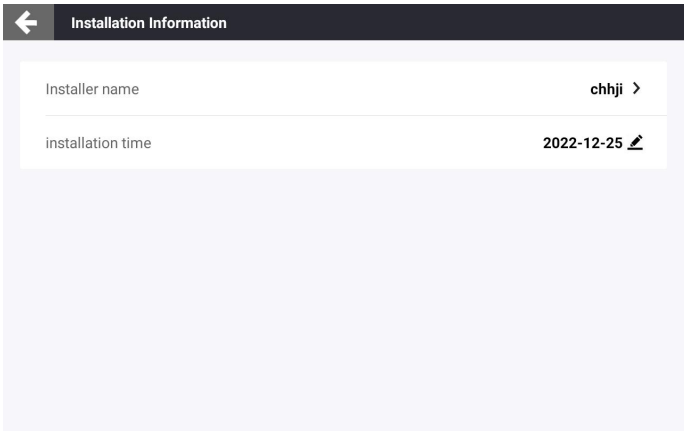


Figure 113. Installation Information tab

You can change the password on the **Account and security** tab. Tap **Send**, and the system will send a verification code to your email address. Enter the verification code you received, and tap **Next** to change the password.

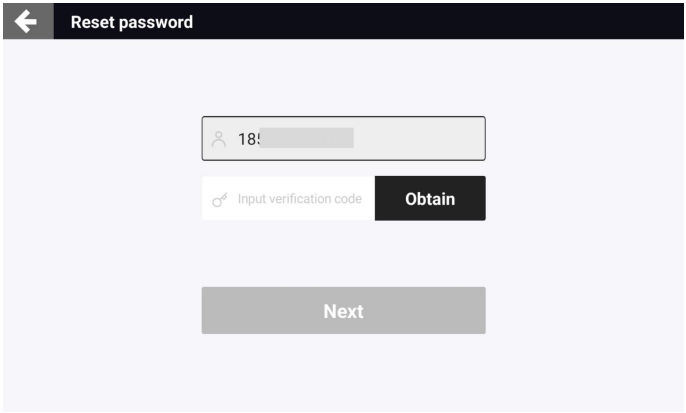


Figure 114. Change the password

6.3.2 System Upgrade

Tap **System Upgrade** on the **UNIVERSAL** screen. When a new version is available and the control terminal is connected to the Internet, the system automatically displays a popup for upgrade. If no popup is displayed, tap **Check** behind **Upgrade via Network** to check whether a new version is available. You can also upgrade the system via USB.

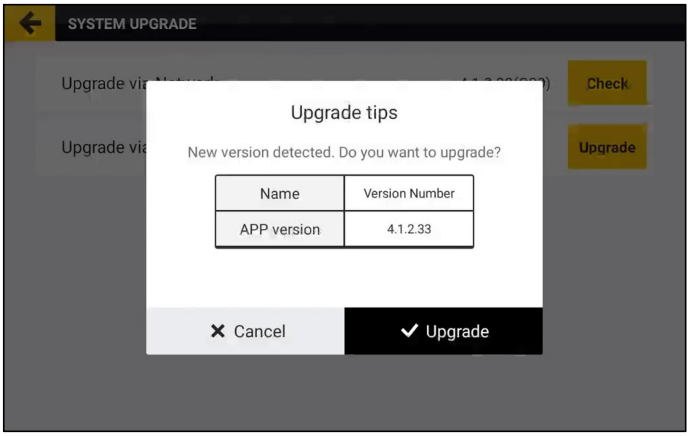


Figure 115. Popup for upgrade

The upgrade progress is displayed on the screen, and no operation can be done during the upgrade.

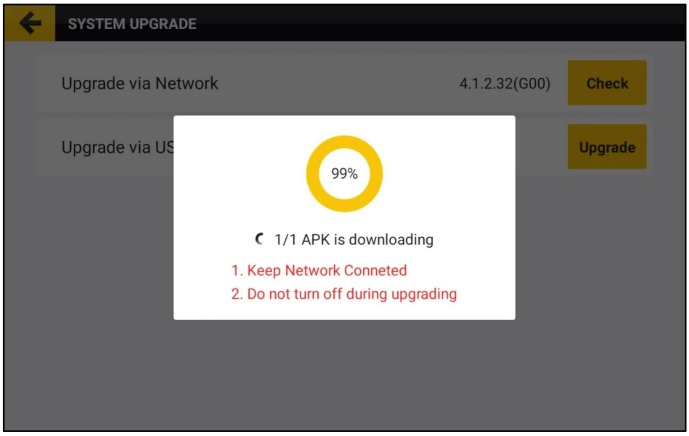


Figure 116. Upgrade in progress

If the upgrade is successful, the system displays an upgrade success message, and automatically runs the new version.

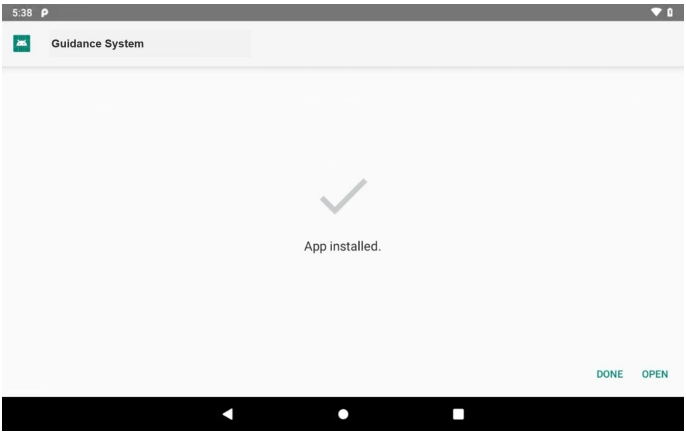


Figure 117. Upgrade completed

Note:

1. Ensure stable network connection throughout the upgrade process.
2. Before the upgrade, ensure that all the components are connected properly and there is stabilized voltage supply throughout the upgrade process.
3. If any problem occurs during the upgrade process, contact the local dealer.

6.3.3 Board Upgrade

Tap **Board Upgrade** on the **UNIVERSAL** screen, and the system automatically checks whether a new version is available for the GNSS receiver board.

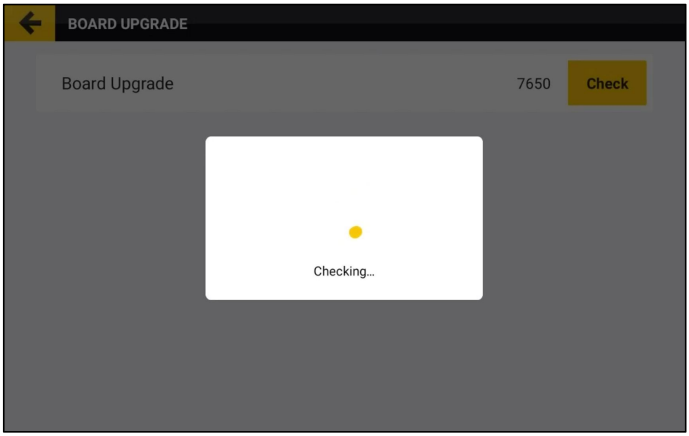


Figure 118. Check for new versions

When a new version is available and the control terminal is connected to the Internet, the system automatically displays a popup for upgrade. If no popup is displayed, tap **Check** to check whether a new version is available.

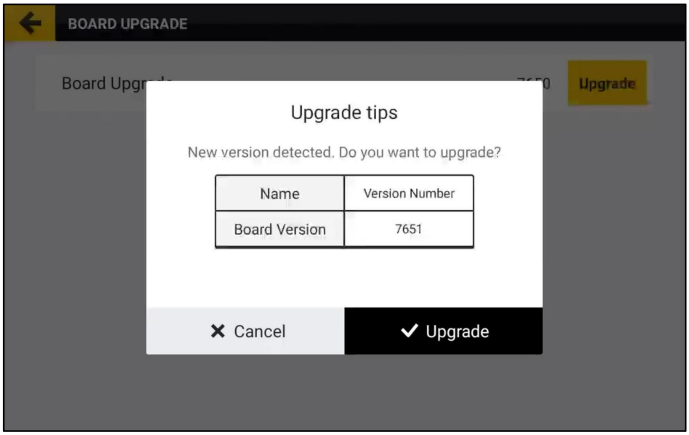


Figure 119. Popup for upgrade

The upgrade progress is displayed on the screen, and no operation can be done during the upgrade.

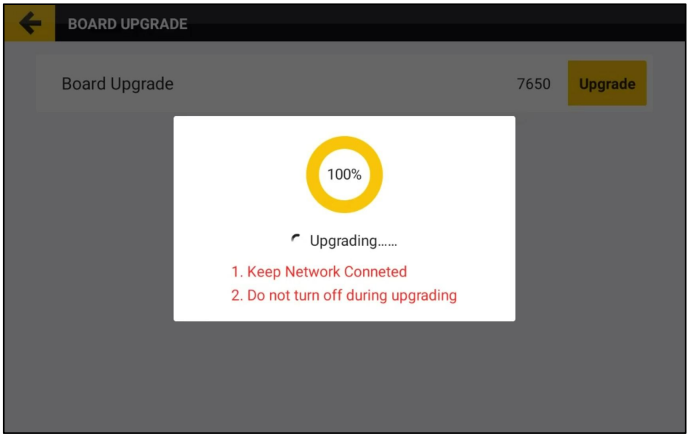


Figure 120. Upgrade in progress

If the upgrade is successful, the system displays an upgrade success message.

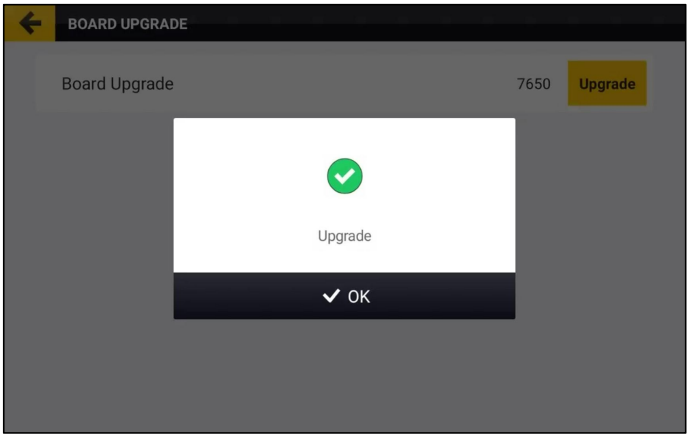


Figure 121. Upgrade completed

Note:

1. Ensure stable network connection throughout the upgrade process.
2. Before the upgrade, ensure that all the components (especially the GNSS receiver) are connected properly and there is stabilized voltage supply throughout the upgrade process.
3. If any problem occurs during the upgrade process, contact the local dealer.

6.3.4 Add to Farm Management System

Tap **Add to Farm Management System** on the **UNIVERSAL** screen, tap **Farm Management System**, enter the check code generated on the Farm Management System, and tap **OK**.

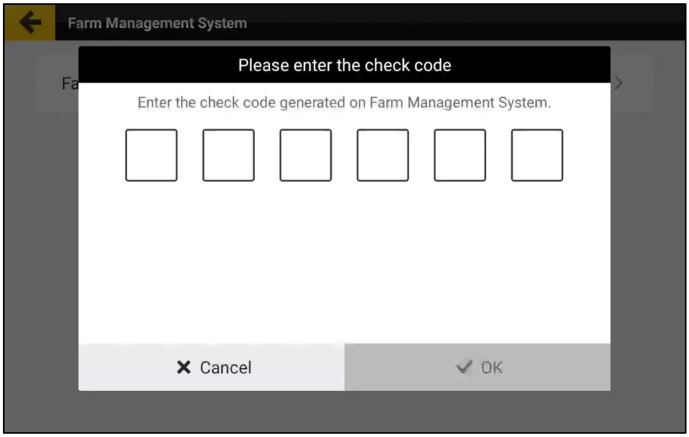


Figure 122. Enter the check code

Tap **YES** on the popup to bind the control terminal with the designated farm on the Farm Management System.

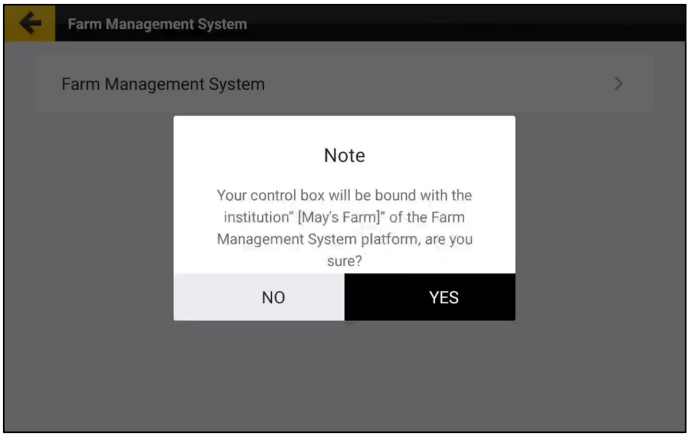


Figure 123. Bind the control terminal

6.4 System

Choose **MENU** > **SYSTEM** to access features regarding system settings, as shown below.

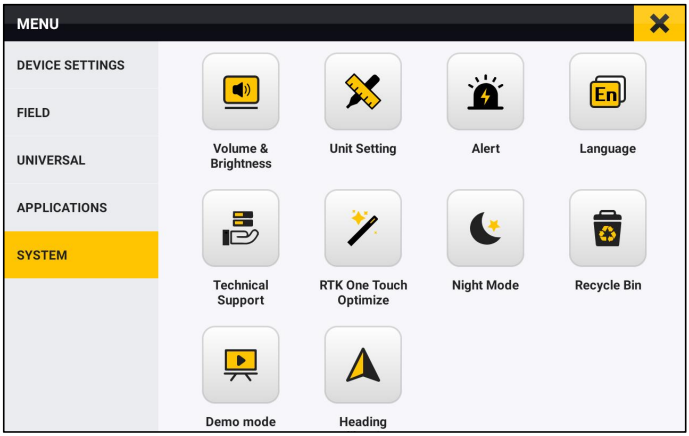
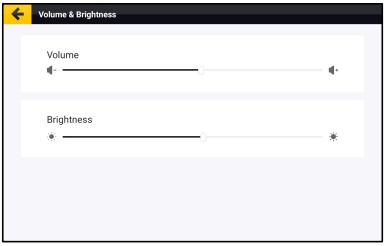
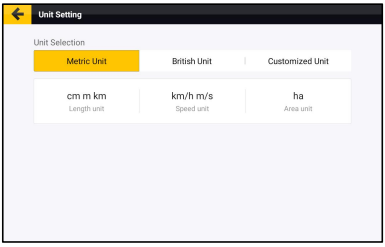
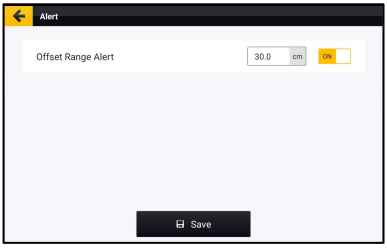
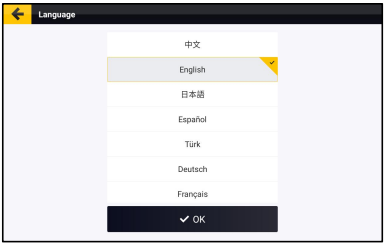
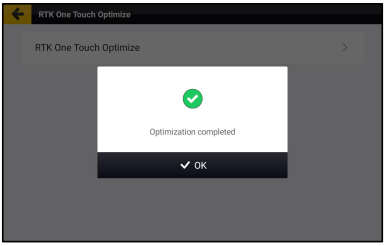
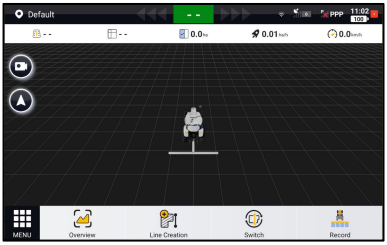
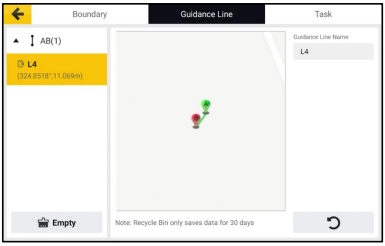
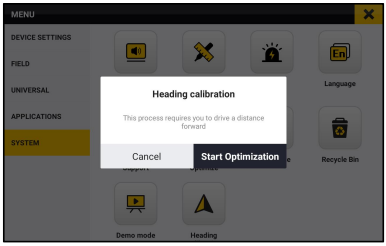


Figure 124. SYSTEM screen

System Settings

Feature	Description	Screen
Volume & Brightness	Adjust the system volume and brightness.	
Unit Setting	Select **Metric Unit** or **British Unit**, or customize according to your preferences.	
Alert	**Offset Range Alert**: If the vehicle offset exceeds the set value, the system issues an alert.	

Feature	Description	Screen
Language	Change the system language. Over twenty languages are available, such as Chinese, English, and Japanese.	
Technical Support	Use this feature under the guidance of the service personnel.	
RTK One Touch Optimize	Use this feature if the RTK signal is poor during the operation.	
Night Mode	Use this feature when working at night.	
Recycle Bin	Deleted boundaries, guidance lines, and task data can be restored in the recycle bin within 30 days.	

Feature	Description	Screen
Heading calibration	Tap **Start Optimization**, and then drive forward at a relatively high speed until it prompts that the heading is calibrated.	

Chapter 3 Common Faults and Solutions

No.	Fault	Solution
1	Bluetooth of GNSS Receiver not connecting	Check if GNSS Receiver is on.
		Check if the GNSS Receiver has been interfered with by the signal.
		Check if the GNSS Receiver is too far away from the flat panel display terminal.
2	No 4G signal	Check whether the SIM card is inserted.
3	No RTK signal	Check that the GNSS Receiver Bluetooth is connected.
		When the mobile base station is connected, check whether the base station is powered on and operating normally.
		When the Network RTK is enabled, check whether the network signals are normal.
		When the Network RTK is enabled, check whether the Ntrip account is valid.
4	Inconsistent working width in multi-line mode	Check whether the vehicle parameters entered are correct.
		Calibrate the implement again.
5	Slight offset in straight line mode	Check whether the roll angle changes in real time.

Chapter 4 Main Hardware Specifications

Hardware Module	Component	Specifications
Control terminal	Screen	10.1-inch, resolution: 1280×800 pixels, brightness: 500 nits
	CPU	Clock speed: 2.0 GHz
	Operating system	Android 13
	Storage	6 GB RAM, 128 GB ROM
	4G	Global
	Wi-Fi	802.11a/b/g/n/ac, 2.4G/5G
	Bluetooth	BT 5.0
	Mounting bracket	Bolt fixed, size and angle adjustable
Wireless GNSS receiver	GNSS module	Receives SBAS, PPP, and RTK signals.
	IMU	Six-axis high-performance IMU
	Mounting bracket	Metal part that can be attached to the roof by dovetail screws or 3M tape
External radio (optional)	External radio, radio antenna, and wiring harness	400 MHz or 900 MHz, magnetic base antenna
Wiring harness	Main power wiring harness	Connected to the vehicle battery to power all other system components.
	Control terminal power wiring harness	Connected to the main power wiring harness or to the vehicle's cigarette lighter to power the control terminal.
	GNSS receiver wiring harness	Connected to the main power wiring harness to power the wireless GNSS receiver, or connected to an external radio to use base station RTK.
	ISOBUS wiring harness	Contains a wireless ISOBUS module for wireless

	(optional)	communication of ISOBUS data with the control terminal.

