



# CHCNAV NX510 Pro User Guide



Precision Agriculture | August 2021

Make your work more efficient

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## Preface

## Copyright & Trademarks

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**Trademarks** - The CHC Navigation, CHCNAV are trademarks of Shanghai Huace Navigation Technology Limited. All other products and brand names mentioned in this publication are trademarks of their respective holders.

## Safety Warnings

The Global Navigation Satellite System (GNSS) is operated by governments and public entities, which are solely responsible for the accuracy and maintenance of the GNSS network. Accuracy can also be affected by poor satellite geometry and obstructions, such as buildings and heavy canopy.

## FCC Interference Statement

This equipment has been designed to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules in the Portable Mode. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

## CE Interference Statement

Declaration of Conformity: Hereby, Shanghai Huace Navigation Technology Ltd. declares that this NX510 Pro is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. A copy of the Declaration of conformity can be obtained from Shanghai Huace Navigation Technology Ltd.



## Notices

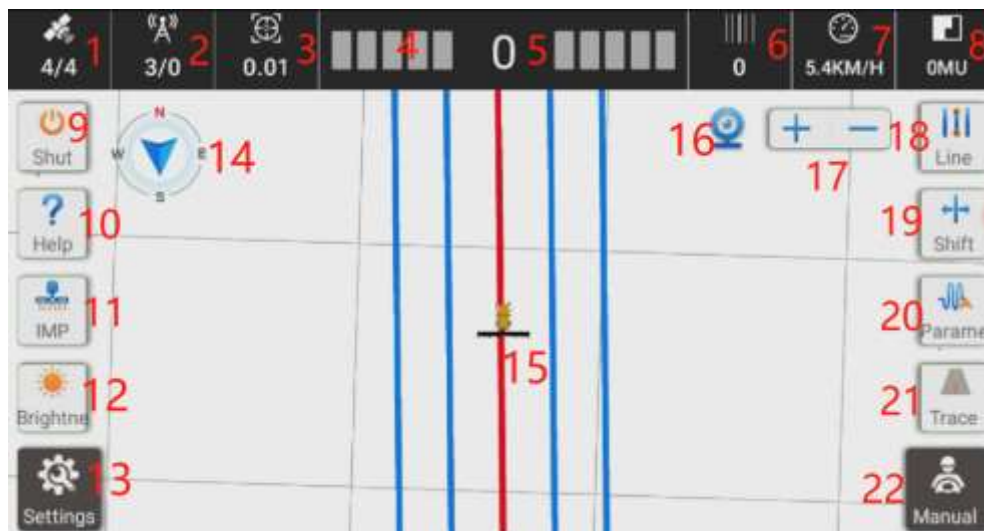
- The receiver will be 10-15cm higher than the original tractor roof top. When the tractor enters or exits the garage or travels at the height limit, the safety of the roof equipment should be paid attention to prevent damage to the antenna and cables.
- Disconnect the power cord when the device is not in use for a long time to prevent loss of battery power.
- The autosteering system shall not be used in restricted areas during non-operating time.
- When the device is turned on for auto driving, the driver is recommended to stay in the tractor cab.
- When using the device, please prevent the cab from water. Protective measures need to be taken for equipment while performing cab cleaning.
- Any disassemble action should be performed in accordance with the instructions or under the instruction of technician.
- Please use it strictly in accordance with the user manual and prohibit changing the software parameters arbitrarily.
- CHCNAV declines any responsibility for damage caused by improper use or any use other than those described in this instruction manual.

## 1. Introduction

### 1.1.Main components

| Device name                  | Image  |
|------------------------------|--|
| PA-3<br>Receiver             |    |
| Console                      |    |
| Electrical Steering<br>Wheel |   |
| GA-Sensor<br>Angle sensor    |  |
| Rear Camera                  |  |

## 1.2. Software interface



1. Satellite information: There are two numbers, displayed in the form of X / Y. X represents the number of tracked satellites, and Y represents the number of used satellites, and Y= 4 refers to RTK fixed.
2. The status of the base station: There are two numbers, displayed in the form of X / Y. X represents the signal latency. If you are using the radio mode, Y is the current number of channels. If you are using network mode, Y will change to “NET”;
3. Positioning accuracy;
4. Horizontal deviation display bar (the default is 1cm per grid, adjustable);
5. Lateral deviation, the tractor is negative on the left side of the navigation line and positive on the right side of the line;
6. The current number of lines where the tractor is located (the original line is 0);
7. Real-time speed;
8. Operating area (default unit is mu, adjustable);
9. Shut down button;
10. Help, including one-click help, alignment guidance, center offset guidance, plow width guidance;

11. Agricultural tool settings, such as plough width, centerline offset, and row spacing;



A: Setup the width of the Plow

B: Setup the Center offset

12. Brightness configuration;
13. Settings, all functions and settings are in this interface;
14. Electronic compass;
15. Vehicle and navigation line;
16. Camera function, it will cover the background with the picture taken by the camera after turning on;
17. Zoom in / out;
18. Fast routing function, the type of routing is the type of the line last time;
19. Line offset



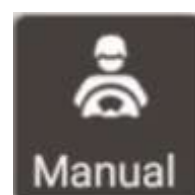
A: The line is shifted to the left.

B: The line is shifted to the right.

C: Enter the travel distance of the line (unit: cm)


D: Line to zero

20. Quickly adjust the entry and travel parameters;
21. Working track coverage;
22. Manual / automatic status display and switching



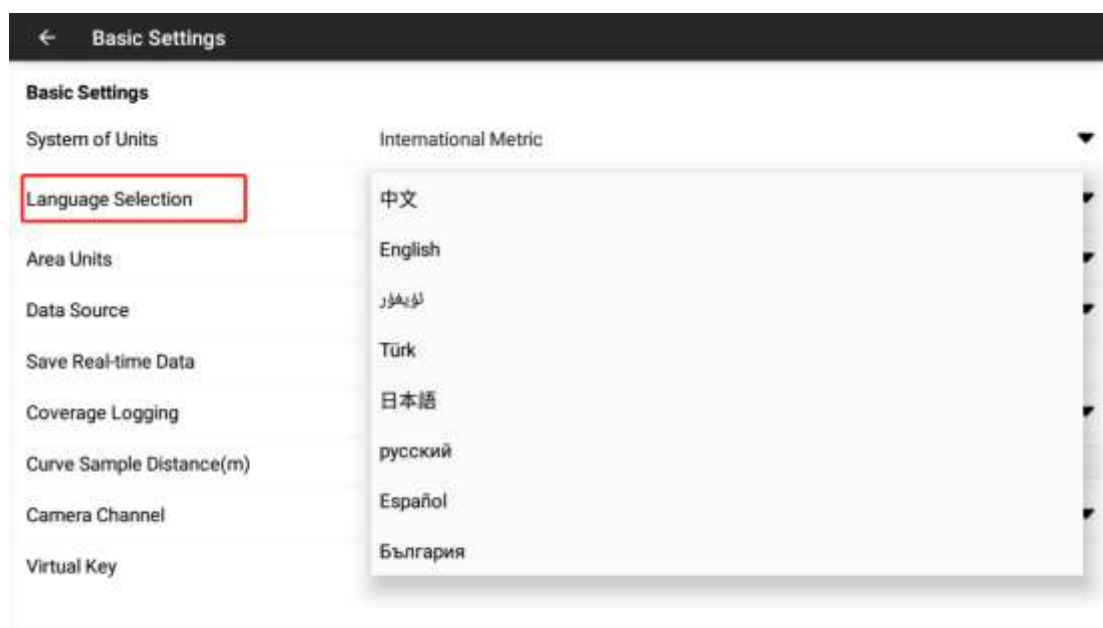
## 2. Getting Started

### 2.1.Power on

| Image   | Description  |
|---|--|
|  | Turn on the red power button above the monitor and the button will turn green. |

### 2.2. Change software language

Get into [Setting]-[System setup]-[Basic Setting]-[Language Selection]

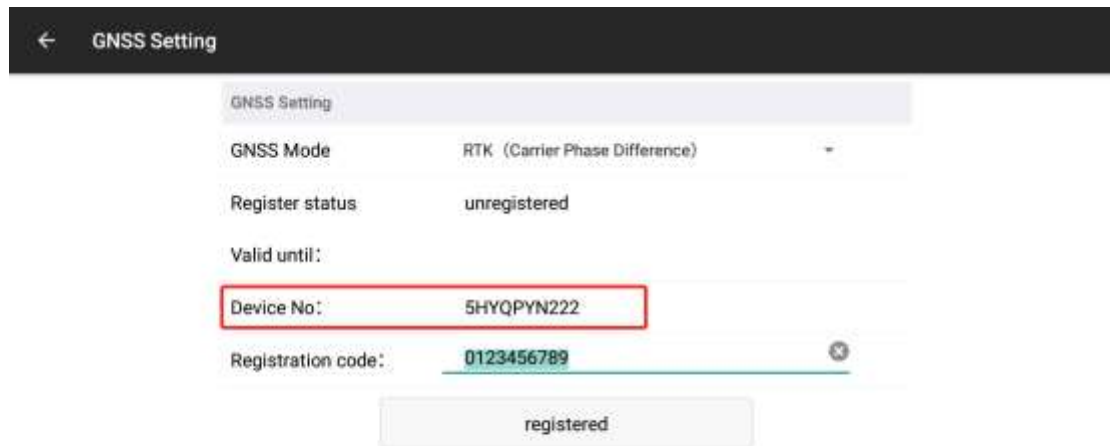




## 2.3. Register the RTK Mode

### Get into [Setting]-[GNSS-Setting]

Show the device No.to technical support and we will provide you the registration code.



The screenshot shows the 'GNSS Setting' screen. At the top, there is a back arrow and the title 'GNSS Setting'. Below this, the 'GNSS Mode' is set to 'RTK (Carrier Phase Difference)'. The 'Register status' is 'unregistered'. Under 'Valid until:', the 'Device No.' is '5HYQPYN222' (highlighted with a red box) and the 'Registration code' is '0123456789' (highlighted with a green box). A 'registered' button is at the bottom.

| GNSS Setting                |                                |
|-----------------------------|--------------------------------|
| GNSS Mode                   | RTK (Carrier Phase Difference) |
| Register status             | unregistered                   |
| Valid until:                |                                |
| Device No:                  | 5HYQPYN222                     |
| Registration code:          | 0123456789                     |
| <button>registered</button> |                                |

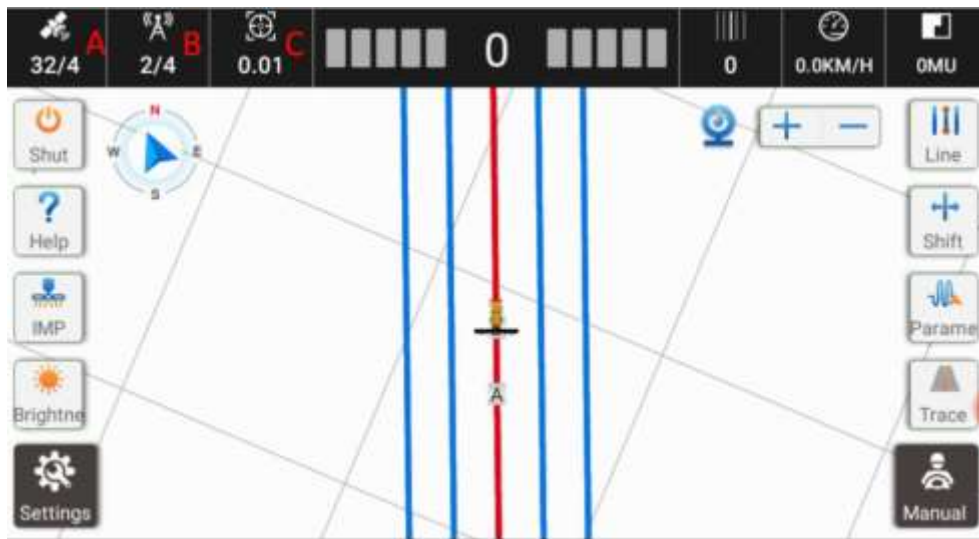
## 2.4. Checking RTK Signal Status



Green LED: it flashes once a second while receiving correction data.

Blue LED: indicates the number of tracked satellites; if it tracks N satellites, the blue LED will flash N times every 5 seconds.

Red light: indicates the RTK status. Red indicates RTK Fixed.



A: Satellite information: displayed in the form of X / Y. X represents the number of tracked satellites, and Y represents the RTK status, and Y= 4 is the normal differential RTK.

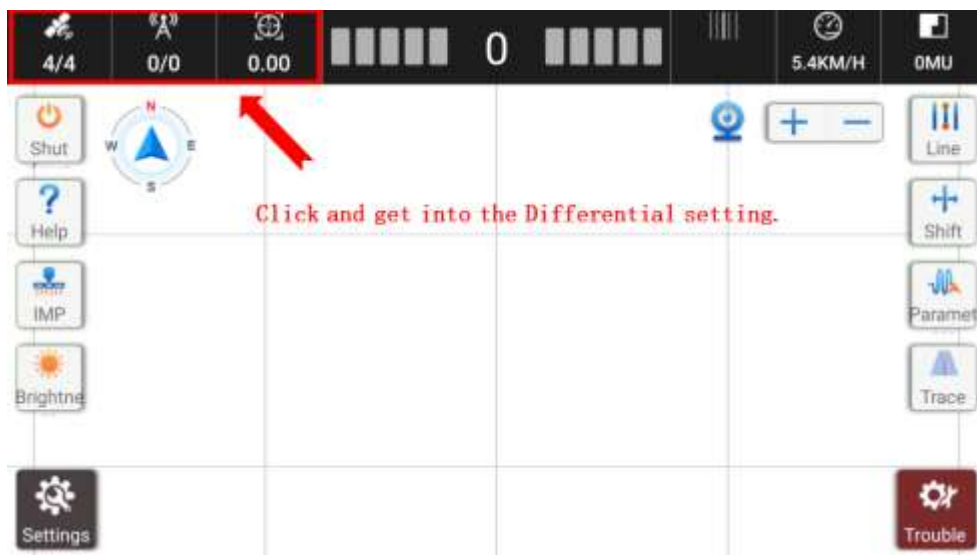
B: The signal status of the base station: displayed in the form of X / Y. X represents the signal latency. If you are using the radio mode, Y is the current channel. If you are using network mode, Y will change to “NET”;

C: Positioning accuracy.

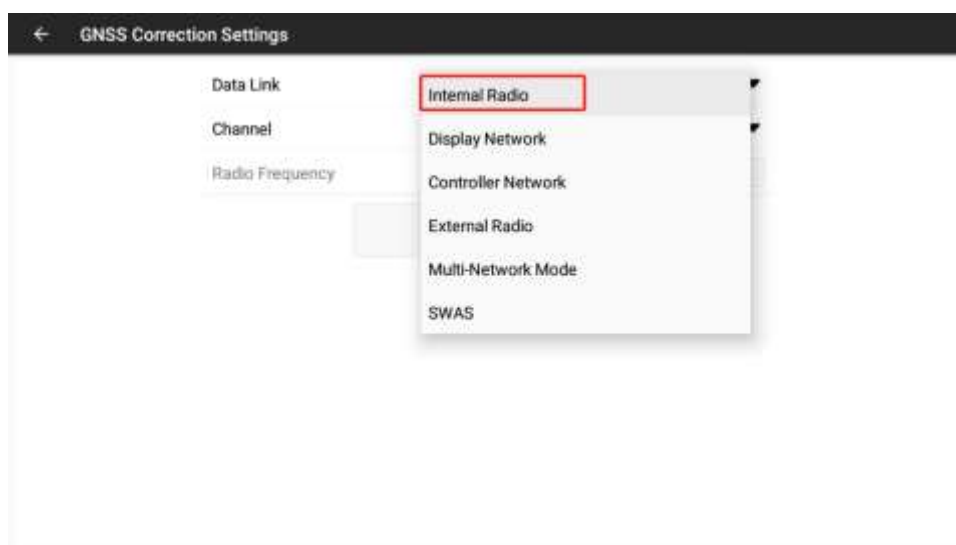
## 2.5. Receiver Settings

### 2.5.1. Built-in radio (using radio base station)

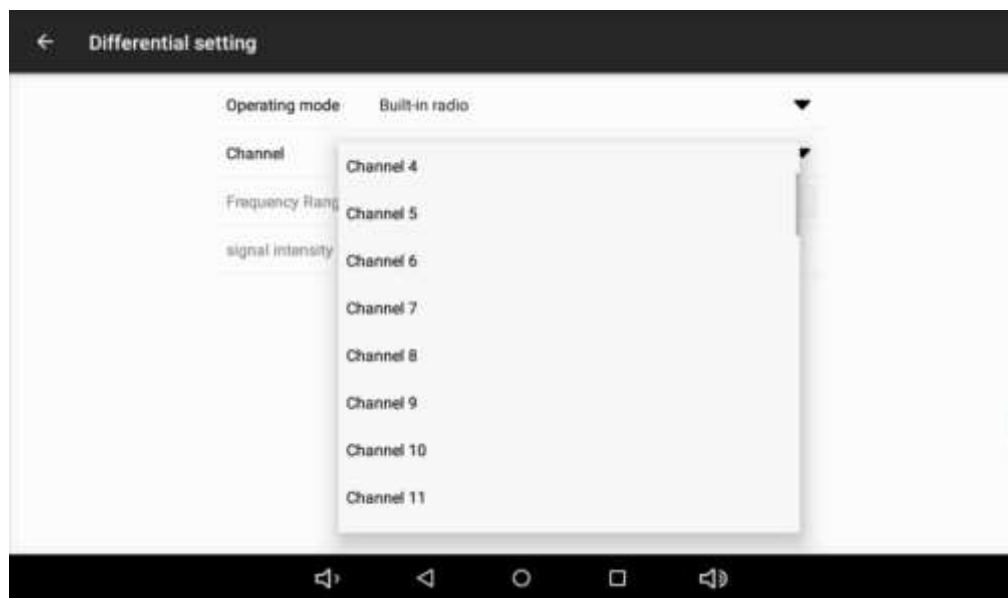
Click the signal display icon in the upper left corner.



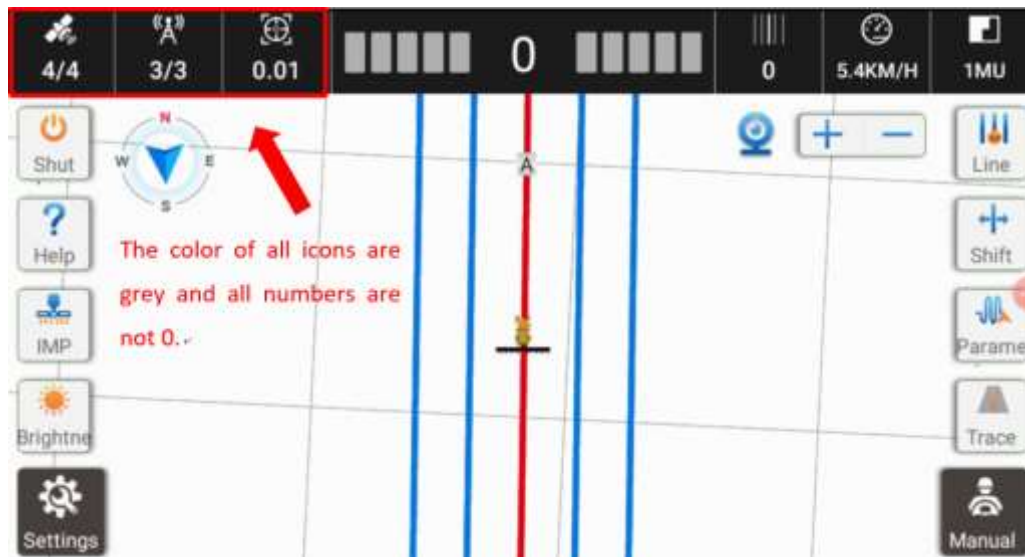
Click [ ▼ ] of Operation mode, select the built-in radio mode.



Click [ ▼ ] of Channel and select the same channel as that of base station.



After selecting the channel, it will show that the configuration is successful. Click [ ← ] in the upper left corner to return to the main interface. Three signal icons in the upper left corner are grey and non-zero, indicating that the RTK signal is available.



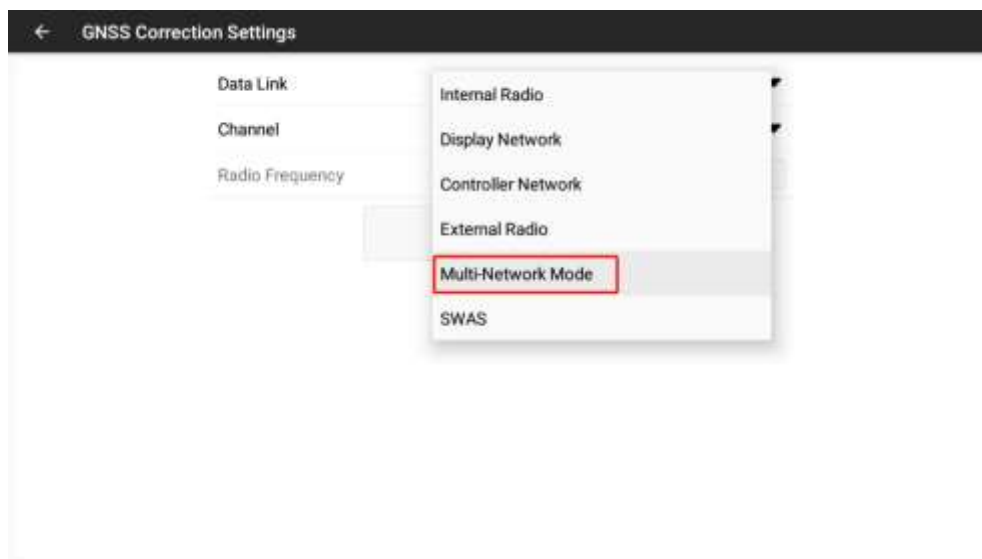
## 2.5.2. Multi-network mode (use a network base station)

[Pre-instruction for using network (fixed) base stations (required)]

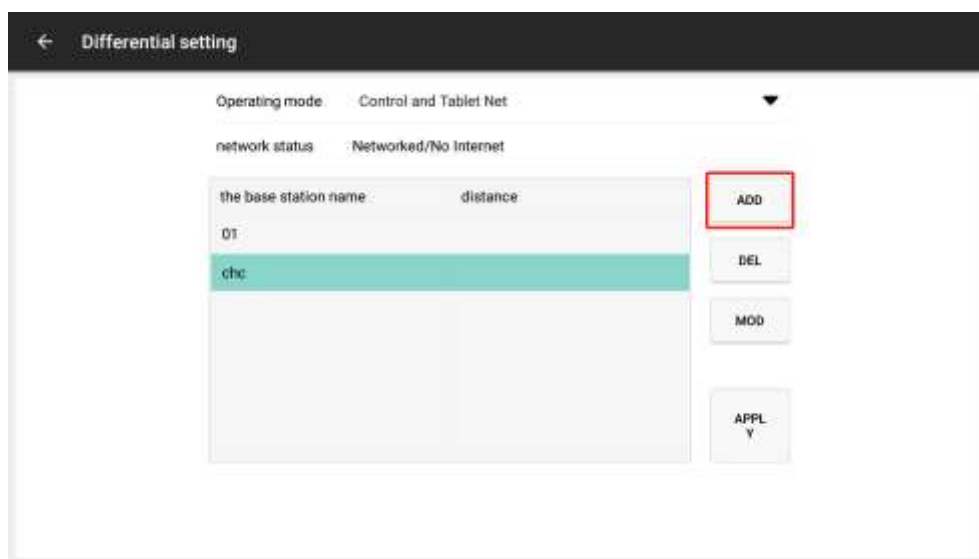
Using the network base station requires 3G/4G data subscription. The user needs at least one SIM card (two in dual-network mode), and one SIM card can be inserted into the PA-3receiver and the other can be inserted into the display.



Step 1: Click [ ▼ ] of operation mode to select the **Multi-Network** mode.



Step 2: Click [Add] to add the base station information.



Base station information (multiple base station information are supported):

The base station name: chc (in default)

Protocol: CORS (in default)

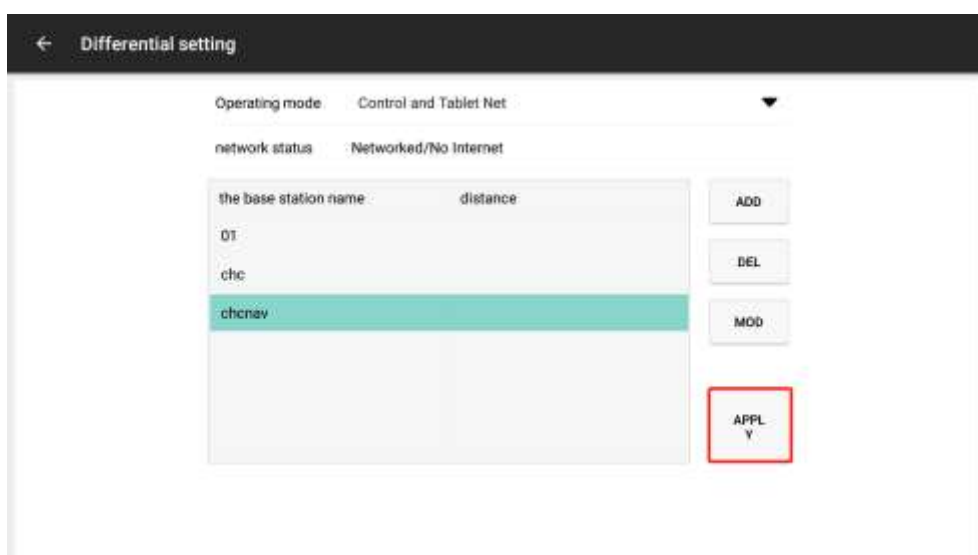
Input the IP, port, username and password you have, click [Save].

Click [Download] in the source list and select RTCM3.2 format.

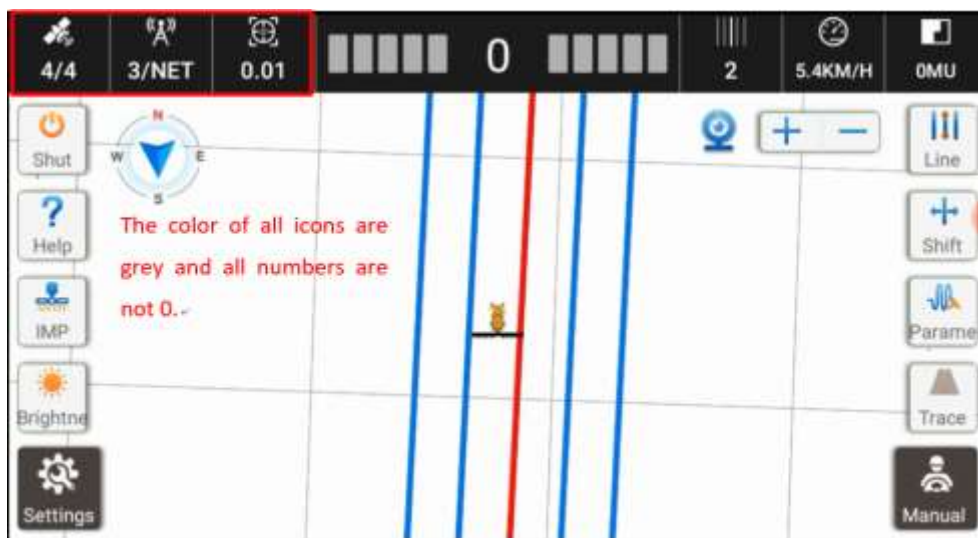


Step 3: return to the **Differential setting** interface, select the set base station, and click [Apply] to connect to the base station. After returning to the main interface, the three icons in the upper left corner are grey and the number is not zero, which means that the base station signal is normally available.


Currently supports saving multiple base stations, the distance of the base station will be displayed, select another base station and click the [APPLY] to replace current base station.

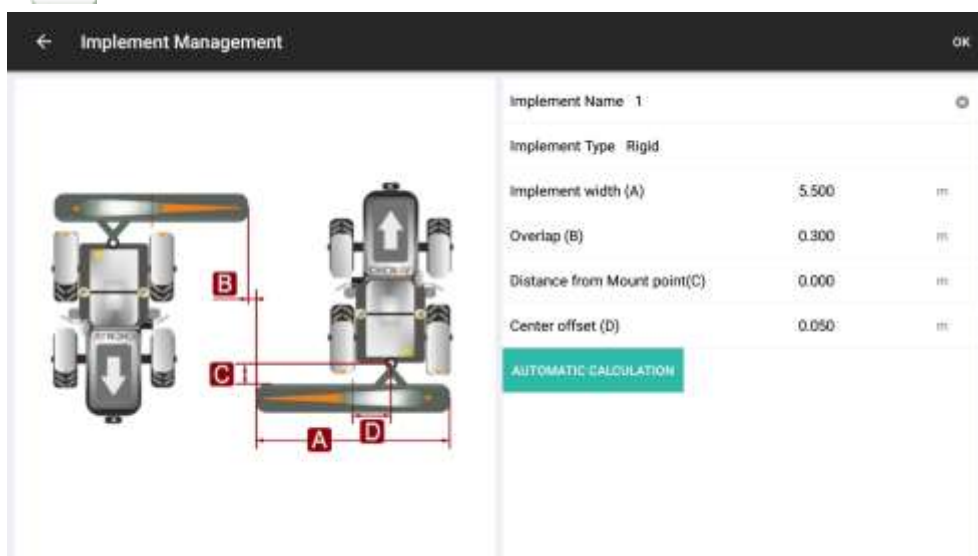


After selecting the base station, the interface shows that the application is successful. Click the [ ← ] corner to return to the main interface. The main interface shows that the three signal icons in the upper left corner are gray and non-zero, indicating that the RTK signal is normally available;



## 2.6. Implement Settings

Click [  ] on the left of main interface to enter the implement setting;



Plough width (A): width of the farm implements; (width from the far-left seeding opening to the far-right seed opening of the seeder)


Line spacing (B): the distance between lines;

Axle-plow distance (C): distance steering shaft and hitch point; ('0' in default)

Center offset (D): The abnormal line spacing due to the misalignment of the plough, it could be adjusted automatically based on the inputted value (see 4.2 Handover Line Calculation for specific operations).

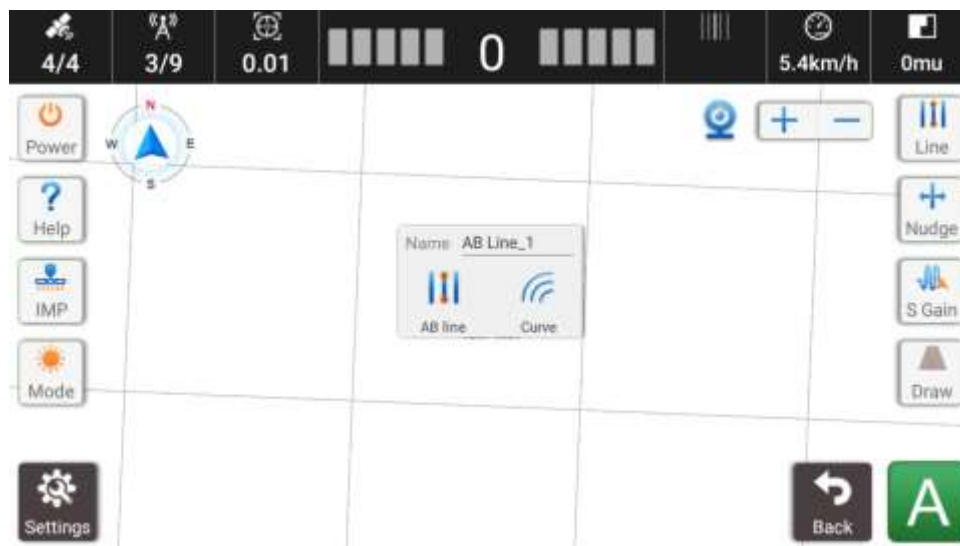


## 2.7. Quick line setting

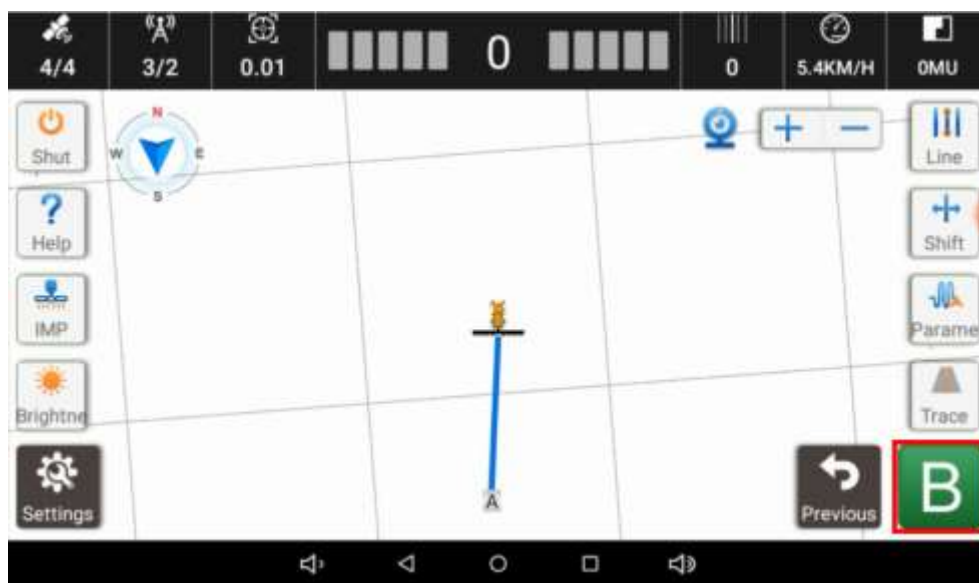
Click  to enter the quick alignment

Park the tractor at the start point (A) of the alignment, and face to the end of the alignment.

Choose the straight AB line or Curve ,the line you want.



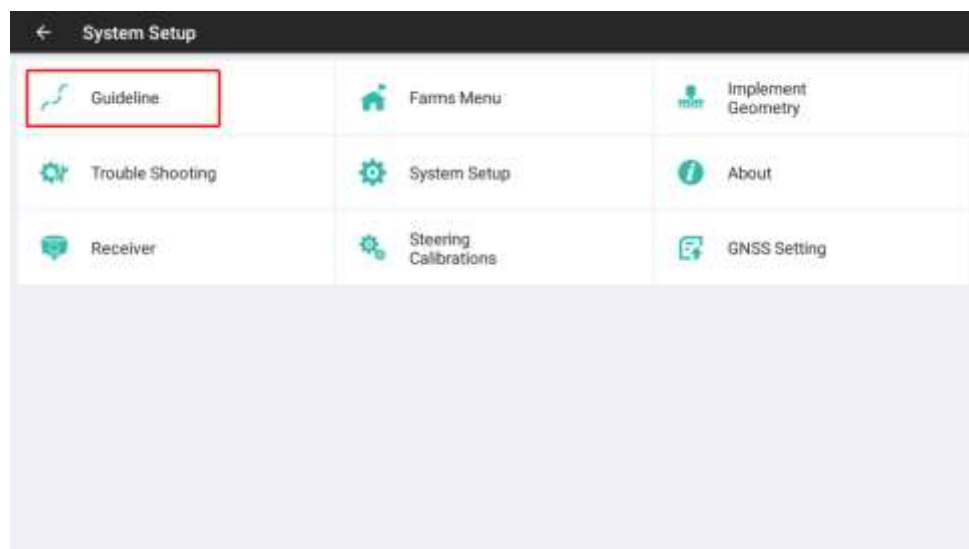
Manually drive to the other side of the alignment, stop and set it as point B. During this process, please keep the agricultural tools lifted up. After the point B is set, the navigation line is automatically saved.



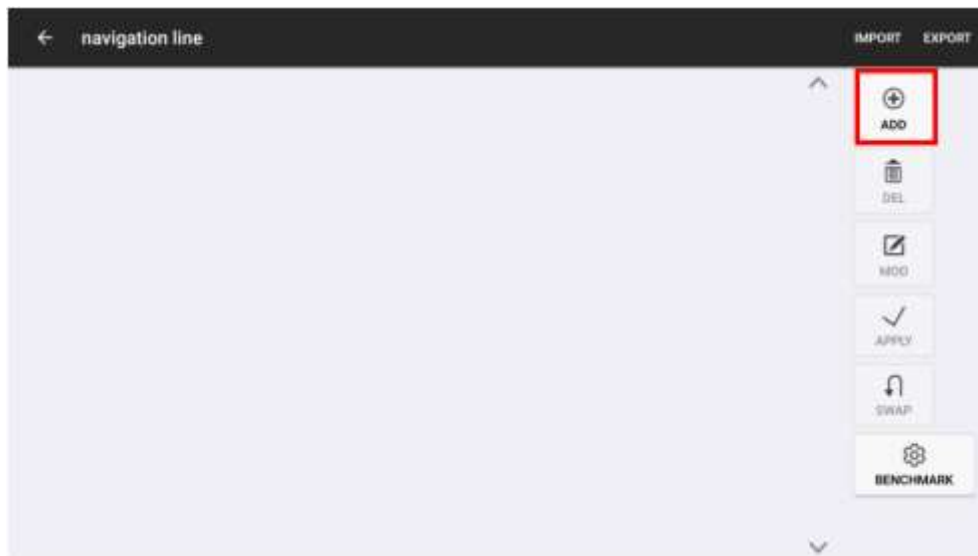
## 2.8. Other alignments

This software can also set other types of guideline.

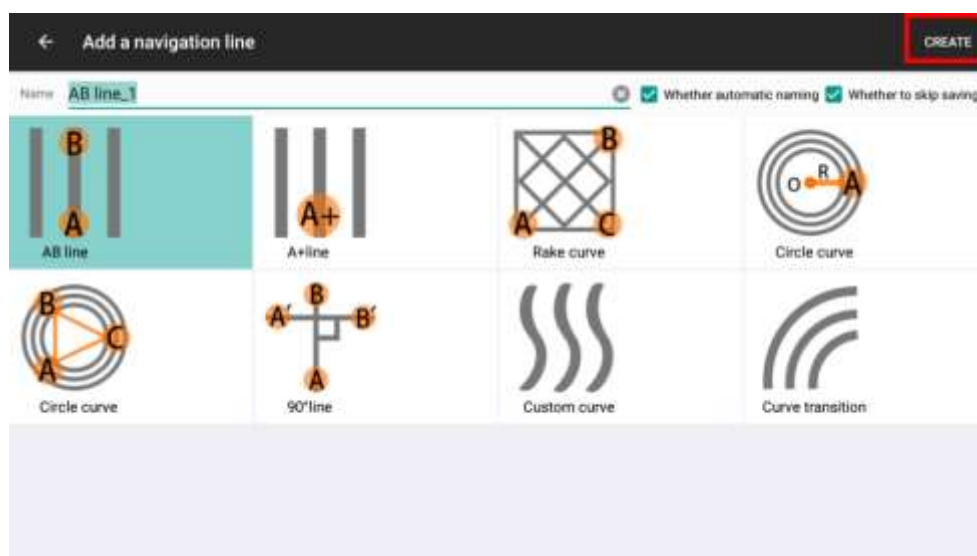
- ① Click [Settings]-[Guide Line Settings]



② Click [Add].



③ Select the type of navigation line, input the name, and click [CREATE] to enter the alignment step.



## 2.9. Auto Pilot

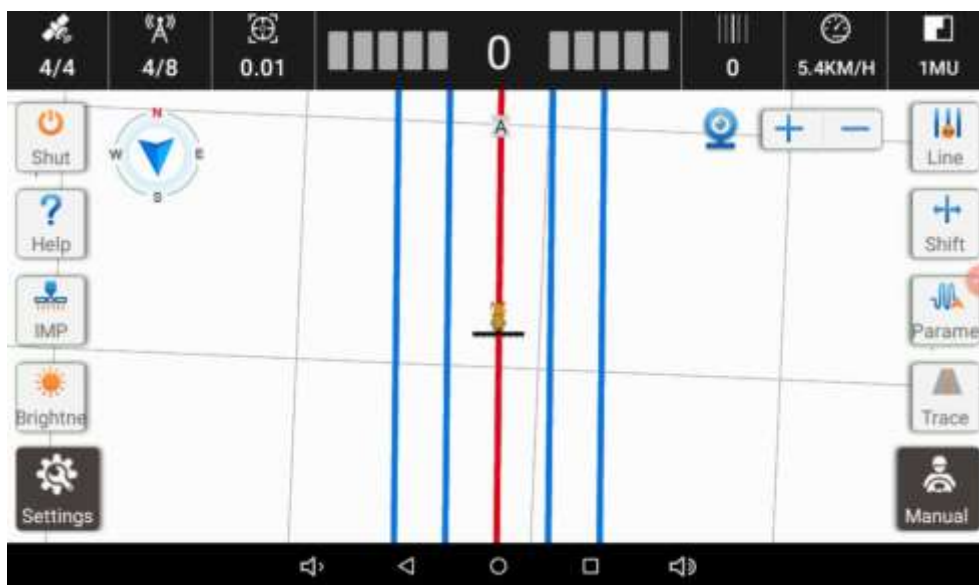


indicates manual mode;

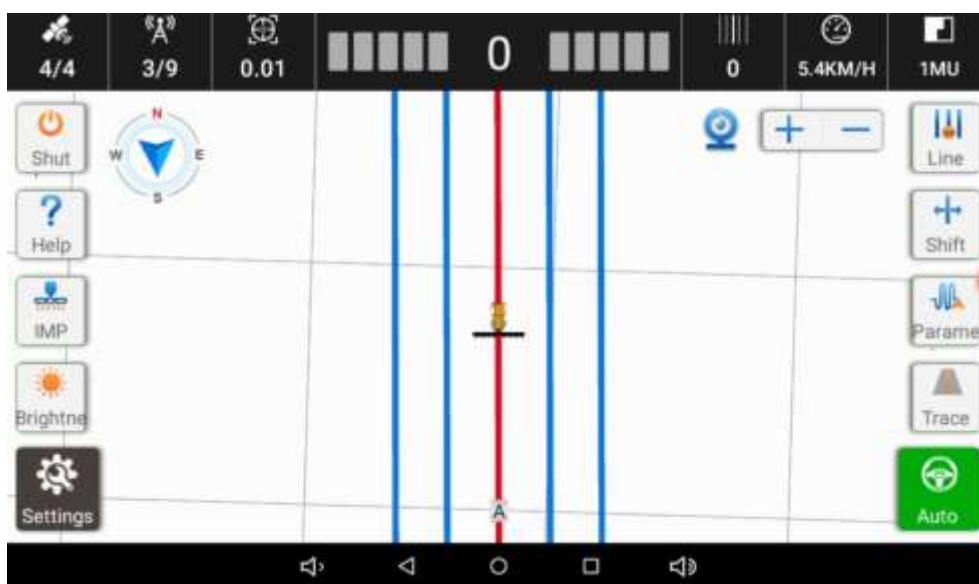


indicates auto pilot mode.

Click this button to switch between the two modes.




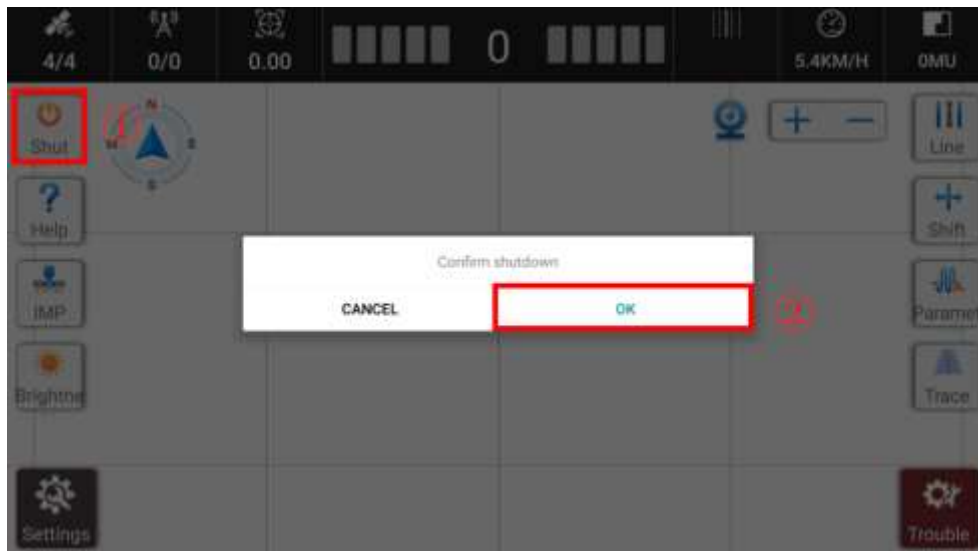
Manual mode



Auto pilot mode

## 2.10. Power off

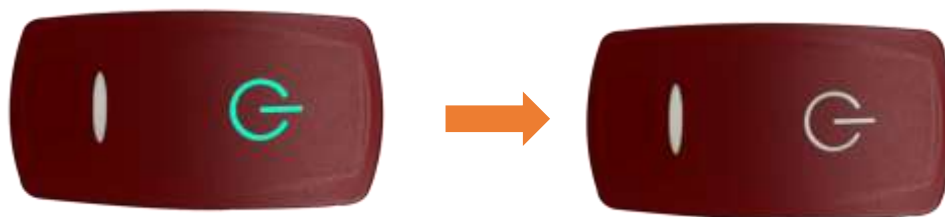
Click  and click OK to turn off the CB-A10 display.



### Controller power off

Slide the red latch downward and press the switch to power off.

Note: The direction of slide will change with the direction of controller mounting.



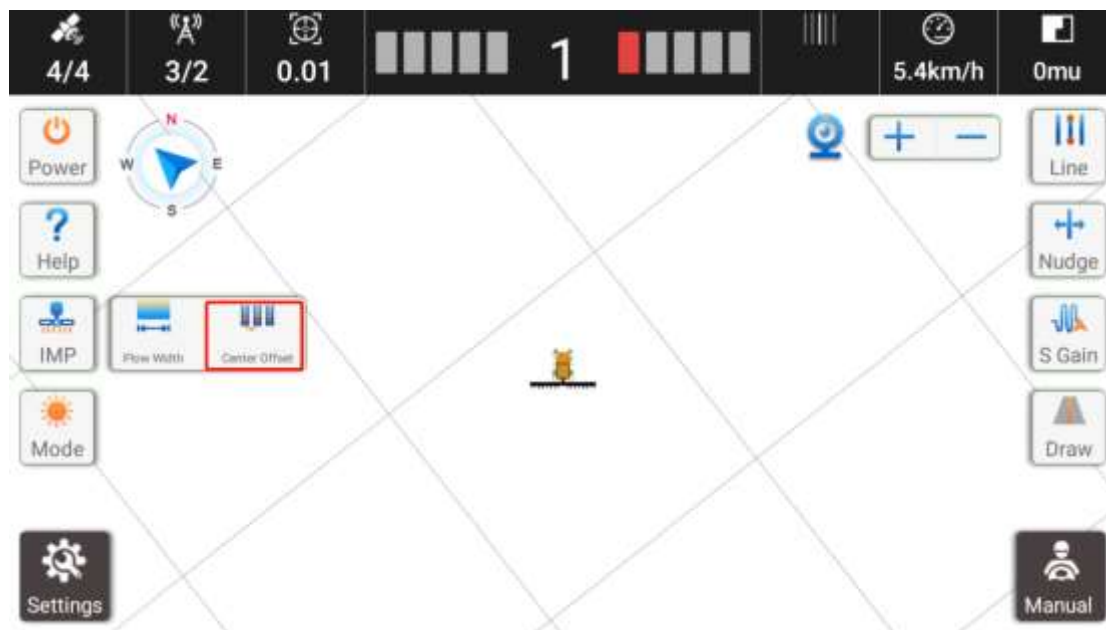
Turn the steering wheel switch to "o" to turn off the steering wheel, the green led will turn off.



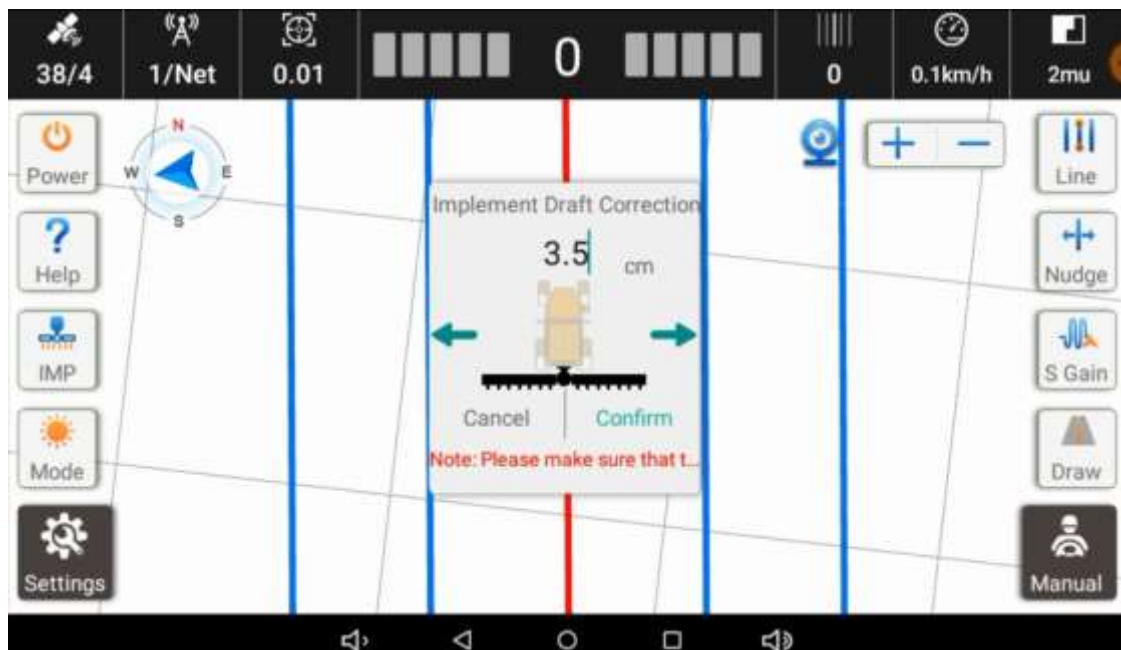
### 3. Common Functions

#### 3.1.Center offset


This function is used to adjust the operation track of agricultural machinery to be repeated or omitted.

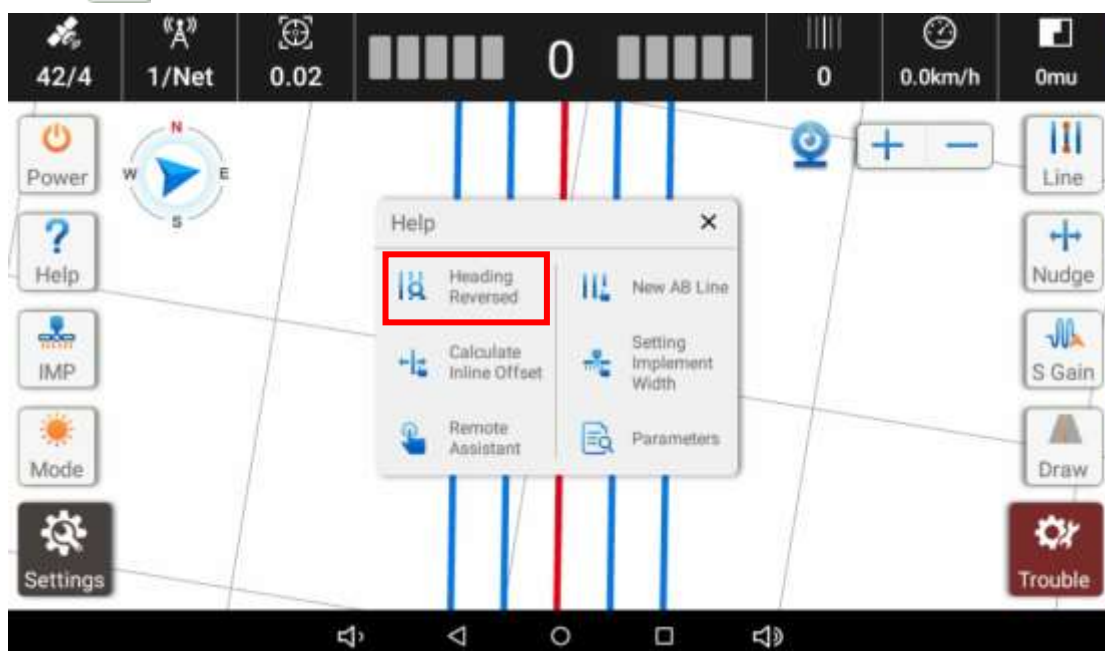


If you set the line spacing to 90cm, after driving a round trip (**turning left**), the spacing in the middle is 86.5cm, then you only need to enter 3.5cm to the right. lateral deviation will be changed automatically. At this time, just start the operation by auto-driving



### 3.2. Help function

Click [  ] to enter the [Help].



#### A. Heading Reversed

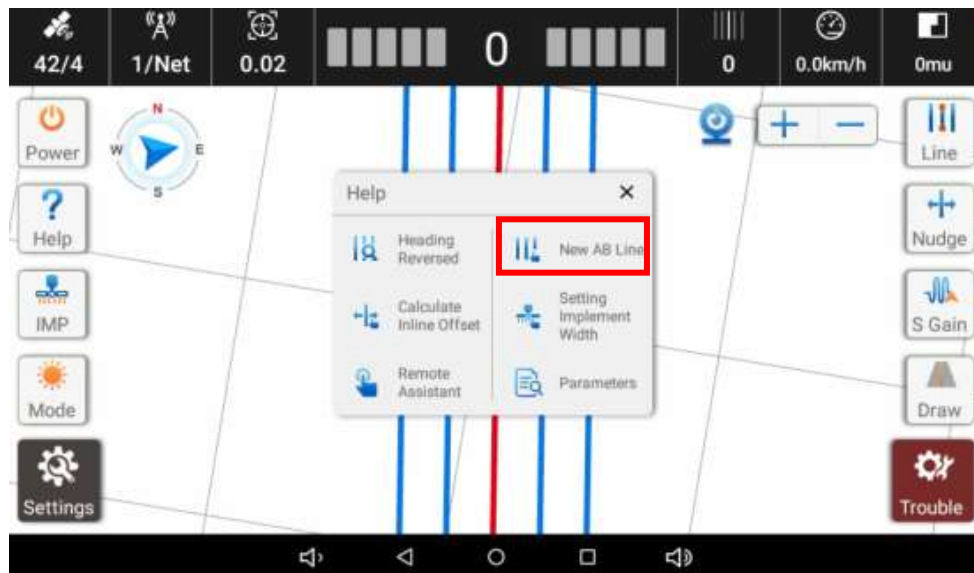
When the guideline swings when the outgoing vehicle stops, you can try to use this function to restore the course.



## B. Alignment guidance

Guidance for each step of the alignment operation, and other functions can't be used. To exit, click [Exit].

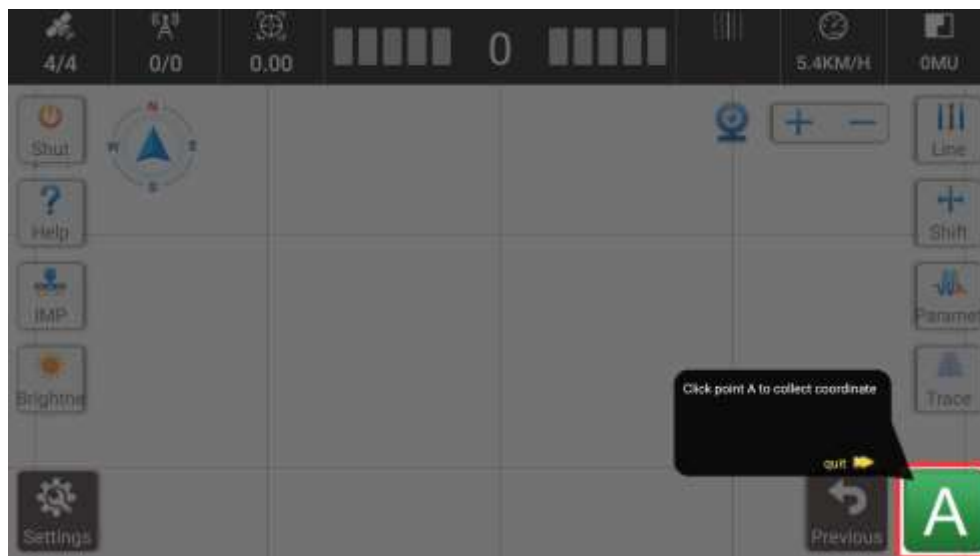
Step 1: Click [Make Line] in [Help] to turn on the AB line alignment guide.



Step 2: After clicking [Make Line], the [Line] button will be highlighted on the right, and other functions are blocked.



Step 3: Click [line], [A] appears in the lower right corner. [A] is the start point, the vehicle should be parked at the starting point of alignment.



Step 4: Manually drive to the other side of the alignment. Set the point B after the tractor stops. During this process, please keep the agricultural tools lifted up. After point B is confirmed, click [Save].

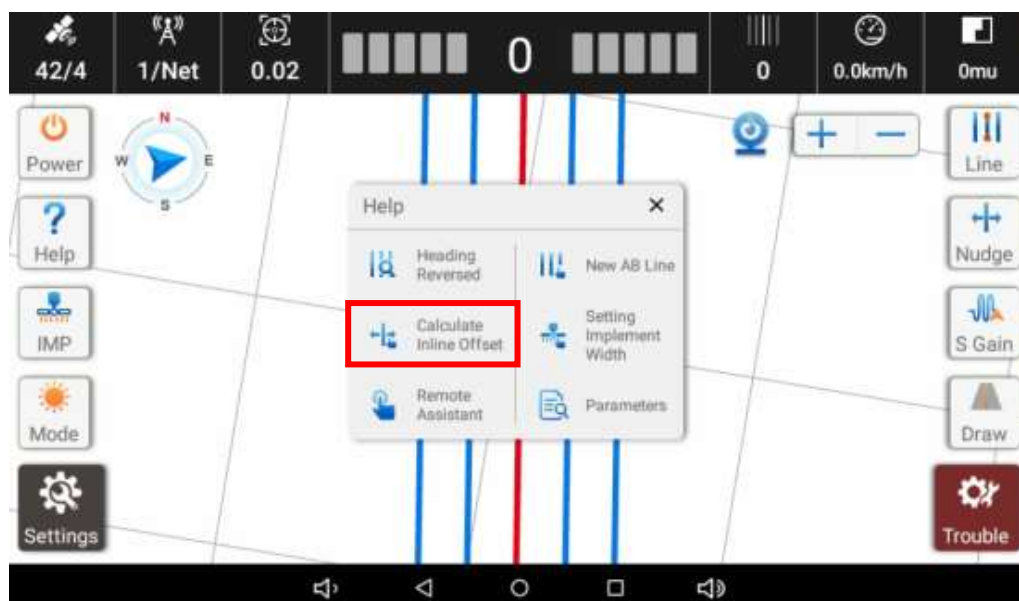




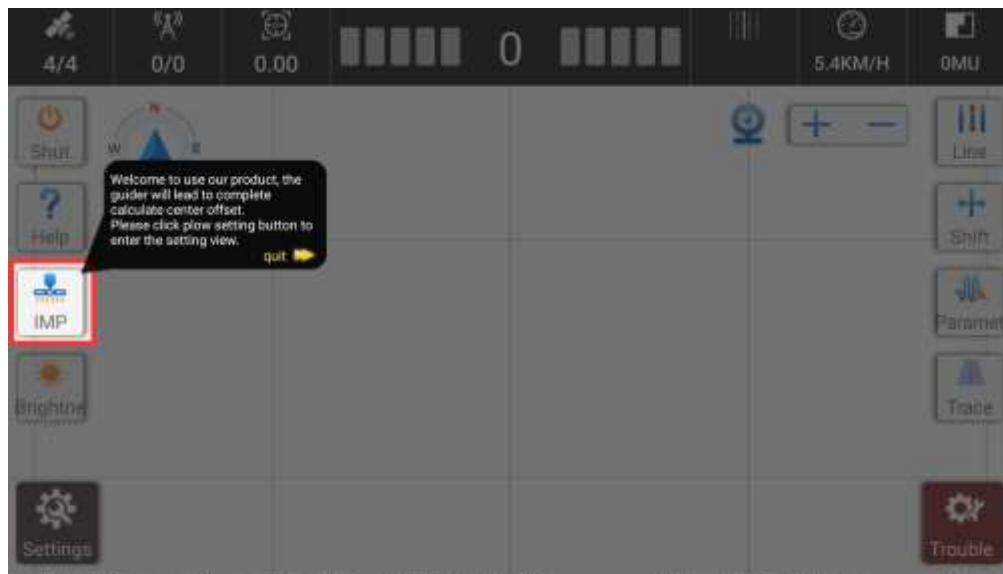
### C. Access calculation guidance

Due to problems such as vehicle calibration and parameter errors, the transfer lines may be inaccurate. Users can complete the self-adjustment of the transfer lines through the calculation guide of the transfer lines.

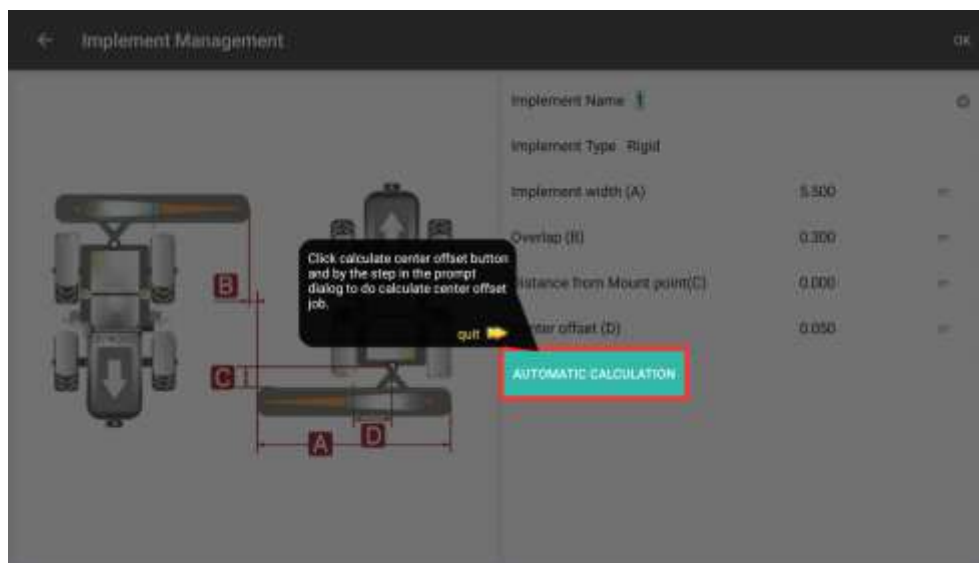
Step 1: Click [Set Center Offset] in the [Help] function



Step 2: Click [IMP].



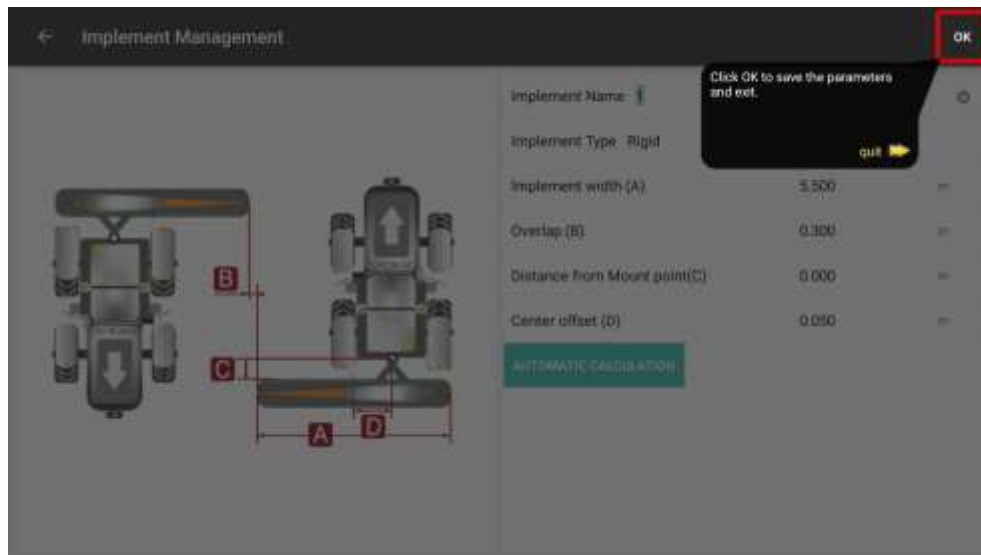
Step 3: Click the function of [AUTOMATIC CALCULATION].



Select the scene based on the real situation.



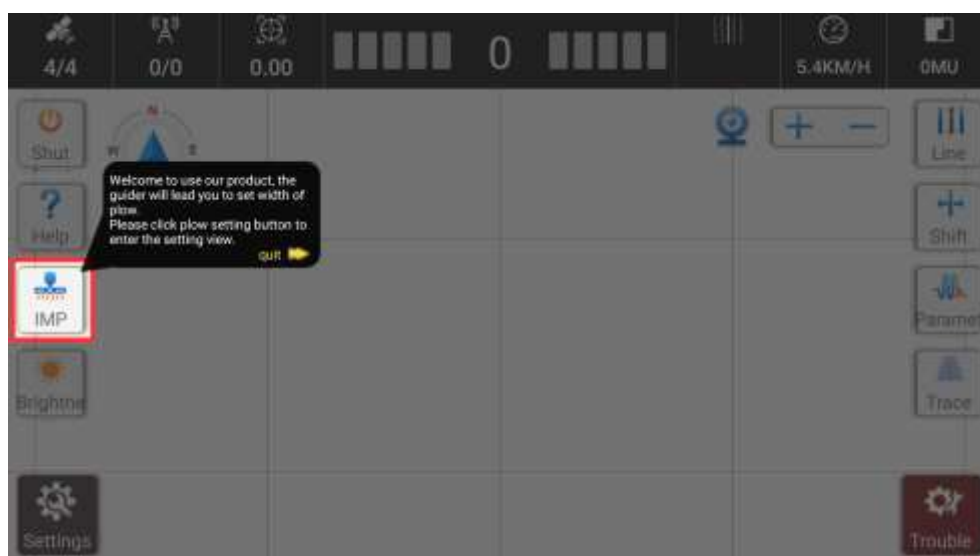
Step 4; Click [Finish] after inputting, the offset of the farm tool center has been set, and click [Save]. The next transfer line generated back and forth can verify that the modification is correct.



#### D. Width Guidance

This function is used to modify the width after changing the farm implement.

Step 1: Click [Set Plow With] in the [Help] function to enter the [Implement Management] interface.



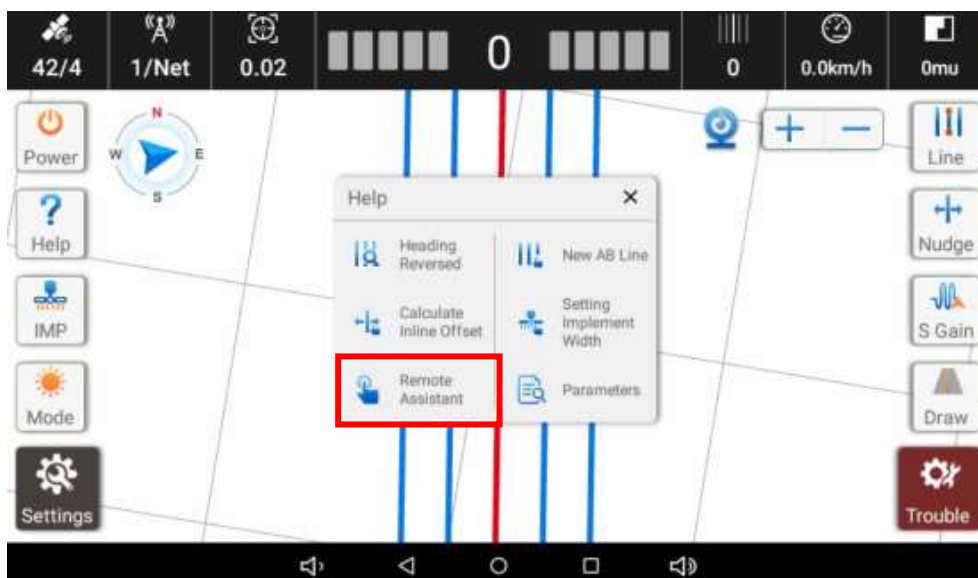
Step 2: Modify the width of agricultural implements and line spacing on [Implement width] and [Line Spacing] to.

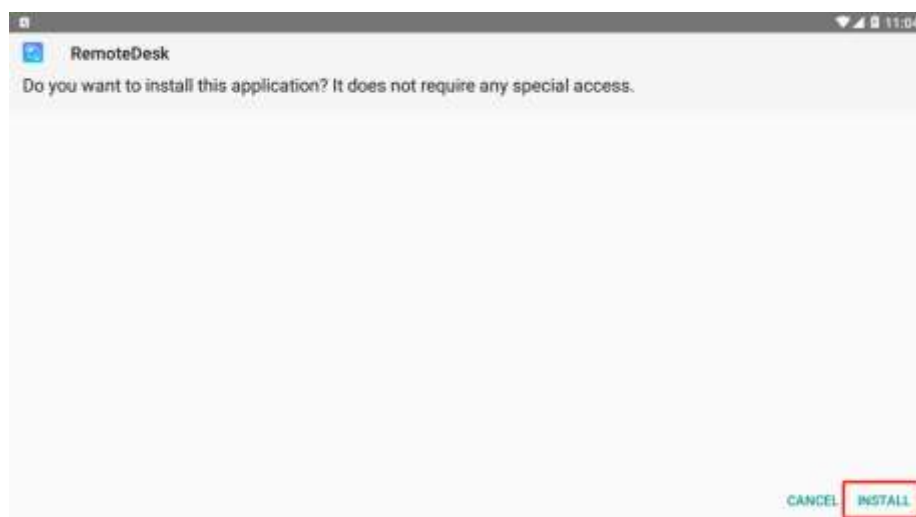
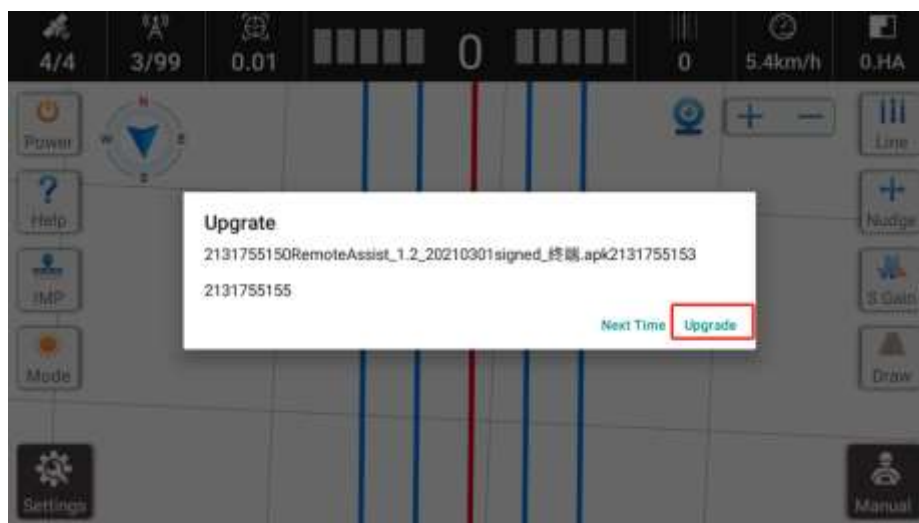


Step 3: Click [OK] after modification.

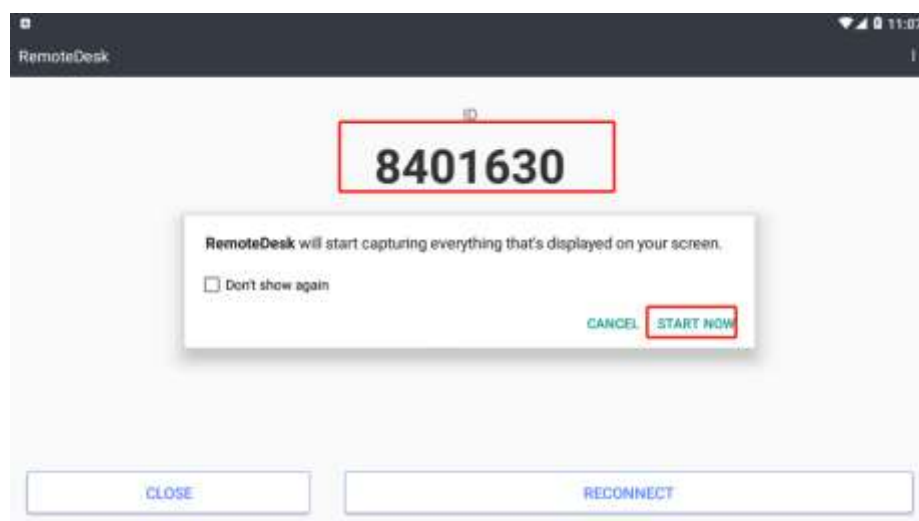
### E. Remote assistant

Click [Remote assistant] and start to download the app





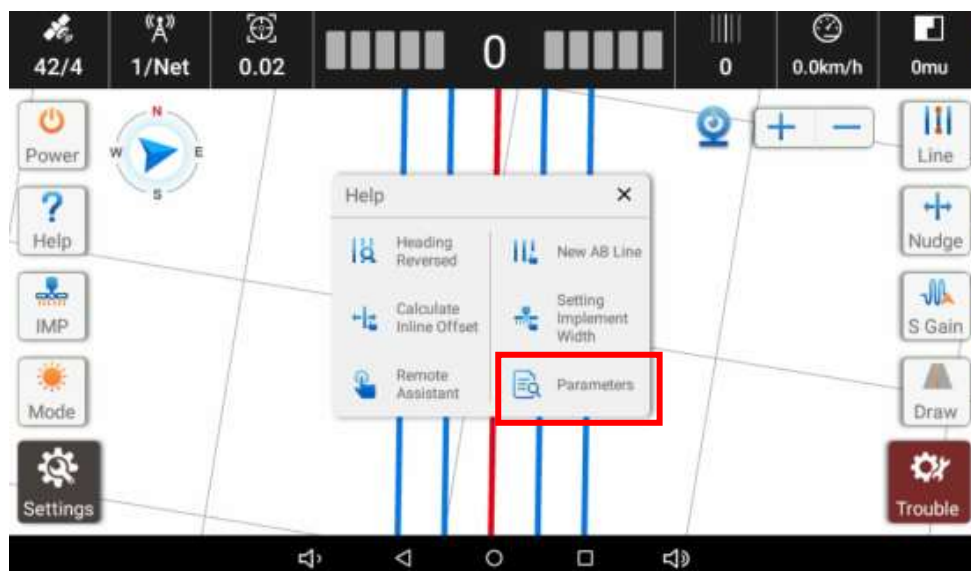
After click the [Start Now], You can provide the ID to our technical support.





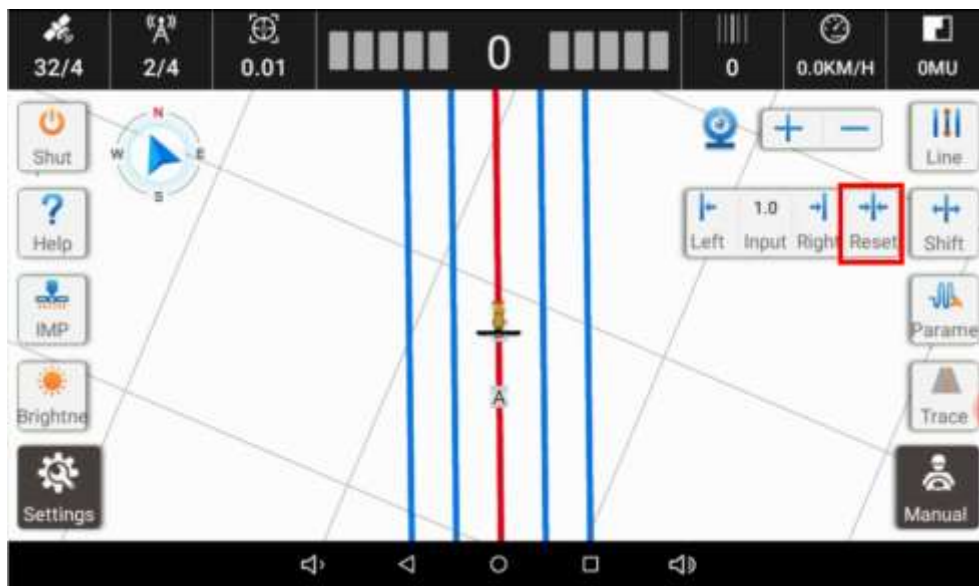
## F. Parameters

Take photo of this page and it can help our technical support analyze problem quickly.



### 3.3. Line to Zero

Click [Shift], then click [Reset] to reset the AB line to zero, that is, to shift the AB line to the current position of the tractor. Please make sure the tractor is facing parallelly with line AB while performing the line to zero.



### 3.4. Transfer line calculation

**Basic conditions:** make sure the alignment is with good straightness, and the setting of plough width is the combination of plough width and the transfer line width. Refer to chapter 3.4 Implement settings.

**Measurement method:** please try to avoid taking sample from the starting point of transfer line (generally, 20 meters after the headland). During test, drive the tractor forward with plough, after driving 100 meters, make a U-turn and drive 100 meters forward, and then make another U-turn and drive 100 meters forward. During driving, automatic pilot is used, and the measurement point is selected in the middle. Take 5 or more points and take the average to avoid accidental errors.

**Operation method:** Measure two transfer lines. According to the real situation, transfer line 1 is generated first, and transfer line 2 is generated later. Select the head to Left or Head to Right according to the software instruction and enter the relevant values. Click OK and then the software will calculate the transfer line.

**Operation method:** please refer to chapter 4.1 c. Transfer Line Calculation Guide for details

### 3.5. Camera function


Click [  ] to open the camera. The background of the main interface is the camera screen.

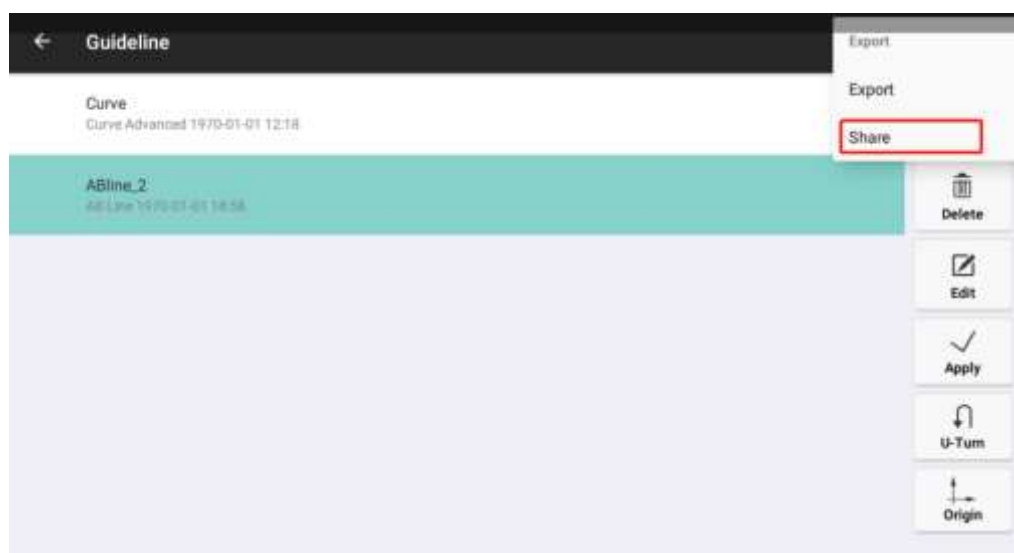


(The renderings are just for reference)

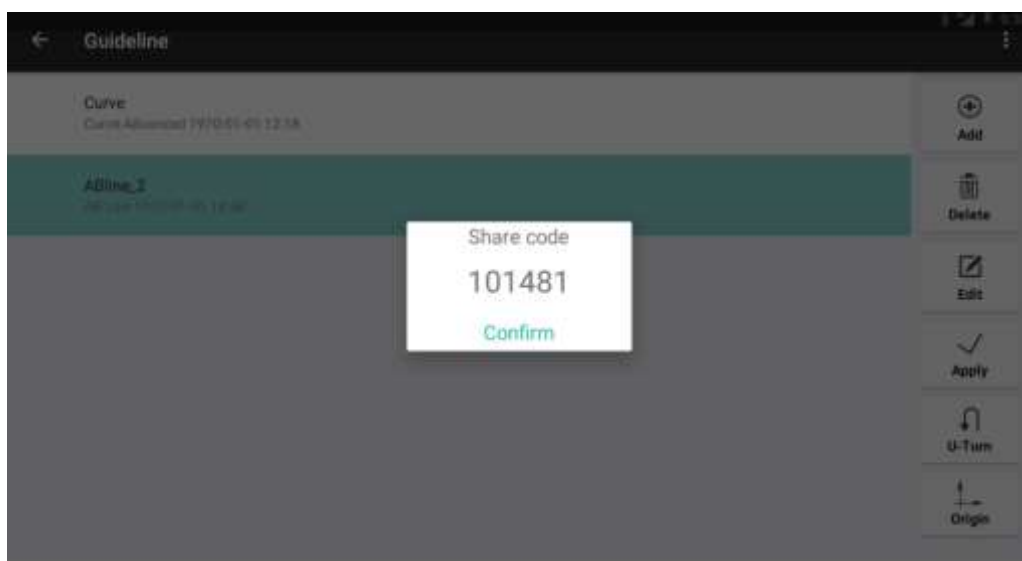
### 3.6. Guideline share

If both of the tablet is online, they can share the guideline remotely.

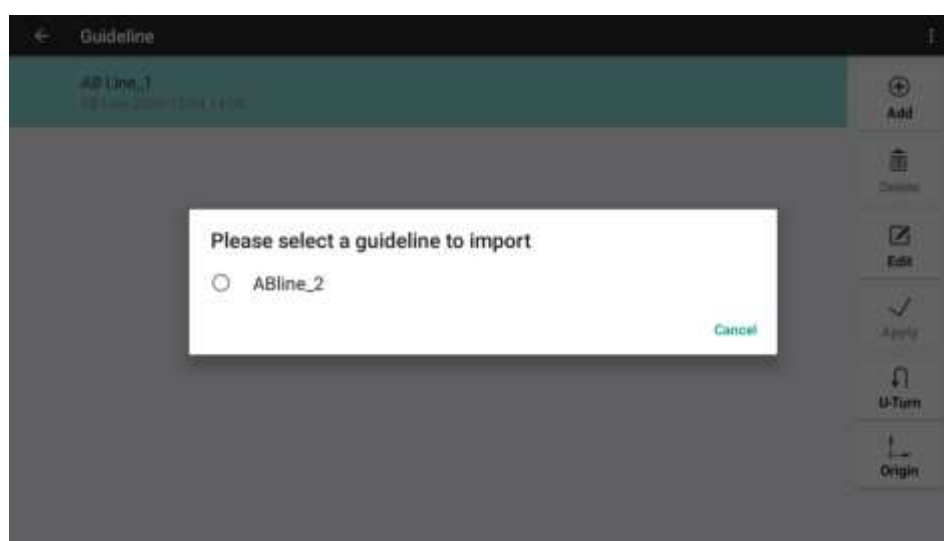
First, choose the guideline you want to share, then click [  ]-[Export]-[Share]



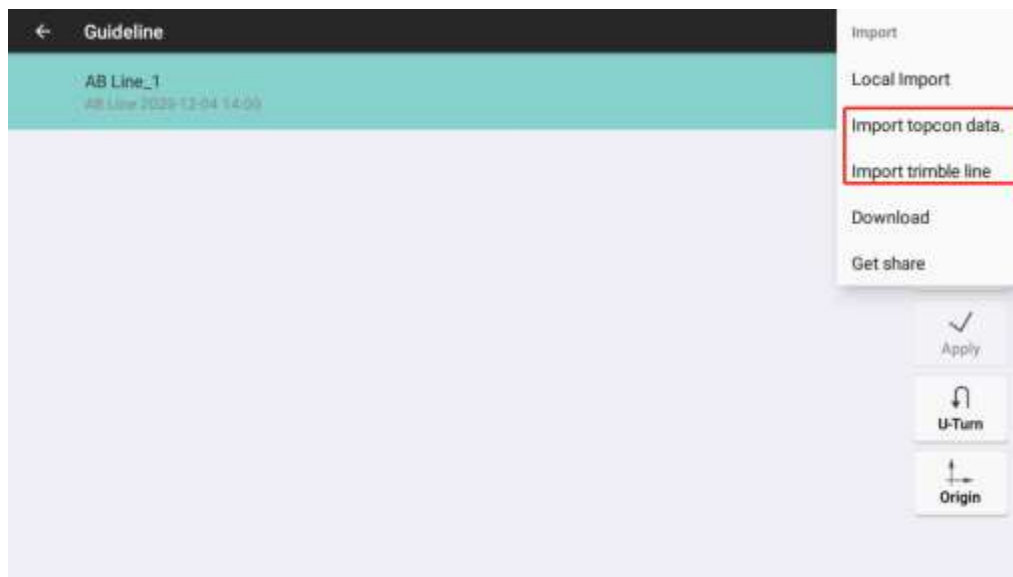
You will get the “Share code”.



Then on the other tablet, click [Import]-[Get share],enter the code. Then you will get the guideline you want to transfer.



If you want to share Trimble or Topcon's guideline to your tablet. You can copy the guideline with USB fresh disk, then click[Import]-[Import Topcon data.]/[Import trimble line]to get the guideline you want.



## 4. Equipment Maintenance

- In order to ensure the normal operation and service life of the equipment, please maintain the equipment under the instruction of the manual.
- Please do not disassemble the main components of the system. If necessary, please contact the CHCNAV after-sales service support@chcnave.com.
- Please use device under the instruction of user guide.
- Regularly check each screw, wiring harness and connector of the system, such as controller fixing screws, angle sensor fixing screws, data cable connectors, etc.

### Steering wheel:

- Keep the motor clean.
- Maintain the environment in which the motor is used.
- Please do not wrap materials such as cotton cloth and dustproof film on the motor.
- Before starting the work, check whether the transmission device is flexible; whether the concentricity of the coupling is standard; the flexibility of the gear transmission.



## **CHC Navigation**

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