HD812

Auto Steering System

User Manual



VECTOR AGR™

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Ⅰ. Disclaimer

1. Disclaimer

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2. Technology and Services

If the content you need cannot be found in this operation manual, please contact the relevant project installation technicians.

Users can also contact us by calling Huida's national customer service hotline: 400-888-0787, and we will serve you wholeheartedly.

The current interface function display is a test version. Please refer to the actual interface functions for the real situation.

Ⅱ. Product Usage Instructions

1. Product Usage Instructions

- Carefully read all user materials provided with this product before use to understand the product's usage methods and precautions.
- Do not disassemble the equipment without permission to avoid safety hazards. If needed, contact professionals. When professionals disassemble the equipment, turn off the power in advance and never disassemble it while powered on.
- Do not connect this equipment unless strictly following the requirements in the manual. Avoid equipment damage and potential safety hazards caused by incorrect connections.
- When supplying power to this product (automatic driving system), pay attention to the equipment's power supply requirements (power supply voltage must be between 9~35V).
- Check each wire harness of the product. If there is damage, replace it in time to avoid affecting the usage effect or causing potential safety hazards.
- Do not disassemble the shell of all components of this product by yourself; otherwise, repairs will not be provided.
- This product does not have an active obstacle avoidance function. Therefore, personnel must be present when the automatic driving system is operating to monitor surrounding safety in real time.
- The automatic driving system cannot control the vehicle's speed. Operators must manually adjust the vehicle speed within a safe and reasonable range.
- When the automatic driving system is testing or calibrating, it will take over control of the vehicle's steering system. The vehicle's steering wheel, wheels, or other body parts may move unpredictably. When starting the vehicle or activating the automatic driving system, ensure surrounding safety to prevent personal injury or property damage.

- Vehicles equipped with our company's automatic driving system are not allowed to activate automatic driving on public roads or in public places.
- Before each use, check whether all components on the equipment are damaged or abnormal. Only when all parts of the equipment are in good working condition can you continue to use this product. If abnormalities or damaged parts are found during inspection, handle them in time or contact after-sales personnel.
- Vehicle accidents caused by illegal operations during automatic driving operations have no relation to Heilongjiang Huida Technology Co., Ltd.

2. Safety Tips

	When the equipment's automatic driving function is activated, the driver is strictly prohibited from leaving the cab.
	The automatic driving system is strictly forbidden to be used during non-operating hours or in non-operating areas.
	Please use the equipment strictly in accordance with the instruction manual, and random modification of software parameters is prohibited.
	When the equipment is not used for a long time, disconnect the power cord to prevent battery power loss.
	When using the equipment, take care to keep the devices in the cab waterproof. Protective measures for the equipment must be taken when cleaning the vehicle, etc.
	The automatic driving system cannot control the vehicle speed, so the operator must manually adjust the vehicle speed to ensure safe driving.
	Unauthorized disassembly of the equipment is strictly prohibited; otherwise, warranty service will not be provided.

Ⅲ. Product Introduction

1. Product Overview

The **Auto Steering System** is a core system for intelligent agricultural equipment independently developed and manufactured by **Huida Technology**, leveraging the company's proprietary core technologies.
HD812 Auto Steering System with Navigation is an autopilot system independently developed and produced by Huida Tech, and a large torque motor is used to control the steering wheel. It is suitable for tractors, transplanters, pesticide spraying machines, crawler tractors and other agricultural machinery.

Verified through long-term practical applications, the system has been entirely self-developed — from hardware design to software algorithms — with all supporting components fully integrated and highly compatible, making it perfectly suited for all steering-wheel agricultural machinery.
During the design phase, the unique conditions of agricultural production and operation were fully considered.
Taking into account factors such as complex terrain, variable climate, and the durability of agricultural machinery under prolonged operation, the system effectively addresses multiple real-world challenges in agricultural production.

High-precision operation:
Powered by high-accuracy positioning, the system achieves centimeter-level operational precision, meeting the strict requirements of standardized agricultural production.
It effectively reduces land and resource waste caused by manual errors, ensures the uniformity of crop growth environments, and enhances both the quality and yield stability of agricultural products.

Enhanced efficiency:
The system eliminates partial omissions in manual operation and realizes automated, precise operation without overlap or omission.
For example, in seeding operations, working efficiency can increase by more than **30%** compared with manual driving.

Extended operating endurance:
With exceptional long-duration performance, the system removes the time limitations of manual driving—allowing vehicles to continue running while operators rest—and supports stable nighttime field operations, maximizing time utilization and accelerating production progress.

Ease of operation:
Featuring intelligent algorithms and a user-friendly interactive interface, the system

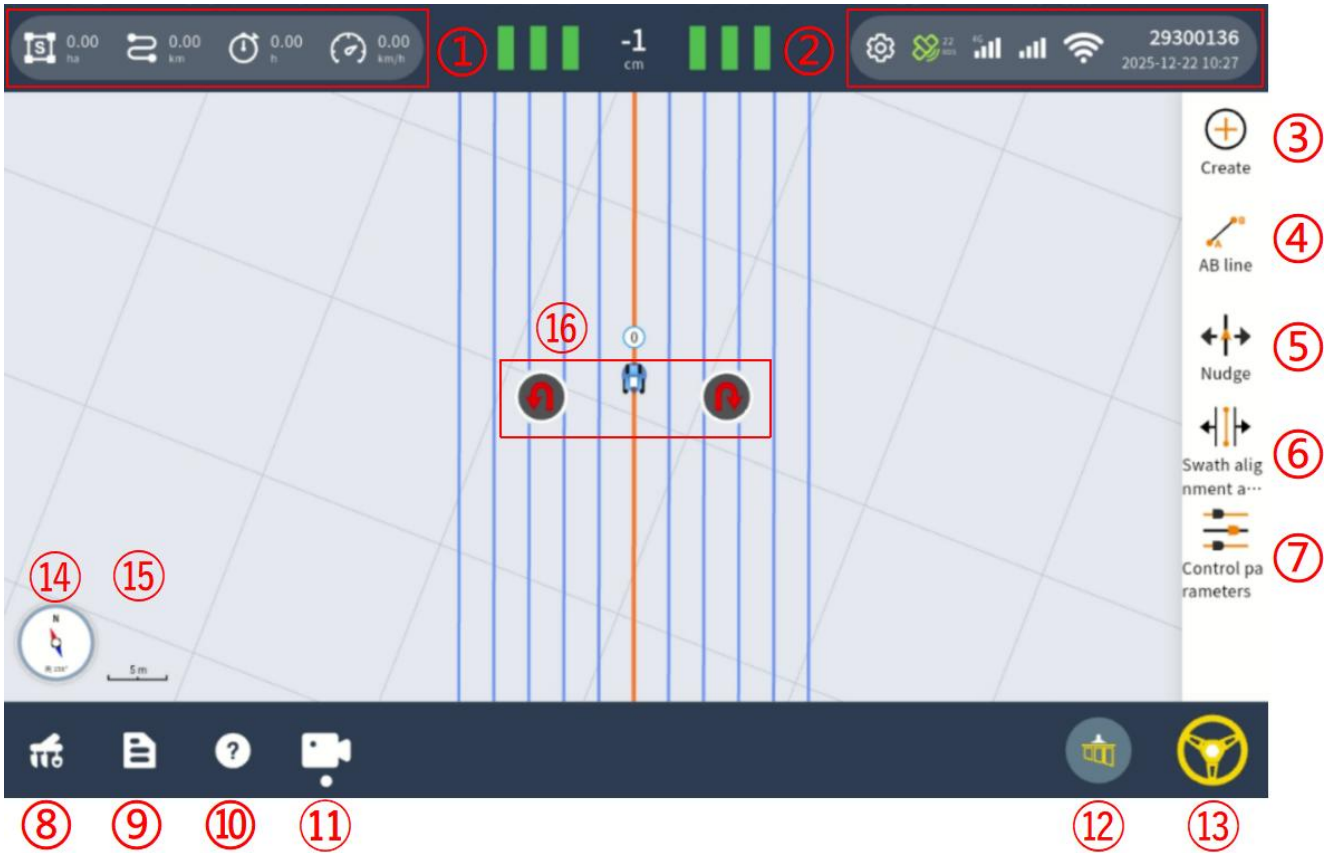
greatly reduces operator workload and lowers technical skill requirements.
Even new users with limited experience can quickly master operation after brief training, enabling wider participation in efficient agricultural production.

In addition, the system offers strong scalability and compatibility.
It can seamlessly connect with agricultural Internet of Things (IoT) platforms to enable real-time transmission, storage, and analysis of operational data.
This provides robust support for the digital and intelligent transformation of agricultural production management, assists practitioners in scientific decision-making, and further optimizes production processes and resource allocation.

2. Main Components Introduction

Device Name	Picture	Introduction
GNSS Antenna		**Positioning:** Supports GPS/GLONASS/Galileo/SBAS **Protection Rating:** IP67 **Operating Temperature:** -20 °C ~ +70 °C **Operation Capability:** capable of all-weather operation **Dimensions:** 182.8 mm × 175 mm × 71 mm
Display Terminal		**Display:** 12.1-inch high-definition screen with a resolution of 1280 × 800 **Brightness:** 800 nits **Processor:** Quad-core high-performance processor **Storage Capacity:** 2 GB RAM + 32 GB ROM **Communication Module:** Built-in 4G full-network communication module
Electric Steering Motor		**Motor Type:** High-torque DC motor **Maximum Torque:** 15 N·m **Maximum Speed:** 100 RPM **Rated Power:** 50 W **Protection Rating:** IP65

3. Software Interface



1. **Operation Status Bar:** Shows the current operation status, including operation area, driving mileage, execution hours, and average speed. Tap the icon group in the upper-left corner on any interface to open the operation data pop-up. Tap the icon again or anywhere on the screen to close it.

2. **Settings:** Shows current system information such as settings, satellite status, SIM status, device ID, and current time. On any interface, tap the icon group in the upper-right corner to open the settings window; tap the same area again to close it.

3. **Create:** Create a new navigation line (default: AB Straight Line).

4. **Work Modes:** Includes AB Straight Line, A+ Straight Line, Curve, Circular (Three-Point Method), Circular (Radius Method), Circular (Circle-to-Circle Method), and Diagonal Field Operation.

5. **Nudge:** Fine-tune the position of the navigation line.

6. **Swath alignment Adjustment:** Provides two adjustment methods to adjust the pass-to-pass line

7. **Control Parameters:** Adjust the vehicle's steering and navigation control parameters.

8. **Implement Management:** Add, edit, or delete agricultural implements.

9. **Task list:** View historical operation data.

10. **Help:** Includes remote control code, diagnostics, version management, and data transmission.

11. **Camera Switch:** Turn the camera on or off.

12. **Track Switch:** Toggle the display of operation tracks.

13. **Auto Drive Switch:** Enable or disable automatic driving.

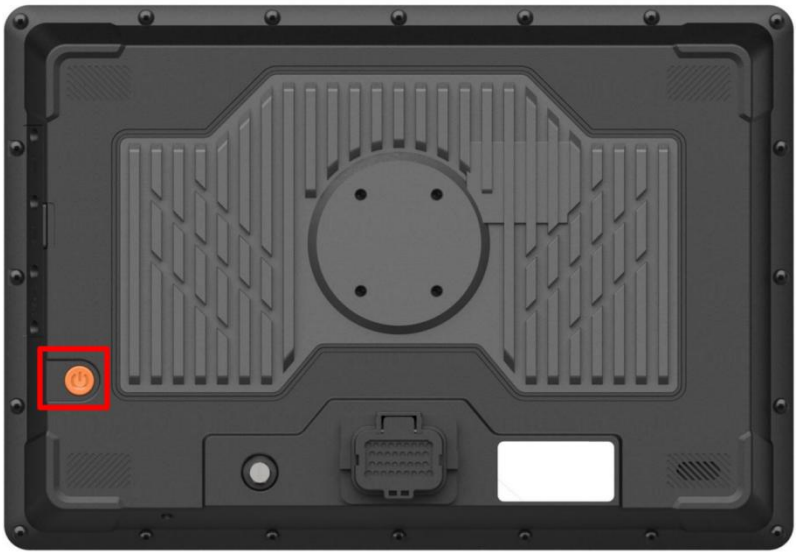
14. **Compass:** Displays the current heading direction.

15. **Scale:** Scale.

16. **One-touch U-turn Switch:** Make a U-turn to left or right.

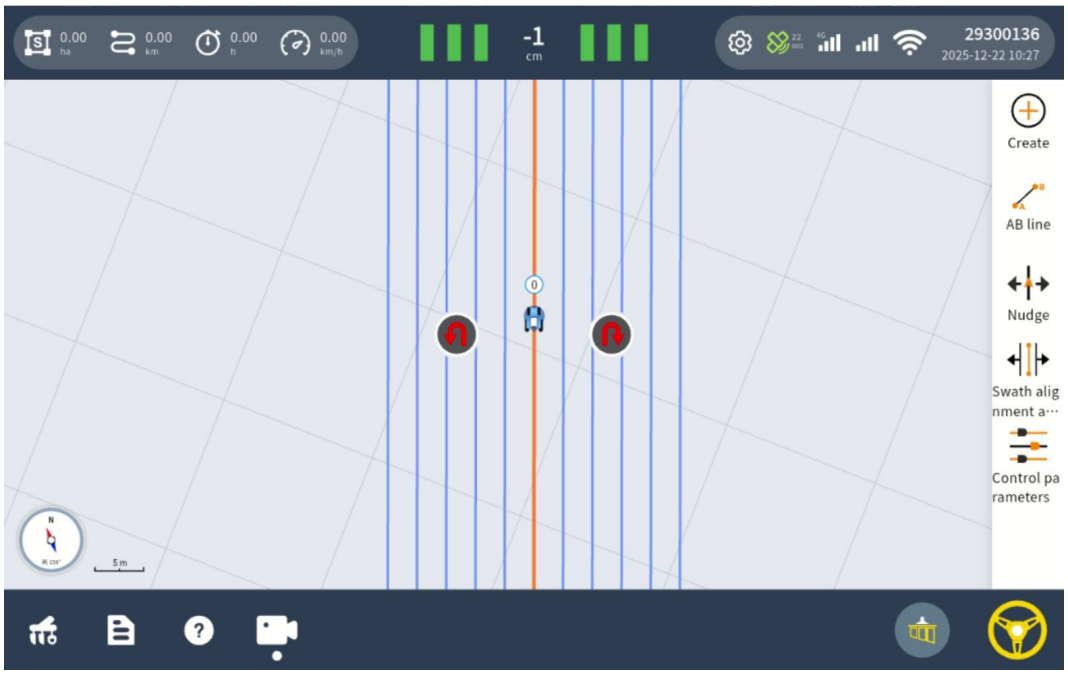
Ⅳ. Product Usage

1. Power On/Off



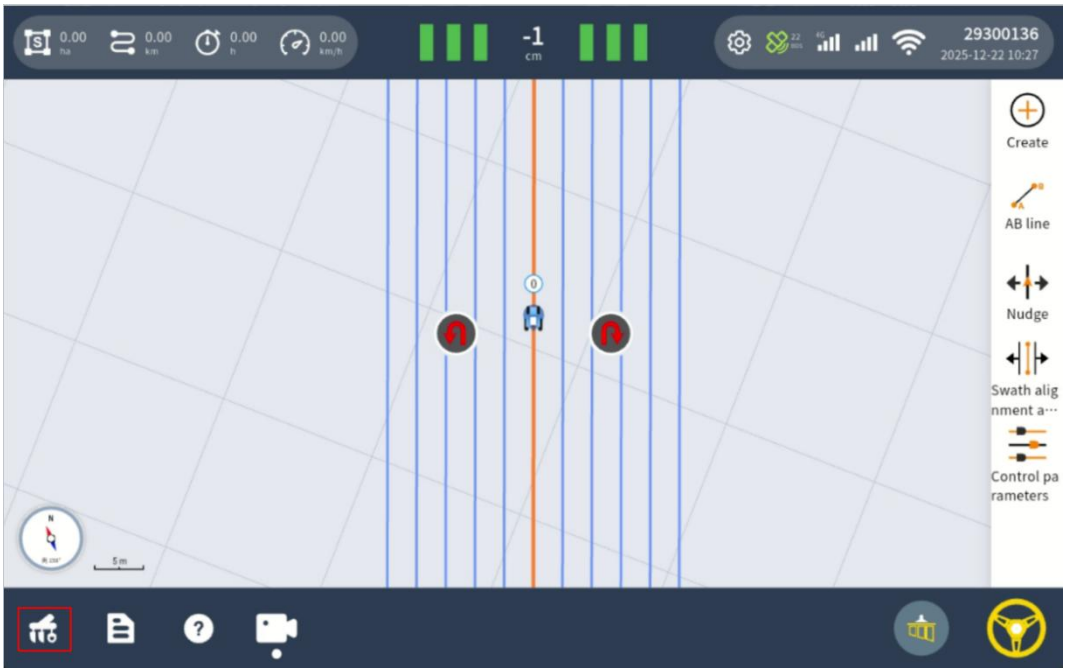
Long press the power button of the display terminal to turn on/off the navigation system.

2. Status Confirm

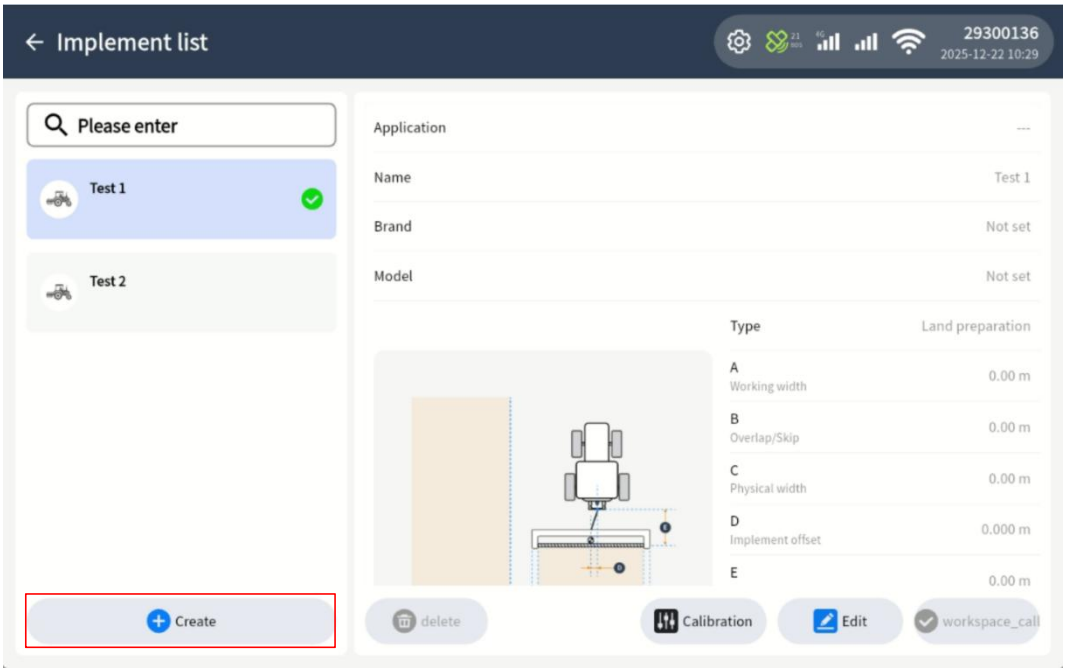


Before enabling automatic driving, ensure that the agricultural vehicle status, navigation peripheral connections, and RTK signal status are all normal. Proceed to the next step only after confirming that all systems are functioning properly.

3. Implement Settings

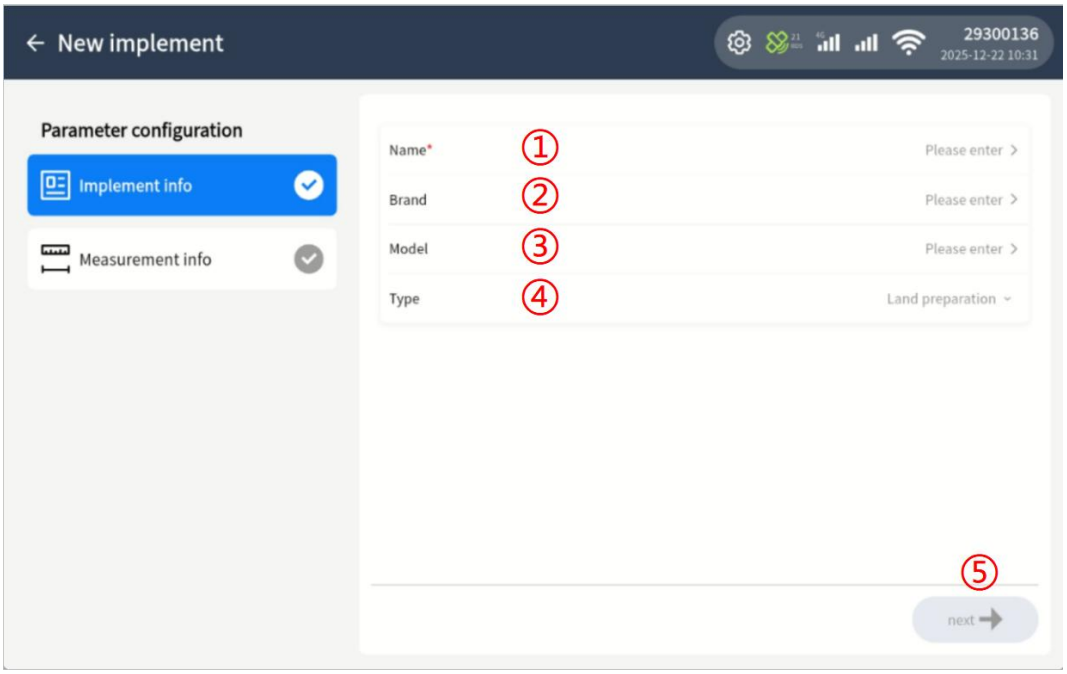


Tap the **Implement** icon in the lower-left corner of the screen to enter the implement settings interface.



Tap **Create**, then enter the implement information, measurement parameters, and other related data for the vehicle used in the operation.

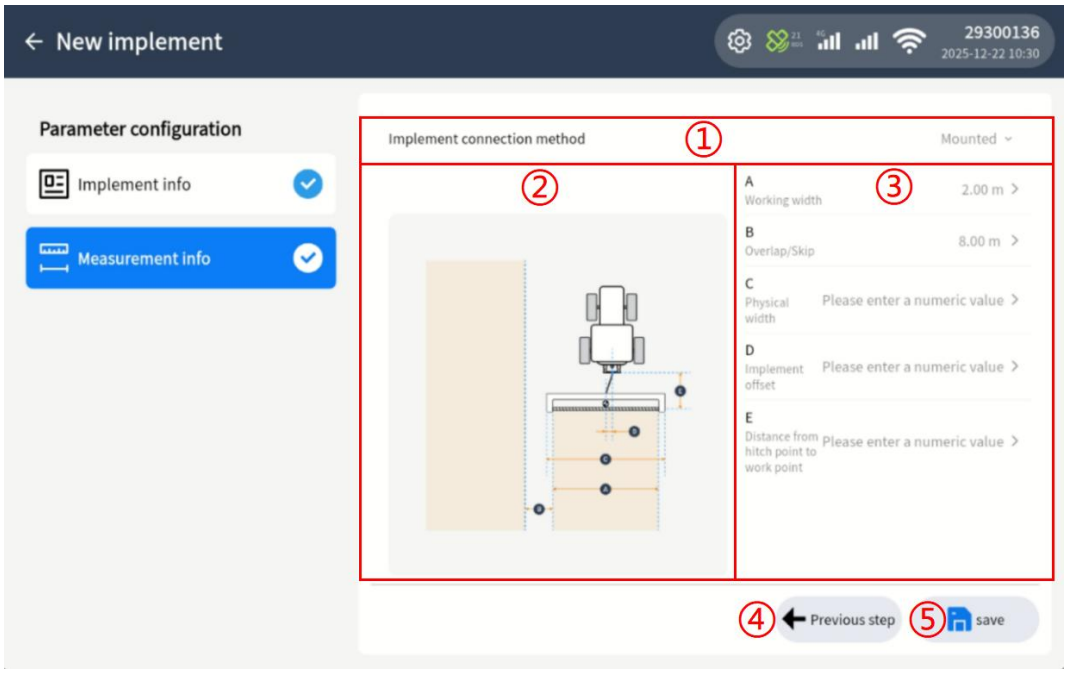
3.1 Implement Information



Enter the Name, Brand, Model and Type.

No.	Function Point	Description
1	Name	Enter the name of the agricultural implement according to its type.
2	Brand	Enter the brand of the agricultural implement according to its type.
3	Model	Enter the model of the agricultural implement according to its type.
4	Type	Select according to the type of the agricultural implement: tillage, sowing, intertillage, transplanting, fertilization, harvesting, vegetable transplanting, irrigation, transportation.
5	→	Next step; Type the configuration directory on this page to jump to "Measurement Information".

3.2 Measurement Information

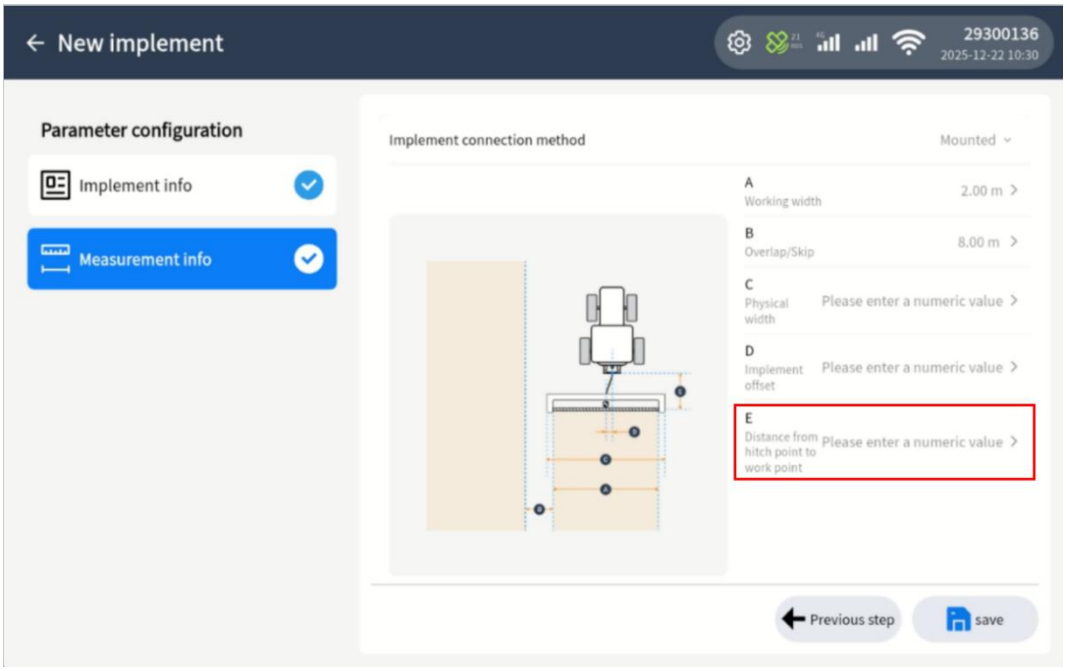


Select the corresponding connection method according to the type of agricultural machinery and material the operation width, overlap, leakage, offset, physical width, and the distance from the connecting pin to the operation point based on the actual measurement results.

No.	Function Point	Description
1	Connection Method	Select according to the connection method of agricultural: Towed/Mounted;"Mounted" is selected by default when creating a new implement.
2	Implement Parameter Diagram	Diagram of agricultural implement parameters for accurate measurement.
3	Implement Parameter Items	**Required parameters:** (A) Working width (B) Overlap / Skip; **Optional parameters:** (C) Physical width (D) Implement offset, (E) Distance from hitch point to work point; In metric mode, the unit is meters (m), and the measurement unit switches with the unit system.
4	←	Operation icon, tap to, returns to the previous item; taping on this page jumps to "Implement Information".
5	Save	Tap to complete the configuration of the implement parameters.

3.2.1 Connection Method

Select according to the connection method of the implement: Towed / Mounted. When a front-mounted implement is selected, item E measures the distance from the working point to the front axle.



3.2.2 Implement Width Setting

As shown in the figure, measure the actual working width of the implement before work.
Measure the straight-line distance from the leftmost working point to the rightmost working point of the implement's working path, and calculate the average value from multiple measurements.
Please ensure the accuracy of the measurements, as incorrect values will affect the pass-to-pass spacing.
Enter the measured implement width.



3.2.3 Pass-to-Pass Line Width

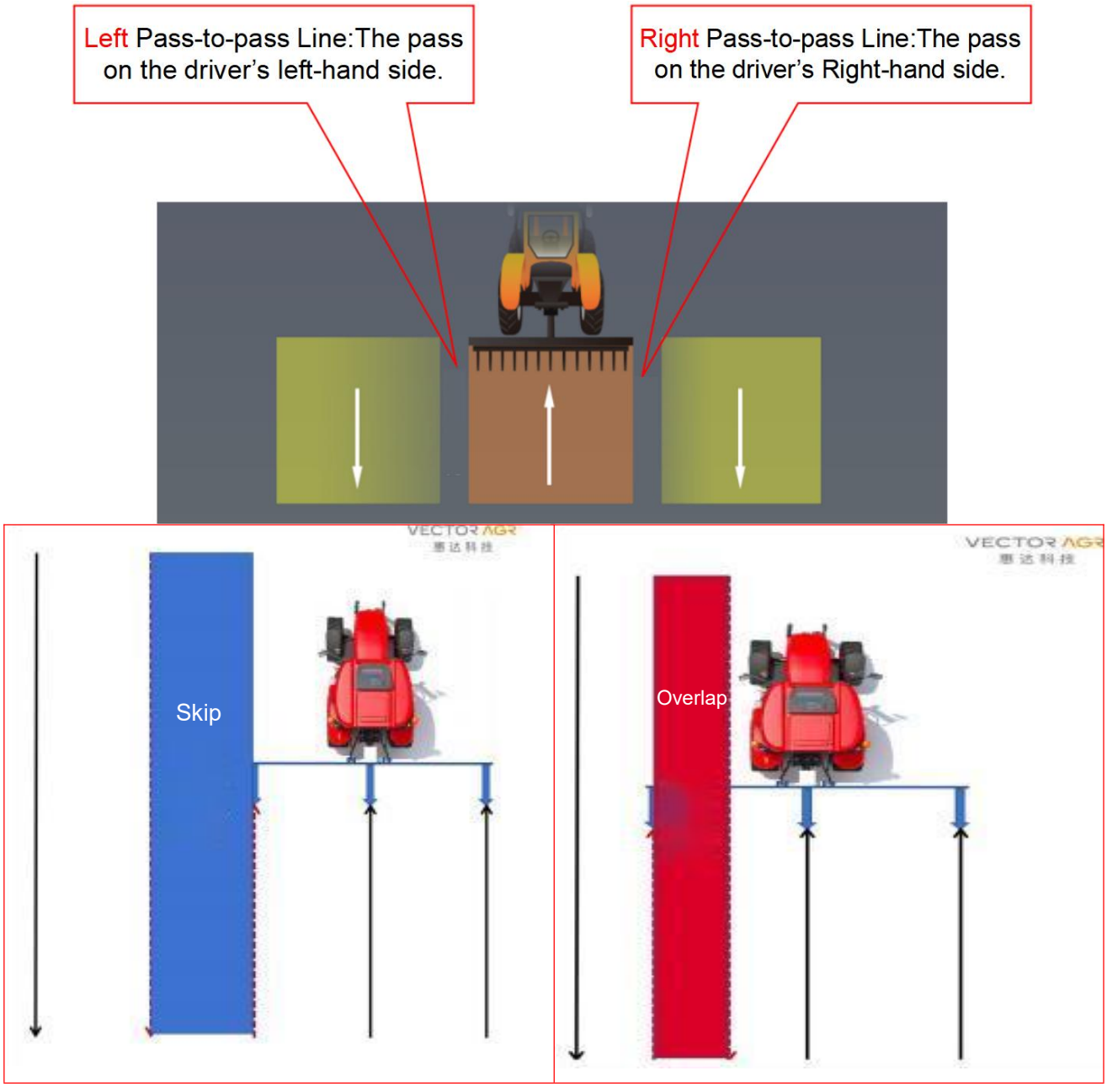
Definition: The distance between two adjacent working passes of the vehicle.

Left Pass-to-pass Line: The pass on the driver's left-hand side.

Right Pass-to-pass Line: The pass on the driver's right-hand side.

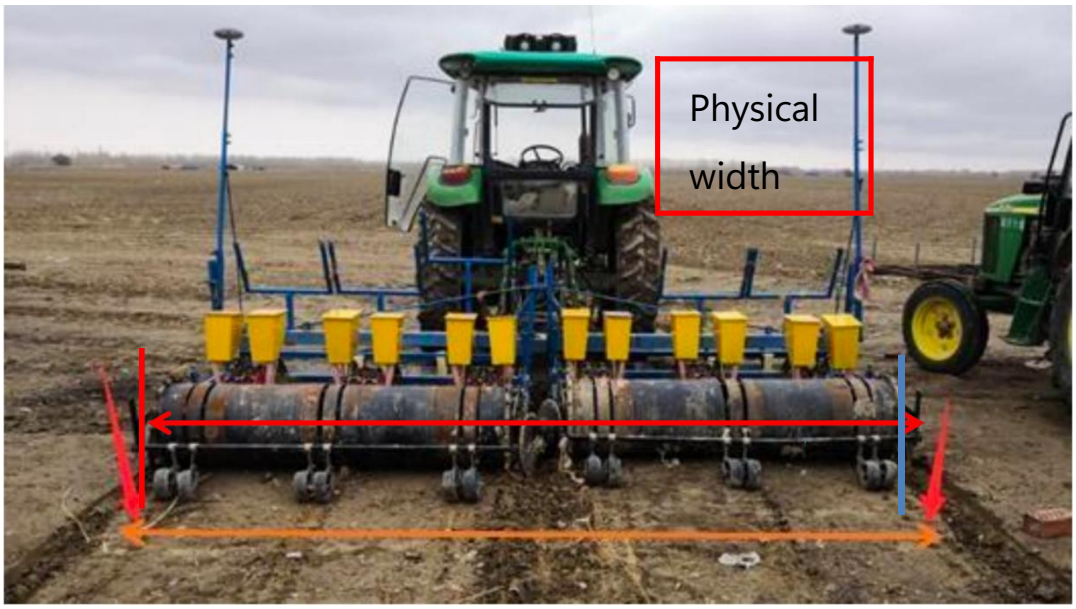
Overlap: The overlapping area between working paths.

Skip: The unworked area between passes.



3.2.4 Implement Offset

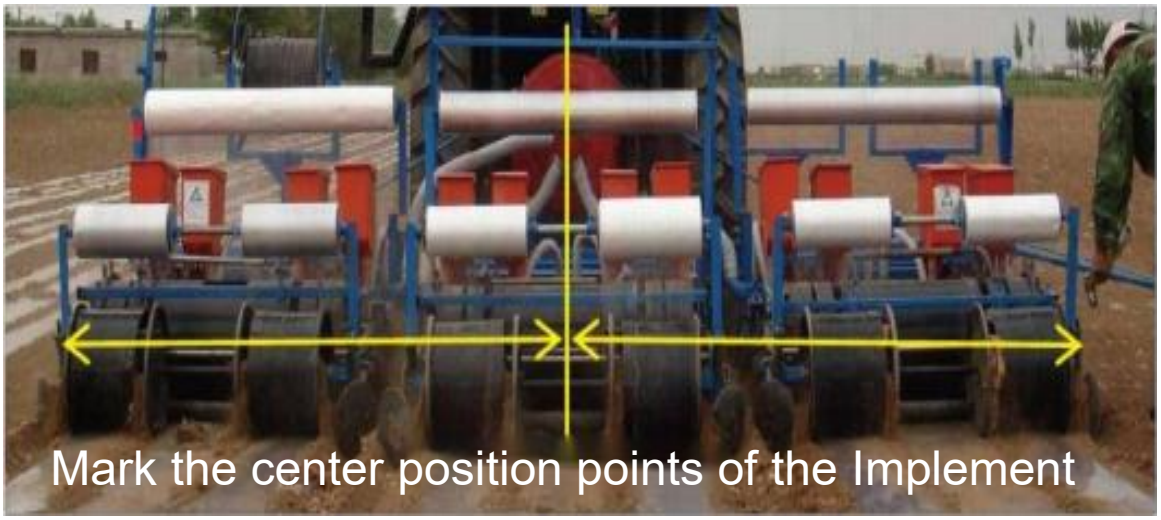
Physical width: The **Physical width** refers to the straight-line distance between the leftmost and rightmost edges of the implement.



3.2.5 Implement Offset

The **Implement offset** is the distance between the center of the vehicle and the center of the implement.

When both centers coincide, the offset value is **0**.



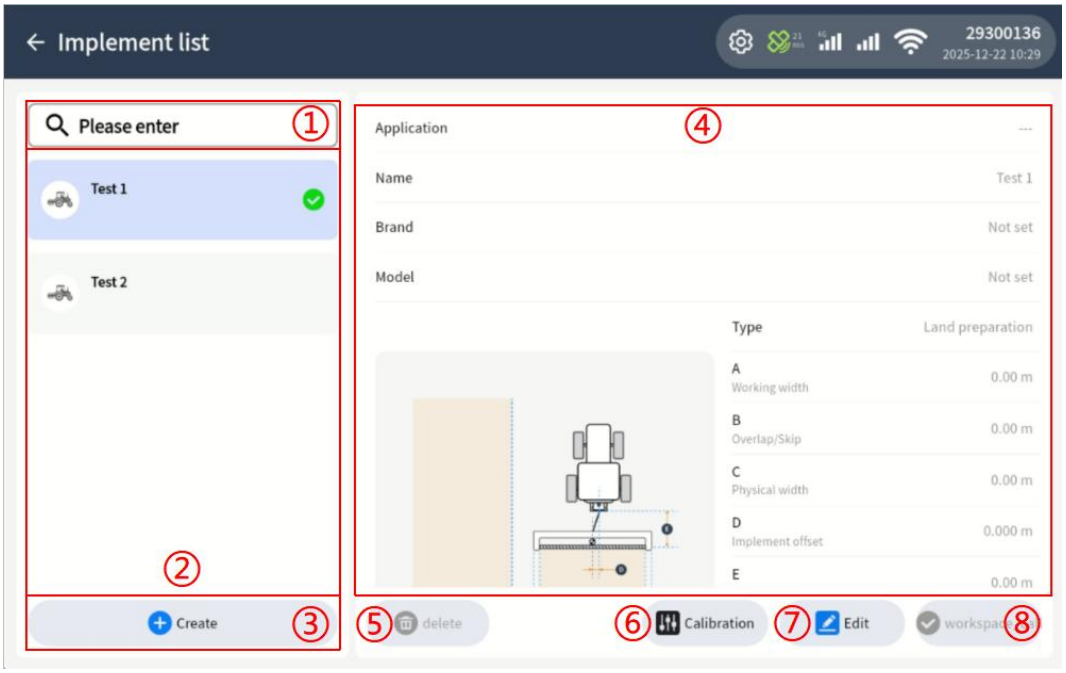
3.2.6 Distance from Hitch Pin to Working Point



This refers to the straight-line distance between the **connection point (hitch pin)** of the vehicle and implement, and the **working point**.

3.2.7 Implement List

After completing the implement setup, tap the **Implement** icon in the lower-left corner of the screen to view the **Implement list**.

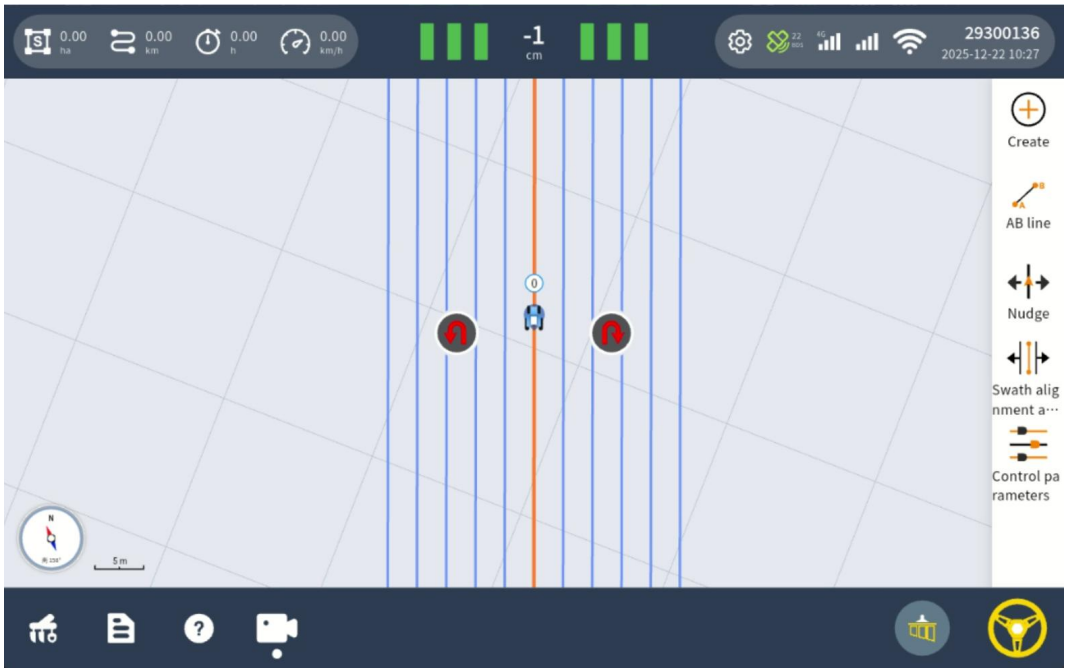


No.	Name	Description
1	Search Bar	Search by implement name.
2	Implement List	Displays all created implements, sorted by creation time (most recent on top). The currently active implement is marked with a checkmark.
3	Add New	Tap to create a new implement. The parameter input panel appears beside the list.
4	Parameter Panel	Displays implement parameters. ① When adding a new implement, the panel shows blank fields for input. ② When selecting an existing implement, it shows saved parameters.
5	Delete	Select an implement and tap **Delete** to remove it. A confirmation prompt will appear. The system also supports deleting the active implement.
6	Calibration	Tap to adjust implement offset.
7	Edit	Tap to edit implement parameters.
8	Call	Tap to activate the selected implement for operation.

4. Work Mode

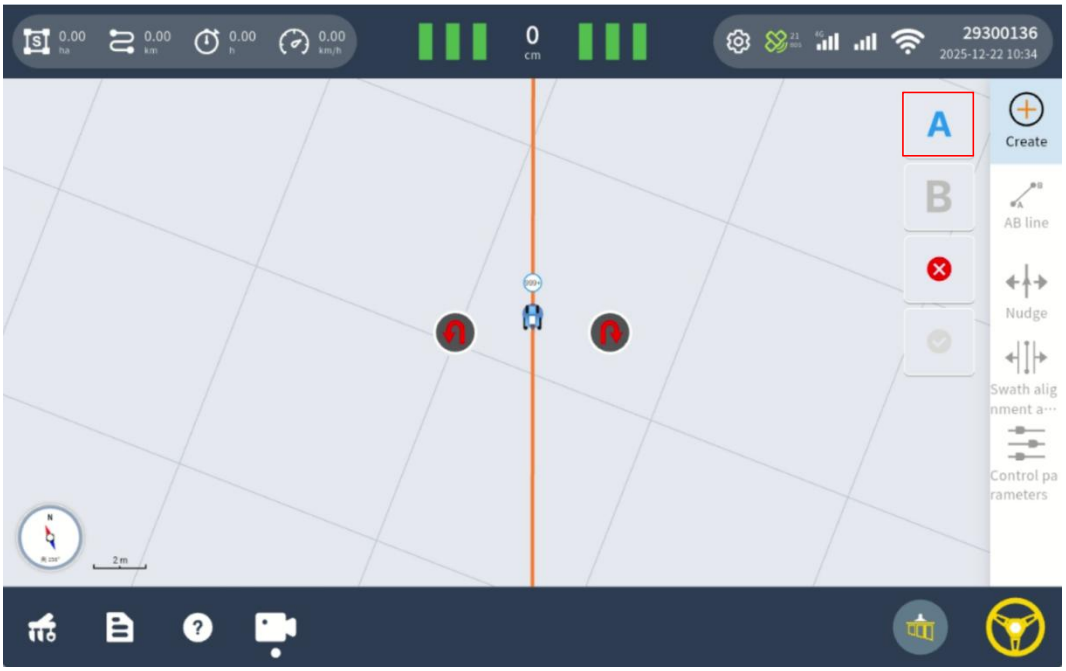
Tap the "Create" icon to enter the **Work Mode** options.
Select the desired work mode and tap **Confirm** to proceed.

Available Work Modes: AB Line, AB Curve, A+ Straight Line.

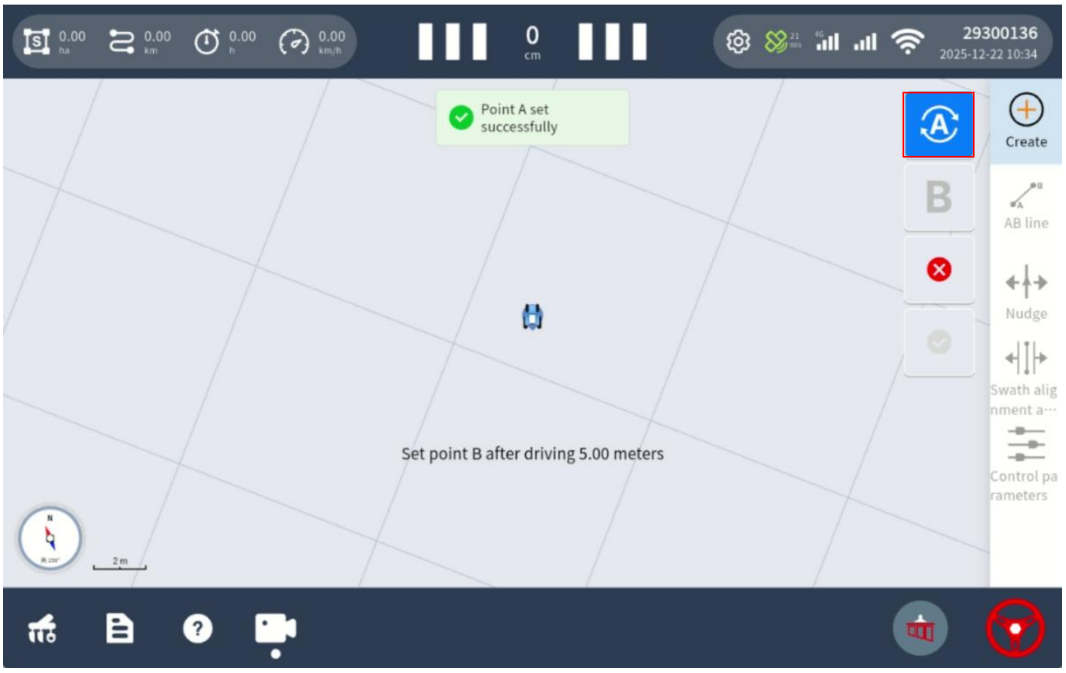


4.1 AB Line

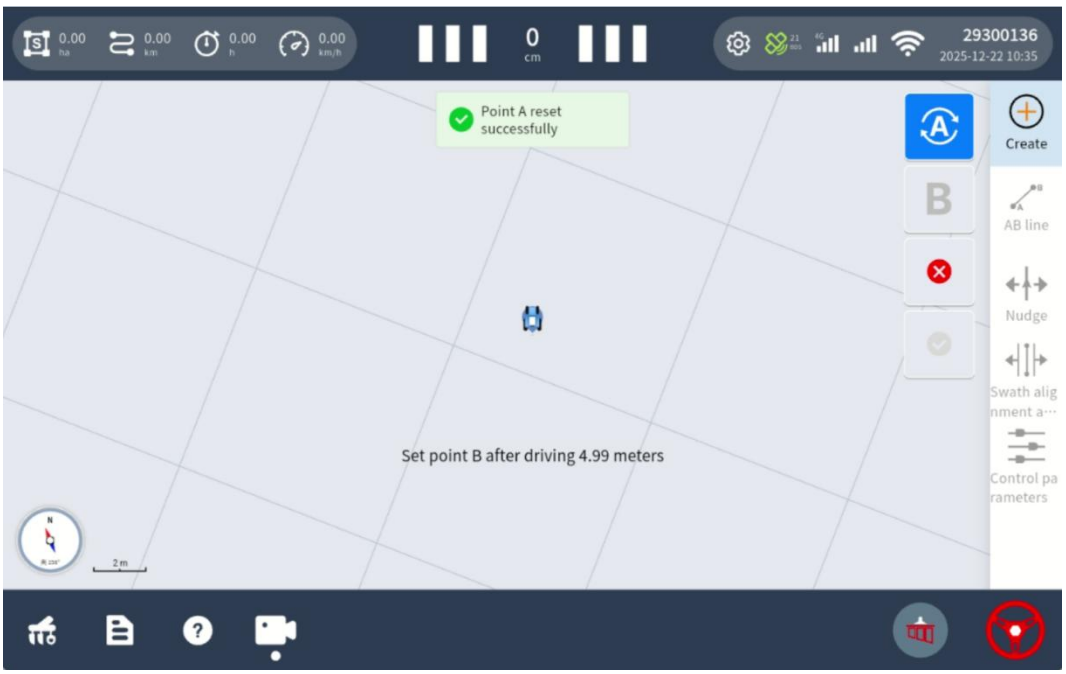
Drive the vehicle to the field head, face the working direction, and tap the **A icon** A on the screen to set Point A.



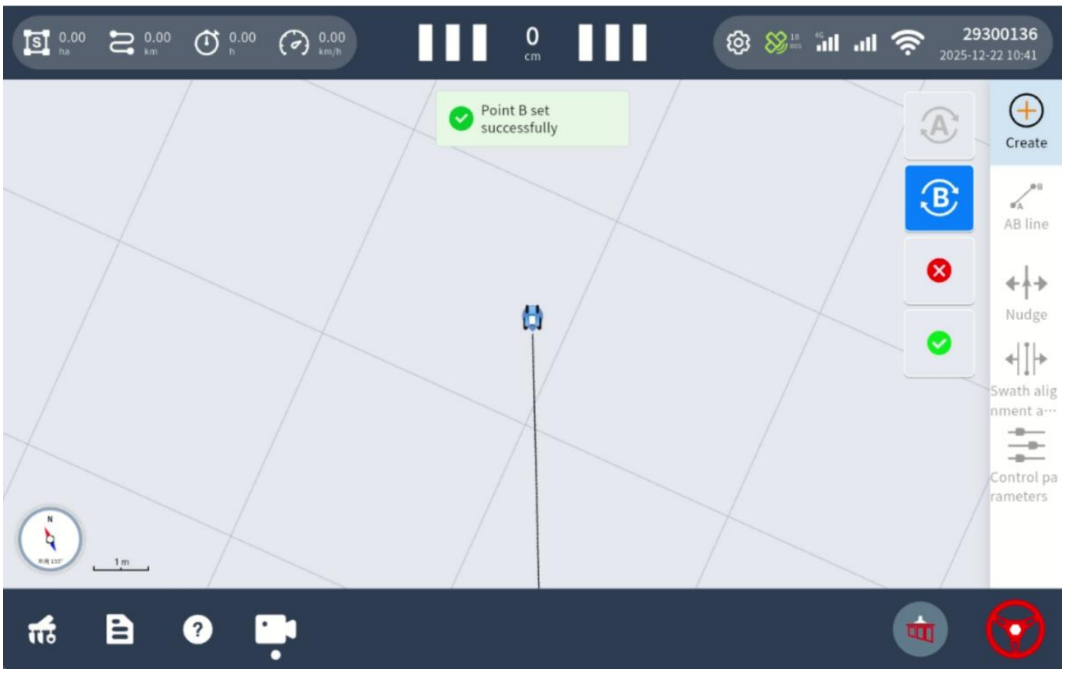
After setting, the system will prompt "Point A set successfully."



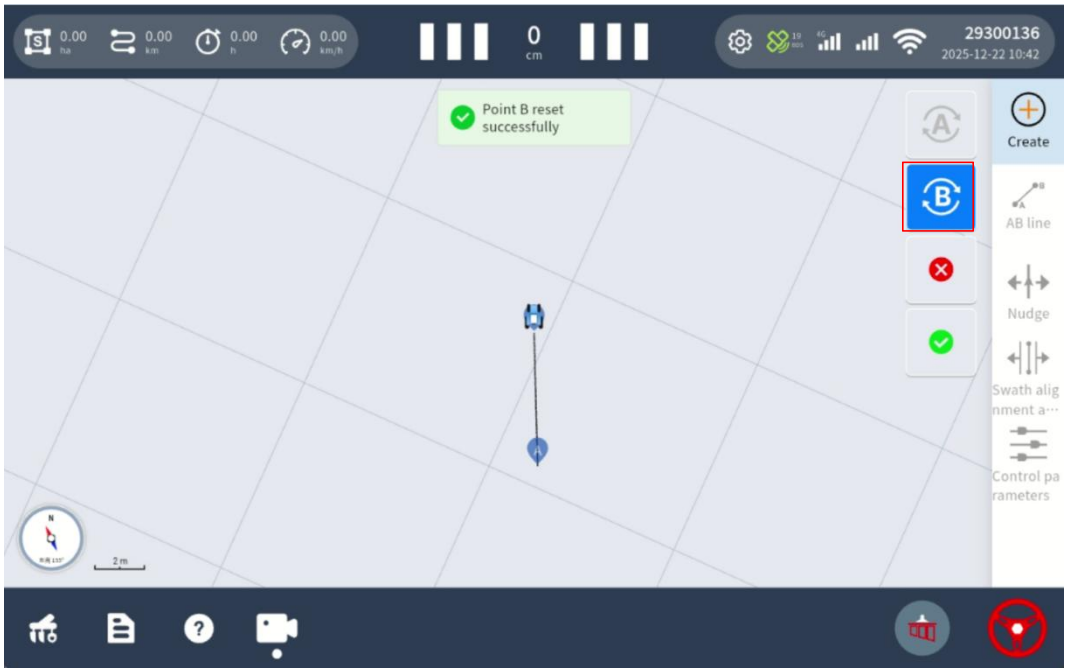
If the position is inaccurate, drive the vehicle to the desired point again and tap the icon to reset Point A. The original Point A will be replaced automatically.



Then, manually drive the vehicle to the opposite end of the field and tap the **B** icon  to set Point B and complete the drawing of the AB line.



At this stage, Point A cannot be modified. If Point B is inaccurate, drive the vehicle to the correct location and tap the  icon again to reset it.

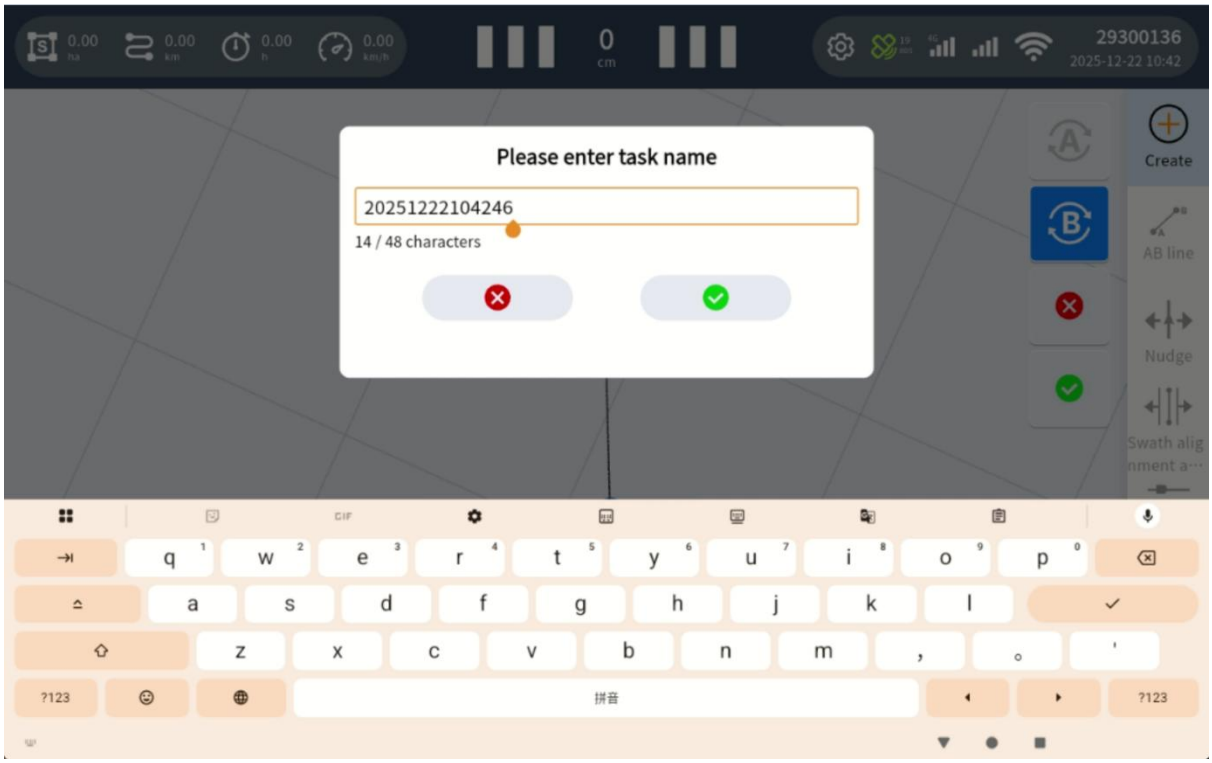


Once Point B is set, the  becomes active. Tap  to save the AB line.

After saving the task name, tap  to begin auto-driving.

At any step before confirmation, you can tap  to cancel this setup.

The field name can be customized and edited.



Notes:

When setting the AB straight line, the vehicle should perform a dry run (no implement engaged).

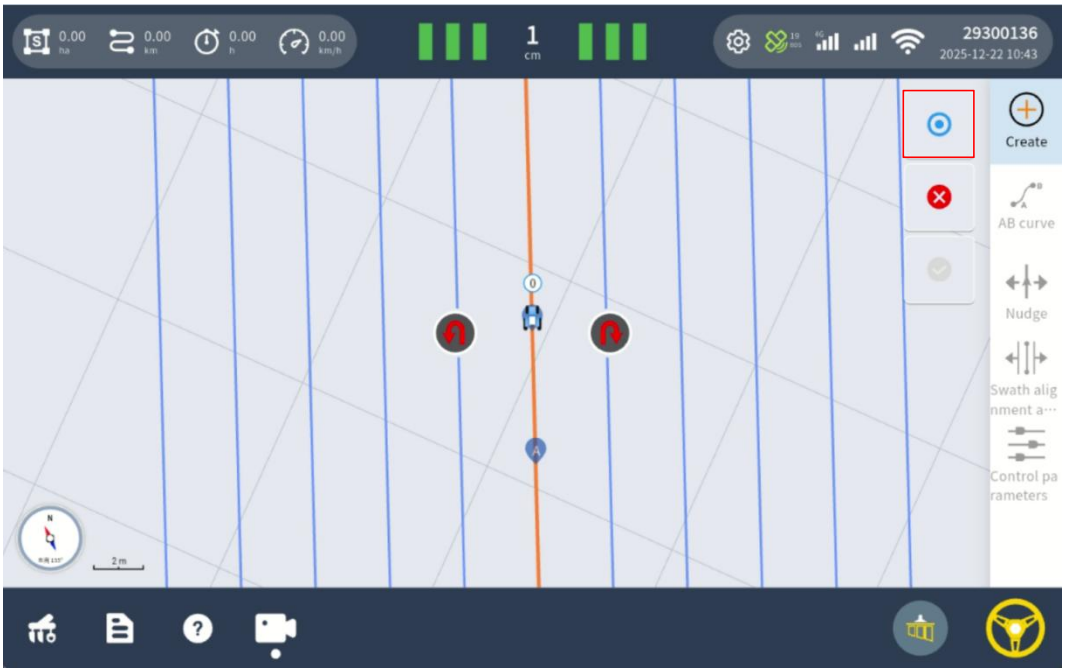
Each time a new field is selected for operation, the AB line must be redefined.

If the operation is not completed on the same day, the saved field data can be recalled for continued operation on the next day.

4.2 AB Curve

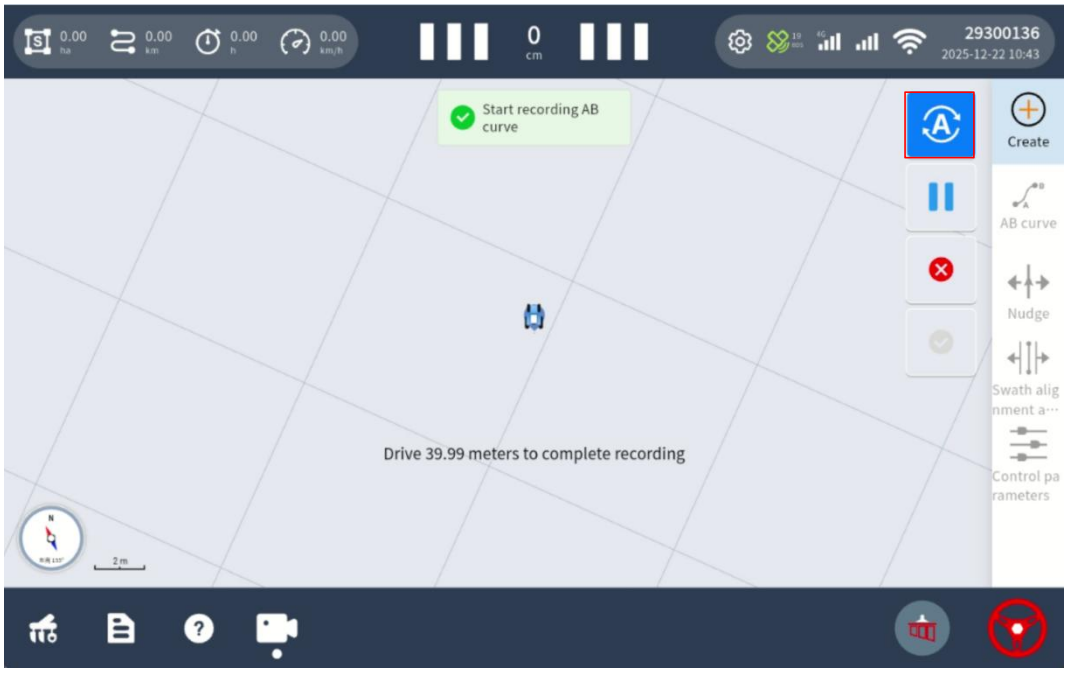
After selecting **AB Curve**, tap **Create**, drive the vehicle to the field head, and face the direction of operation.

Tap the Record icon to start recording.

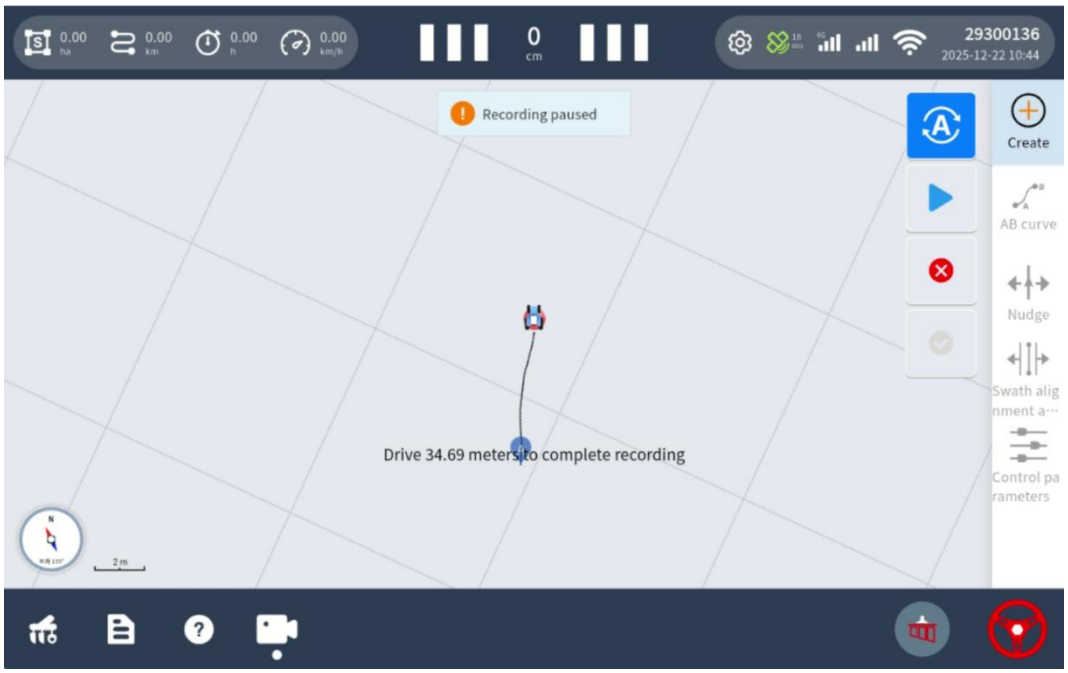


Once Point A is set, the screen will display a confirmation prompt.

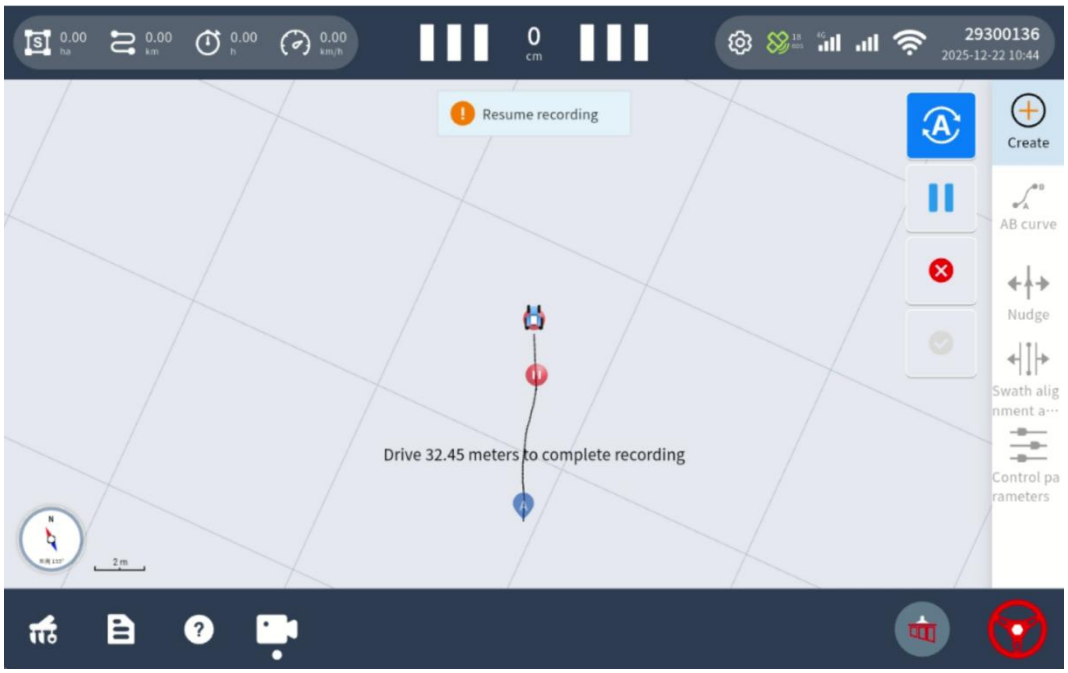
If the position is inaccurate, drive the vehicle back to the correct location and tap  to redefine it (the original Point A will be automatically cleared).



To add a straight segment, tap the **Pause Recording**  button (the path traveled during the pause will be recorded as a straight line).

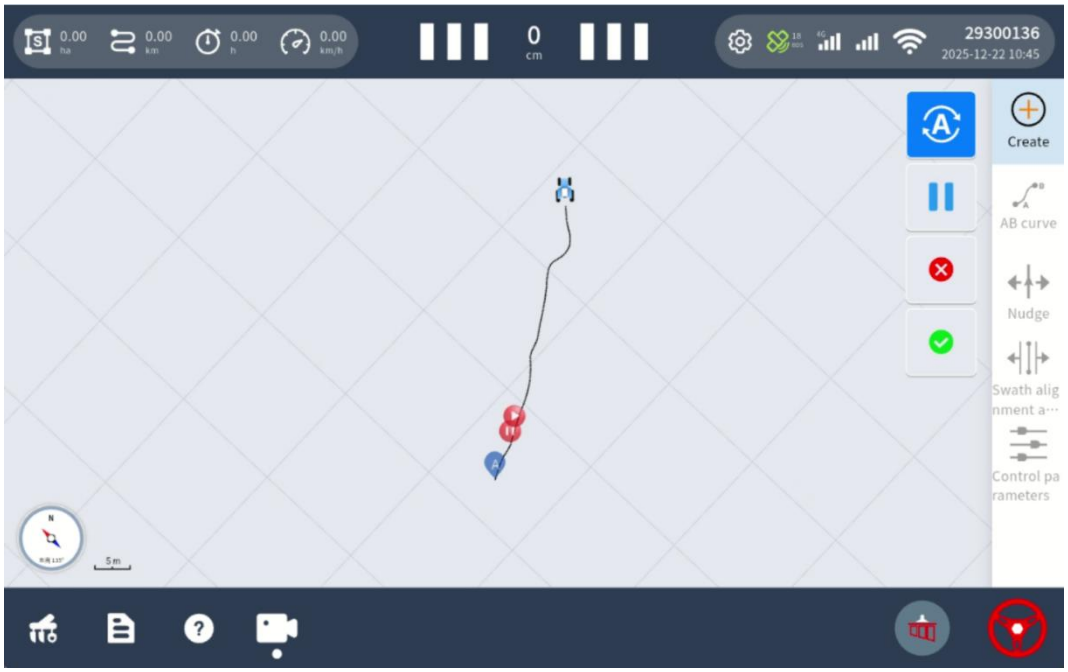


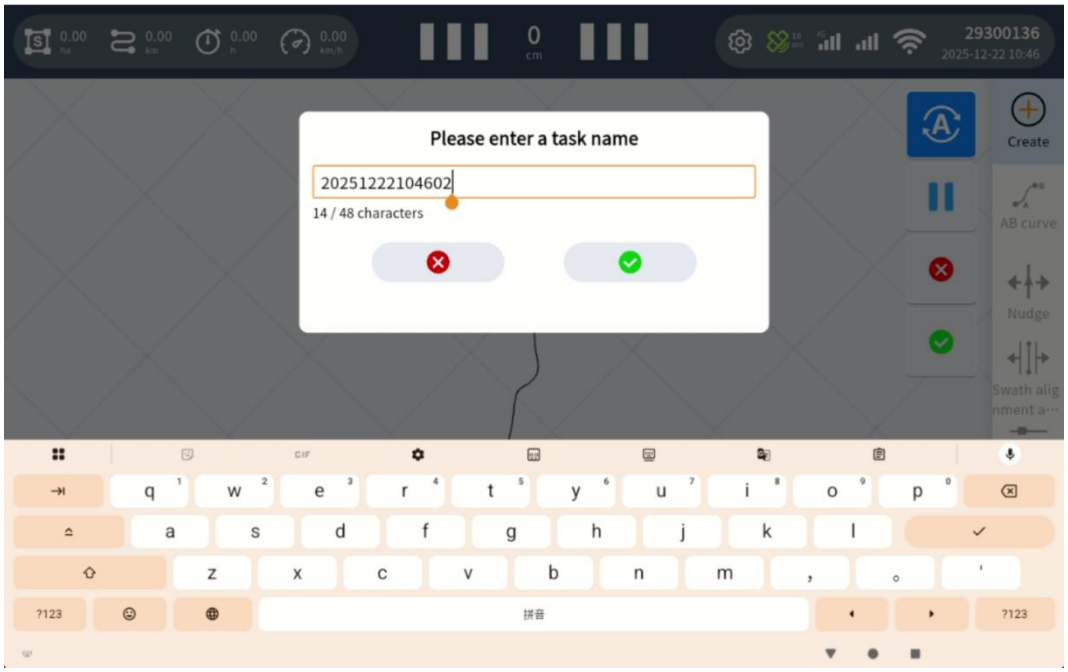
To continue curve recording, tap the **Resume Recording**  button.



When the vehicle reaches the endpoint of the curve route, tap the **Confirm** icon  to complete creation.

You can tap **Cancel**  at any stage to stop and discard the process.

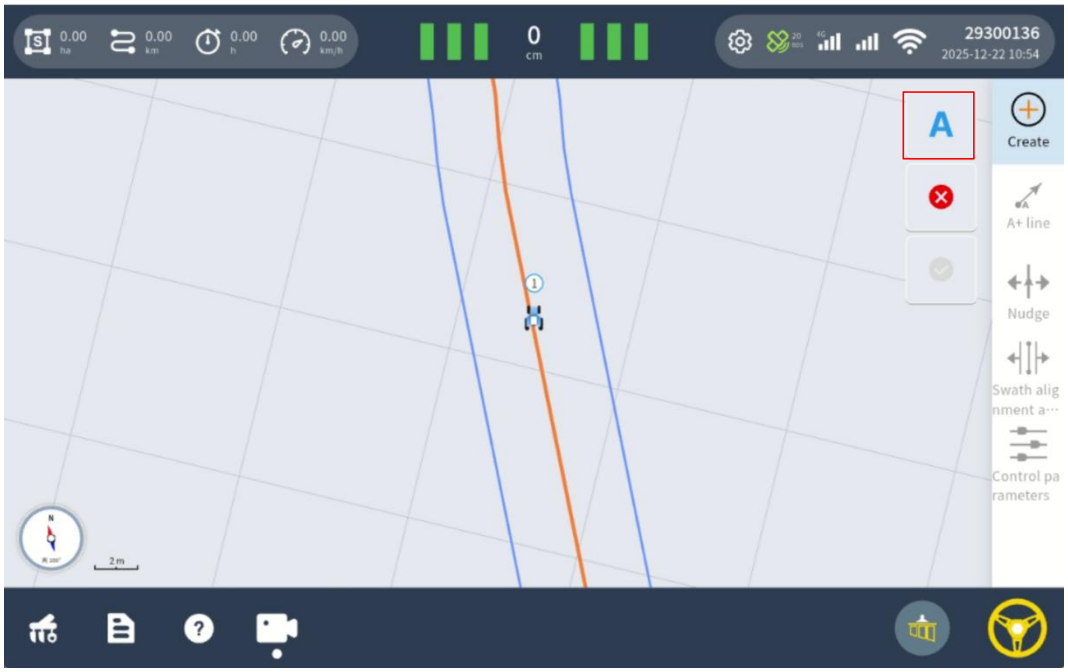




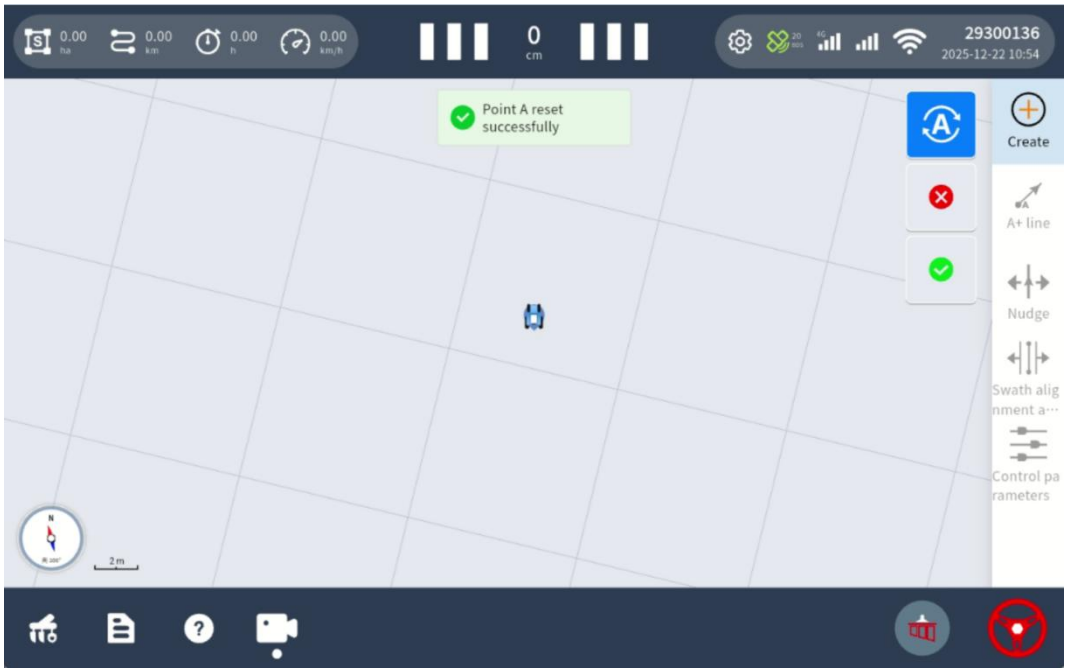
4.3 A+ Line

After selecting **A+ Line Mode**, tap .

Tap  then the system will automatically create a navigation line using the vehicle's current heading angle as a reference.



If the position or vehicle's heading angle is inaccurate, drive the vehicle back to the correct location and vehicle's current heading angle and tap  to redefine it (the original Point A will be automatically cleared).



Tap , enter the field name, and then tap  to begin auto-driving.

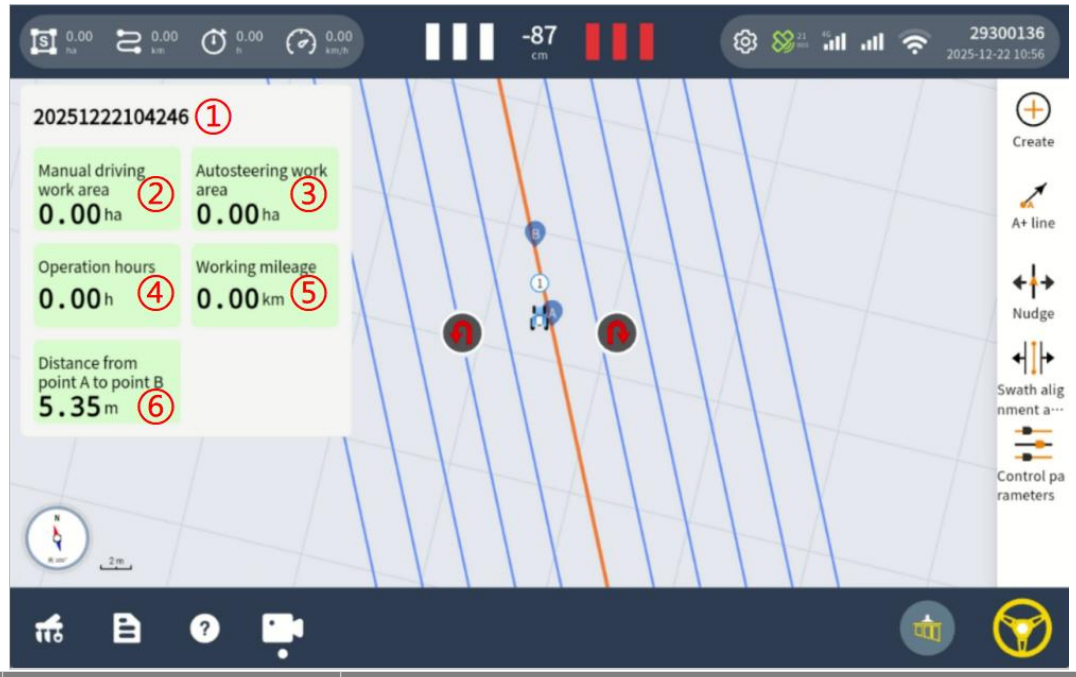
4.4 Auto Driving

Icon	Indicated Status	Function
 Orange	System is ready for auto-driving	Tap to start Auto Drive
 Green	System is performing auto-driving	Tap to stop auto drive
 Red	System cannot start auto-driving	Cannot start auto drive; check for faults

Ⅴ. Common Functions

1. Operation Status Bar

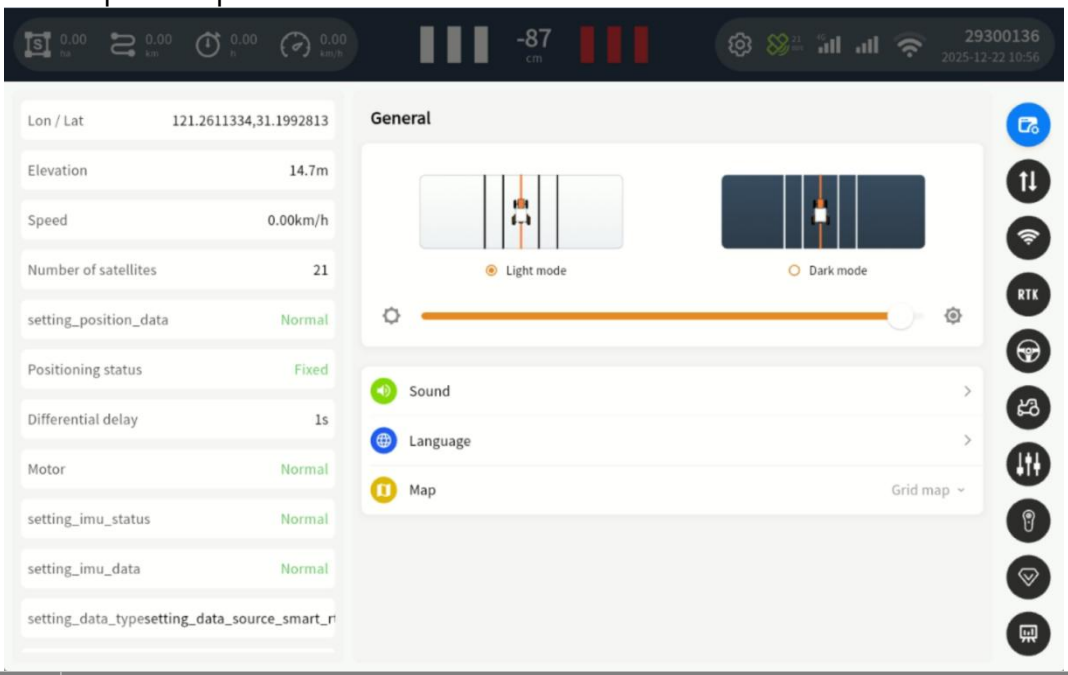
Displays current operation data in real time.
During operation (whether Auto Drive is enabled or not), tap the function area in the **upper-left corner** to open the pop-up window displaying operation data.
Tap this area again or anywhere outside the window to close it.



No.	Data Name	Data Description
1	Work Name	The name of the current work.
2	Execution Hours	The total Auto Drive time during the operation. The calculation stops when Auto Drive is turned off. If the current trajectory recording mode is manual, the manual driving time is also included.
3	Work Mileage	The total Auto Drive distance during the operation. The calculation stops when Auto Drive is turned off. If the current trajectory recording mode is manual, the manual driving distance is also included.
4	Manual Operation Area	The area covered by manual driving.
5	Auto Operation Area	The area covered by auto driving.
6	Distance from Point A to Point B	The distance between Point A and Point B. This is only displayed in **AB Line Mode** and hidden in other modes.

2.Setting

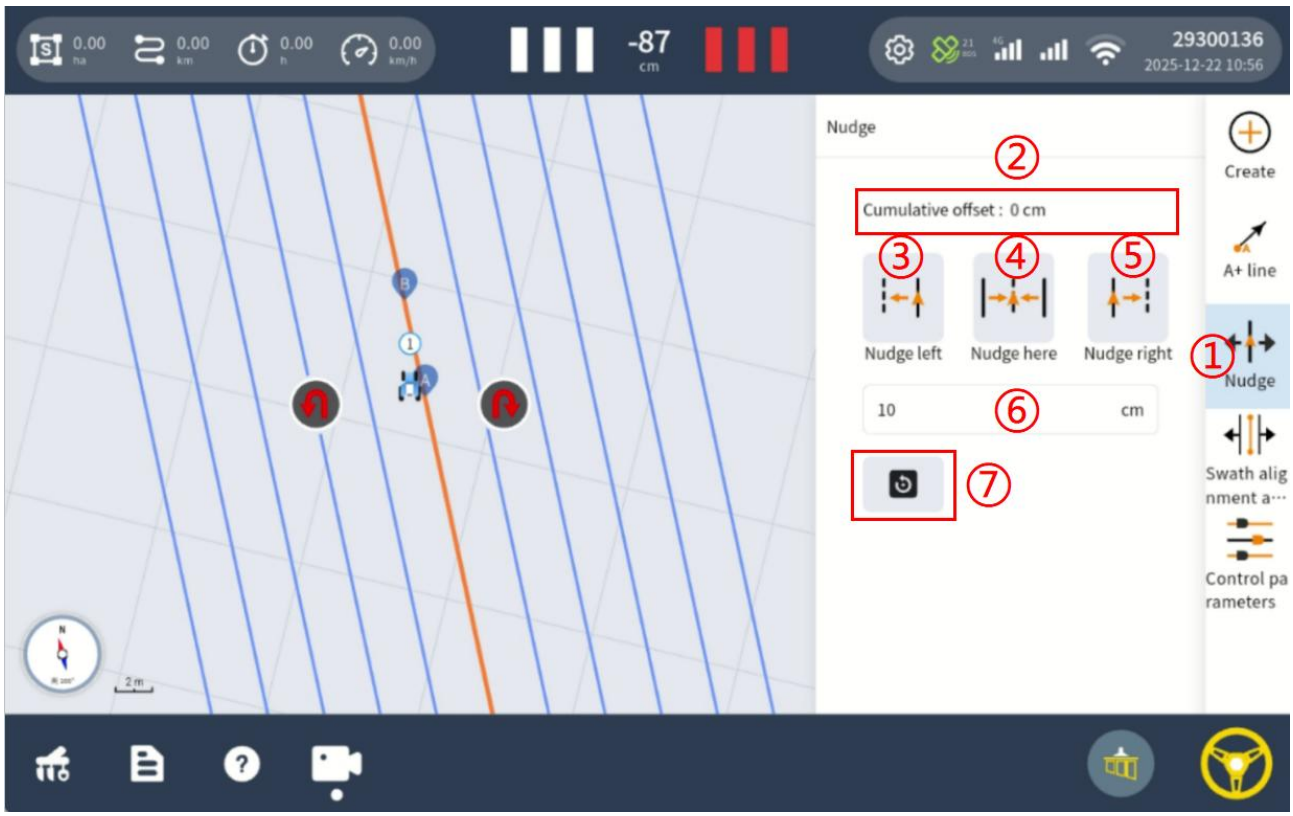
Tap the **status icon area** in the **upper-right corner** on any screen to open the drop-down **Settings** panel.
Tap again to collapse the panel.



Icon	Description
	General Settings: Includes theme color, brightness, volume, alarm settings, unit system, and satellite map configuration.
	WLAN Settings: Connect to and configure Wi-Fi networks.
	Mobile Network Settings: View SIM card information and manage mobile network connections.
	RTK Settings: Configure and manage differential correction sources.
	Navigation Settings: Customize the navigation and Auto Drive mode.
	Vehicle Configuration: Vehicle information configuration and parameters adjustment.
	Vehicle Calibration: Steering ratio calibration and tilt calibration for the vehicle.
	External Devices: Configure external accessories such as 360°cameras and wired control handles.
	License Management: Manage licenses for baseline services, star-level services, and paid software features.
	Demo Mode: Enable or disable Demo Mode and adjust its parameters.

3. Navigation Line Nudge

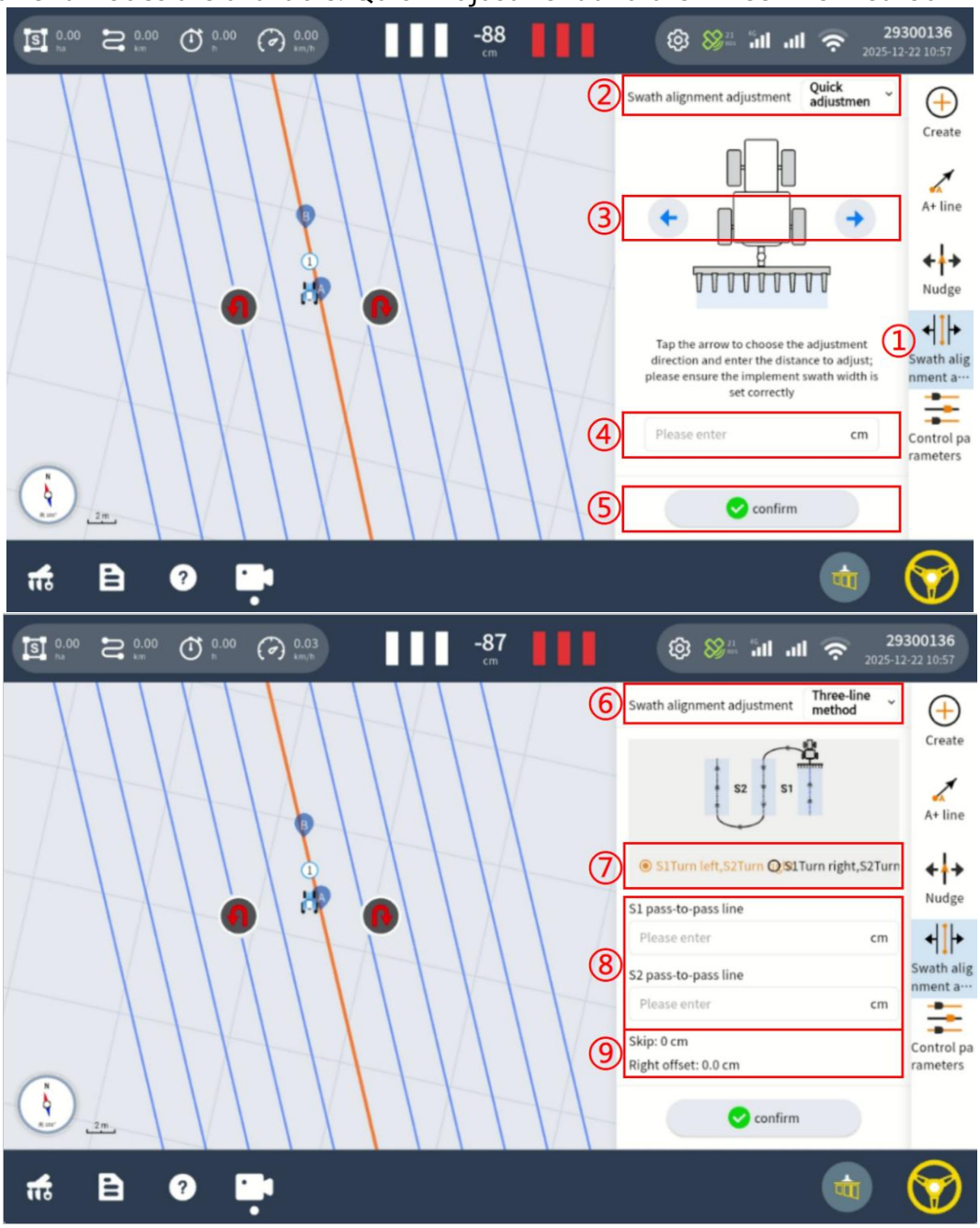
Used to fine-tune (nudge) the position of an existing navigation line.
By nudging left or right, the navigation line can be precisely aligned with the actual working path.



No.	Name	Description
1	Nudge Switch	Enables or disables the nudge function.
2	Cumulative Offset	Shows the total offset distance relative to the initial navigation line (0). "–" indicates a leftward offset; "+" indicates a rightward offset.
3	Nudge Left	Tap to shift the navigation line to the left.
4	Nudge to Here	Aligns the navigation line to the vehicle's current position.
5	Nudge Right	Tap to shift the navigation line to the right.
6	Value Input Box	Enter the desired nudge value (unit: cm).
7	Reset Navigation Line	Tap to reset the navigation line to its original position.

4. Swath Alignment Adjustment

Tap Swath Alignment Adjustment in the toolbar to open the adjustment interface.
Two adjustment modes are available: Quick Adjustment and the Three-line method



No.	Name	Description
1	Swath Alignment Switch	Toggle button for enabling or disabling Swath alignment Adjustment.
2	Calibration Mode	Two modes available: **Quick Adjustment** and **Three-Pass Method**. Tap to switch between them.

3	Adjustment Direction (Left / Right)	In Quick Adjustment mode, the arrow performs two functions: • **Direction Selection:** Each tap adjusts by 1 cm in the selected direction. • **Synchronous Display:** The input box below updates automatically (negative for left, positive for right). The displayed distance value is the target adjustment that the user wants to apply. The system calculates the correction accordingly.
4	Input Box	Enter the target adjustment value (unit: cm).
5	Confirm	Confirm. Tap to perform the calibration.
6	Three-Pass Method	Calibration mode based on three pass-to-pass lines.
7	Direction Selection (Three-Pass)	Choose **Left Pass-to-pass Line** or **Right Pass-to-pass Line** according to the last pass result.
8	Three-Pass Value Input	Enter the accurate pass-to-pass line width value measured during operation.
9	Parameter Prompt	Displays the parameter information after calibration.

4.1 Quick Adjustment Example

Enter the pass-to-pass line deviation according to actual operation results.
For example:
If the ideal pass-to-pass line is **66 cm**, but the actual left-side pass-to-pass line is **60 cm**, enter **6 cm** (66 − 60 = 6) in the Quick Adjustment field.
Since the left pass-to-pass line is narrower than ideal, the vehicle should shift **right**.
Select the **right arrow** and tap **Confirm** to complete calibration.

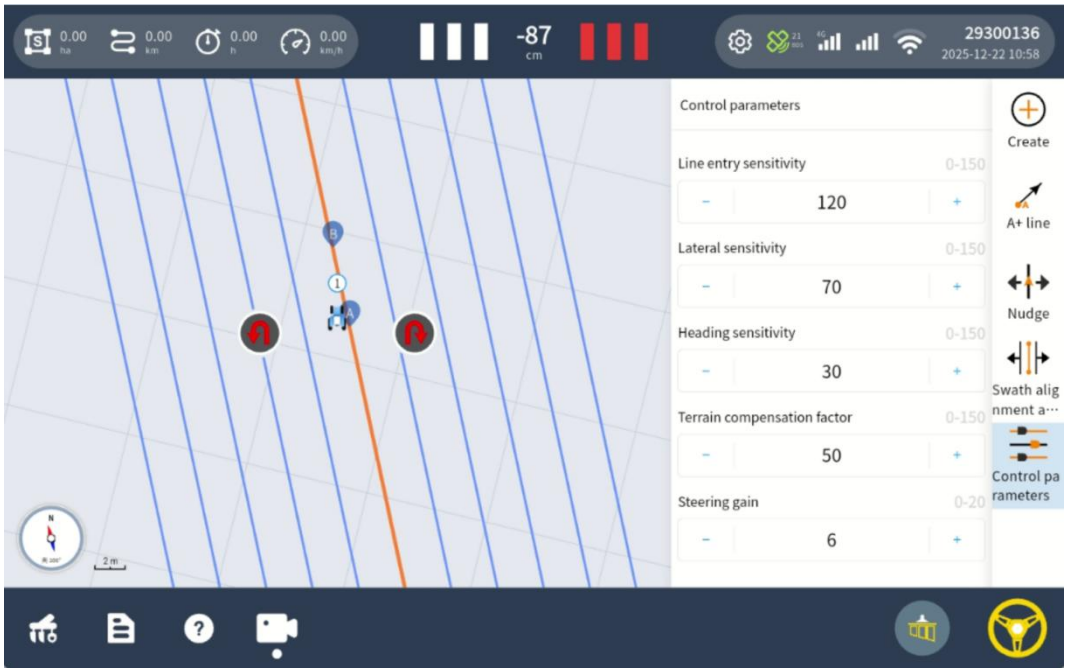
4.2Three-Pass Method

Drive the tractor to perform three consecutive passes.
After the third pass, determine the side (left or right) where the alignment deviation occurs.
Select the correct direction, enter the actual measured pass-to-pass line width, and tap **Confirm**.

Note:

Before performing swath alignment calibration, make sure implement parameters are entered correctly.
The sum of the two actual pass-to-pass line widths should equal twice the theoretical width.

5. Control Parameters



Line entry sensitivity: Determines how quickly the system responds during straight-line navigation.

Lateral sensitivity: Controls the timing of steering wheel correction.

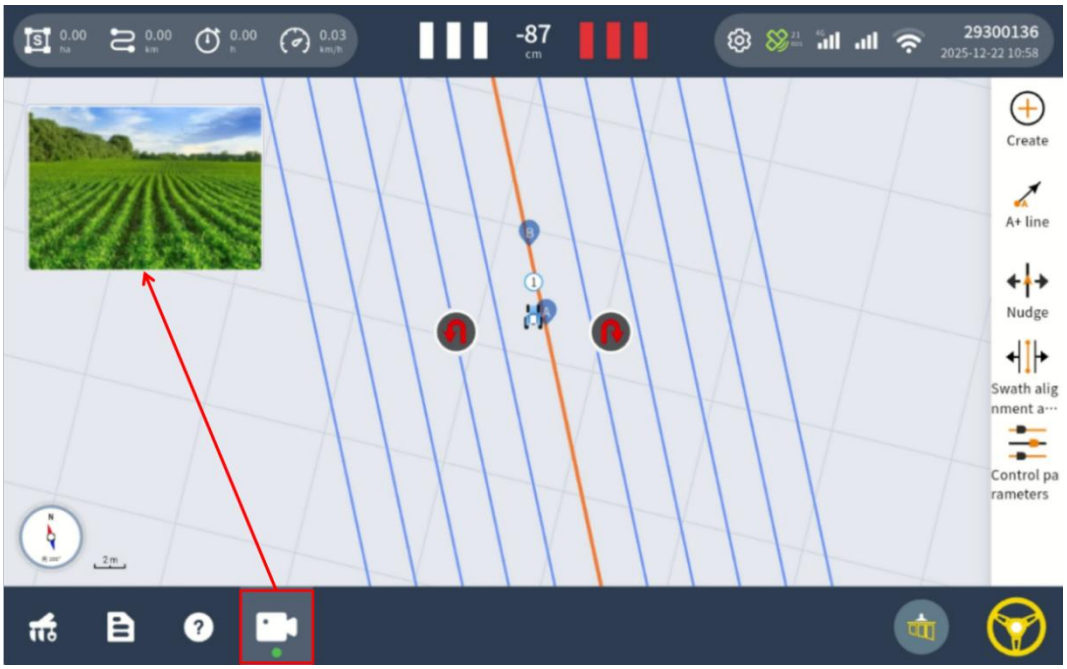
Heading sensitivity: Adjusts the steering wheel swing angle for course correction.

Terrain compensation factor: Defines how strongly the system compensates for uneven terrain.

Steering gain: Controls the frequency of steering wheel oscillation.

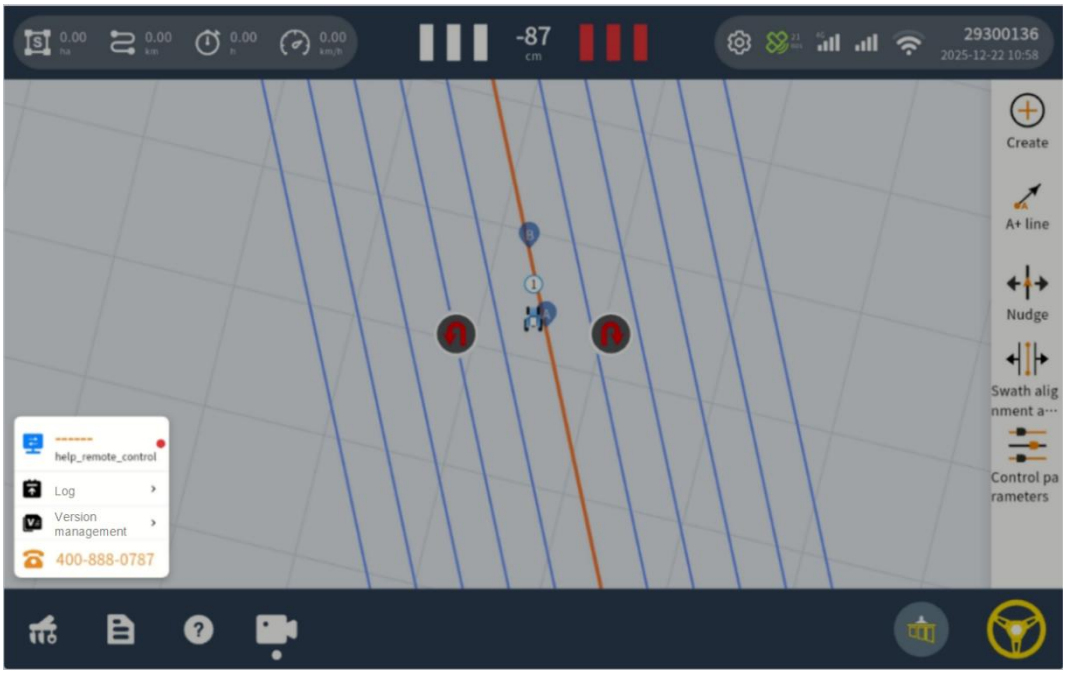
6. Camera Switch

Tap the **Camera** icon on the workbench at the bottom of the screen to turn the camera **on**. Tap it again to turn the camera **off**.



7.Help

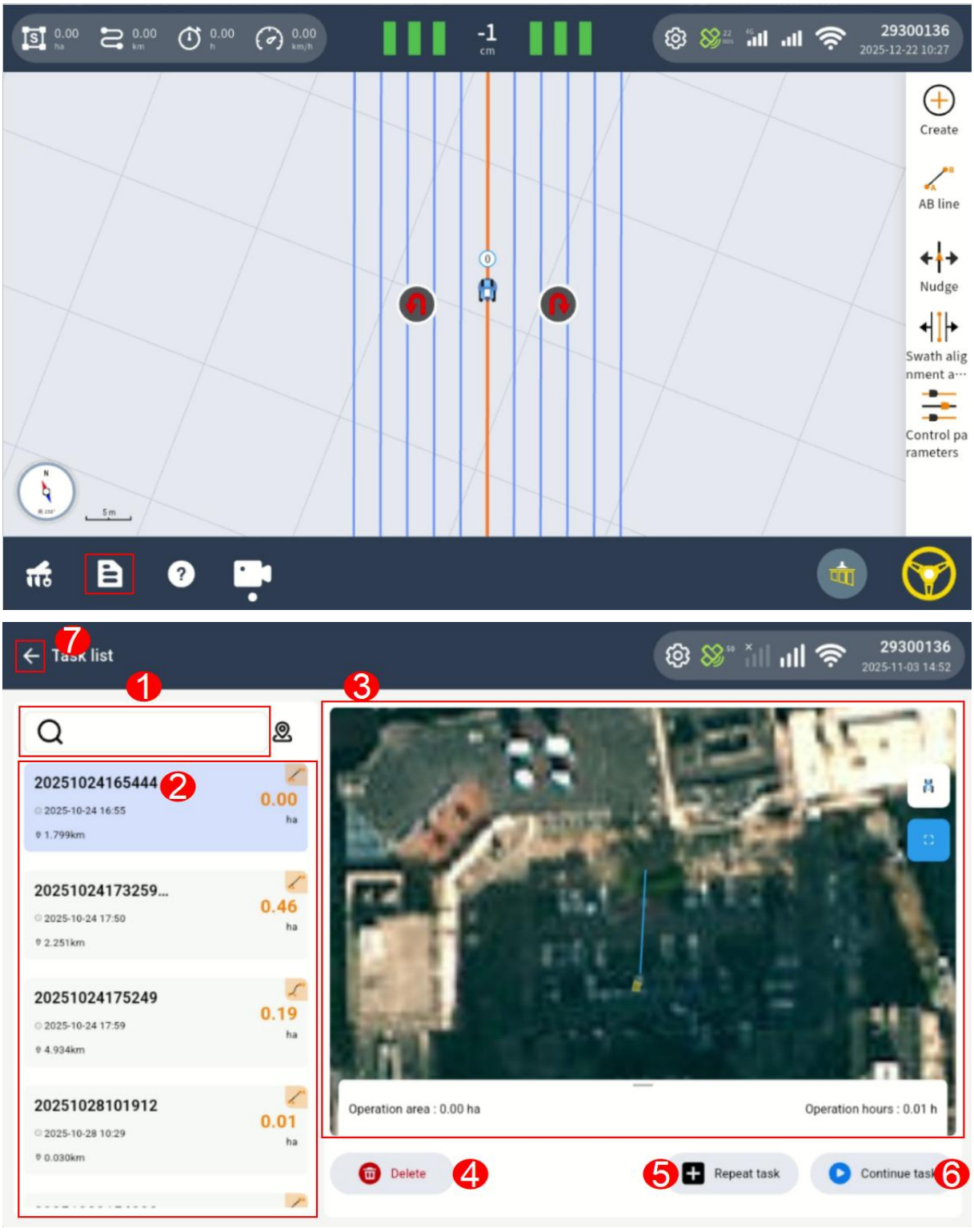
Provides users with tools for quick troubleshooting and assistance when encountering navigation-related issues.



Remote Control Code: Used for technical remote assistance.
Before requesting remote support, please send the displayed control code to the technical support team.

Version: Displays the current software version and allows for system upgrades.

8. Task List



The **Operation List** allows users to view, manage, or resume field operations. Functions include viewing field information, deleting records, re-operating with existing navigation lines, or continuing from the previous operation point.

No.	Name	Description
1	Search Bar	Allows searching by operation name.
2	Operation List	Displays a list of historical operations. A check mark appears next to the selected operation.
3	Operation Details	Shows operation information such as duration, number of sessions, start time, and end time.
4	Delete	Deletes the selected operation record.
5	Re-operate	Reuses an existing navigation line for repeat operations (e.g., in the next season or year).
6	Continue Operation	Continues from the last recorded position of the previous operation. A new record will be created automatically in the operation details window.
7	Exit	Exit the operation list.

Ⅵ. Common Problems

1. Equipment Information Fault Analysis

Status Bar	Status Bar Information	Status Bar Analysis
Positioning Status	Fixed	Normal
	Floating	The device is receiving too few or weak satellite signal
	Pseudorange	Base station signal not received
	Single Point	Only a single satellite point is resolved (no differential correction).
	Invalid	No satellite signal detected.
Data Source	Unconfigured	Base station not configured
	Normal	Normal
Data Source Status	Unconfigured	Base station not configured
	Authentication Failed	Account authentication error.
	Disconnected	Network unavailable — check if the 4G network is functioning properly. If the issue persists, contact support to verify whether the vehicle is outside the base station coverage area.
Control Box	Not connected	Check the main wiring harness connection
	Connected	Normal
WAS	Not connected	Check the gyroscope wiring connection
	Connected	Normal
Front Wheel Angel	Uninitialized	Occurs when the vehicle remains stationary for an extended period. Start the vehicle and drive forward for a short distance (speed > 1.6 km/h) to complete initialization.

2. Common Fault Analysis

Fault Phenomenon	Cause Analysis	Solution
Terminal does not start	Fuse damaged	Replace the fuse
Tap but no rotation	Motor failure	Replace the motor
Black screen / Flickering screen	Terminal malfunction	Replace the terminal
	Terminal wiring harness damaged	Replace the terminal wiring harness
	Receiver main wiring harness not powered	Replace the main wiring harness
	Battery power loss or loose power cable connection	Charge the battery/tighten the power wiring harness
Automatic driving stops unexpectedly	Abnormal wiring harness connection	Check the wiring harness connection

Ⅶ. Equipment Maintenance

To ensure proper operation and extend the service life of the equipment, please perform maintenance and servicing strictly in accordance with the specified requirements.

Unauthorized disassembly or assembly of any main system components is strictly prohibited. If maintenance is required, please contact authorized after-sales service personnel in time.

Operate the system strictly according to the user manual.

Regularly inspect all screws, wiring harnesses, and connectors of the system—such as controller mounting screws, angle sensor fixing screws, and data cable connectors—on a weekly basis. If any looseness, detachment, or damage is found, please tighten or repair them immediately.

Steering Wheel Maintenance:

Keep the motor clean. Avoid long-term accumulation of dust, soil, or other debris on the motor surface.

Maintain a proper operating environment for the motor. Do not wrap cotton cloth, dust-proof film, or other materials around the motor to ensure adequate ventilation and cooling.

Before each operation season, check whether:

The transmission system operates smoothly.

The coupling concentricity meets the standard.

The gear transmission is flexible.
If any jamming or abnormal resistance is detected, identify the cause and eliminate the fault before operation.

Ⅷ. Wiring harness connection diagram

