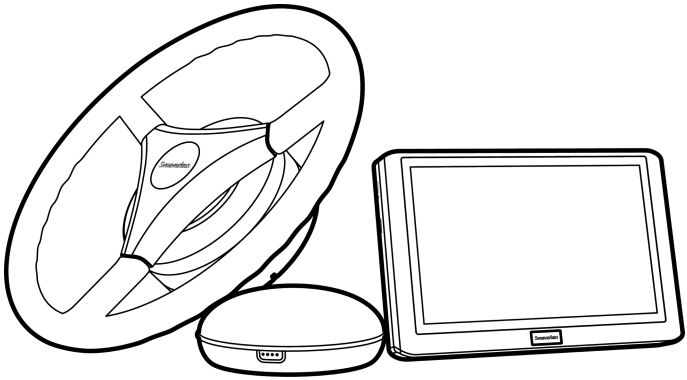
Sveaverken F100 Auto Steer System

Software User Manual



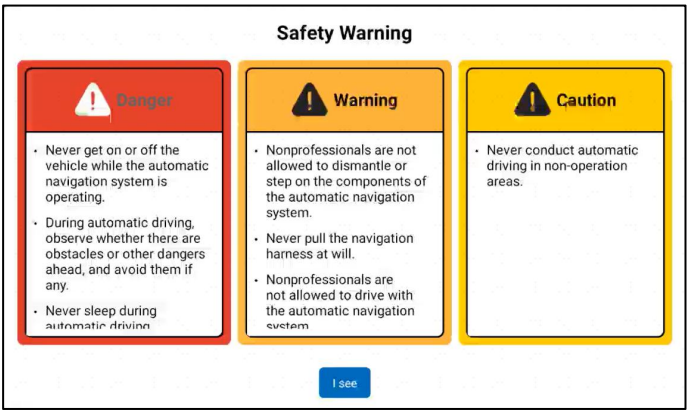
Sep. 2022 | Software Version: V3.1.3

Safety Instructions

Before using the Sveaverken F100 Auto Steer System, make sure that you have read and understood all the safety requirements.

Safety Symbols

After the control terminal is powered on, safety warnings are displayed on the home screen for 3 seconds, as shown in the figure below.



Operator Requirements

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. Fatigued driving is prohibited.
4. Drivers must obtain the relevant driving license required by the local laws.

Operation Environment

1. Please drive in an open area far from the crowd and ensure that there are no irrelevant personnel and vehicles in the operation area.
2. Please stay away from people, livestock, obstacles, electric wires, tall buildings, airports, signal towers, etc. So as not to interfere with the signal and affect the operation.
3. Please work in good weather (not extreme weather such as heavy rain, heavy fog, snow, lightning, strong wind, etc.).
4. When the system is under the testing, calibration, adjustment, or automatic steering, please ensure that there are no people or obstacles near the running track to prevent personal injury or property damage.

Operation Rules

1. During driving or operating, it is strictly prohibited to get on or off the vehicle during driving.

2. The vehicle must be kept under monitoring by the driver to ensure timely intervention.
3. When the vehicle equipped with this system is driving on public roads or public areas, please ensure that the control terminal is powered off.

Checking

1. Make sure to have enough fuel in the driving vehicle.
2. Ensure that the parameters in the kit are calibrated before the automatic driving operation.
3. Make sure the antenna and angle sensor are installed properly. If there is any movement, please calibrate it again before using it.
4. Please do not use worn or damaged cables. Please purchase and replace new cables in time.

Others

1. Do not disassemble the product yourself, or it will affect the warranty service.
2. The equipment damages caused by force majeure (lightning strike, high voltage, collision), are not included in the free maintenance service.
3. Please connect the device strictly according to the instructions in the manual. For cables such as data cables, you need to pinch the root of the plug and insert it gently. Do not pull it hard or even rotate it, which may cause needle breakage.
4. When supplying power to this product (the kit), please pay attention to the power supply requirements of the device (controller and electric steering wheel power rating is 9-36 V).

Contents

1. About This Document

1.1. Purpose

This manual briefly describes how to use the Sveaverken F100 Auto Steer System for agricultural vehicles through simple and clear operation processes, so that users can learn to perform each operation easily, quickly, and accurately.

1.2. Technical Support

Starting from the date of purchase, you are provided with the technical support and upgrade services from Sveaverken Technology (Shenzhen) Co., Ltd.

Sveaverken official website: https://www.sveaverken.com

2. Product Overview

2.1. Introduction

For details, refer to Sveaverken F100 Auto Steer System on the Sveaverken official website:

https://www.sveaverken.com

Product standard: Q/440300 SVEA 001-2022.

2.2. Main Components

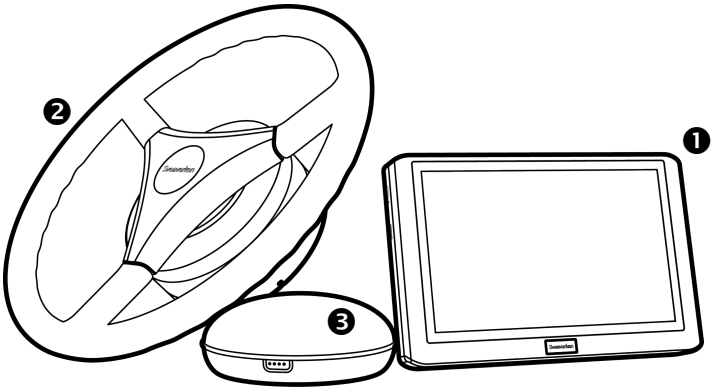


Figure 2.2.1 Main components

No.	Name	Function
1	Control Terminal	Provides human-machine interaction interfaces for vehicle control and communication.
2	Electric Steering Wheel	Consists of a steering motor and a steering wheel, and provides steering control of the vehicle.
3	GNSS Receiver	Receives satellite signals and obtains location and attitude information of the vehicle.

Precautions for installing the GNSS receiver:

1. Do not disassemble, connect, or disconnect the GNSS receiver when the system is powered on.
2. Always maintain lightning protection when installing the GNSS receiver outdoors.
3. Always maintain water protection when installing the GNSS receiver outdoors.
4. Place the GNSS receiver outdoors when using or testing the system.
5. The radio may generate heat during use, so watch out to avoid burns.
6. Avoid unnecessary coverings on the GNSS receiver to maintain good ventilation.

2.3. Hardware Interfaces of Control Terminal

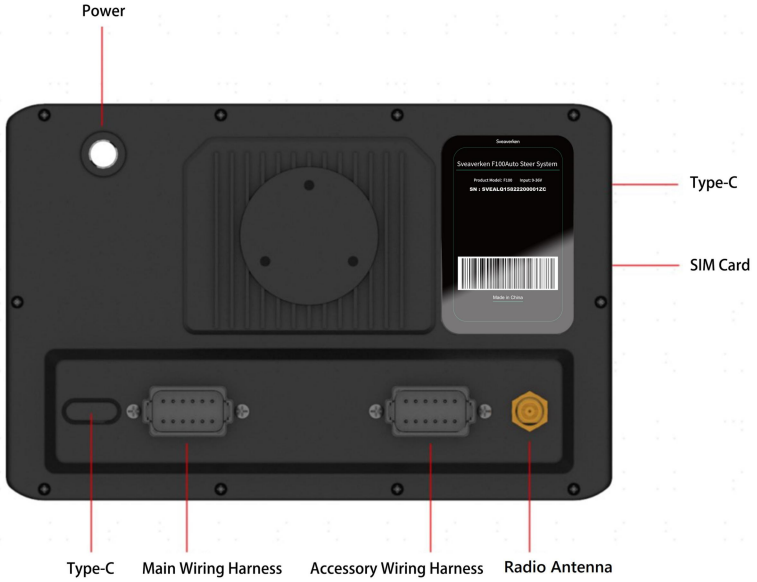


Figure 2.3.1 Hardware interfaces of the control terminal

3. Software Operation Instructions of Control Terminal

3.1. Workflow Overview

In order to make it easier for users to understand the operation and use of the software, this document describes the operation procedure and related auxiliary functions of the operating workflow of the system from a new user's perspective. A new user needs to complete the installation, configuration and preparatory operations before using the system for the first time and smoothly entering the autosteering driving.

3.2. Commissioning

Use the following workflow to install and commission the Sveaverken F100 Auto Steer System for the first time:

Select a language → Register and log in to your account → Enter installation information → Source Connection → Set vehicle parameters → Calibrate the angle sensor → Calibrate the whole vehicle → Complete commissioning

3.2.1. Selecting a Language

Turn on the in-vehicle control terminal and select a language for this system. tap **Next step**. The screen for registration and login is displayed.

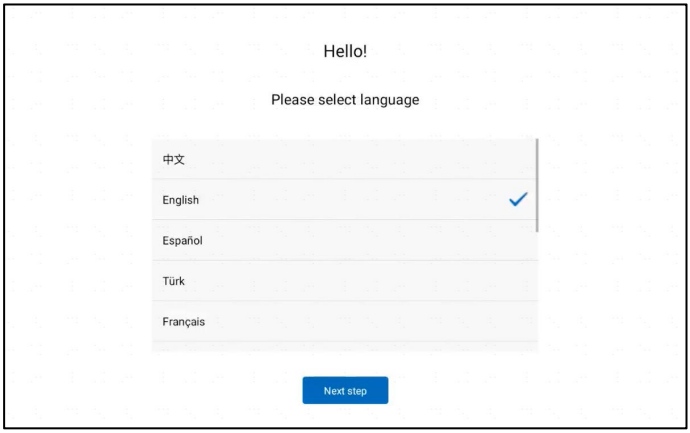


Figure 3.2.1 Selecting a language

3.2.2. Register/Login

After completing the language settings, you will enter the registration and login screen.

Account Registration: You are required to register an account for the initial use of the system. tap **Register immediately**. On the displayed screen, enter your email address, verification code, and password, and tap **I agree in User Privacy Policy.**

Account Login: If you have an account registered, you can log in directly by entering your user name (email address) and password to enter the home screen of the system.

Forgot Password: allows you to enter the password resetting screen when you forgot your password. Enter your email address, verification code, and new password. Then, tap **Login** to enter the home screen of the system.

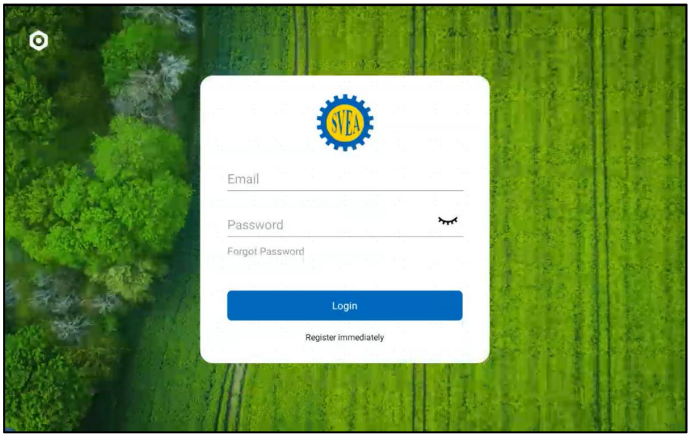


Figure 3.2.2 Home screen of login and registration

3.2.3. Entering Installation Information

After successfully registering and logging in for the first time, you need to enter related user information, installation information, and vehicle information. Please note that the initial information you have entered will directly or indirectly affect your after-sales service. Therefore, please strictly follow the following procedure:

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

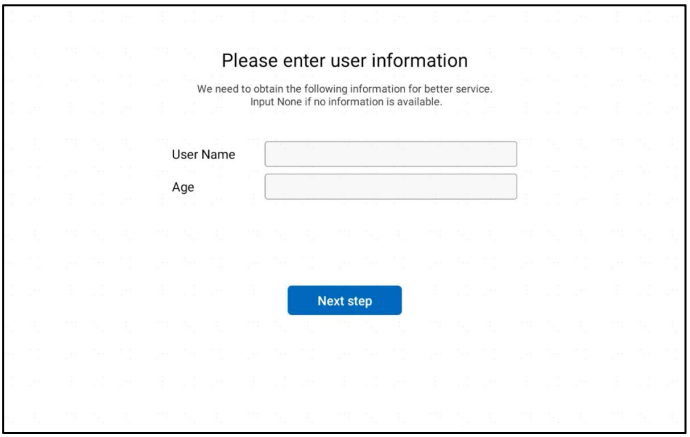


Figure 3.2.3 Entering user information

Step 2: Enter Sveaverken information, and tap **Next step**.

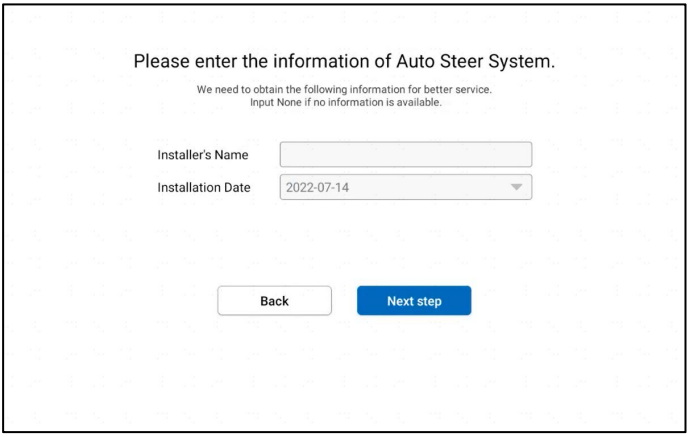


Figure 3.2.4 Enter Sveaverken information

Step 3: Enter all the required vehicle information, and tap **Next step** to open the home screen.

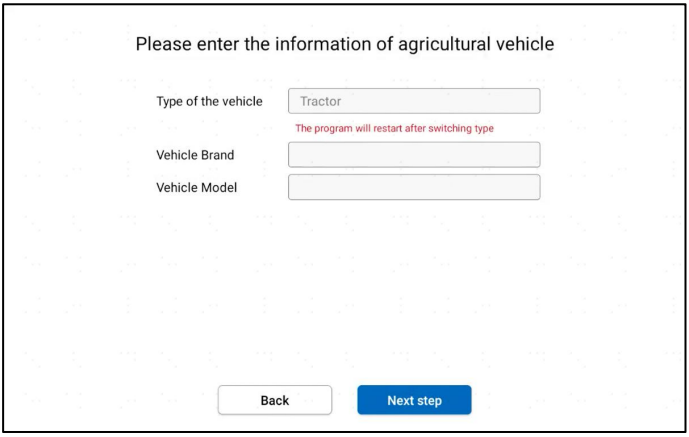


Figure 3.2.5 Entering agricultural vehicle information

Note: The system loads the control mode according to the vehicle type you selected, so select the vehicle type you actually use.

3.2.4. Home Screen

After successfully logging in to the system, you will enter the home screen. You can view the network connection status and operation status in real time. Your account login record will be automatically saved locally. Therefore, you can directly enter the home screen of the system every time you open the control terminal.

In terms of system mode, select the corresponding one. Please choose carefully according to the actual usage and tap **OK**. The home screen is displayed.

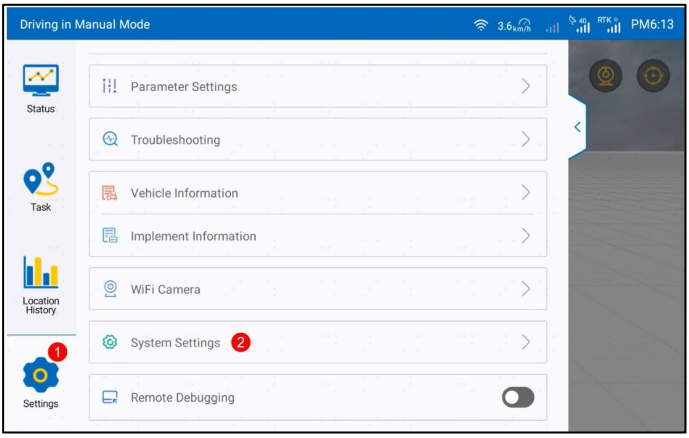


Figure 3.2.6 Settings list

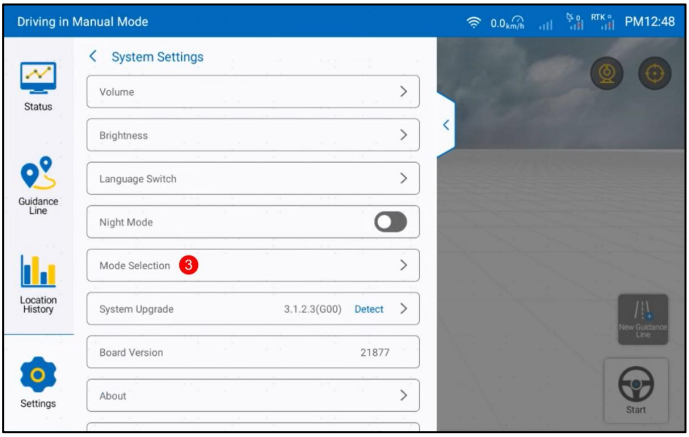


Figure 3.2.7 Selecting system settings

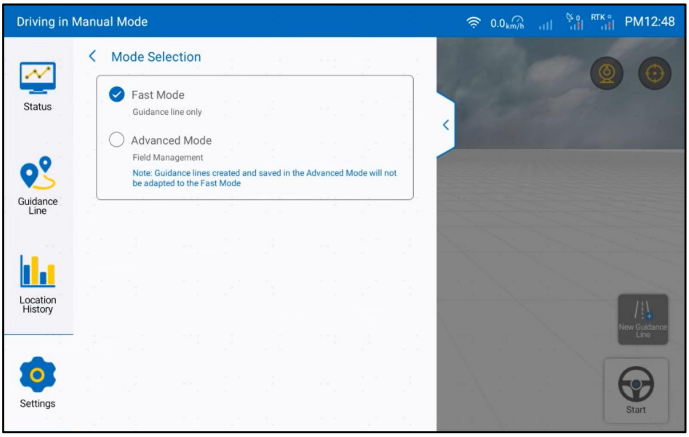


Figure 3.2.8 Mode Selection

Fast mode

The operation is simpler. The task can be started directly after importing the guidance line.

Advanced mode

Upgrade the field management function, start the operation after completing the task configuration, and have a more systematic management of the field data.

Note:

- The guidance line used in the advanced mode cannot be adapted to theFast Mode.

- When using the advanced mode for the first time, you need to purchase an activation code from the dealer to activate the use of the corresponding function. See **3.7.3.8 system settings** for the specific activation process.

3.2.4.1. Main Interface of Fast Mode

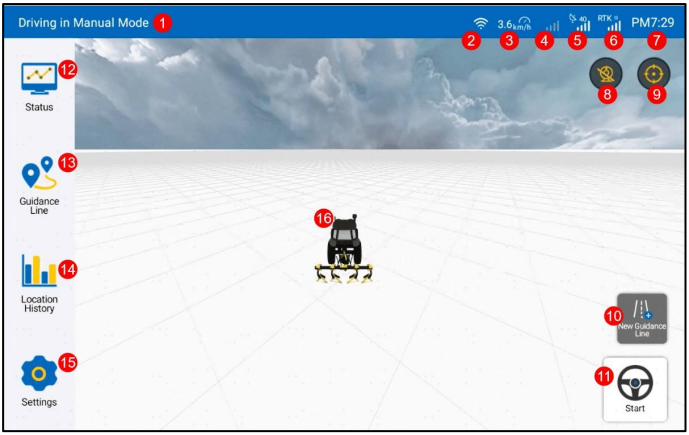


Figure 3.2.9 The main interface of Fast Mode

No.	Name	Function
1	Current driving mode	Shows the current driving mode, including manual driving mode and autosteering driving.
2	Wi-Fi signal	Show that the current device is connected to the wireless network.
3	Real-time speed	Displays the running speed of the current agricultural machine, and the speed unit can be changed in the setting.
4	4G signal	The mobile network signals, shows the real-time cellular data communication of the autonomous driving system.
5	GNSS signal	The satellite signal, shows the connection status of the system.
6	Correction Source	The correction source can be connected in the Mobile Base Station, Network RTK, or SBAS mode. The icon shows the signal strength of the correction source.
7	Time	Android system time, users can manually change the time zone in Android system.
8	Real-time video	Real-time monitoring of machine tool operation status through Wi-Fi camera, real-time feedback of operation status. (**Note**: Wi-Fi camera needs to be purchased separately.)

No.	Name	Function
9	Perspective switch	Fix the perspective of three-dimensional view by tapping the button.
10	New Guidance line	Set new guidance line by tapping this shortcut button.
11	Autosteering Start / Stop button	Tap to start or stop the autosteering mode.
12	Status	Tap to access the real-time information and current status of agricultural machines.
13	Guidance line	Tap to access the Guidance line detailed page for checking, adding, selecting and deleting guidance line.
14	Location history	Click to expand the historical operation data information, and view the operation time, operation area, operation width, operation efficiency, historical operation trajectory etc.
15	Settings	Tap to access Parameter Settings, Source Connection, Trouble Checking, System Upgrade, and Version.
16	Vehicle	Shows the movement of vehicles in real-time.

3.2.4.2. Main Interface of Advanced Mode

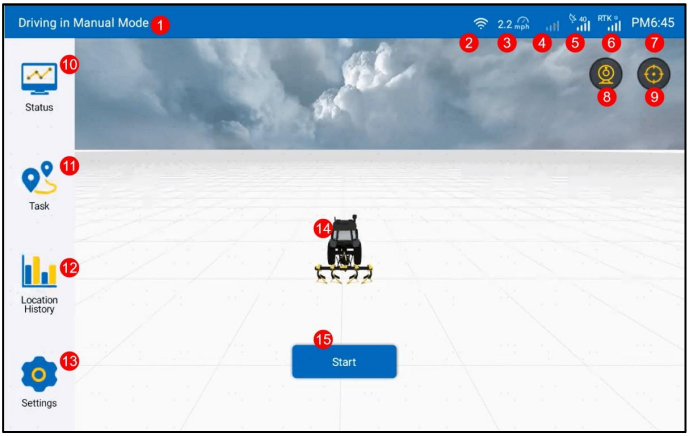


Figure 3.2.10 Main interface of advanced mode

No.	Name	Function
1	Current driving mode	Shows the current driving mode, including manual driving mode and autosteering driving.

No.	Name	Function
2	Wi-Fi signal	Show that the current device is connected to the wireless network.
3	Real-time speed	Displays the running speed of the current agricultural machine, and the speed unit can be changed in the setting.
4	4G signal	The mobile network signals, shows the real-time cellular data communication of the autonomous driving system.
5	GNSS signal	The satellite signal, shows the connection status of the system.
6	Correction Source	The correction source can be connected in the Mobile Base Station, Network RTK, or SBAS mode. The icon shows the signal strength of the correction source.
7	Time	Android system time, users can manually change the time zone in Android system.
8	Real-time video	Real-time monitoring of machine tool operation status through Wi-Fi camera, real-time feedback of operation status. (**Note**: Wi-Fi camera needs to be purchased separately.)
9	Perspective switch	Fix the perspective of three-dimensional view by tapping the button.
10	Status	Tap to access the real-time information and current status of agricultural machines.
11	Task configuration	Click to configure the field, boundary, guidance line and task setting information of each task.
12	History data	Click to expand the historical operation data information, and view the operation time, operation area, operation width, operation efficiency, historical operation trajectory etc.
13	Settings	Tap to access Parameter Settings, Source Connection, Trouble Checking, System Upgrade, and Version.
14	Vehicle	Shows the movement of vehicles in real-time.
15	Start task	After clicking, if the task configuration has been completed, it will enter the operation status; otherwise, it will enter the task configuration interface.

3.2.5. Select Correction Source

You can connect to three correction sources: Mobile Base Station, Network RTK and SBAS.

1. **Mobile Base Station**: You need to select and power on a radio station, and pair with it.
2. **Network RTK**: You can set up an RTK connection through the network, when a CORS base station nearby and you have a local Ntrip account. To enable this mode, you need to connect to the network first.
3. SBAS: In this mode, instead of using a radio station or the network, the autosteering kit receives differential data from the SBAS system to provide differential positioning. Note that in this mode, the positioning precision is lower, with a straight-line operation offset of about 5cm and a row spacing offset of about 40 cm. Select this mode with caution based on your demand.

Note: If you need to use SBAS, you need to purchase the hardware version containing SBAS and Upgrade to V3.1.3 or later.

Step 1: Tap **Settings** > **Correction Signal Source** to open the selection screen.

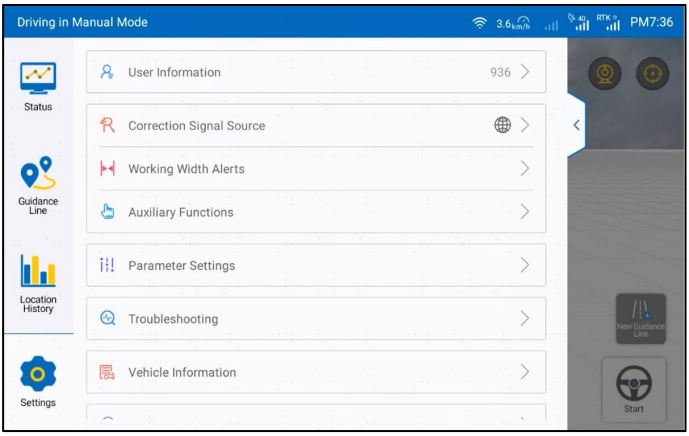


Figure 3.2.11 Settings list

Step 2: Select a correction source you want to use.

On this screen, you can select to connect to a mobile base station, a network RTK or a SBAS. The system connects to a mobile base station by default. You can change it through the toggle on the right. If you select Network RTK, this becomes the default mode next time you log in.

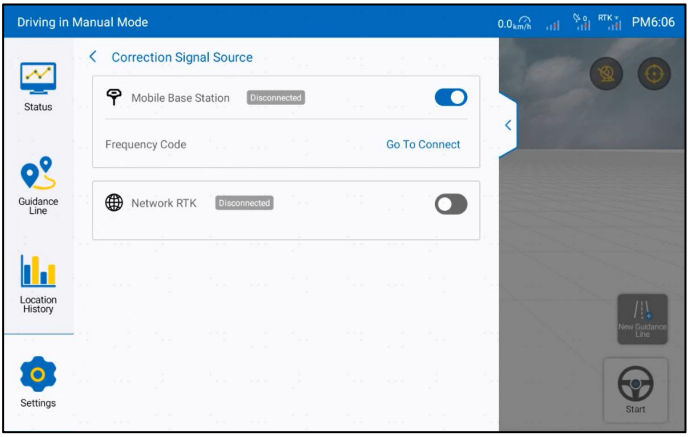


Figure 3.2.12 Correction source change

- **Mobile base station RTK**: To connect to a mobile base station, enable **Mobile Base Station**, and tap **Frequency Connecting**. In the popup dialog, enter the frequency code. (For frequency codes, refer to **Base Station User Manual**.)

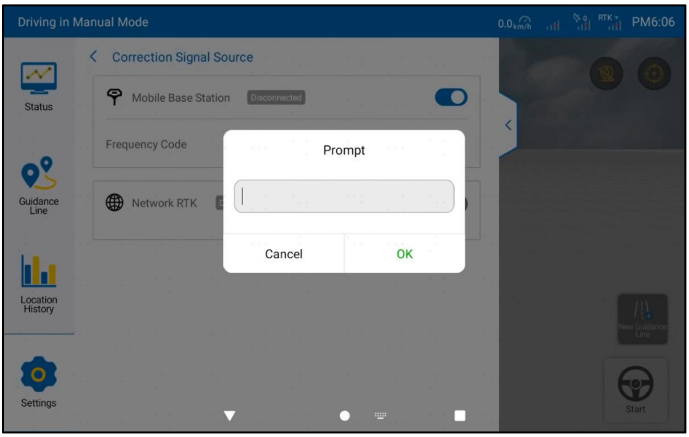


Figure 3.2.13 Entering the frequency code

- **Network RTK**: To connect to the Network RTK, enable **Network RTK** and tap **Connect**. In the displayed dialog box, enter your Ntrip domain name and account information.

  Ntrip domain: Enter the host and port, and tap **Get Source**. The source node field automatically shows the port having the strongest signal strength, indicating that the Ntrip domain information is completed.

  Ntrip account: After entering the Ntrip domain information, enter the account and password, and tap **Connect** to connect to the network RTK.

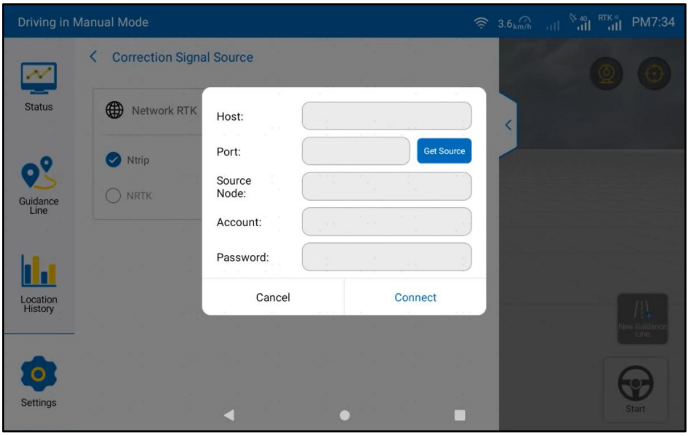


Figure 3.2.14 Ntrip account login

- **SBAS:** To connect to SBAS, enable **SBAS**. **WAAS** is selected by default, and the status becomes Connected after convergence. If you want to use a different source, select a source and tap **OK**, and then simply wait for successful connection.

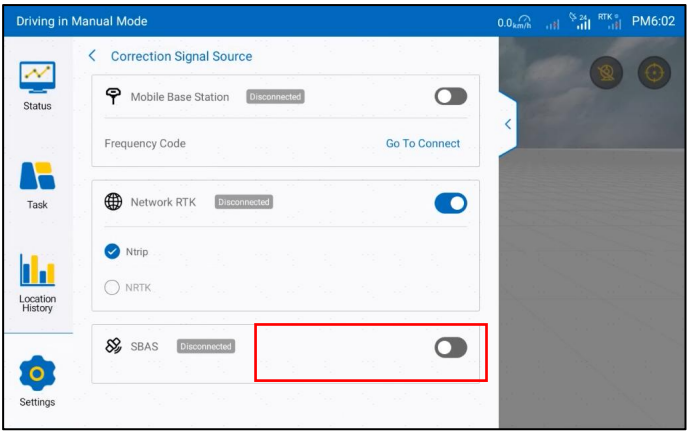


Figure 3.2.15 Connect to SBAS

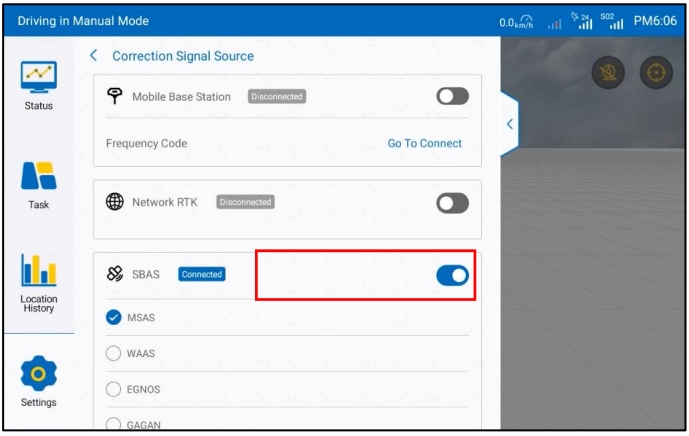


Figure 3.2.16 SBAS connected

During SBAS connection, the **Status** is **1**, and the operation cannot be started. After the connection is established, the **Status** becomes **2**, and the source icon in the upper right corner changes to **SXX**. **XX** is the age of differential, which is a number from 0 to 20.

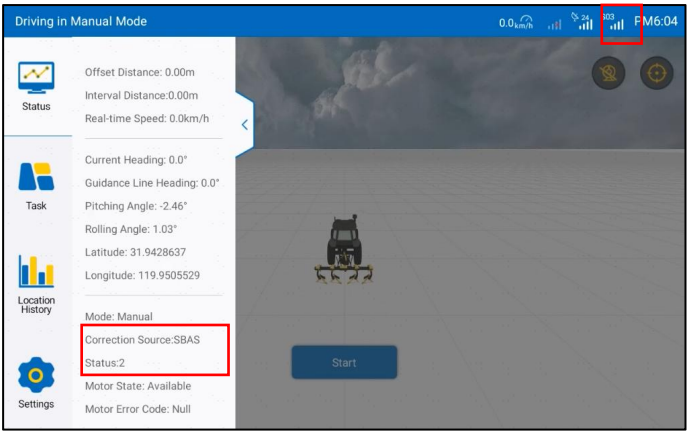


Figure 3.2.17 Status after SBAS connection

Note:

1. It takes up to 3 minutes to connect to a mobile base station or network RTK, and up to 5 minutes to connect to SBAS.
2. If connection to a correction source fails, try connecting to another correction source. If the fault persists, check the correction source in **Settings** > **Troubleshooting**, as shown below.

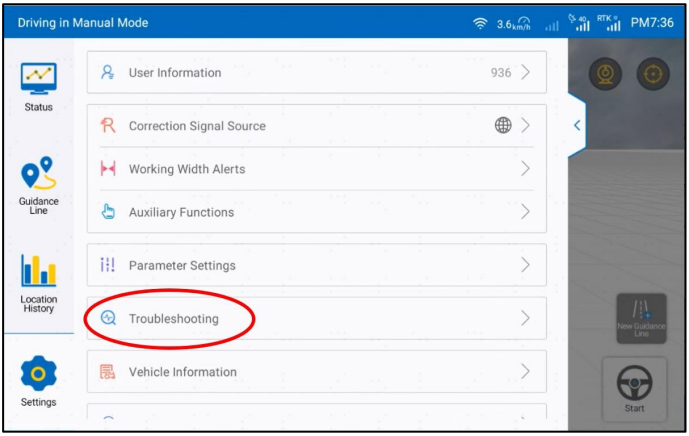


Figure 3.2.18 Setting list

The troubleshooting shows two results. The check mark indicates that the test is passed, the cross mark indicates test failure, the ! mark indicates that it is available but the low accuracy.

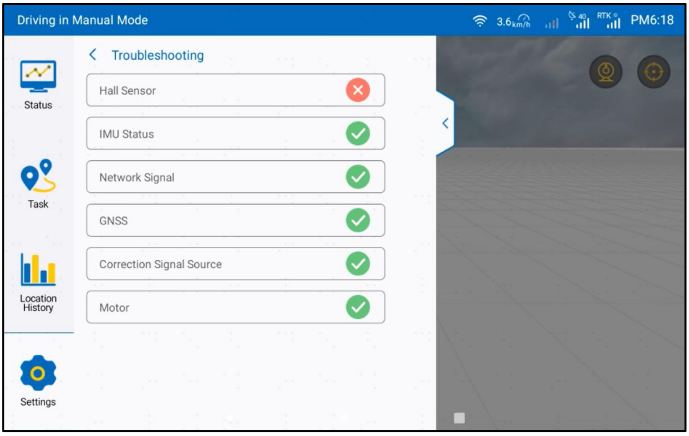


Figure 3.2.19 Troubleshooting

3.2.6. Setting Vehicle Parameters

After entering the home screen of the system, perform the following operations to set vehicle parameters:

From the sidebar, choose **Settings** -> **Vehicle Information**.

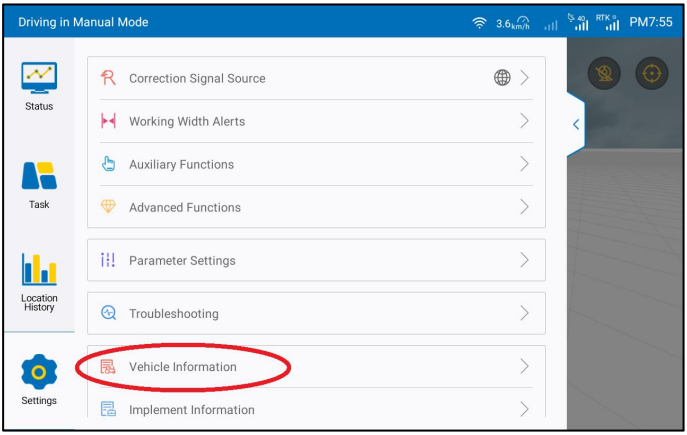


Figure 3.2.20 Setting List

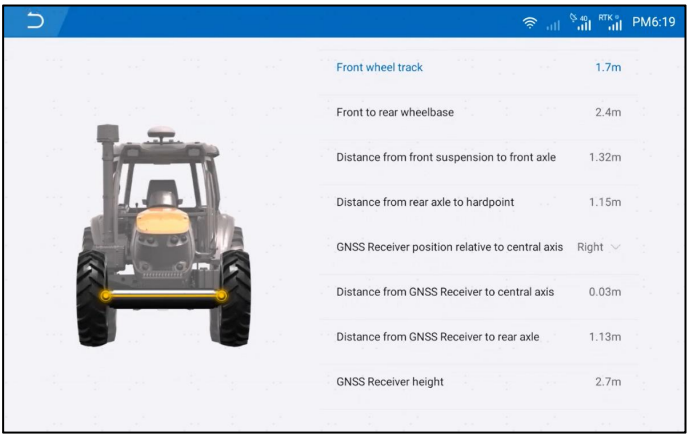


Figure 3.2.21 Vehicle information

*For details about the measurement operations, please check the corresponding commissioning instruction video.

3.2.7. Calibrating Angle Sensor

After completing vehicle parameter settings, you need to calibrate the angle sensor. Perform the following operations to calibrate the angle sensor:

Step 1: Choose **Settings** -> **Parameter Settings**.

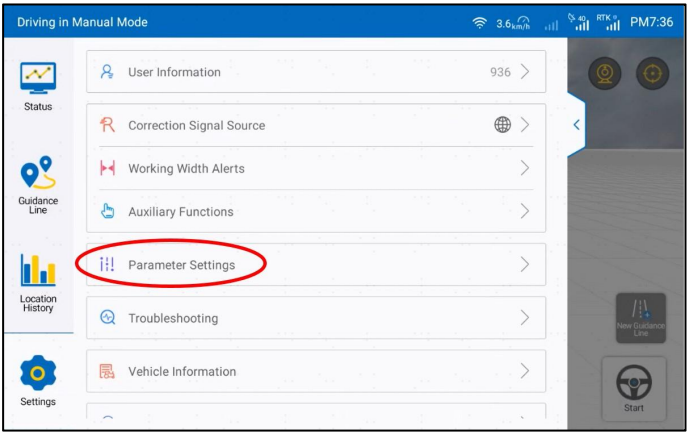


Figure 3.2.22 Setting list

Step 2: Tap **Angle Sensor Calibration** in the detailed page of parameter settings.

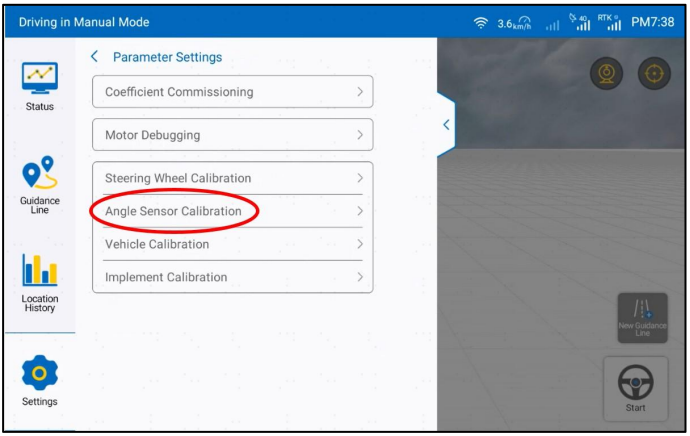


Figure 3.2.23 angle sensor calibration

Step 3: User needs to select the sensor type after getting into the angle sensor setting page.

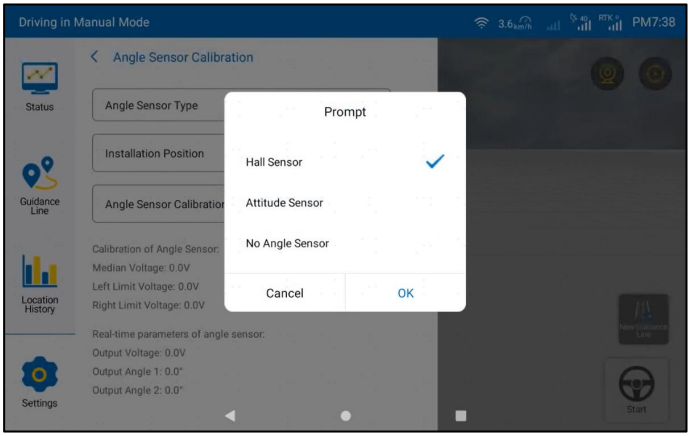


Figure 3.2.24 Select angle sensor type

- If the selected type is **Hall Sensor**, then the user needs to select the installation position of the angle sensor. After selecting the installation location, click **Calibrate** to directly enter the calibration process. Please follow the prompts in the following interface to calibrate. Rotate the steering wheel according to the process **leftmost-rightmost-center** and tap **OK** after each action finished.

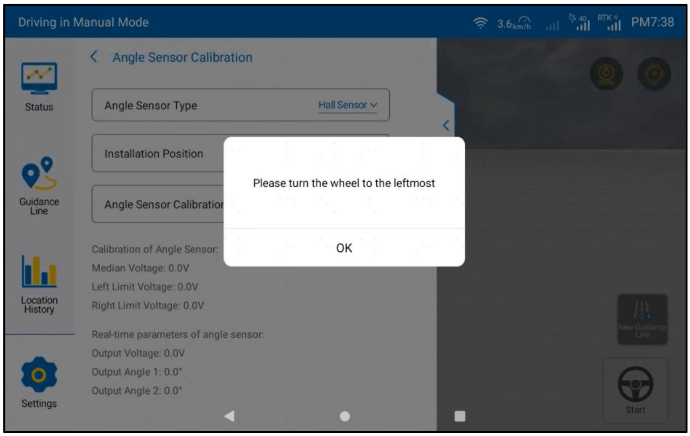


Figure 3.2.25 Turning the wheel to the leftmost

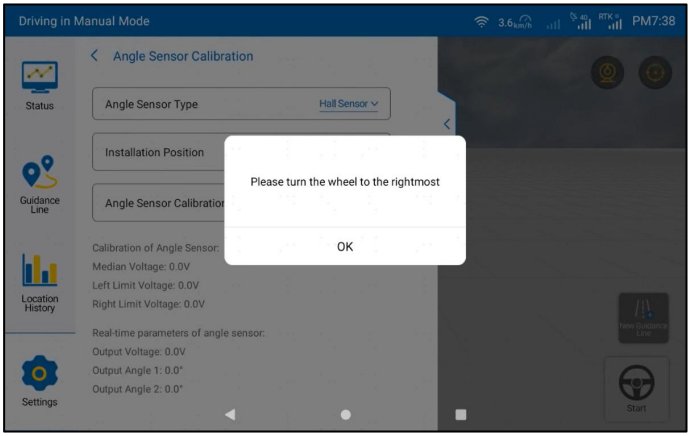


Figure 3.2.26 Turning the wheel to the rightmost

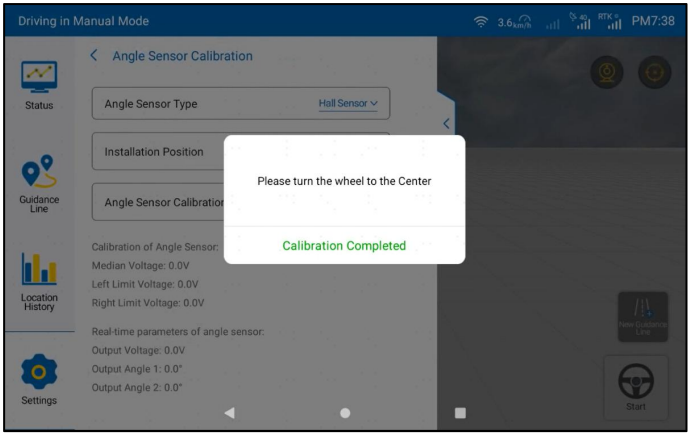


Figure 3.2.27 Turning the wheel to the center

- If the angle sensor type is selected as **attitude sensor**, please then select the installation position of your angle sensor.

Note: when you choose **attitude sensor**, you should drive straight for 15-20 m in manual mode to complete data convergence every time you open the system.

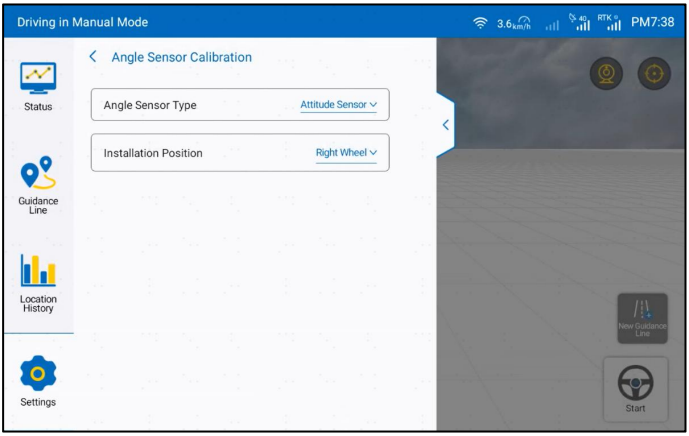


Figure 3.2.28 attitude sensor

- If the angle sensor type is selected as **no angle sensor**, after selecting **no angle sensor**, enter its interface as shown below.

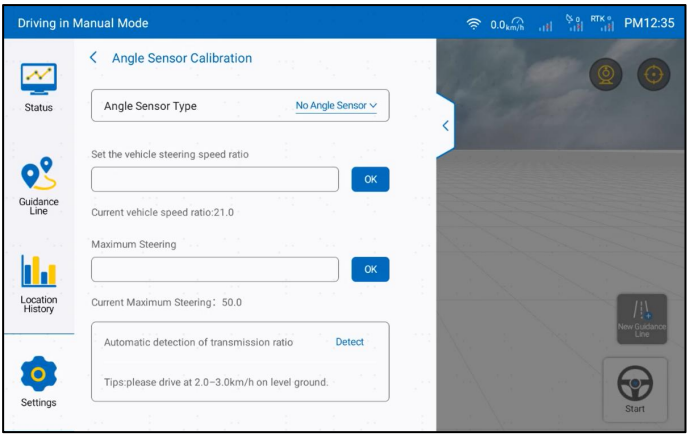


Figure 3.2.29 No angle sensor

After entering the setting screen for no angle sensor, put the vehicle's gear into the low gear first. Then, tap **Detect** and step on the accelerator to make the agricultural vehicle run straight for about 20 m on a level surface freely at a low speed (2–3 km/h) until the **Detection Done** prompt box is displayed. Then, the vehicle steering speed ratio is automatically detected and the setting of no angle sensor is completed.

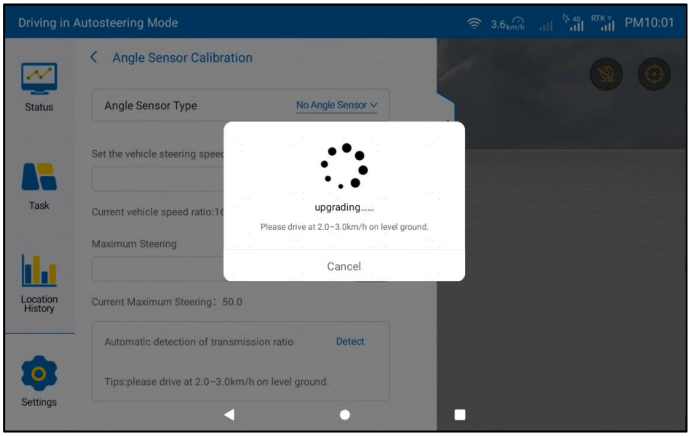


Figure 3.2.30 Detecting the speed ratio

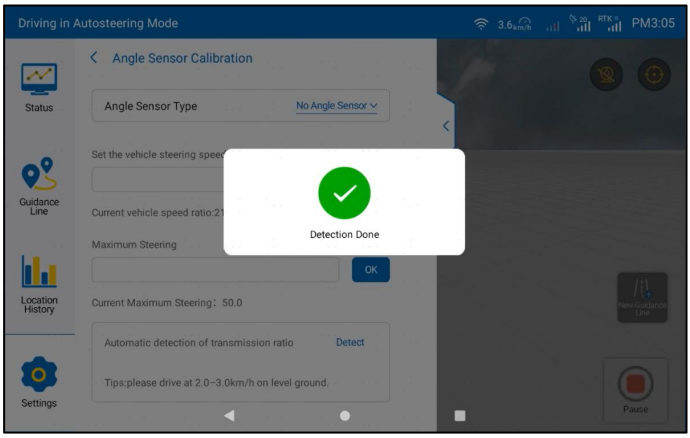


Figure 3.2.31 Detect finished

If the sensor type is switched, the device needs to be restarted after the sensor is switched to take effect.

3.2.8. Vehicle Calibration

After angle sensor calibration finished, you need to calibrate vehicle to correct working offset. On the displayed Settings screen, tap into **Vehicle Calibration** from the **Parameter Settings**, then tap **Start Calibration** in the vehicle calibration page, and you can get into the calibrating process. On the calibration screen, carefully read the current calibration step displayed.

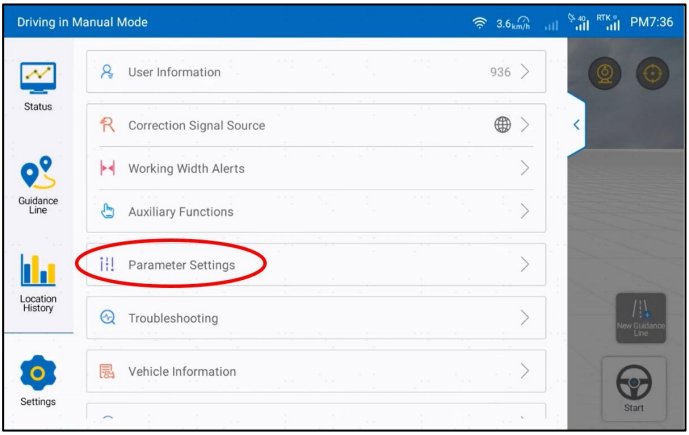


Figure 3.2.32 Setting List

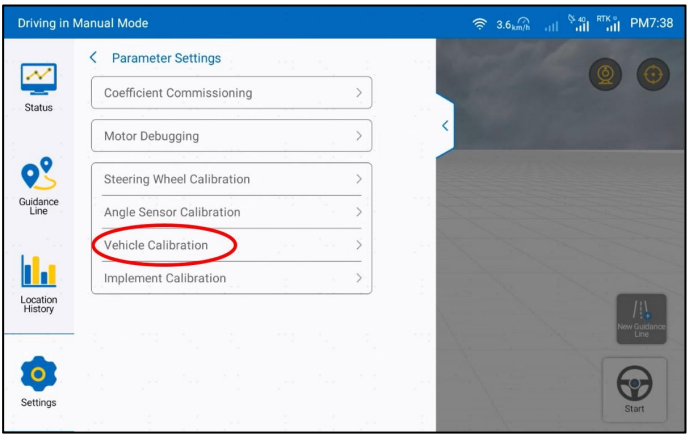


Figure 3.2.33 Vehicle Calibration

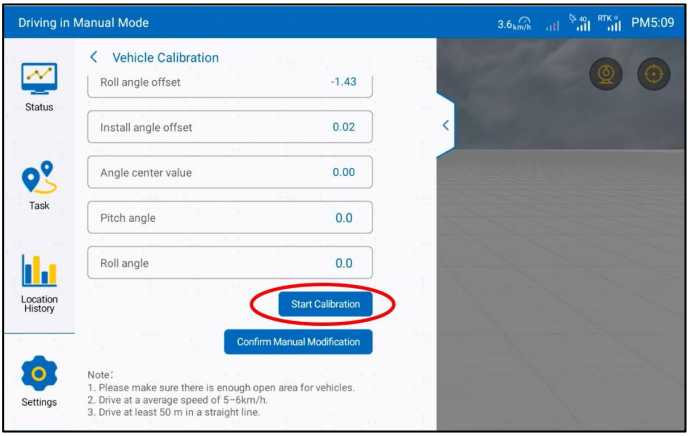


Figure 3.2.34 Start Calibration

Step 1: Move the agricultural vehicle to the starting point and tap **Confirm Point A** on the screen.

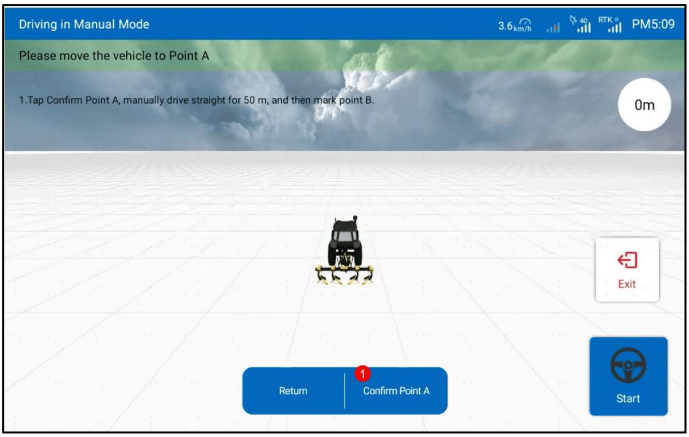


Figure 3.2.35 Confirm Point A

Step 2: After confirming Point A, manually drive the vehicle straight for 50 m and **Confirm Point B**. During the driving towards Point B, the distance traveled will be displayed on the upper right corner of the screen in real time. You can check whether the current distance from Point A meets the distance requirement of 50 m based on this value.

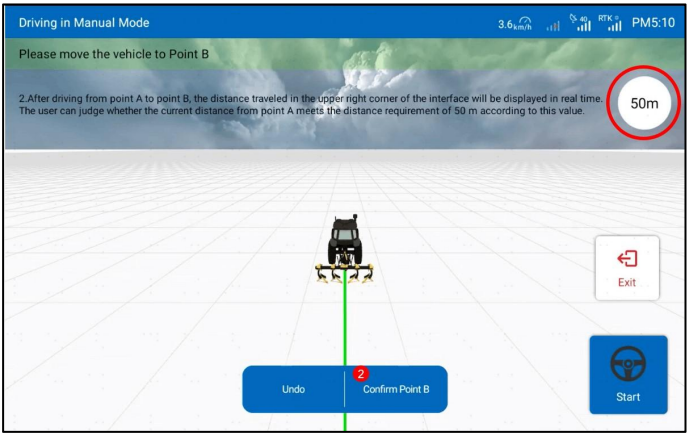


Figure 3.2.36 Confirm Point B

Step 3: After confirming Point B, please follow the prompt 2. on the screen to manually turn the vehicle around and make it return to Point B on the guidance line just confirmed (with the front end of the vehicle facing Point A). After the adjustment is completed, tap **Start** to make the vehicle run to Point A in the autosteering driving mode according to the guidance line just confirmed.

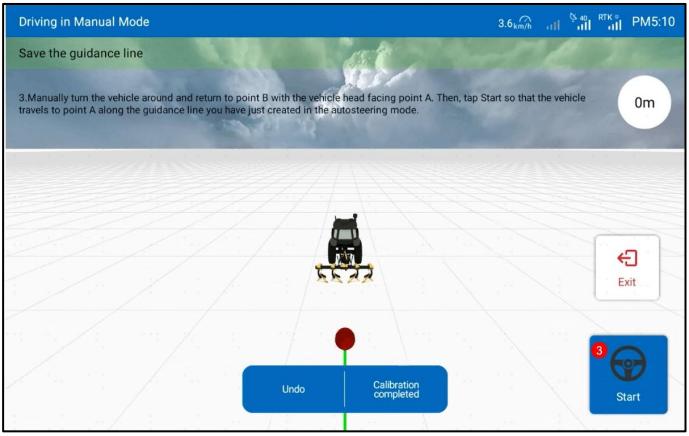


Figure 3.2.37 Starting autosteering driving after turning around

Step 4: tap **Stop** after the vehicle arrives at Point A in the autosteering driving mode.

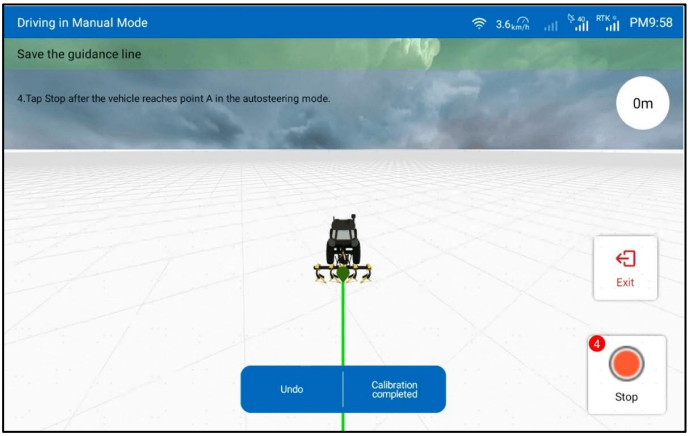


Figure 3.2.38 Stopping autosteering driving

Step 5: Manually turn the vehicle around to make it return to Point A on the guidance line (with the front end of the vehicle facing Point B). Then, tap **Start** to make the vehicle run from Point A to Point B in the autosteering driving mode.

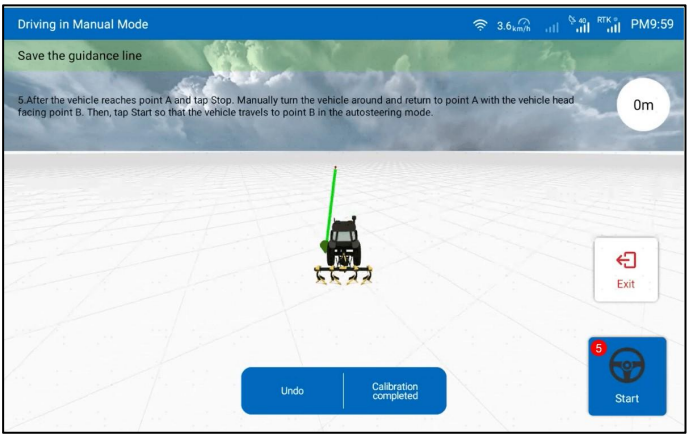


Figure 3.2.39 Manually turning around and start the auto-working

Step 6: After the vehicle reaches Point B in the autosteering driving mode, tap **Stop** to stop the current autosteering driving operation.

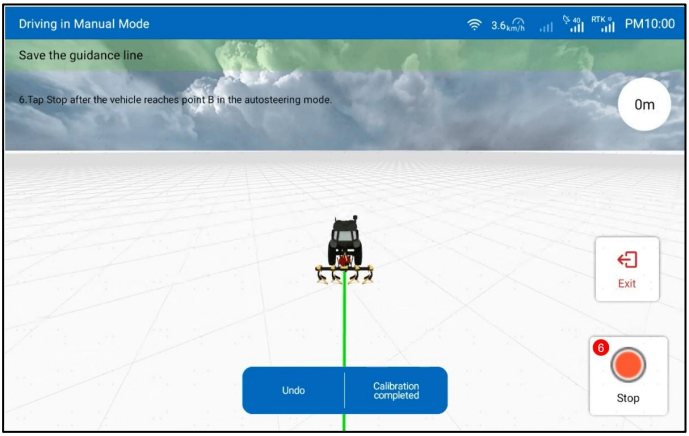


Figure 3.2.40 Stop autosteering driving after reaching the point A

Step 7: tap **Calibration completed** to complete the vehicle calibration and return to the home screen.

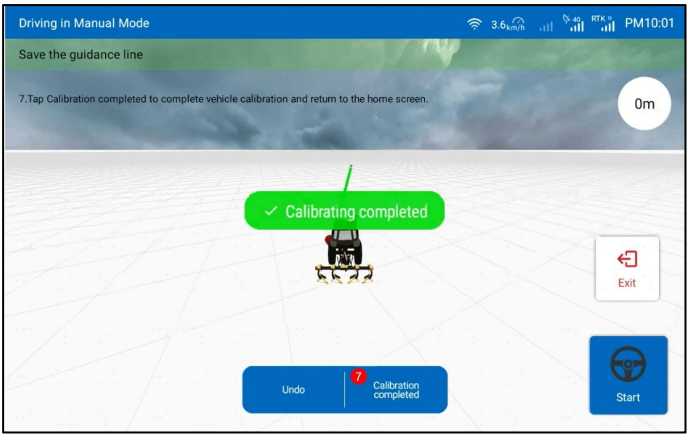


Figure 3.2.41 Calibration finished

After completing the above steps of commissioning, you can start to use control terminal for intelligent operations.

3.3. Preparatory Operations

3.3.1. Confirm the Source Connection

Confirm the source connection before operation preparation:

1. Check whether the source connection mode is correct.

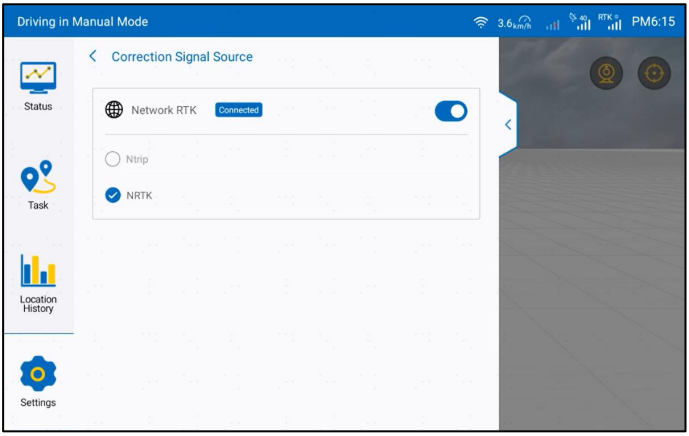


Figure 3.3.1 Confirm the source connection mode

2. Check whether the connection is normal. If the Network RTK mode is used, **RTK** is displayed in the upper right corner. Then, check whether you have full signal bars in the status bar.

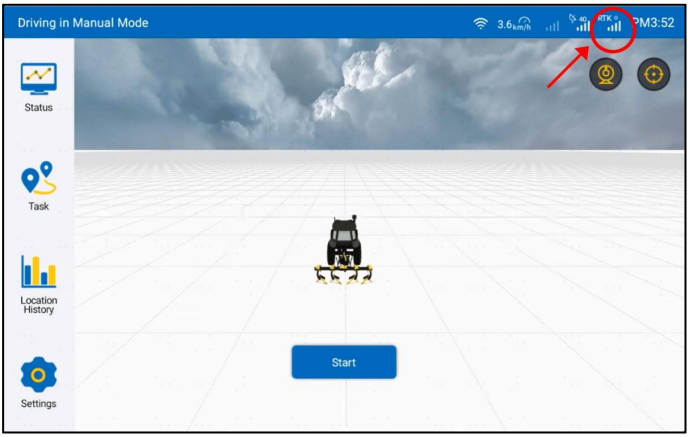


Figure 3.3.2 **RTK** displayed in the upper right corner when the RTK mode is used

3.3.2. Getting the Course Angle

If the RTK connection is normal, drive ahead and accelerate the vehicle for more than 5s (Only one operation is required for each startup) .

3.3.3. Preparatory Operation in Fast Mode

Confirm the source connection → Getting the course angle → Add guidance line → Import guidance line → Start operation

3.3.3.1. Adding New Guidance Line

After confirming the connection to the RTK, you can start setting points. You can follow the prompts to complete setting points A and B to save a new guidance line, and import the new guidance line to the current operation. For more specific instructions on creating guidance lines, please refer to Section 3.4 to create a guidance line.

3.3.3.2. Import Guidance Line

You can directly import the required guidance line from the list of guidance lines to the current operation as follows:

Step 1: If you have already saved the guidance line before, please find out the line you want to import in the list of guidance lines. And then tap Import button in the required guidance line tab to import the line to the current operation.

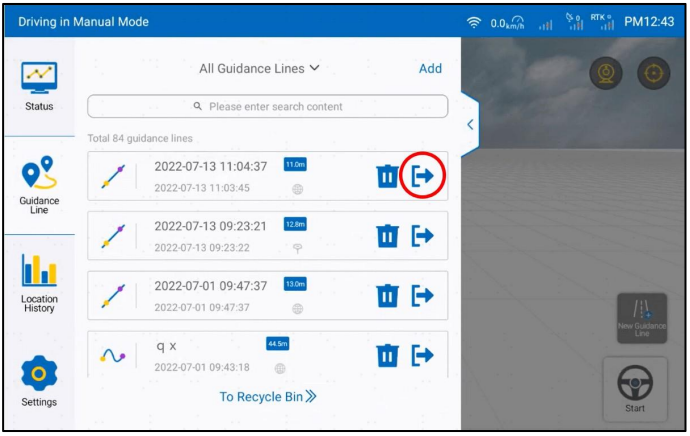


Figure 3.3.3 Guidance line list

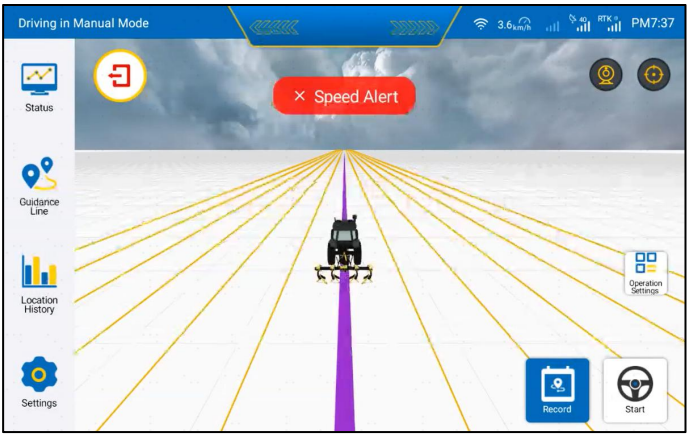


Figure 3.3.4 Guidance line imported

If Multi Line Mode is needed, please enter into **Settings** > **Parameter Settings** > **Working Width Alerts** to set the working width for the preparatory operation in multiline mode, as shown in the following figure.

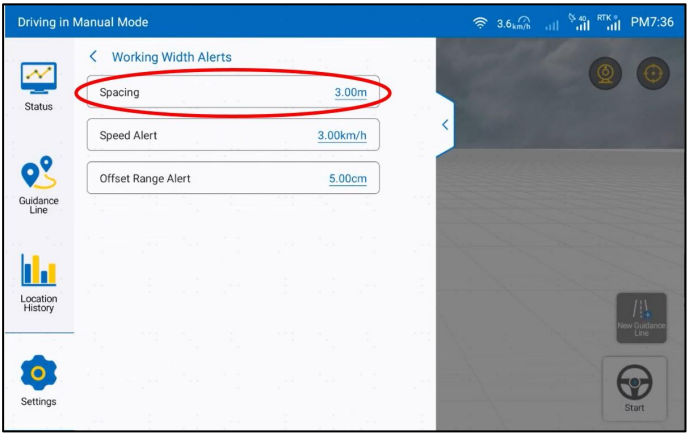


Figure 3.3.5 Setting the operating space

3.3.4. Preparatory Operation for Advanced Mode

Confirm Source connection → Getting the course angle → Add and select field → Add and select task →Add and select boundary → Add and select guidance line→ Confirm task configuration → Start operation

3.3.4.1. Add and Select Fields

Click **Task** button on the left to enter the task configuration interface. First, add and select an operation field.

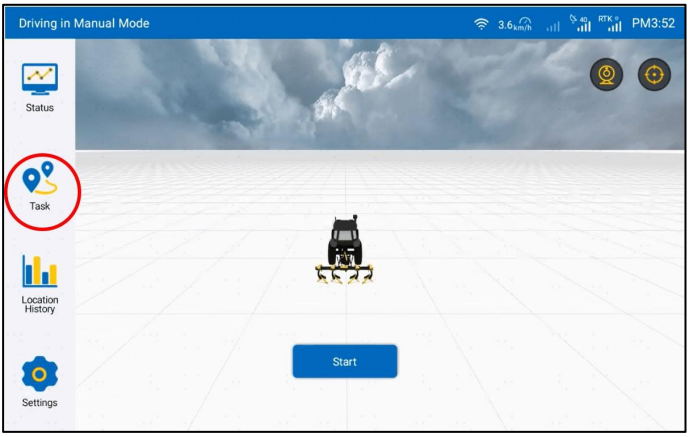


Figure 3.3.6 Task configuration entry

The configuration field interface is shown in the figure below:

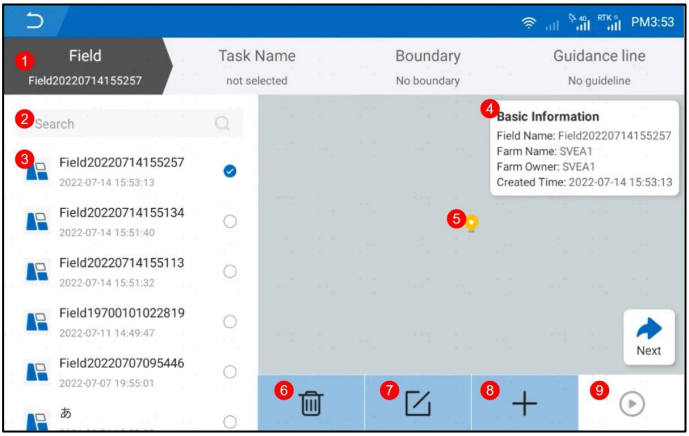


Figure 3.3.7 Configure field interface

No.	Name	Function
1	Task configuration items	Select the fields, boundaries, guidance lines and task settings required for the operation. Gray represents the current configuration items. Under each item, it will display current selection. If it has not been selected, it will display "not selected". Otherwise, the corresponding option is displayed below.
2	Search box	Find the target field by searching the field name.
3	Field list	Display existing fields, including field name and creation time. Click to select the field to be operated.
4	Field basic information	Including field name, farm name, farm owner and creation time.
5	Field map	Display the current position and selected boundary and guidance line position.
6	Delete field	Click to delete the field, and the associated boundary, guidance line and history data will be deleted after deletion and **cannot be restored**.
7	Modify field information	Click to modify the field name, farm name and farm owner information.
8	Add field	Click to add a new field, fill in field name, farm owner and farm name.
9	Run configuration	If the task configuration is not completed, it is

No.	Name	Function
		impossible to click; after the configuration is completed, click pop-up task information configuration confirmation box to confirm the information and start the operation.

Note: If the field is not selected, it is impossible to set the boundary, guidance line and task setting.

Add field

After filling in the corresponding field name, farm owner and farm name, click **Save**.

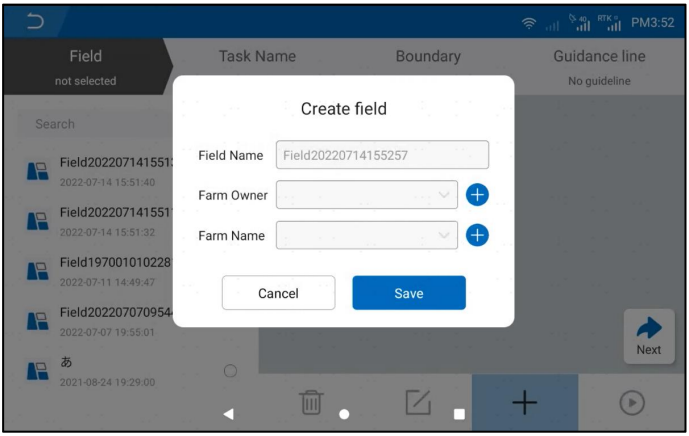


Figure 3.3.8 Interface for adding field

3.3.4.2. Add and Select Task

Click **Task Name** to add or select from the list the intended task.

The task selection interface is as follows:

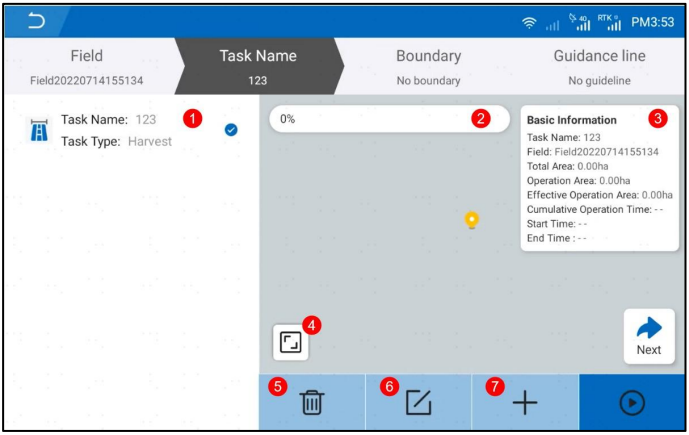


Figure 3.3.9 Setting Interface for Task Name

No.	Name	Function
1	Task settings list	Task settings that has been created.
2	Task progress	Check the task progress.
3	Basic information	In the basic information column, you can view the total area, the area that has been worked, the effective worked area (the area that has been worked within the boundary), the accumulated operation time, and the start and end time of the task.
4	Full-screen display	Click the Full-screen icon to view the task in full screen.
5	Delete task settings	Delete the selected task setting, which cannot be restored after deletion.
6	Modify task settings	Modify the operation type and operation width of the selected task setting.
7	Add task settings	Add new task setting, which requires filling in the operation type and operation width.

3.3.4.3. Add and select boundary

Click Boundary to add or select from the list the intended. If the operation does not require a boundary, select the **No boundary** option.

The configuration boundary interface is shown in the figure below:

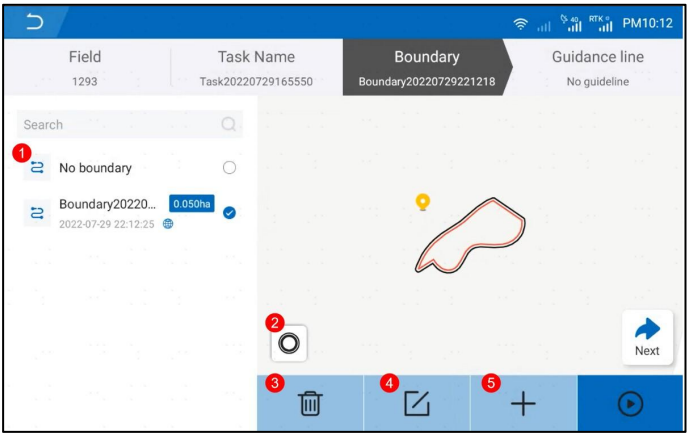


Figure 3.3.10 Interface for configuring boundary

No.	Name	Function
1	Boundary list	Display the existing boundary, including name of boundary, the operatable area enclosed and the creation time.
2	Change the distance to the edge of the field	Modify the margin of the boundary offset inward or outward, is zoomed in or out, remind users of the position of the edge of the field or the place where to turn around.
3	Delete boundary	After selecting the boundary, click Delete icon, and the deleted items can be restored in the recycle bin within 30 days after deletion. For details about the recycle bin, please refer to the introduction of the recycle bin in Section 3.7.3.8 System Settings.
4	Modify boundary name	Click to modify the selected boundary name.
5	Add boundary	Click to enter the interface of adding boundary and guidance line.

Add boundary

Press the **Start** button on the **Add boundary** interface.

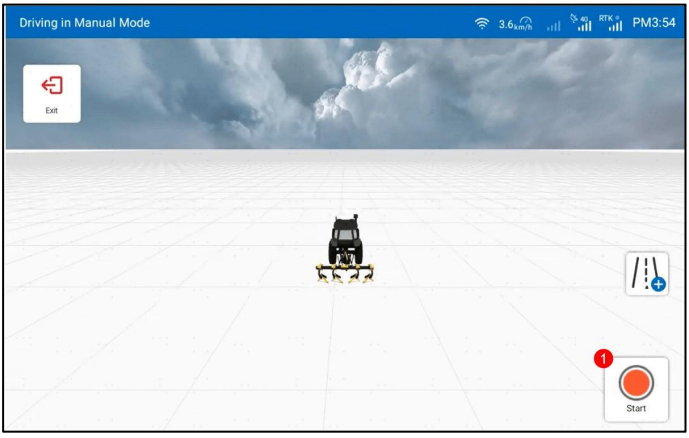


Figure 3.3.11 Interface of **Add Boundary**

After pressing the **Start** button, you need to select the position of the implement to determine the position of the boundary, then click **Confirm**.

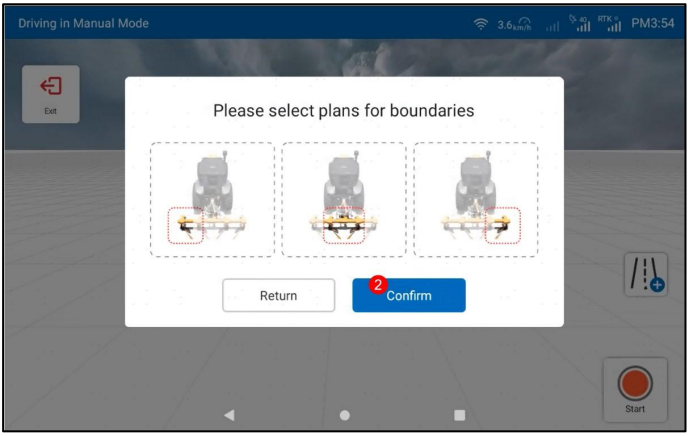


Figure 3.3.12 Interface of boundary plan

When finished, press the **Pause** button and choose **Save**.

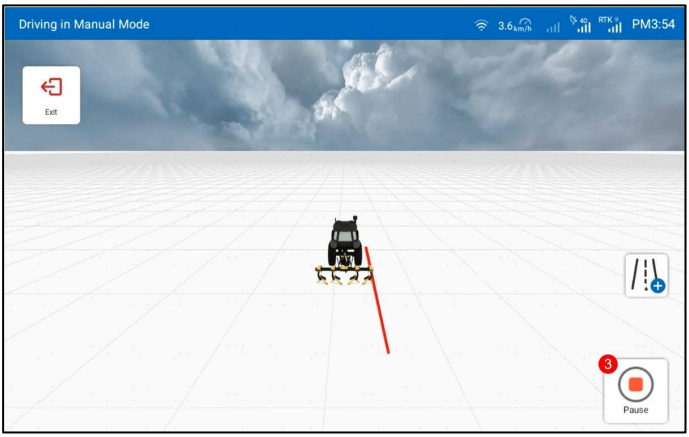


Figure 3.3.13 Interface when finished recording the boundary

When saving, you need to fill in the boundary name, margin and the offset. During operation, a pop-up window will prompt when the distance from the field edge is 30 m.

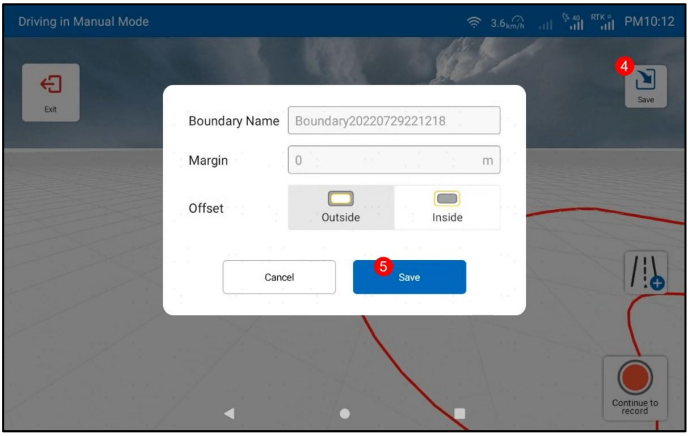
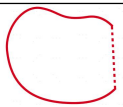


Figure 3.3.14 Interface of saving the boundary

When saving the boundary, if the boundary does not meet certain requirements, the following adjustments will be given for different situations:

Table 3.3.1 Adjustments for irregular boundaries

Boundary situation		Adjustments	Example
x - Distance between two ends	x<10 m	Auto-completion of boundary	
	10 m<x<50 m	Connect with a straight line	
	50 m<x	Continue recording by pressing 	
Special boundary	Length of boundary < 80 m		
	Crossed boundary	Auto-optimization	
	Boundary too narrow	Re-record by pressing 	
	Boundary contains multiple sub-area		

3.3.4.4. Add and Select Guidance Line

Click **Guidance line** to add or select from the list the intended guidance line. If there is no need for a guidance line, you may choose the **No guideline**.

The guidance line configuration interface is shown in the figure below:

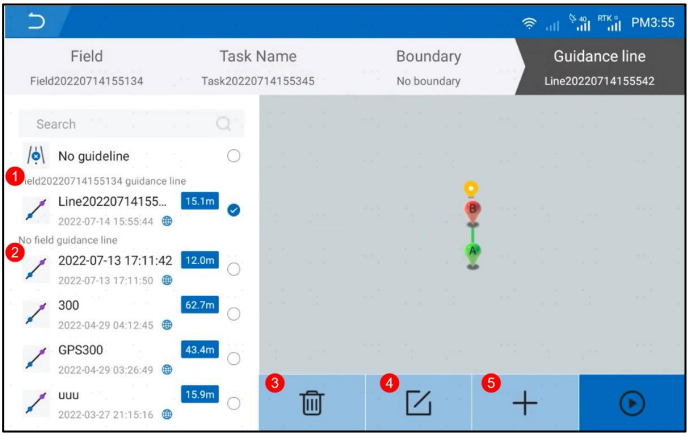


Figure 3.3.15 Interface for configuring guidance line

No.	Name	Function
1	The guidance line list of the field	Display the existing guidance lines, including the name, length and creation time of the guidance line.
2	List of guidance lines without attribution	Display the guidance lines generated in the extreme Fast Mode.
3	Delete the guidance line	Click Delete icon to select the guidance line, and deleted item can be restored in the recycle bin after deletion. For details about the recycle bin, please refer to the introduction of the recycle bin in Section 3.7.3.8 System Settings.
4	Modify the name of the guidance line	Click to modify the selected guidance line name.
5	Add guidance line	Click to enter the interface of adding boundary and guidance line. For more specific instructions on creating guidance lines, please refer to Section 3.4 to create a guidance line.

3.3.4.5. Confirm Task Configuration

After all the information are selected, click confirm button, and an information confirmation window will pop up. After confirming that the configuration information is correct, click **OK**. Click **Start** button on the homepage to enter the operation interface.

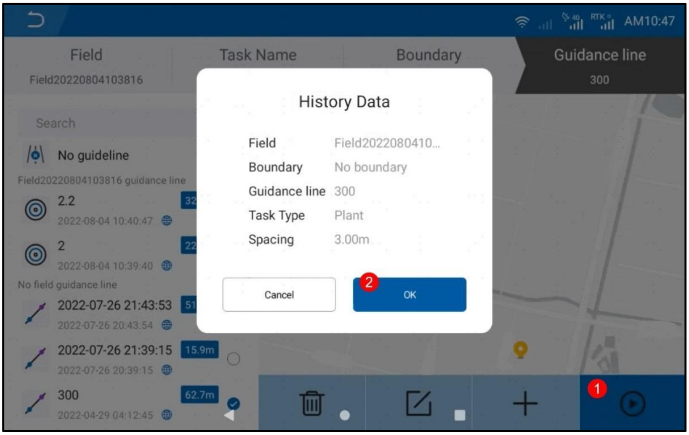


Figure 3.3.16 Interface for confirming configuration

3.4. Create Guidance Lines

The guidance line includes straight line mode (AB line mode), curve mode and pivot mode. Users can create certain guidance lines according to their actual needs.

In Fast Mode, you can click **New Guidance Line** in the main interface or the **Add** button in the guidance line list to create new guidance lines.

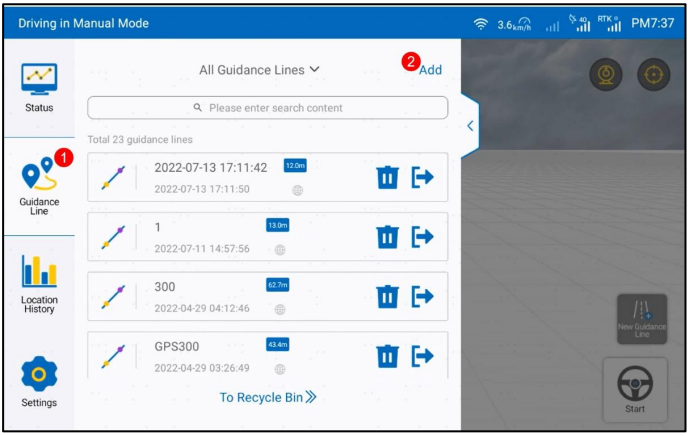


Figure 3.4.1 Adding new guidance lines in Fast Mode

In Advanced Mode, click the Task in the left column to expand the full interface for task settings. You may create new guidance lines on the interface of guidance line settings by clicking the Add icon in the bottom column.

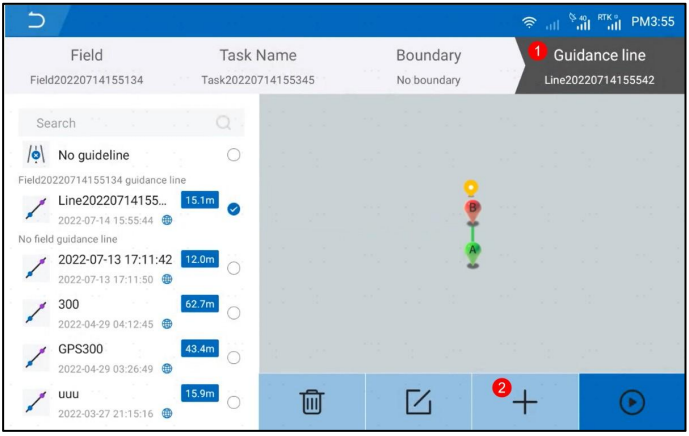


Figure 3.4.2 Adding guidance lines in Advanced Mode

Detailed steps for creating different guidance lines are shown below.

- **Straight Line Mode**

Step 1: Move the vehicle to the starting point of the operation, and tap **Point A** on the screen of control terminal to determine the current position as Point A of the new guidance line. After confirming Point A, manually drive the vehicle straight for 15–20 m.

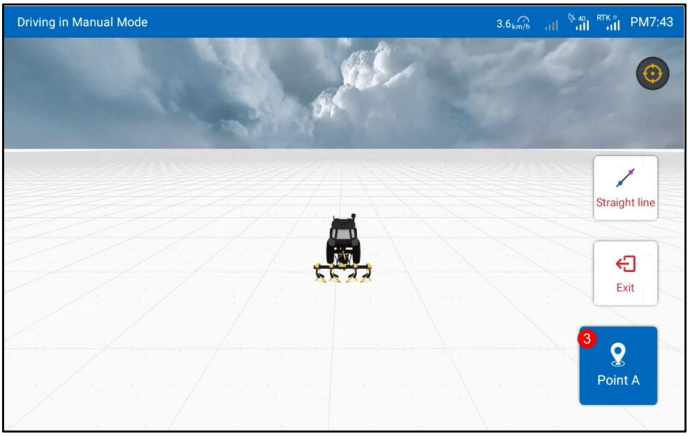


Figure 3.4.3 Confirming Point A

Step 2: Brake the vehicle and tap **Point B** on the screen of the in-vehicle control terminal to determine the current position as Point B on the guidance line.

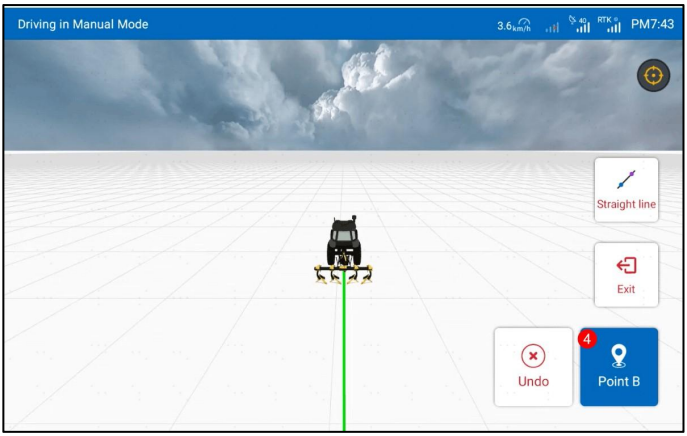


Figure 3.4.4 Confirming Point B

Step 3: After confirming Point B, please tap **Import** and enter the guidance line name in the prompt. Then go back to the list of guidance lines after naming the new line. And the newly added guidance line will be displayed on the top of the list.

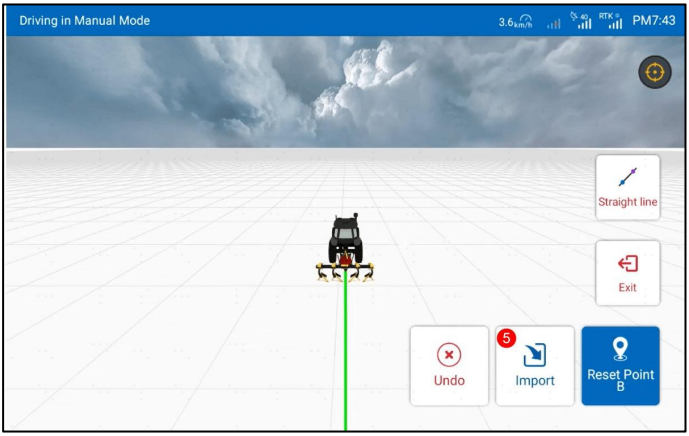


Figure 3.4.5 Import Guidance Line

- **Curve Mode**

Step 1: On the displayed Guidance Line setting page, tap **Straight Line** to switch the plotting mode to the **Curve**. After switching to the curve mode, please move the vehicle to the starting point of the operation, and tap **Point A** on the screen to confirm the current position as Point A on the curvilinear guidance line.

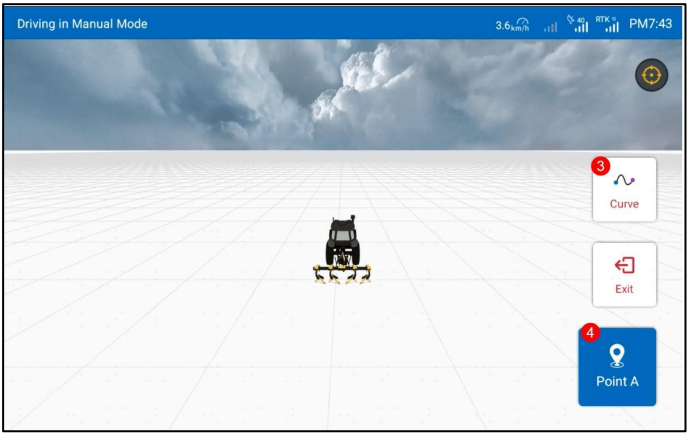


Figure 3.4.6 Switch plotting mode to the curve

Step 2: After confirming Point A, please directly curve the vehicle's path to the ending point of another side you want to determine (for example, from the starting point to the other field edge) in manual mode and tap **Point B**.

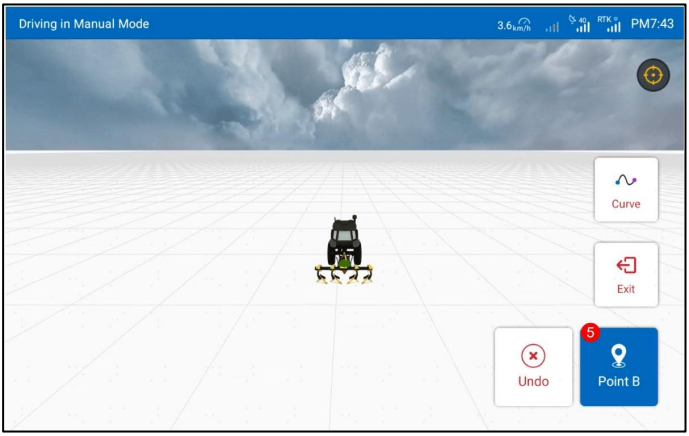


Figure 3.4.7 Confirming Point B

Step 4: After confirming point B, please tap **Import** and enter the new line's name, and then you can get into the curve mode working page.

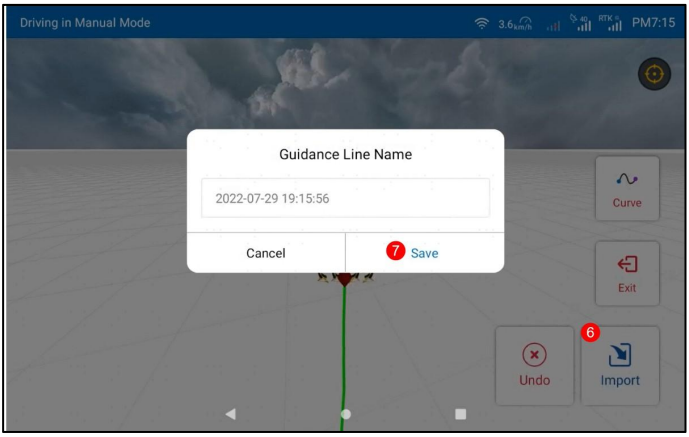


Figure 3.4.8 Import new guidance line

Notes for the curve mode:

1. In the curvilinear mode, Point A is the starting point and Point B shall be a point on another field edge.
2. In multi-line mode, make sure to travel in the same line lengths as the curvilinear guidance line, or the route beyond the curvilinear guidance line will gradually tend to be a straight line.
3. In curvilinear mode, after confirming Point A, you cannot directly tap **Curve** to switch to Straight Line mode. Please cancel the plotting before switching the mode.

- **Pivot mode**

Pivot mode is only supported under Advanced Mode. The steps are as follows:

Step 1: Choose Pivot Mode when entering the process of creating new guidance lines.

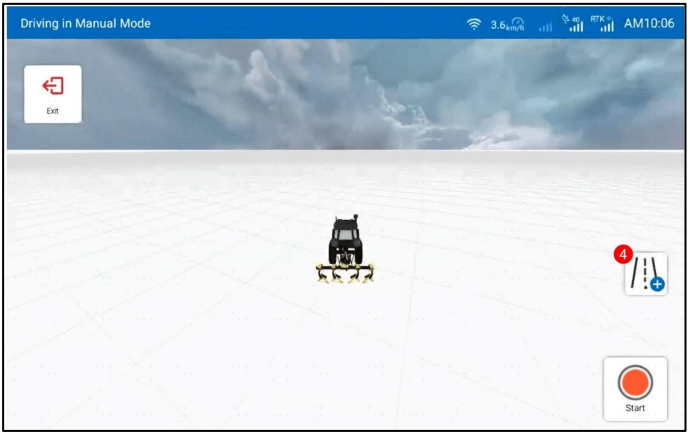


Figure 3.4.9 Create a guidance line

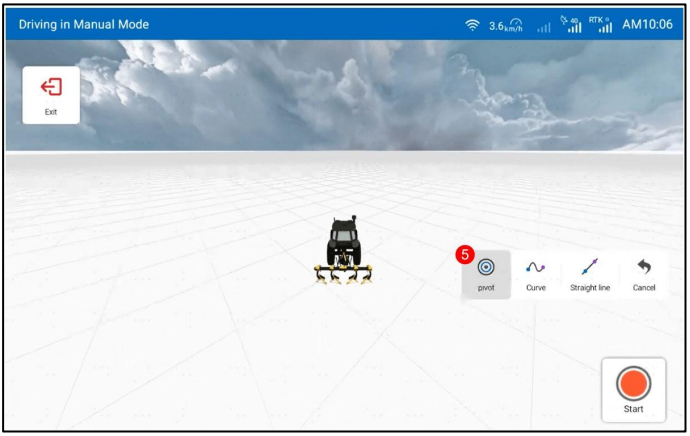


Figure 3.4.10 Switch to Pivot Mode

Step 2: Set point A at the starting point, drive the vehicle along the outer edge of the circular field for at least 20 m, set point B and click **Save**.

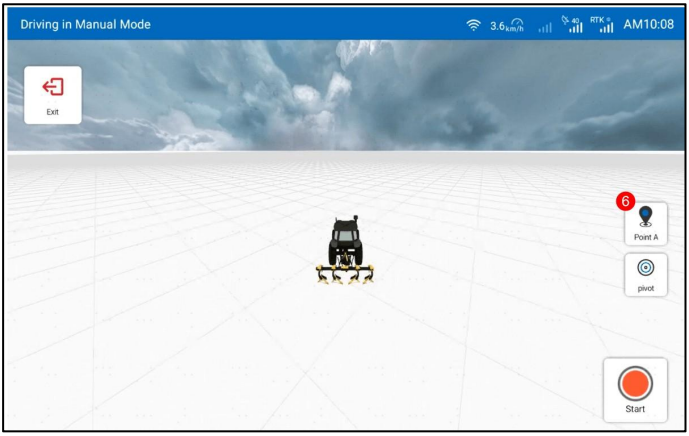


Figure 3.4.11 Set point A

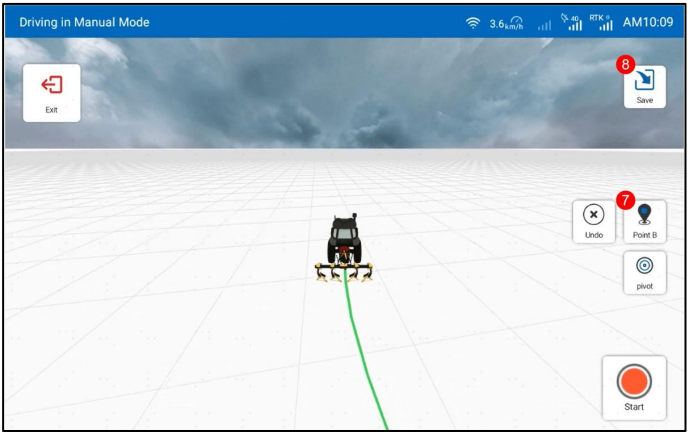


Figure 3.4.12 Set point B

Step 4: Enter the distance from the edge of the implement to the edge of the field, click **OK**, enter the name of the guidance line and then save.

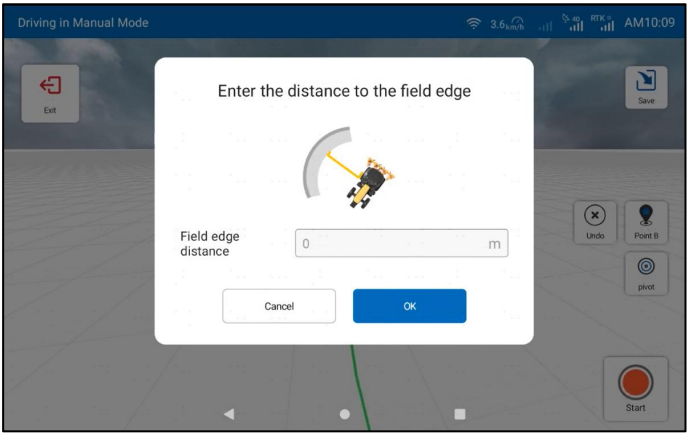


Figure 3.4.13 Set field edge distance

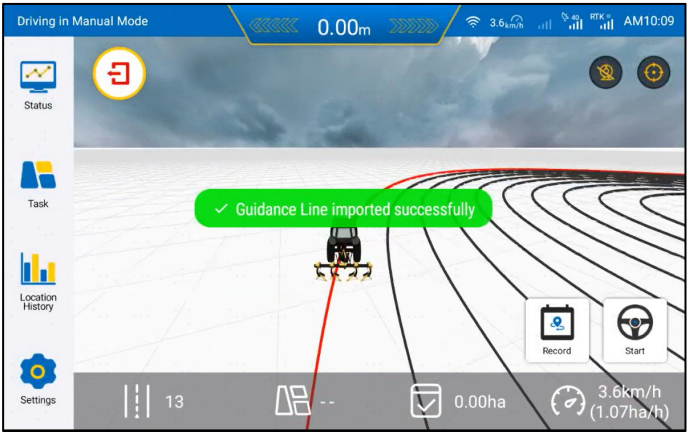


Figure 3.4.14 Interface of working with Pivot Mode

Note: When working with Pivot Mode, when the vehicle is 20 m away from the starting point, please follow the instructions in the notification to get prepared to disengage from auto mode and enter the next work path, and then repeat the above operations until all paths are completed.

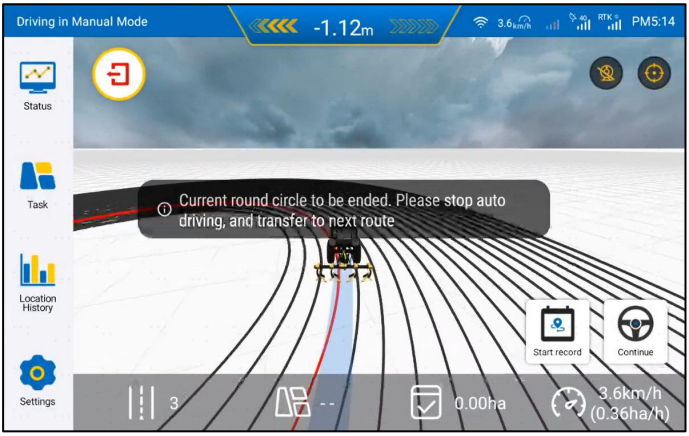


Figure 3.4.15 Interface of auto-steering

3.5. Start Operation

3.5.1. Operation Interface

- **The interface of Fast Mode**

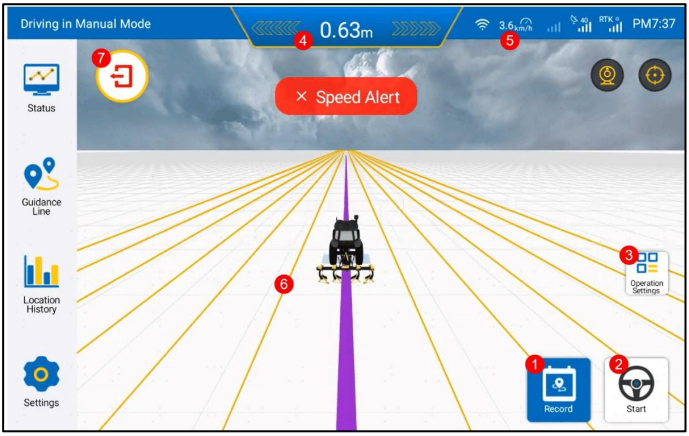


Figure 3.5.1 Operation interface

No.	Name	Function
1	Operation record button	Blue means that the current operation data is recording. And white means that the current operation data is not recorded. Click to switch the recording status.

No.	Name	Function
2	Auto-driving button	Blue means it is in auto-driving status. White means it is not in auto-driving status. Click to switch driving status.
3	Operation setting	Including marking field, multi-line/single-line mode, translation guidance line, translation guidance line to the current position, offset adjustment and other functions.
4	Offset distance	The offset distance of the current operation relative to the guidance line is displayed in a real time manner, and the offset unit can be changed in the settings.
5	Real-time speed	Display the current driving speed of the agricultural machinery, the speed unit can be changed in the settings.
6	Guidance line for operation	The navigation line during operation.
7	End task	Click to end the task. And user can view the details of this operation in the History data.

- **The interface of Advanced Mode**

Figure 3.5.2 Interface of Advanced Mode

No.	Name	Function
1	Real-time task information	On the bottom column you can see the serial number of the guidance line where the vehicle is currently located, the total area of the field,

No.	Name	Function
		the area that has been worked, the proportion of the area that has been worked, and the real-time speed.
2	Task record	If it is in blue it indicates that the current task data is being recorded, and if in white it indicates that the current job data is not recorded. Click to switch it on and off.
3	Auto mode	If it is in blue it means it is in auto-steering state, and if in white means it is not in auto-steering state. Click to switch between two driving modes.
4	Translate guidance line	Translate guidance line according to user needs during operation.
5	Switch multi-single line mode	Click to switch between multi line mode and single line mode of guidance line.
6	Offset distance	The offset distance between the current path and the guidance line is displayed in real time, and the unit can be changed in the settings.
7	Guidance line	Guidance line for auto-steering.
8	Boundary	The red one is the recorded boundary, and the black is the scaled boundary. A prompt will pop up when the distance to the black border is 30 m, and the black border can be set as the position where to turn around (Uturn position) or the real edge of the field.
9	End task	Click to end the task, and you can view the details of this task in the task data.

 If the guidance line has not been imported before starting the task, an icon for creating a new guidance line will appear in the operation interface.

Create a new guidance line/boundary: If the guidance line and boundary are not chosen during task configuration, when entering the operation interface, you can directly create a new guidance line and boundary in the operation interface, and the task data of this creation would also be recorded.

3.5.2. Operation Setting

After completing the installation and commissioning and task configuration procedures in sequence according to the above operations, it will start automatic driving operation. During the operation, according to the user's actual operation needs, six

operations can be carried out: switching operation record status, switching driving mode, shifting the guidance line, switching operation mode, marking the field and switching guidance lines and boundaries. The specific operation process is as follows:

1. Switch operation record status

Click **Start Record/Record** button in the lower left corner of the main interface to switch the status of the operation record.

Non-recording operation status: The operation data and operation traces during the non-recording time are not recorded in this operation.

Record operation status: operation data and operation traces during the recording time are recorded in this operation.

2. Switch driving mode

Click **Start/Stop** at the bottom right corner of the main interface to switch the driving mode.

Manual driving status: The user manually controls the steering wheel to assist straight line operations. When driving manually, user can perform operations such as shifting the guidance line, switching operation modes, and marking the boundary.

Autopilot status: Navigation automatically controls the steering wheel to assist straight line operations. The operation of marking the field can be carried out during automatic driving, and other operation setting operations should be switched to manual mode.

3. Guidance Line Translation

In the manual mode after starting the task, the user adjusts the guidance line in the current multi-line mode to the left and right according to the needs of the actual operation, and drives according to the adjusted guidance line.

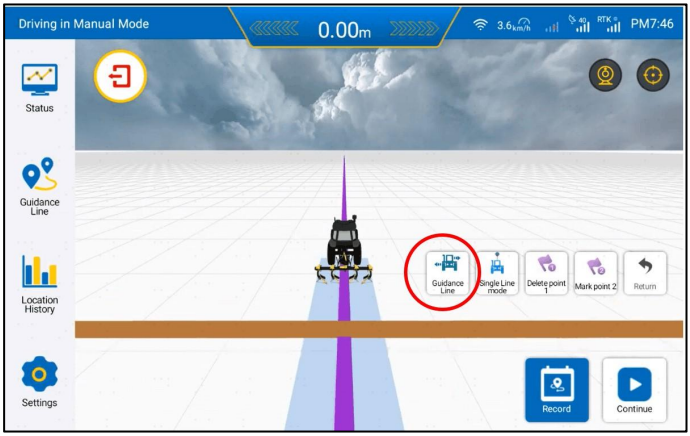


Figure 3.5.3 Selecting Guidance Line Translation

Guidance Line Translation: Tap **Guidance Line**, and tap **Translate to the Current Position** or **Guidance Line Translation** based on the operation.

- **Translate to the Current Position**: Tap **Translate to the Current Position** and then tap **OK** to translate the guidance line to the position of the agricultural machinery.

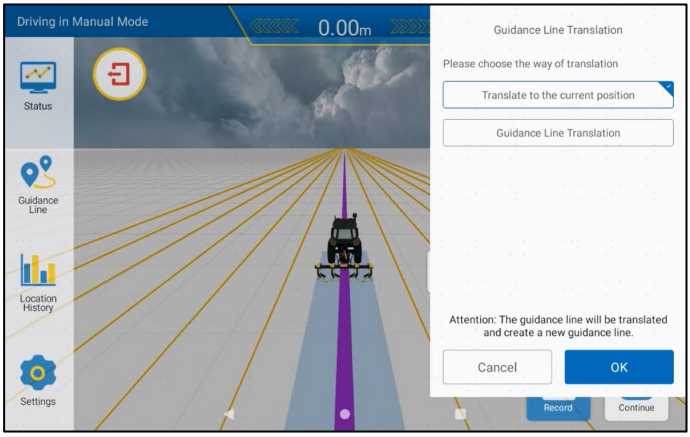


Figure 3.5.4 Translate to the current position

- **Translate to the Fixed Position**: Tap **Guidance Line Translation**, select the moving direction, enter the moving distance, and then tap **OK**.

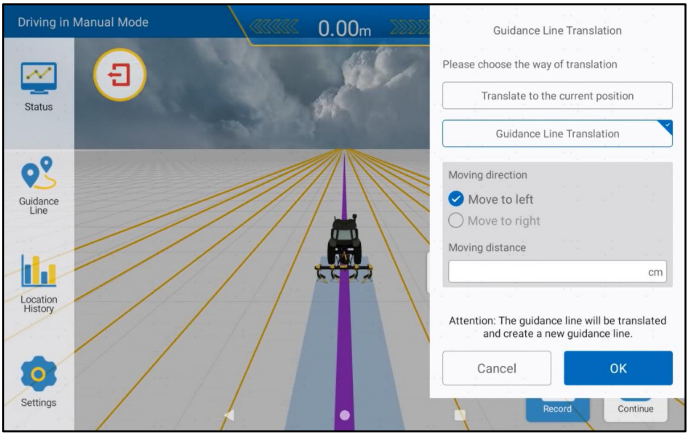


Figure 3.5.5 Translate to the fixed position

Note for The Use of Shifting Guidance Line:

Shift guidance line function is available only in the manual driving status in the multi-line mode.

4. Switch operation mode

The operation mode is divided into single-line mode and multi-line mode. The user can click **Multi-line Mode/Single-line Mode** in the operation setting to switch the current operation mode. If the specific operation mode is easy to be confused, please judge the current operation mode status based on the single-line/multi-line interface background of the operation

Multi-line mode: Auxiliary straight line operation under equidistant conditions;

Single-linemode: Auxiliary straight line operation under free spacing.

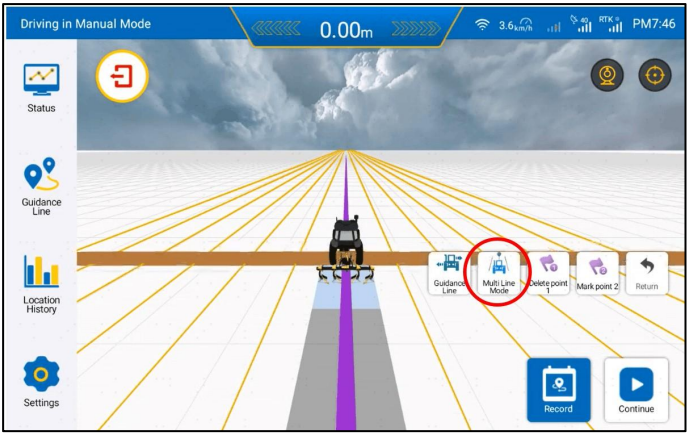


Figure 3.5.6 Multi-line mode

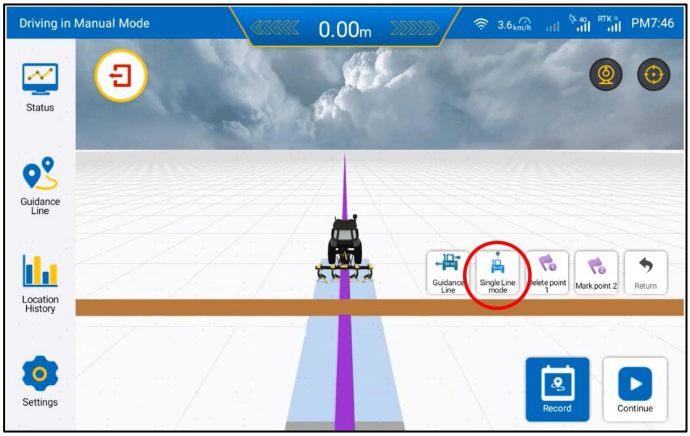


Figure 3.5.7 Single-line mode

5. Mark the Edge

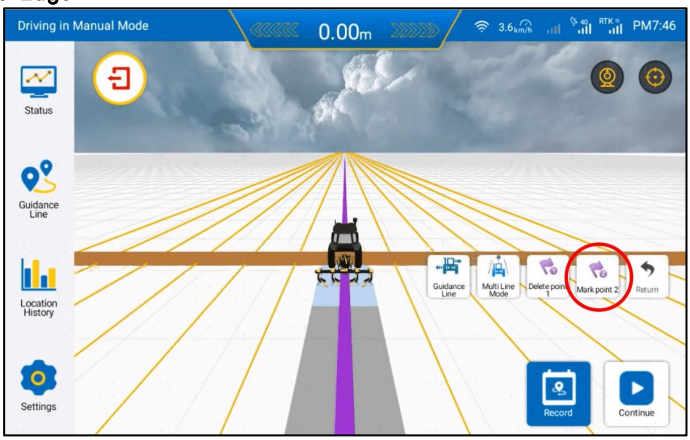


Figure 3.5.8 Marking the field edge

After importing guidance line or during the intelligent operation, you can enable the function of marking the field edge according to the actual needs. This function can alert the user when the vehicle is about to reach the field edge of another side, thereby effectively avoiding safety accidents especially in dark environment.

1. After importing the guidance line or during an intelligent operation, if you want to use this function, drive the vehicle to the field edge and tap **Mark point 1** to mark the current position of the vehicle as the field edge, or tap Mark point 2 on the opposite direction.
2. The system will provide an alert sound and alert message for careful driving when the vehicle travels 30 m away from the marked field edge.
3. When the system warns driver, you can tap **Pause** to suspend the current autosteering driving and resume the manual driving mode. Then, the alert sound and alert message will disappear immediately.

Notes for marking the field edge:

Only one field edge is allowed in the same direction.

In addition to completing commissioning and autosteering operations, you also can check the real-time status of the operating vehicle and undertake other system settings on the in-vehicle control terminal.

6. Switch guidance lines

When not in the work state, you could enter the **Task** to switch guidance lines and boundaries.

7. Continue the task

In advanced mode, you may call the same task to continue if it is not completed, and the task data will be cumulated and shown in history data. The previous task

settings will be implemented by default this time, otherwise you need to change it manually.

When resuming the task, history task traces of the last task will appear, with a red dotted line guiding the vehicle to the position where the last task ended. After clicking the **Start** button, the red guide line will disappear.

The red guide line is only for instruction and you can continue to work at any position.

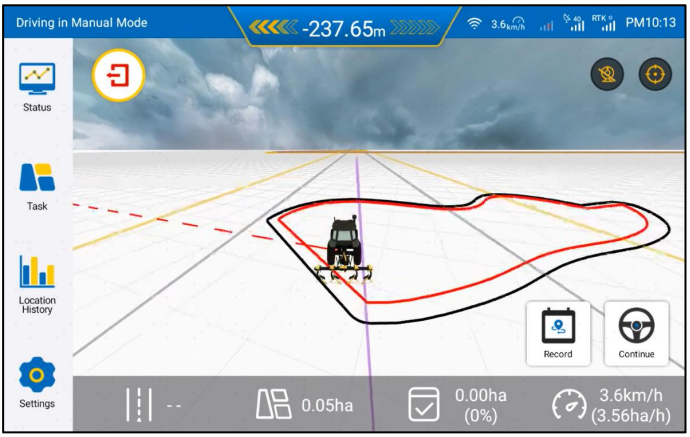


Figure 3.5.9 A red dashed line that guides the tractor

3.6. Advanced Functions

Users can use the advanced functions in the advanced mode after the advanced mode is activated. The existing advanced function is Uturn. which can be selected and used according to the actual situation.

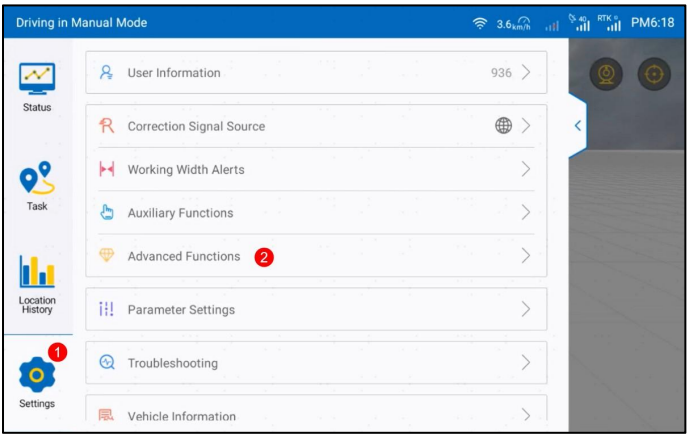


Figure 3.6.1 Setting list

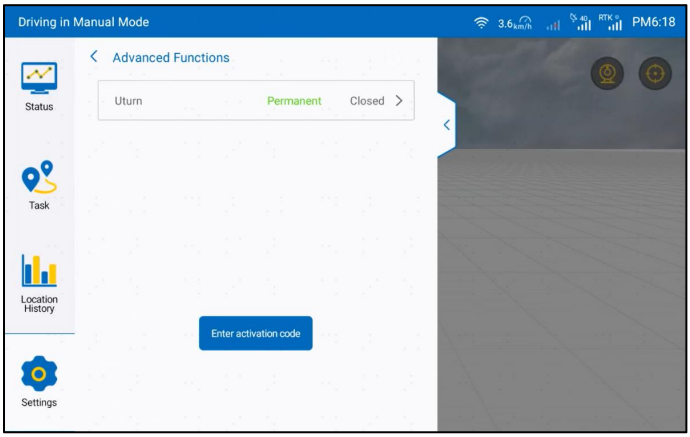


Figure 3.6.2 Advanced functions

- **Uturn**: Automatically plans paths at any position in the field for automatic Uturns and headland operations.

Applicable field types:

1. Rectangle or approximate rectangle fields

Figure 3.6.3 Rectangle or approximate rectangle fields

2. Quadrilateral fields with large included angles

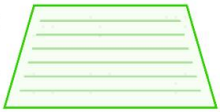


Figure 3.6.4 Quadrilateral fields with large included angles

3. Approximate quadrilateral fields with small missing parts

Figure 3.6.5 Approximate quadrilateral fields with small missing parts

Shapes of fields that can be partially planned:

1. Quadrilaterals with large missing parts
2. Polygons, triangles, teardrops, and other shapes with large triangular space

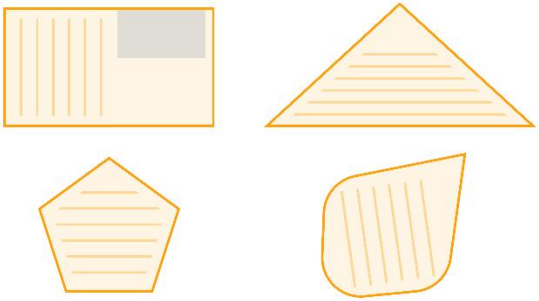


Figure 3.6.6 Shapes of fields that can be partially planned

Fields that cannot be planned:

1. Overly narrow fields
2. Overly small fields

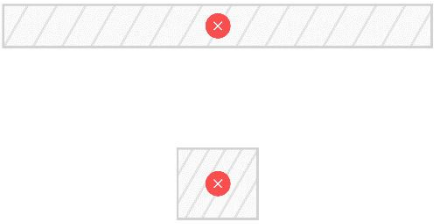


Figure 3.6.7 Fields that cannot be planned

The operation procedure is as follows:

1. Set the vehicle and implement parameters in **Settings** > **Vehicle Information**. Ensure that the turning radius is correct. To get the turning radius, drive the vehicle to make a circle at the maximum steering angle and measure the radius of the outer ring that the vehicle leaves on the ground.

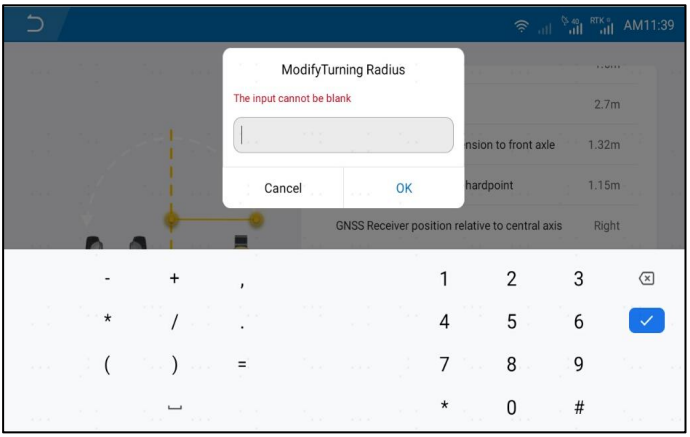


Figure 3.6.8 Set the turning radius

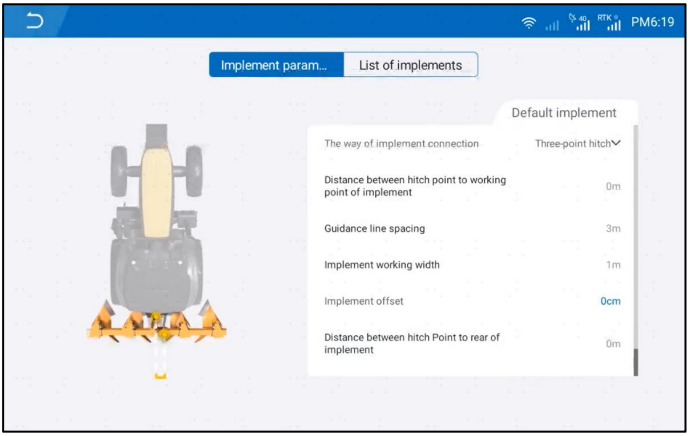


Figure 3.6.9 Set the implement parameters

2. Choose **Settings** > **Advanced functions** > **Uturn**, and enable or disable the function.

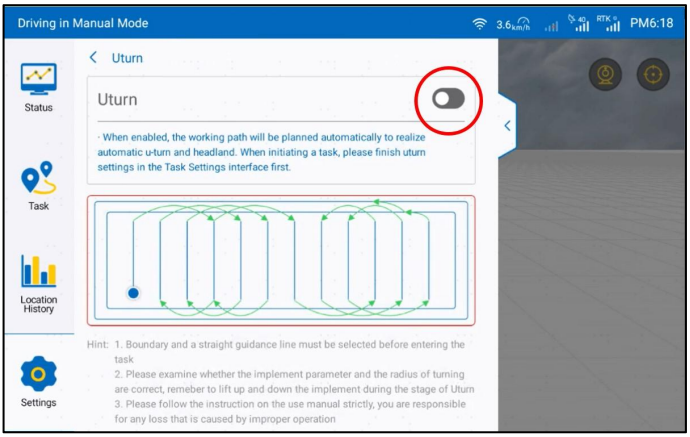


Figure 3.6.10 Uturn details

3. Tap **Task** and choose the field, boundary, and guidance line. If you select **No guideline**, the guidance line will be generated automatically when the Uturn function is enabled.

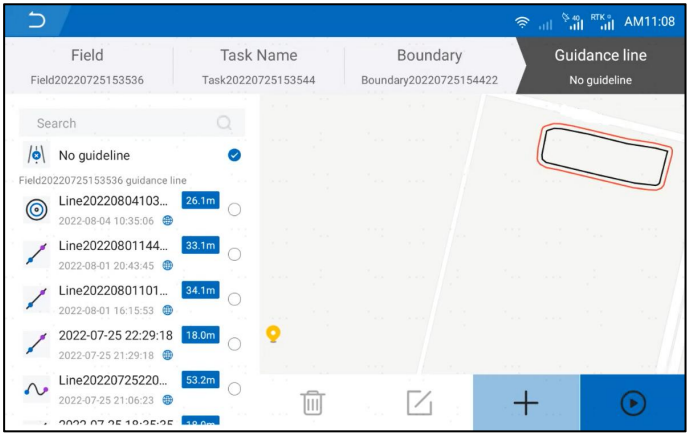


Figure 3.6.11 Choose the boundary and the guidance line when creating an operation

4. Tap **Start**, drive the vehicle to the Uturn start point, and tap the **Uturn** icon on the right.

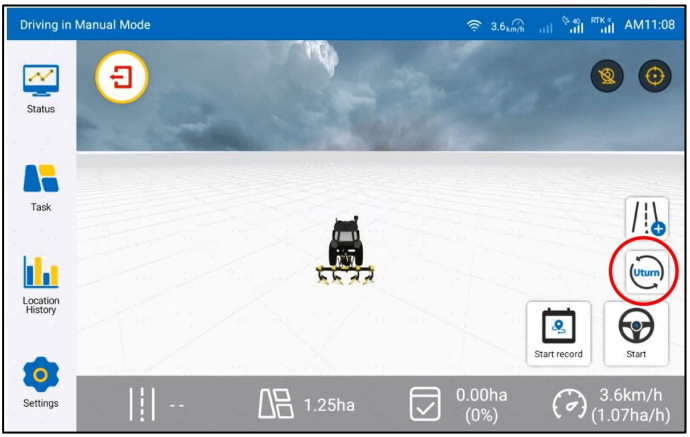


Figure 3.6.12 Operation screen

Note: If No guideline is selected, the pop-up dialog "**No guidance line. Do you want to generate automatically?**" appears. Tap **OK** and select the direction to generate the guidance line.

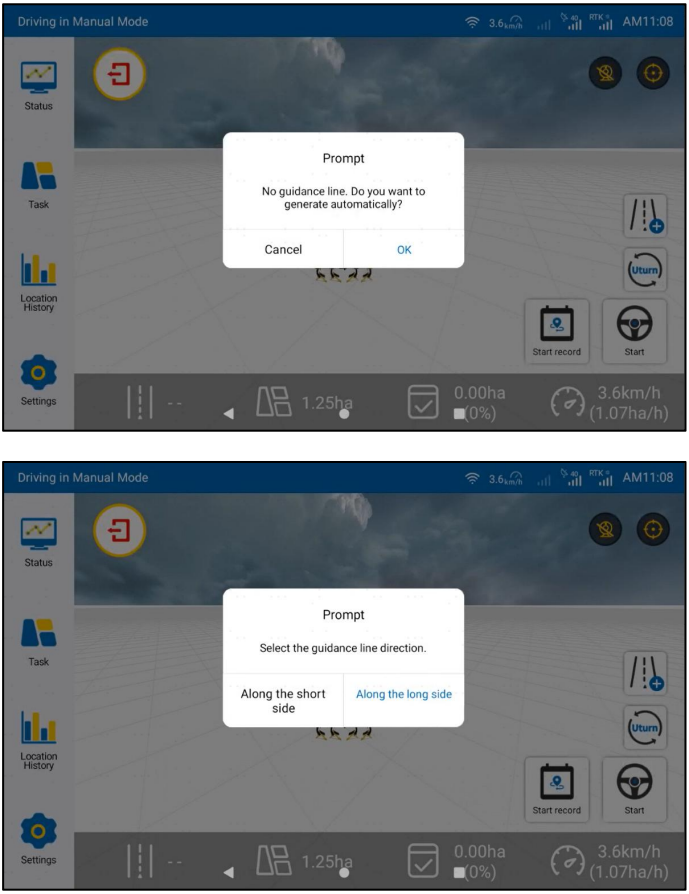


Figure 3.6.13 Pop-up dialog displayed when No guideline is selected

5. Choose the Uturn direction and whether to perform the headland operation and tap **Save**. Then, the system plans the working path and displays a pop-up prompt.

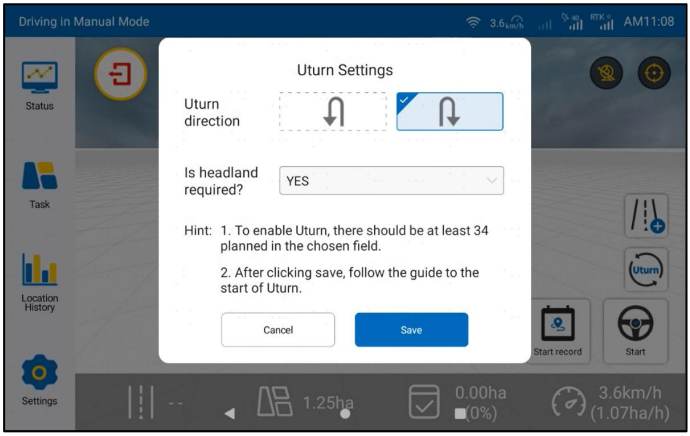


Figure 3.6.14 Setting interface of Uturn system

- If you choose to perform the headland operation, the vehicle performs it based on the boundary shape.

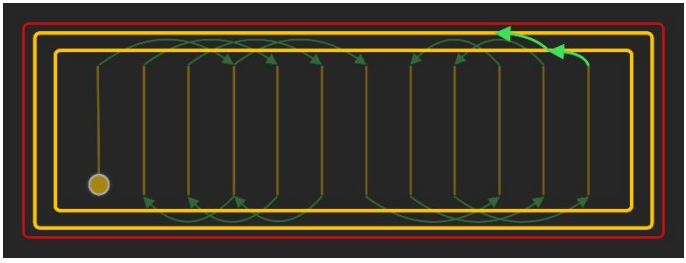


Figure 3.6.15 Automatic headland operation when you choose to perform it

- If you choose not to perform the headland operation, the system recommends the optimal headland path when autosteering is completed. You need to manually drive the vehicle to the start point of the recommended headland path.

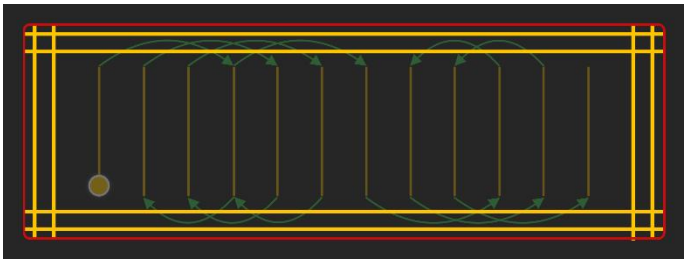


Figure 3.6.16 Optimal headland path recommended when you choose not to perform the headland operation

6. The Uturn coverage is displayed if it is not higher than 95%. Tap **OK** to return to the operation screen.

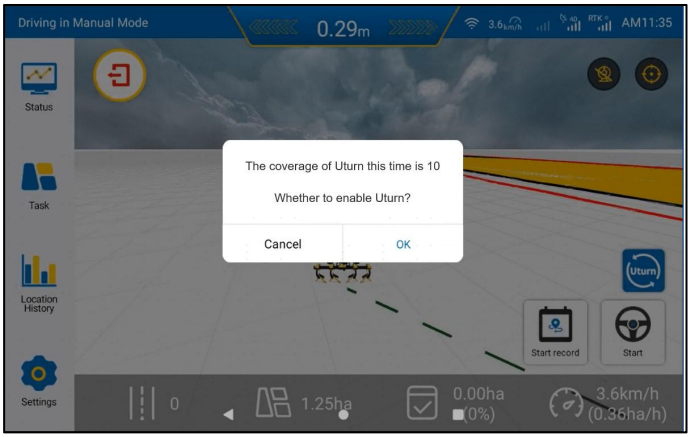


Figure 3.6.17 Uturn coverage

7. Follow the green line to drive to the start point, and tap **Start**.

Figure 3.6.18 Start the Uturn task

Note:

- Before confirming the Uturn settings, ensure that your vehicle is close to the start point, and heading to the working direction of a guidance line.
- If the vehicle deviates from the guidance line with a large angle, the Uturn operation cannot be started. If the Uturn operation cannot be started when the vehicle is aligned to the guidance line, the vehicle might be heading to the opposite direction.

Fault prevention:

Scenario 1 When the user exits the task and enters it again without changing any parameters:

The original paths will be kept.

Scenario 2 When any of task, boundary, guidance line, vehicle parameters, implement parameters, whether to perform the headland operation, or turning direction is changed:

The original Uturn paths will be canceled. You need to set the parameters and plan the Uturn paths again.

Scenario 3 Before Uturn planning, part of the task is already completed:

Uturn planning is effective only on the remaining part to avoid repeated operation.

3.7. Other Functions

3.7.1. Status

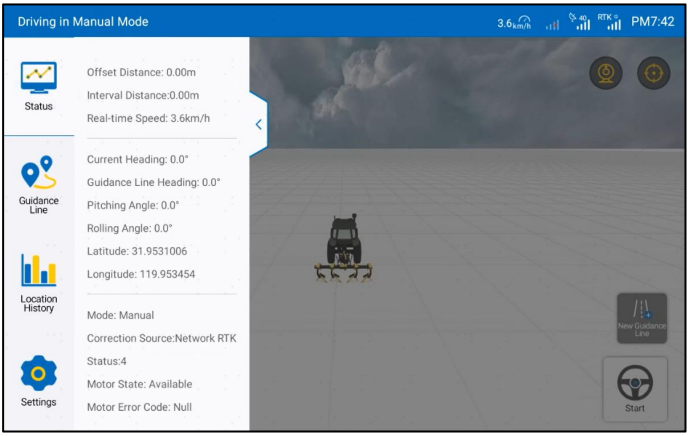


Figure 3.7.1 Status

Users click the **Status** to access the working status and operation of the vehicle.

Offset distance: Offset distance of the vehicle;

Interval distance: distance between pass;

Real-time speed: Real-time speed of the vehicle;

Current heading: Current heading angle of the vehicle;

Guidance line heading: The heading angle of the AB line;

Pitching angle: the overall pitching angle of the vehicle;

Rolling angle: the overall rolling angle of the vehicle;

Longitude and latitude: The real-time latitude and longitude of the vehicle;

Mode: Manual, automatic interval such as AB line, misalignment of heading, the distance of AB point is too small, heading update timeout, position update timeout, and heartbeat timeout;

Park brake: Emergency braking;

Correction Source: Connection mode of the correction source;

Status: Connection status of the correction source. The value 4 indicates connection succeeds.

Motor status: The status of the motor;

Motor error code: the error number when an error occurs.

3.7.2. Location History

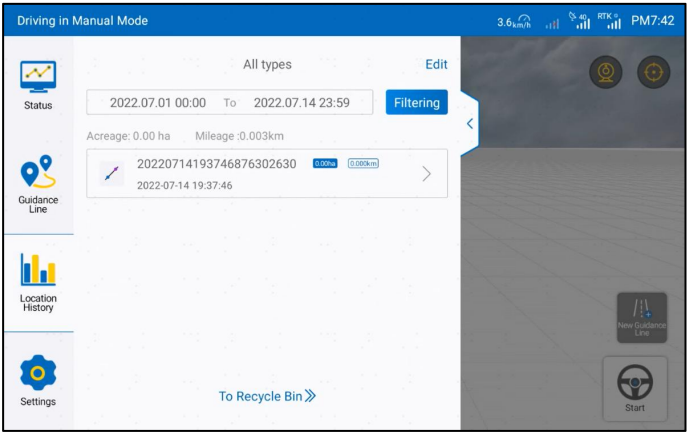


Figure 3.7.2 Operation Data

1. **Check the operation list.** After expanding the operation data details page, users can view the single information of historical operations here, including: operation time, operation width, operation area, operation efficiency etc.
2. **Filter the job list.** Users can filter the operation information by month. After the data is filled in, click **Filtering** to refresh the list.
3. **Filter the operation list.** In the Fast Mode, users can filter the operation data by the operation time; in the Advanced Mode, users can filter the historical operation information by date, field and operation type. After the filter data is filled in, click **Filter** to refresh the operation data list.

Precautions of operation data:

1. Historical operation data is the operation data accumulation of each Guidance line.
2. The latest operation is placed on the top of the list, sorted by date.
3. The date on the list is the date on which the field was saved, not the date of the last job operation.
4. The acre and time are cumulative items of historical operations instead of a single data of the latest operation.

3.7.3. Settings

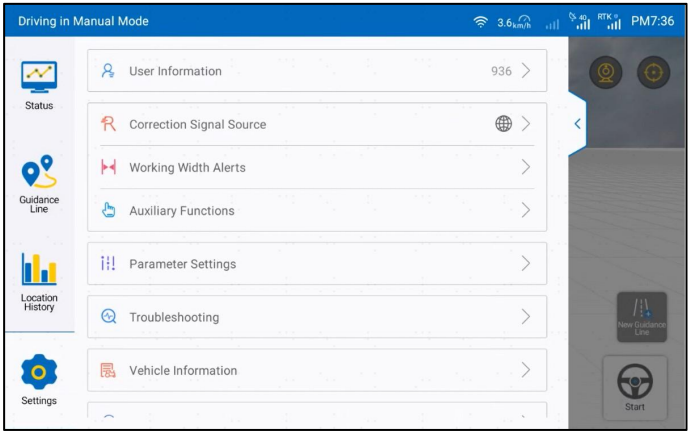


Figure 3.7.3 Setting list

The user clicks **Settings** to expand the setting details page and display the setting items.

3.7.3.1. Correction Source

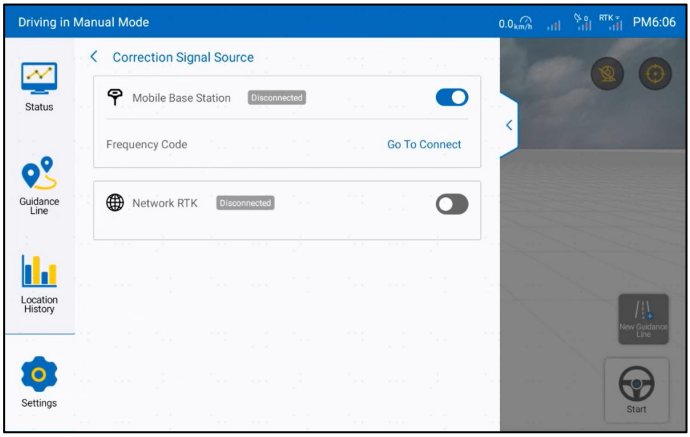


Figure 3.7.4 Correction source settings

After finishing the vehicle parameter settings, you need to select the connection mode of the correction source before operation. The system supports two connection modes: **Mobile Base Station** and **Network RTK**. The default mode is **Mobile Base Station**. Follow the steps below to select the connection mode:

1. Tap Settings and choose Correction Source.
2. Use the toggles to select the connection mode. The Mobile Base Station mode is selected by default.

When using the mobile base station for the first time, you need to pair with it first. Tap **Frequency Connecting**, enter the frequency code in the pop-up dialog, and then save the settings to establish the RTK connection.

3. After connection, check the signal icon in the top status bar. If the RTK mode is used, **RTK** is displayed; If the icon does not change after a few minutes, reconnect or switch the connection mode. For details, see Section 3.2.5 "Select Correction Source".

3.7.3.2. Working Width Alerts

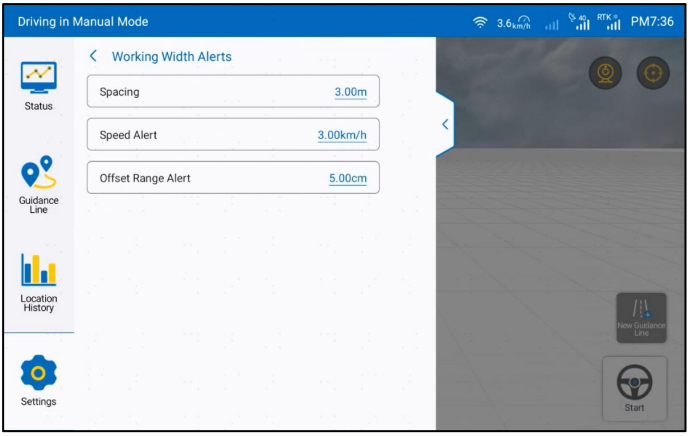


Figure 3.7.5 Working width alerts

On the displayed Parameter Settings screen, tap the **Working Width Alerts** tab. The displayed details screen allows setting Operating space, Speed Alert, Offset Range Alert, and Driving distance warning. Tap the item that needs to be set and enter the corresponding value.

Spacing: indicates the distance between adjacent guidance lines in multiline mode.

Speed alert: indicates the warning speed preset. It allows the system to prompt the driver to manually slow down the vehicle in autosteering driving mode in the case of speeding.

Offset range alert: indicates the warning offset preset for the vehicle in autosteering driving.

3.7.3.3. Auxiliary Functions

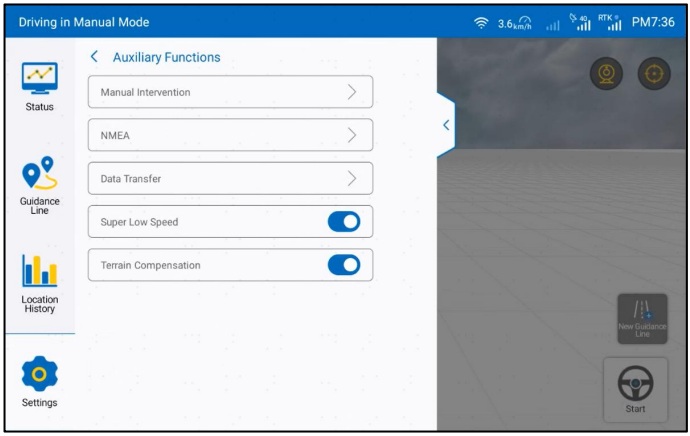


Figure 3.7.6 Auxiliary Functions

- **Manual Intervention**

You can get disengaged of the automatic driving mode manually when this function is turned on. The sensitivity of manual intervention can be adjusted.

- **NMEA**

Turn on the NMEA function to transmit the GPS information received by the automatic navigation device to other electronic devices. User should enable it in Settings-Accessibility and set the intended format and transmission frequency.

Selectable baud rate：2400 B/S、4800 B/S、9600 B/S、14400 B/S、19200 B/S、38400 B/S、57600 B/S、115200 B/S;

Selectable output formats：GGA、VTG、GST、HDT、RMC;

Selectable output frequency：1/60HZ、1/30HZ、1/10HZ、1/5HZ、1HZ、2 HZ 、5HZ、10 HZ.

- **Terrain Compensation**

If the operation field contains more slopes, the terrain compensation can be turned on to achieve a more precise navigation effect.

- **Super Low Speed**

When using the Hall angle sensor, the ultra-low speed mode can be turned on to ensure the accuracy and stability of the operation at ultra-low speeds below 0.3 km/h.

- **Data Transfer**

Map information, including field, boundary, guidance line, and task data, can be exported out of or into the Sveaverken autosteering through online sharing or USB flash drive.

Online Sharing:

Before the USB flash drive is inserted, data can be transferred to the designated user through online sharing. The steps are as follows:

Step 1: Go to **Settings** > **Auxiliary Functions** > **Data Transfer**, select the data to be shared, and tap the sharing button at the top right.

Note: Only field, boundary, and guidance line information can be shared online.

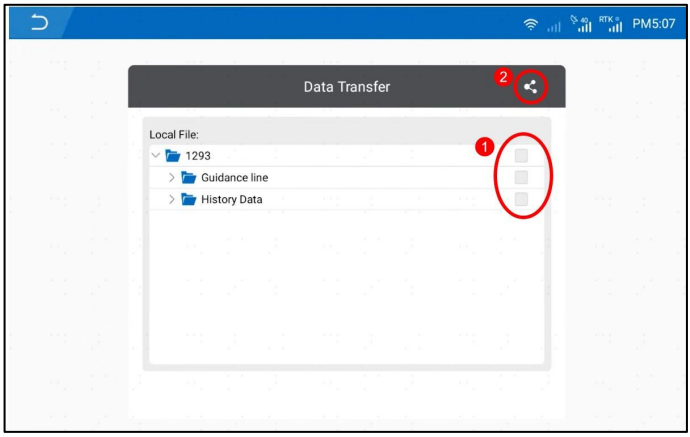


Figure 3.7.7 Data transfer

Step 2: Enter the user account, and tap **Confirm**.

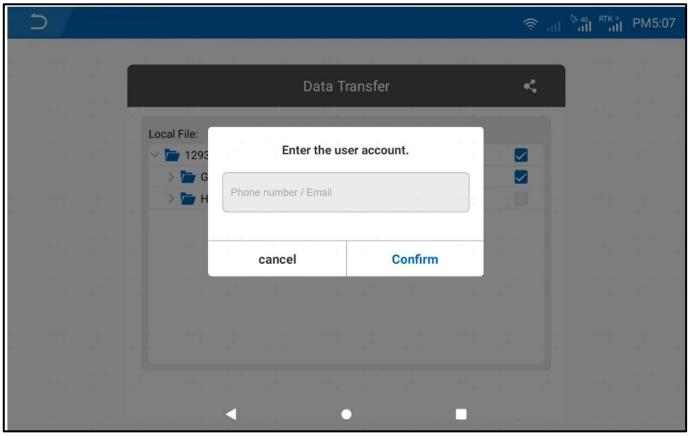


Figure 3.7.8 Enter the account of designated user

Step 3: Select the current device SN and tap **Confirm.** A window pops up if the sharing is successful.

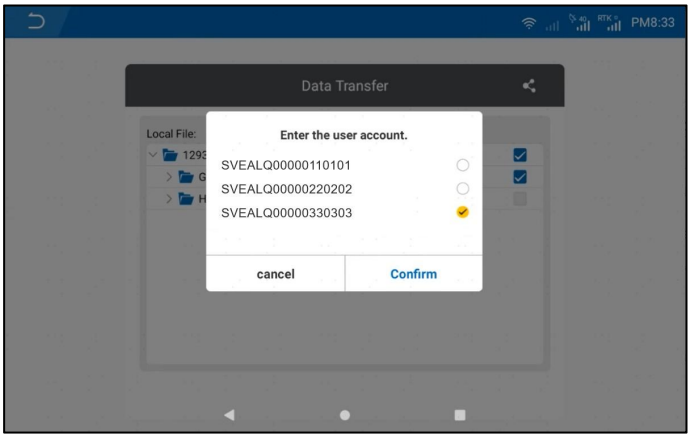


Figure 3.7.9 Select the device SN

Notes:

1. Only data in the formats specified on the screen can be imported.
2. Task data cannot be shared online.

3.7.3.4. Parameter Setting

Choose **Settings** > **Parameter Settings**. On the displayed screen, you can set Angle Sensor, Vehicle Calibration and Calibration of Accessories to ensure operational accuracy.

- **Angle Sensor**

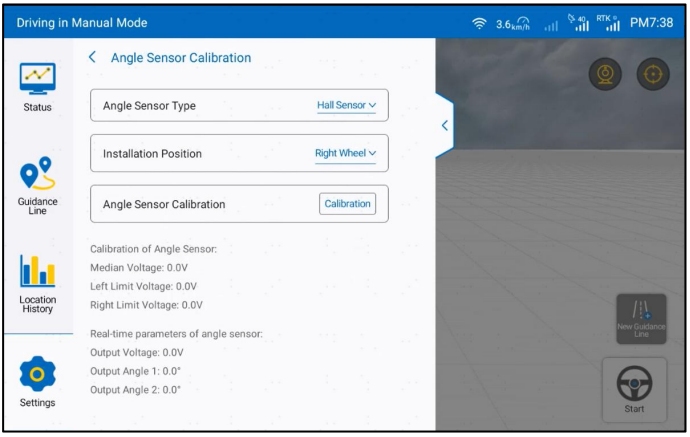


Figure 3.7.10 Angle sensor settings

Tap the **Angle Sensor Calibration** tab in parameter calibration page. On the displayed details screen, set **Angle Sensor Type**, **Installation Position** and tap **Calibration** to calibrate the angle sensor in this position. For details, see Section 3.2.7 Calibrating Angle Sensor

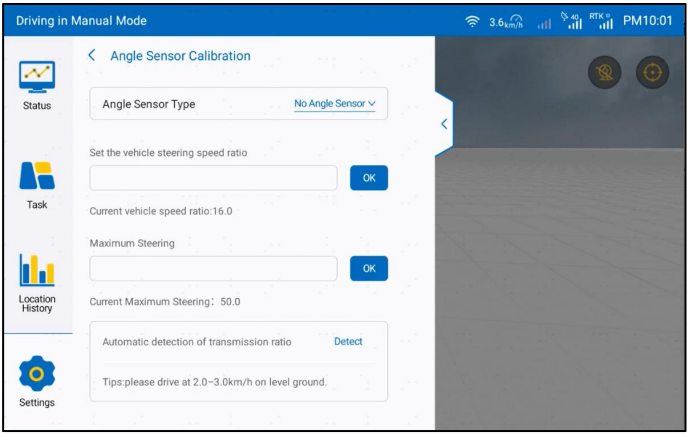


Figure 3.7.11 Settings for no angle sensor

- **Calibration of Accessories**

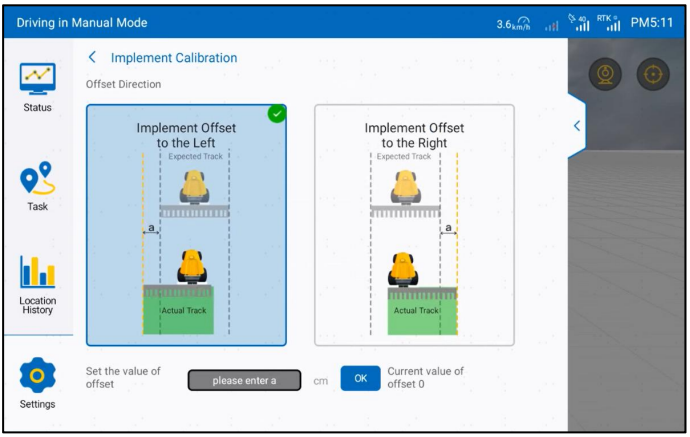


Figure 3.7.12 Settings for calibration of accessories

When auto-driving path has an offset within 3 cm after the implement is equipped, please measure the value. If the auto-driving path tends to the left comparing to the pre-set guidance line, please select **Implement Offset to the Left** and enter the deviation value **a**, and then click **OK** to save the setting; if the auto-driving path tends to the right, select **Implement Offset to the Right** and enter the deviation value **a**, and click **OK**.

- **Parameters Commissioning (for FAE Only)**

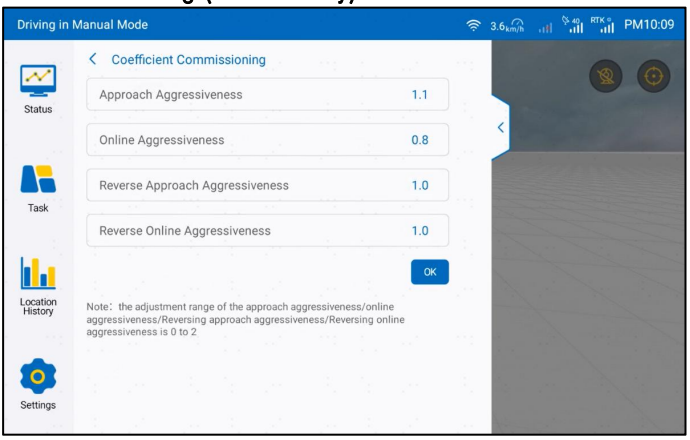


Figure 3.7.13 Coefficient Commissioning

Approach Aggressiveness: affects the time for the vehicle to enter the next guidance line when making a turn. The larger the value is, the shorter adjustment time the process needs. However, the driving instability is higher.

Online Aggressiveness: affects the linear driving accuracy of the vehicle. The smaller the value is, the higher the control degree, but the instability will increase accordingly. For example, the possibility of an "S" turn is greater.

- **Vehicle Calibration**

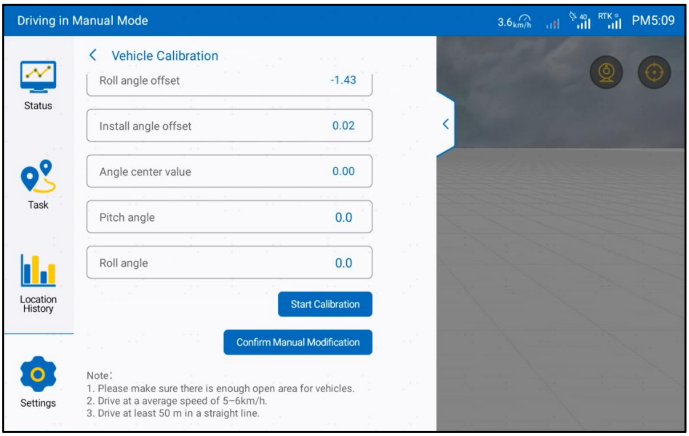


Figure 3.7.14 Vehicle calibration

For detailed operations, see Section 3.2.8 Vehicle Calibration.

3.7.3.5. Implement Information

Tap **Implement Information** in Settings to view the implement parameters and list of implements.

Tap **Implement Parameters** to view the way of implement connection, the distance between the implement and the hitch, and implement working parameters.

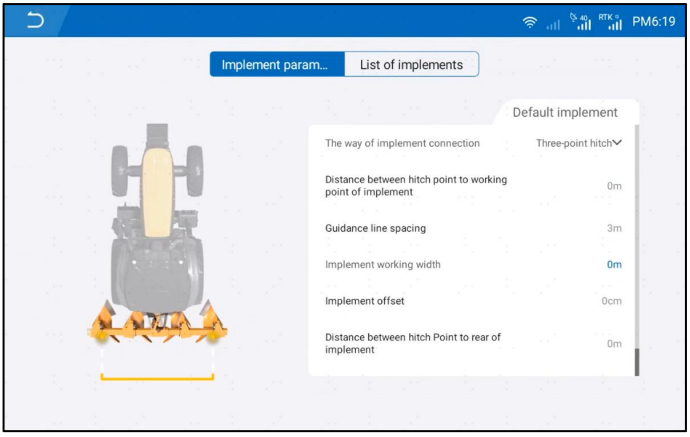


Figure 3.7.15Implement parameter

Tap **List of Implements** and delete, edit, create, upload, and synchronize implements to create and manage the implement library. **Note**: The implement library can contain a maximum of 10 implements.

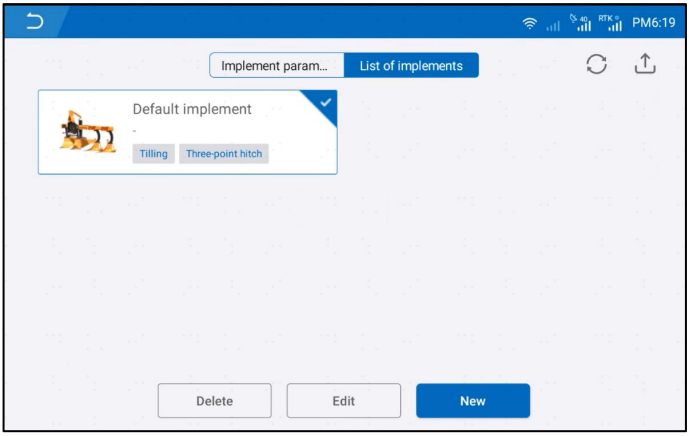


Figure 3.7.16 List of implements

- **Delete the Implement**: Select an implement and tap **Delete** to delete the implement information.

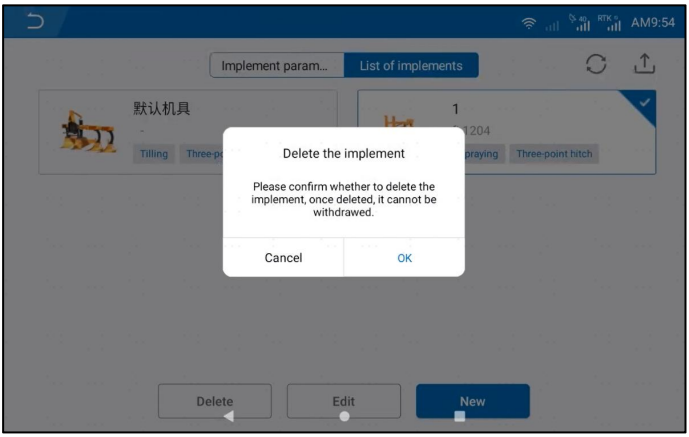


Figure 3.7.17 Delete an implement

- **Edit the Implement**: Select an implement and tap **Edit** to modify the implement information.

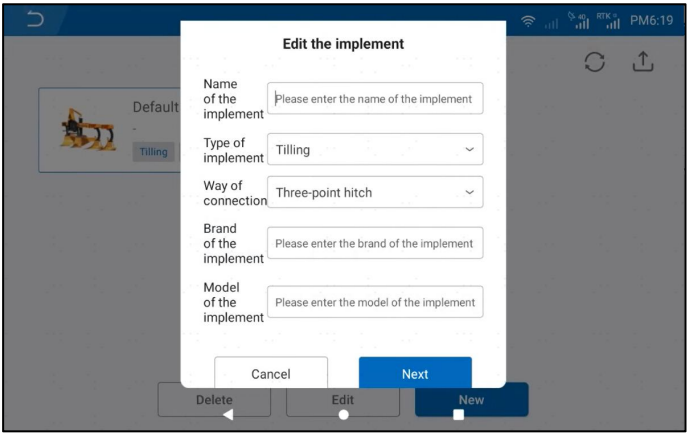


Figure 3.7.18 Edit an implement

- **Create New Implements**: Tap **New** and then perform the following steps:

Step 1: Fill in the basic information of the new implement and tap **Next**.

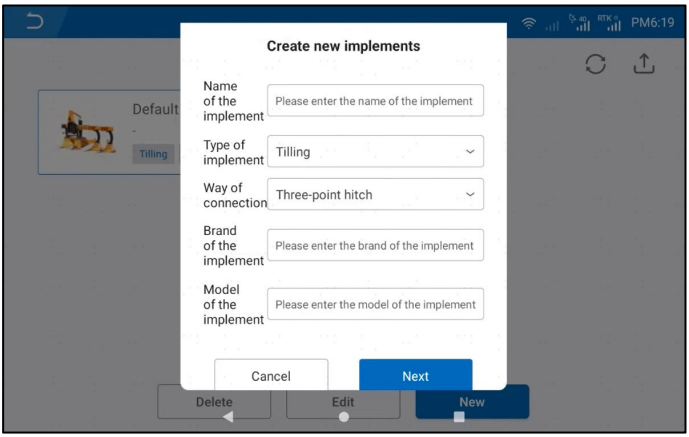


Figure 3.7.19 Create new implements - basic information

Step 2: Fill in the working information of the new implement, and tap **Save**. If any item is not set, the information cannot be saved.

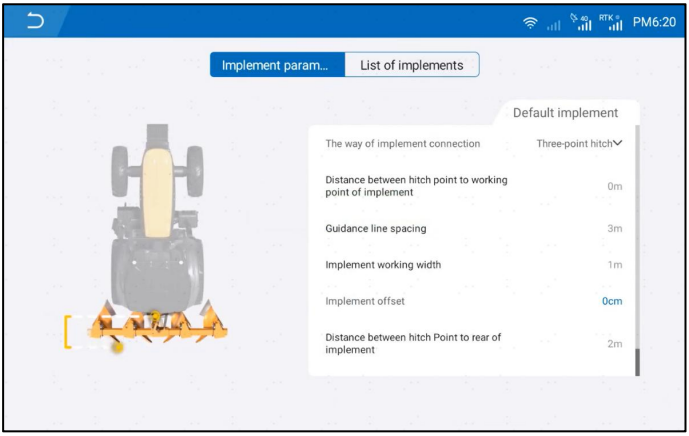


Figure 3.7.20 Create new implements - work information

- **Upload the Implement**: Tap the upload icon to upload implement information.

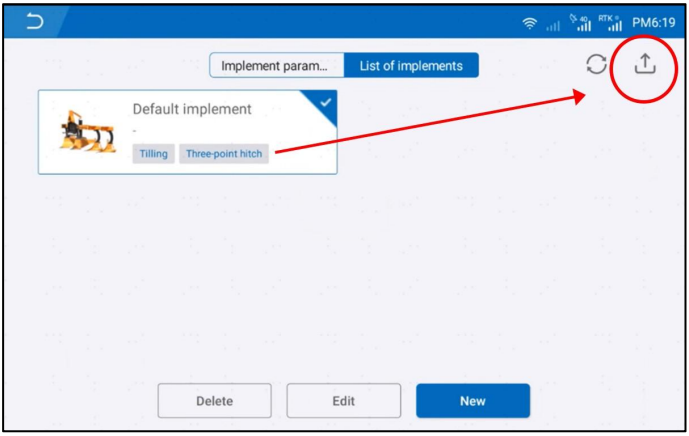


Figure 3.7.21 Upload implements

- **Synchronize the Implement**: Tap the synchronize icon to synchronize the previously uploaded implement information.

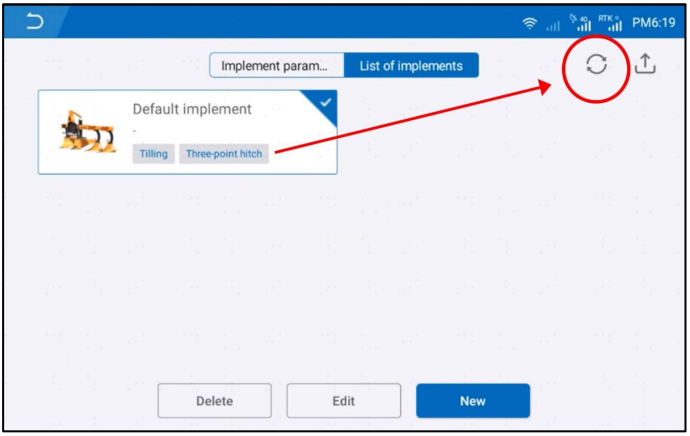


Figure 3.7.22 Synchronize implement

3.7.3.6. Troubleshooting

If encountering any problem during use, the user can enter **Troubleshooting** to perform software and hardware detection of the vehicle. The user can promptly adjust the fault items displayed as × in the screen, the interface is as shown in the figure below.

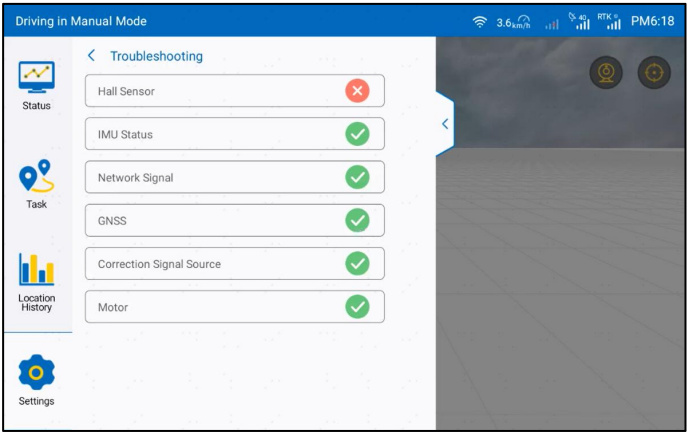


Figure 3.7.23 Troubleshooting

3.7.3.7. Vehicle Parameters

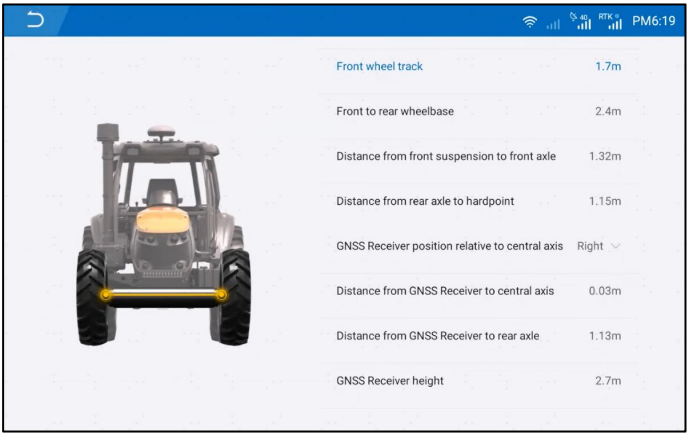


Figure 3.7.24 Vehicle parameter settings

Tap the **Vehicle Parameters** tab. On the displayed details screen, tap the required items and enter the corresponding vehicle data to complete vehicle parameter settings. For specific measurement details, please refer to the instruction video.

Positioning antenna spacing calibration

If there is a problem of large and small lines in the multi-line mode during the operation, the user is required to calibrate the positioning antenna spacing according to the following diagram.

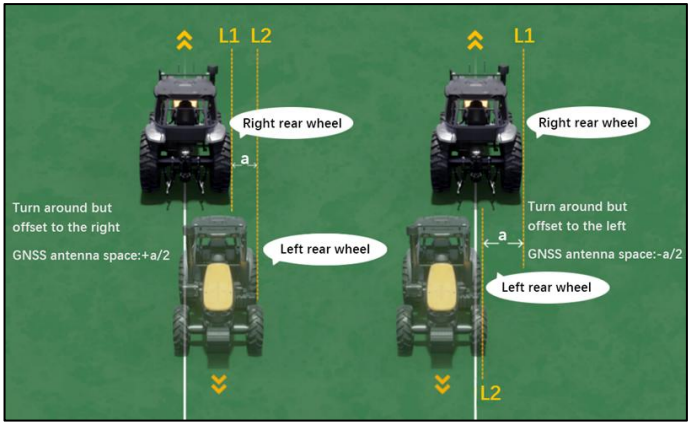


Figure 3.7.25 Positioning antenna spacing calibration

Step 1: Create a guidance line: create and import a guidance line. (The starting point is point A, the end point is point B)

Step 2: Set the line spacing and select the operation mode: set the operation spacing in the "parameter setting" to 10 meters, and select the operation mode as multi-line mode.

Step 3: Drive two times.

First driving: Drive the vehicle at a low speed from point A to point B. If the vehicle is stable (the offset error displayed on the screen is less than 2 cm), stop after the driving distance is not less than 10 meters, and mark at the right rear tire position of vehicle, confirm the marking line L1.

Second driving: After marking the marking line L1, turn the vehicle around and continue driving in the reverse direction along the driving route just now. When driving to the vicinity of the marking line L1 in the second step (note: ensure that the driving status is stable at this time, that is, the offset distance displayed on the screen is less than 2 cm), stop and draw the marking line L2 at the left rear wheel position.

Step 4: Measuring error: use a tape measure to measure the distance between the two marking lines, and record the value **a** (unit: m)

Step 5: Please enter a value in the interface of **Positioning Antenna-Central Axis Distance**, and click **OK** to complete the corresponding positioning antenna spacing calibration.

3.7.3.8. System Settings

- **System version (OTA upgrade)**

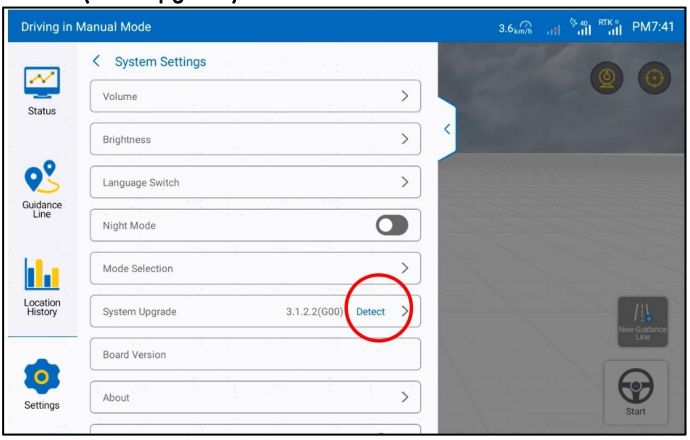


Figure 3.7.26 OTA Upgrade

When there is an update to the software version, you can perform the following operations to achieve a one-tap upgrade of the auto steering system:

1. Turn on the in-vehicle control terminal of the autosteering system. Make sure that the control terminal can access the Internet through network SIM card/Wi-Fi network and that the network status is stable (please make sure the 4G antenna is connected properly).
2. If there is a new version, the system will automatically display a prompt for upgrade.

3. Tap **Confirm Update** in the prompt box to enter into the upgrade process.
4. Do not take any operation during the upgrade. You can check the upgrade progress through the displayed information and wait for its completion.
5. After the upgrade is successful, the system will display a prompt that the upgrade is successful and then automatically enter the new version.
6. If the upgrade fails, the system will prompt you to retry. tap Retry to re-upgrade the system.

Notes for OTA upgrade:

1. Ensure that the network status is stable throughout the upgrade process.
2. Do not power off the terminal during the upgrade process.
3. If you encounter any problems during the upgrade, please contact your local dealer for help or call the technical service hotline.

- **Mode selection**

User can switch between Fast Mode and Advanced Mode here. You need to purchase the activation code from the dealer and perform the following steps to activate the function:

1. Tap **Settings** > **System Settings** > **Mode Selection** > **Activate**.

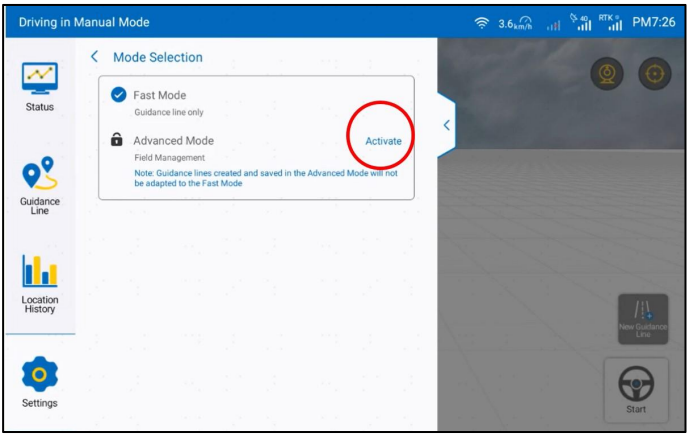


Figure 3.7.27 Mode Selection

2. Enter the activation code in the pop-up dialog, and tap **OK**.

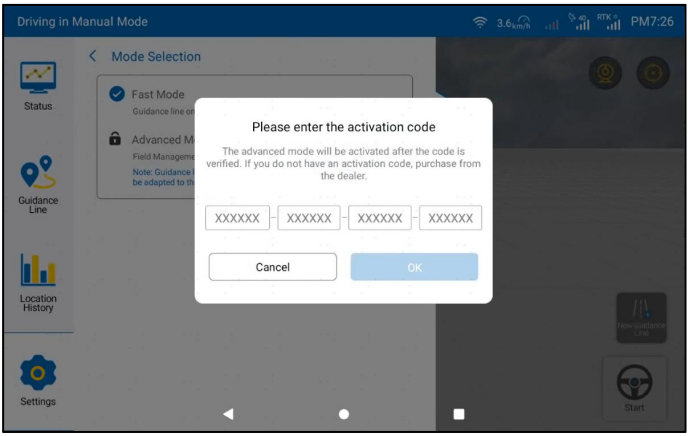


Figure 3.7.28 Enter the activation code

3. After the activation code is verified, an Information Confirmation dialog pops up. If the code is correct, click **Confirm** to activate.
4. After the mode is activated, users can view its status and the advanced mode interface, and the functions include field task, Uturn and so on can be used.

- **Recycle bin**

Boundary, guidance line and History data deleted within 30 days can be restored in the recycle bin.

- **Unit settings**

User can choose the unit to display as metric or imperial units, or define own unit combination based on unit usage habits.

- **Language Settings**

You can select a system language from several languages, such as Chinese, English, Spanish, and Russian.

Note: Language switching is not supported during operation.

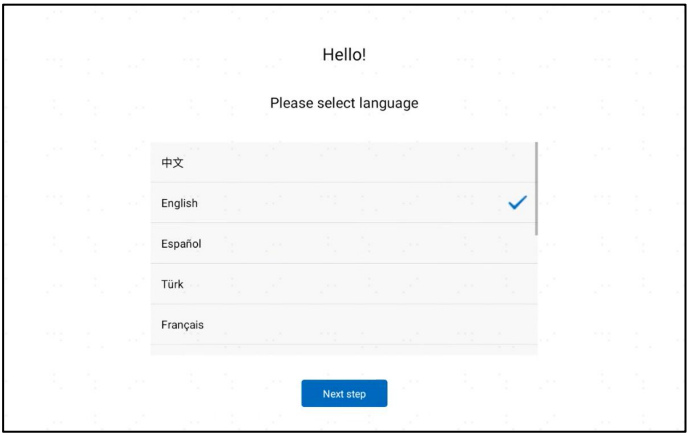


Figure 3.7.29 Language selection

3.7.3.9. Wi-Fi Camera (Optional)

Two Wi-Fi cameras can be connected via hotspot. The operation is as follows:

1. For the first use, please turn on the Wi-Fi camera in the settings.
2. Turn on the hotspot mode before binding, and scan the code via camera to identify and bind the camera. Up to two cameras can be bound via scanning the code. The scanned camera is displayed on the right side. Click **OK** to enter the camera view page.
3. The current video stream can be viewed on the camera list page. If it is required to bind other cameras, click **Delete** and repeat the binding steps to bind.

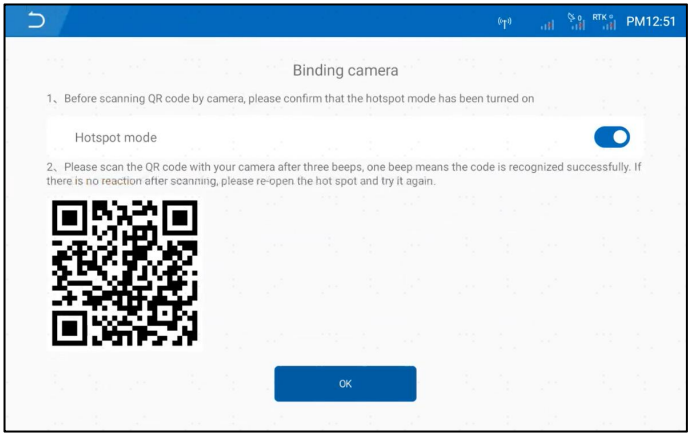


Figure 3.7.30 Wi-Fi camera configuration

4. After the binding is completed, user can click return button in the upper left corner to enter the working interface, and Click real-time video button to open the main interface display.
5. Click Switch button to switch the camera. Click Full Screen button to maximize the camera interface, and click again to restore. Click Close button to close the camera window in a real time manner.

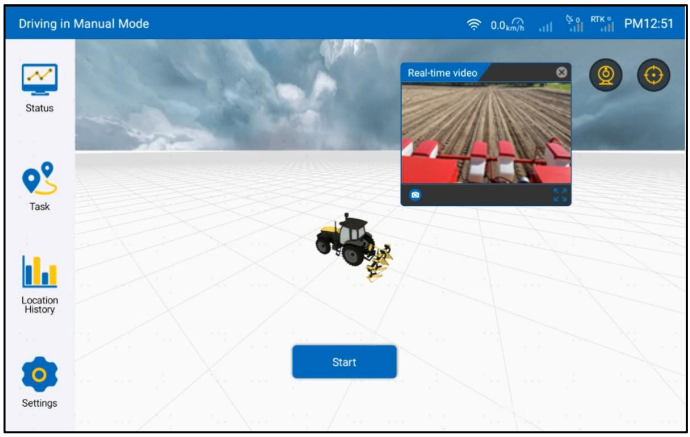


Figure 3.7.31 Real-time video

3.7.3.10. Remote Commissioning

Turn on the remote commissioning function, which should use with the background control program to realize the remote control screen function; user should turn on the **Remote Debugging**switch in the settings.

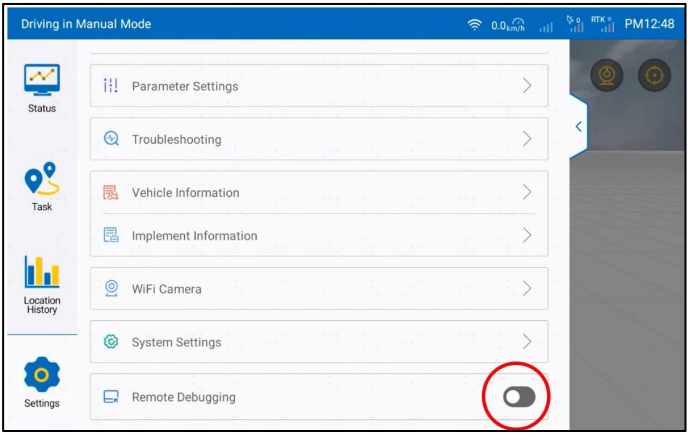


Figure 3.7.32 Remote debugging

3.7.3.11. Changing the Password

In **Settings** > **User Information** > **Account and security**, you can perform the following steps to change the password.

1. Choose **User Information** > **Account and security** > **Change Password** and change the password.

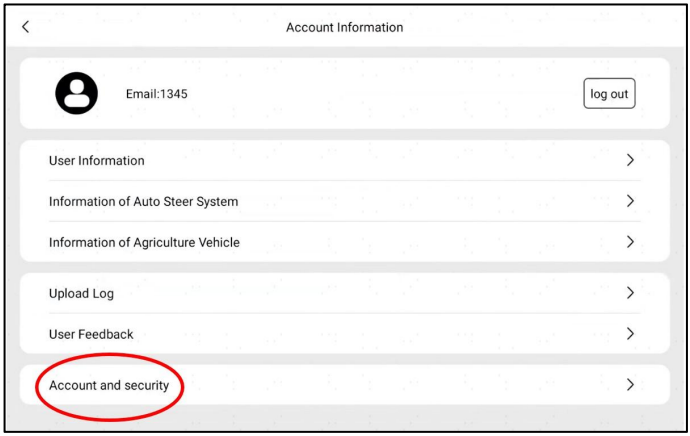


Figure 3.7.33 User information

2. You will be logged out after the password is changed. You may log in again on the login screen displayed.

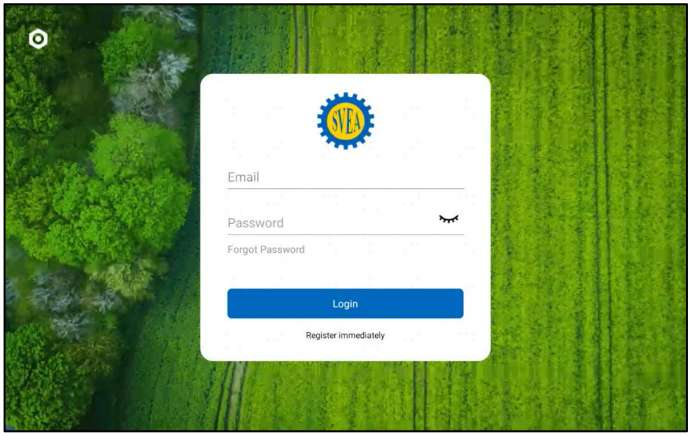


Figure 3.7.34 Login

3.7.3.12. Other Settings

In addition to Parameter Settings, Correction Source, and Troubleshooting, the Settings screen allows setting and querying other general information such as Volume, Brightness, and device information.

4. FAQs

No.	Fault	Troubleshooting
1	S turn in autosteering operations	Check whether the rolling angle and pitching angle change in real time.
		Calibrate the angle sensor (optional).
		Check whether the GNSS receiver is installed and connected properly.
2	Steering wheel malfunction during autosteering operations	Check the brake.
		Test the motor.
		Power off and restart the vehicle.
		Check whether the GNSS receiver is installed and connected properly.
3	No 4G signal	Check whether the SIM card is inserted.
4	No RTK signal	When the mobile base station is connected, check whether the base station is powered on or operating normally.
		When the Network RTK is connected, verify whether 4G signals are normal.
		When the Network RTK is connected, verify whether the Ntrip account is valid.
5	Inconsistent working width in multi-line mode	Verify whether the vehicle parameters are entered correctly.
		Verify whether the vehicle calibration in **Settings** is completed.
		Calibrate the implement again.
6	"Service not enabled, power off and restart the vehicle" appeared during start-up	Power off and restart the vehicle.
7	Slight offset in straight line mode	Check whether the rolling angle changes.

5. Nameplate Position

Note: The nameplate is fixed on the side of the motor by rivets, and the motor is fixed under the steering wheel.

6. Appendix

6.1. Specification Table 1

No.	Assembly	Component	Specifications
1	Control Terminal	Control Terminal	Size: 275×180×40 mm; Basic configuration: 10.1-inch capacitive touch screen, LED backlight, 1280×800 pixels, LCD>500 nits RAM: 2G; ROM: 8G Signals: RF signal, positioning satellite signal, and 4G signal; External interface: SIM card slot*1, Type-C port*2; Power supply: 9 V - 36 V; Operating temperature: -20 ° C~+70 ° C; Storage temperature: -40 ° C~+85 ° C; IP rating: IP65; Relative humidity: 0% - 95%, 40 ° C (non-condensation); Wi-Fi specifications: 2.4 GHz frequency band, BT 5.0 Frequency range: 2,412 – 2,484 MHz Radio communication: 400M/900M/NONE
2	GNSS Receiver	GNSS Receiver	Frequency range: GPS L1/L2, GLONASS L1/L2, BDS B1/B2/B3, Galileo E1/E5b; Operating voltage: 9 V – 36 V; Operating current: < 300 mA; Size: 162×78 mm; Operating temperature: -20 ° C~+70 ° C; Storage temperature: -40 ° C~+85 ° C; IP rating: IP66 External interface: TNC dual antenna extension *1, Type-C debug port *1
3	Electric Steering Wheel	Steering Wheel	Steering wheel diameter: 410 mm;
4		Steering Motor	Power supply: 12 V or 24 V; Peak torque: 20 Nm (12 V); 30 Nm (24 V); IP rating: IP65

No.	Assembly	Component	Specifications
5		Splined Sleeve	Multiple models

6.2. Specification Table 2

Item	Unit	Designed Value
Model	-	SVEABD-2.5GD autosteering system
Steering control type	-	Motor steering
Onboard computer processor model	-	SVEAMCU01
Onboard computer memory capacity	GB	2
Onboard computer hard disk capacity	GB	8
Operating system and software version of onboard computer	-	Android 9.0; SDK version 28
Size and resolution of onboard computer display	-	275 mm × 180 mm × 40 mm; 1280 × 800 px
Types of onboard computer interfaces	-	UART, IIC, SPI, GPIO, USB, and Ethernet
Onboard computer data input and output protocol	-	Sveaverken proprietary communication protocol V1.0
Type and frequency range of GNSS receiver	-	Dual-frequency receiver; BDS B1/B2, GPS L1/L2, GLONASS L1/L2, GALILEO E1/E5b, and SBAS
Firmware version of GNSS receiver motherboard	-	V1.1
Number of GNSS receiver channels	-	432
Types of GNSS receiver interfaces	-	GPS, BDS, and GLN
GNSS receiver differential system	-	RTK
GNSS receiver data update frequency	Hz	20
Receiving antenna type of GNSS receiver	-	Right-handed circular polarization (RHCP) antenna
Firmware version of steering controller motherboard	-	V1.1
Model of hydraulic valve or rotating motor	-	TZ165H02C12
Model of angle sensor	-	SEVA-GS01

Item	Unit	Designed Value
Signal coverage of mobile base station	km	-
Signal coverage of fixed base station	km	-
Frequency of radio frequency equipment	MHz	-
Power of radio frequency equipment of mobile base station	W	-
Power of radio frequency equipment of fixed base station	W	-
Integrated components	-	Onboard computer, controller, and GNSS receiver