

XE300 Guidance System for Excavator User Guide

ComNavTech



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01

Hardware Installation

Main hardware components

Tablet and components:



P300 PLUS GNSS Tablet×1



Power Cable×1



Tablet Bracket



Radio Antenna×1



4G Antenna×1



Cigarette lighter male connector
wiring x 1

Main hardware components

GNSS antenna and components :



GNSS Antenna×2



GNSS Antenna Cable×2



Antenna holder×2

Sensor and components :



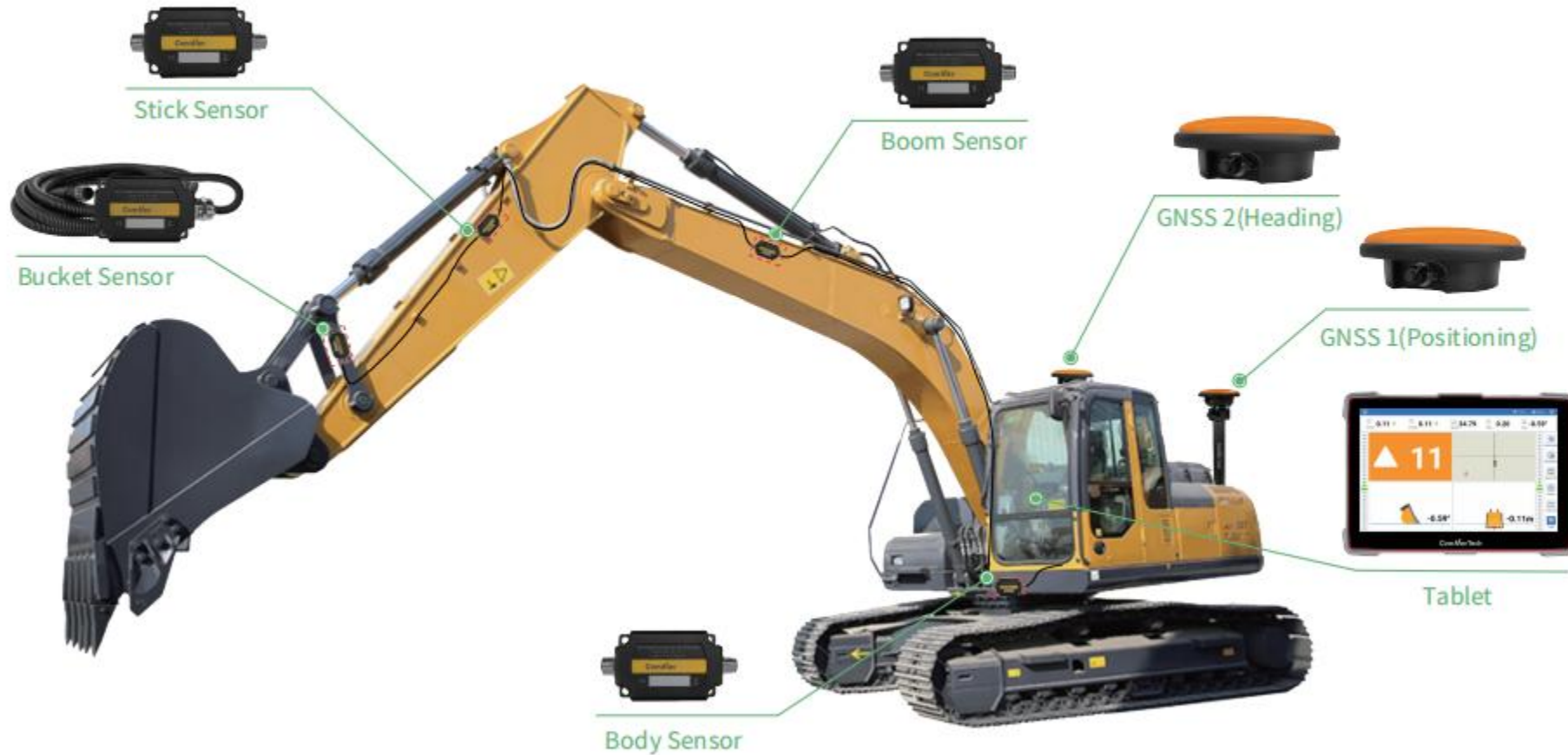
Sensor ×4



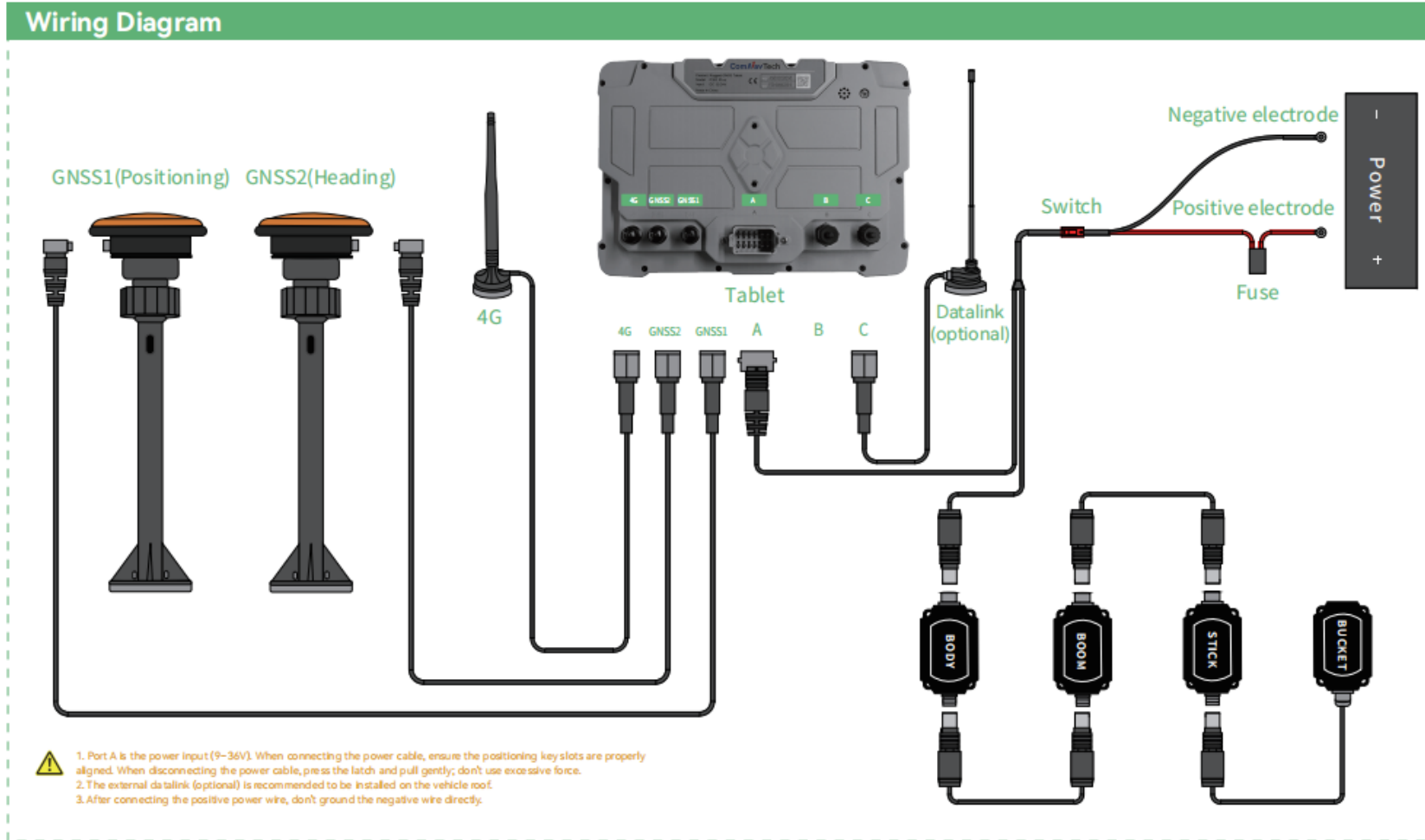
Sensor Cables

Hardware Installation Diagram

Installation Diagram



Hardware Wiring Diagram



- Notes:**
1. Port A is the power port (9-36V). When connecting the power cable, align with the anti-misinsert groove. When unplugging, hold the latch. Port B is reserved, and Port C is for the radio;
 2. Other ports are TNC screw interfaces. To ensure reliable connections, rotate until they can no longer turn. Tools may be used if necessary;
 3. The 4G antenna and radio antenna (optional) are recommended to be installed on the vehicle roof.

1.1 GNSS antenna installation



1. Location selection

The antenna installation location should avoid being blocked or damaged by the high temperature of the engine outlet. The distance between the two antennas should be greater than 1 m. The installation platform should be stable and not shake.

2. Install antenna holder

Fix the GNSS antenna holder to the rear of the driver's cab by super glue or welding.

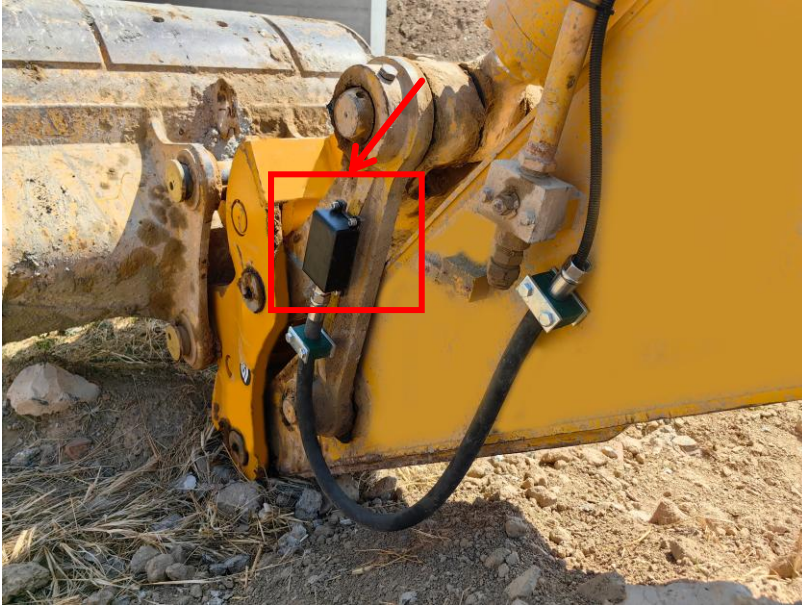
3. Install GNSS antennas

Install 2 GNSS antenna on the holder and fix them.

4. Cable Connection

Connect one end of the cable to the GNSS antenna firmly, and the other end to the antenna interface of the tablet (note the markings of the left and right antennas and interface protection). Lead the cable into the cab, and make the cable routing as concealed as possible, avoiding high temperature, extrusion, and sharp objects.

1.2 Bucket sensor installation



1. Location selection

Reserve sensor and oil pipe clamp positions according to the diagram. The sensor should be installed laterally and vertically, on the left or right side of the bucket in the driving direction, and the installation position should be stable;

2. Bottom plate installation

Secure the sensor base plate to the installation position using strong adhesive or welding. If installed by strong adhesive, the installation position should be cleaned before installation to ensure the firmness of the adhesive;

3. Sensor installation

Fix the bucket sensor to the bottom plate with the provided bolts, with the sensor cable facing downwards, and secure the protective cover with bolts;

4. Cable connection

Connect the cable to the sensor, arrange and secure the cable, and reserve a certain length of cable at the moving point of the connecting rod to avoid damaging the cable during mechanical operation.

1.2.1 Bucket sensor installation

Underwater operation

1. Location selection

Reserve sensor and oil pipe clamp positions according to the diagram. The sensor should be installed laterally, on the left or right side of the bucket in the driving direction, and the installation position should be stable;



2. Sensor installation

1) Place the bucket sensor inside the protective cover, inject waterproof glue into the cover, and wait for the glue to solidify;

2) Additional protection is required outside the protective cover to prevent the impact of large underwater debris;

3) The installation direction of the sensor is downward with the sensor cable and the protective cover is fixed with bolts;



3. Cable connection

Arrange and secure the cables connecting the sensors, and reserve a certain length of cable at the moving point of the connecting rod. Add a protective tube to the sensor cable up to the forearm to increase waterproof sealing and protect the cable.



1.3 Stick sensor installation



1. Location selection

Reserve sensor and oil pipe clamp positions according to the diagram. The sensor should be installed laterally and vertically, on the left or right side of the bucket in the driving direction, and the installation position should be stable;

2. Bottom plate installation

Secure the sensor base plate to the installation position using strong adhesive or welding. If installed by strong adhesive, the installation position should be cleaned before installation to ensure the firmness of the adhesive;

3. Sensor installation

Fix the stick sensor to the base plate with the provided bolts, and according to the position shown in the diagram, fix the stick sensor with the male head facing the upper boom by adhesive or welding;

4. Cable connection

Connect the cable to the sensor, arrange and secure the cable, and reserve a certain length of cable at the moving point of the connecting rod to avoid damaging the cable during mechanical operation.

1.4 Boom sensor installation



1. Location selection

Reserve sensor and oil pipe clamp positions according to the diagram. The sensor should be installed laterally and vertically, on the left or right side of the bucket in the driving direction, and the installation position should be stable;

2. Bottom plate installation

Secure the sensor base plate to the installation position using strong adhesive or welding. If installed by strong adhesive, the installation position should be cleaned before installation to ensure the firmness of the adhesive;

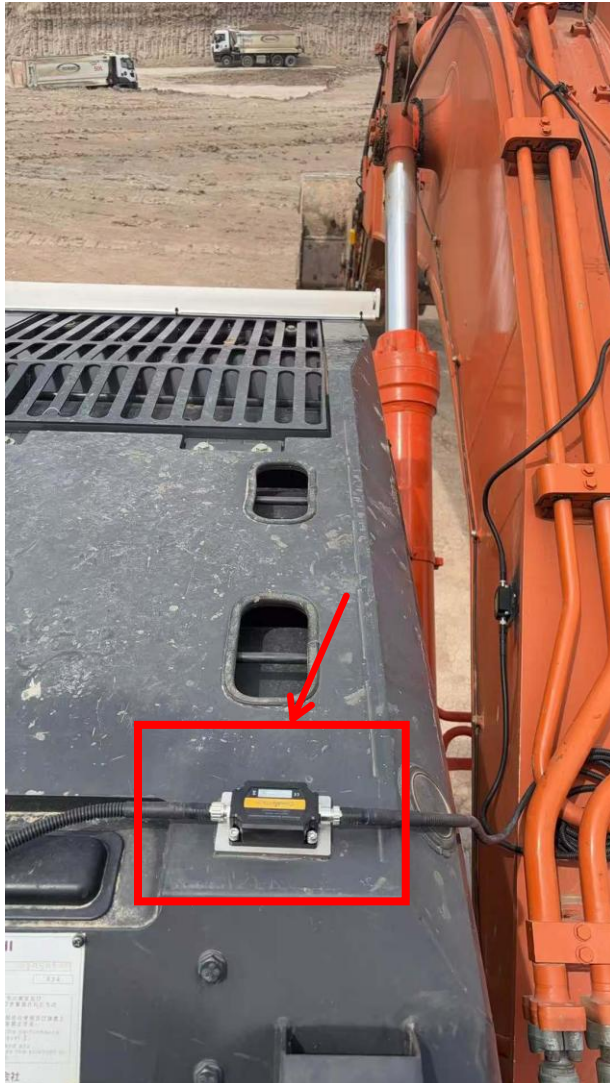
3. Sensor installation

Fix the boom sensor to the base plate with the provided bolts, and according to the position shown in the diagram, fix the boom sensor with the male head facing the upper cab by adhesive or welding;

4. Cable connection

Connect the cable to the sensor, arrange and secure the cable, and reserve a certain length of cable at the moving point of the connecting rod to avoid damaging the cable during mechanical operation.

1.5 Body sensor installation



1. Location selection

According to the position shown in the diagram, place the vehicle sensor on the top of the cab to ensure a stable installation position and avoid high temperatures;

2. Bottom plate installation

Secure the sensor base plate to the installation position using strong adhesive or welding. If installed by strong adhesive, the installation position should be cleaned before installation to ensure the firmness of the adhesive;

3. Sensor installation

Fix the vehicle body sensor to the bottom plate with the provided bolts, with the excavator's forward direction as the reference, and the male head of the vehicle body sensor facing the left side of the cab for adhesive or welding fixation;

4. Cable connection

Connect the cable to the sensor, arrange and secure the cable, and reserve a certain length of cable at the moving point of the connecting rod to avoid damaging the cable during mechanical operation.

1.6 External antenna installation



1. Location selection

Place the antenna on the top of the driver's cabin, ensuring it is outdoors for more stable reception of radio and 4G signals;

2. Install

Secure the external antenna to the top of the cab using 3M adhesive or magnetic attraction. If installed using 3M adhesive, the installation position should be cleaned before installation to ensure the firmness of the adhesive;

3. Cable connection

Connect the external antenna to the corresponding tablet interface. The radio cable interface is connected to the C port of the tablet, and the 4G cable interface is connected to the 4G port of the tablet.

1.7 Power cable connection



1. Method selection

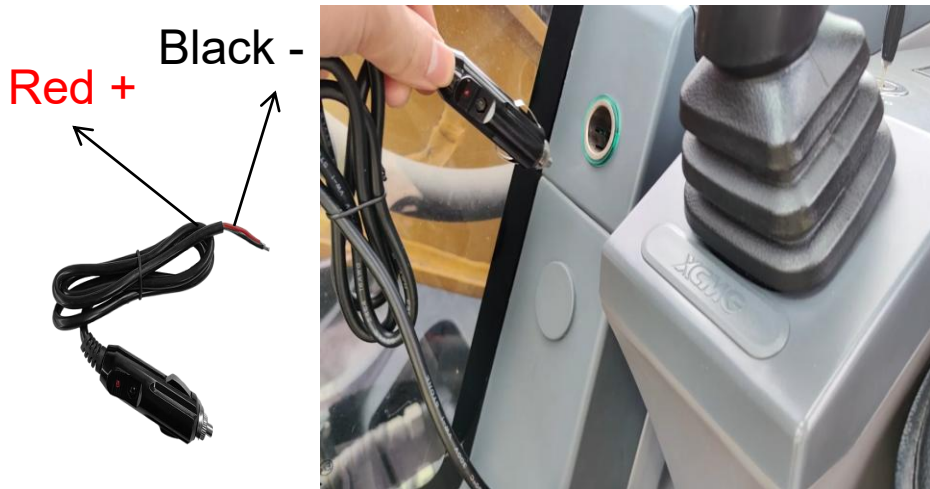
The system supports 9V~36V DC power supply, and users can access the power supply through the car battery or cigarette lighter interface.

2. Car battery

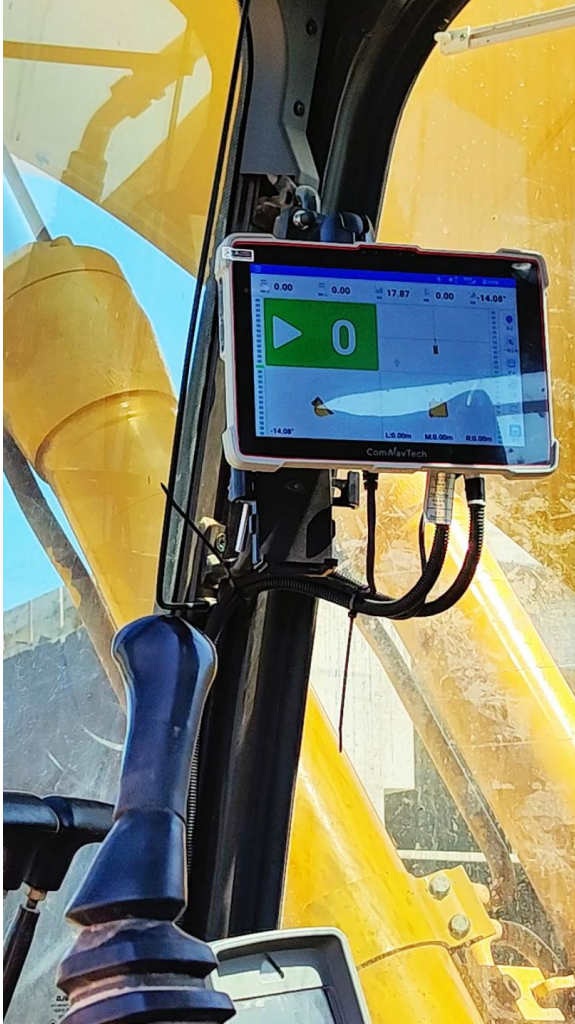
Connect the red and black terminals of the power cable to the car battery. The red terminal is connected to the positive pole and the black terminal is connected to the negative pole. After the connection is completed, turn on the power switch and the button indicator light will light up.

3. Cigarette lighter interface

Connect the red and black terminals of the power cable to the cigarette lighter cable, and insert the cigarette lighter into the cigarette lighter interface. Turn on the switch button, and the button indicator light will light up.



1.8 Tablet installation



1. Location selection

Choose a location that is easy to fix and convenient for the operator to see the screen while working.

2. Install tablet Bracket

Fix the tablet bracket in the pre-selected position with screws and adjust the tablet to a suitable viewing angle.

3. Cable connection

Connect the power cable, GNSS antenna cable, and 4G antenna cable to the corresponding ports on the tablet.

1.9 Tablet computer wiring harness connection



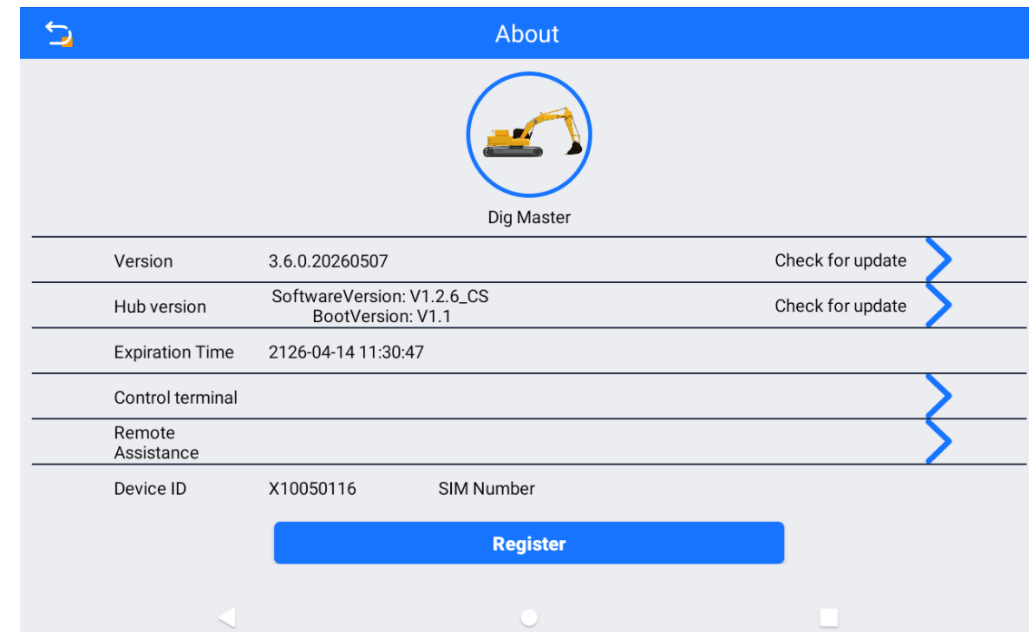
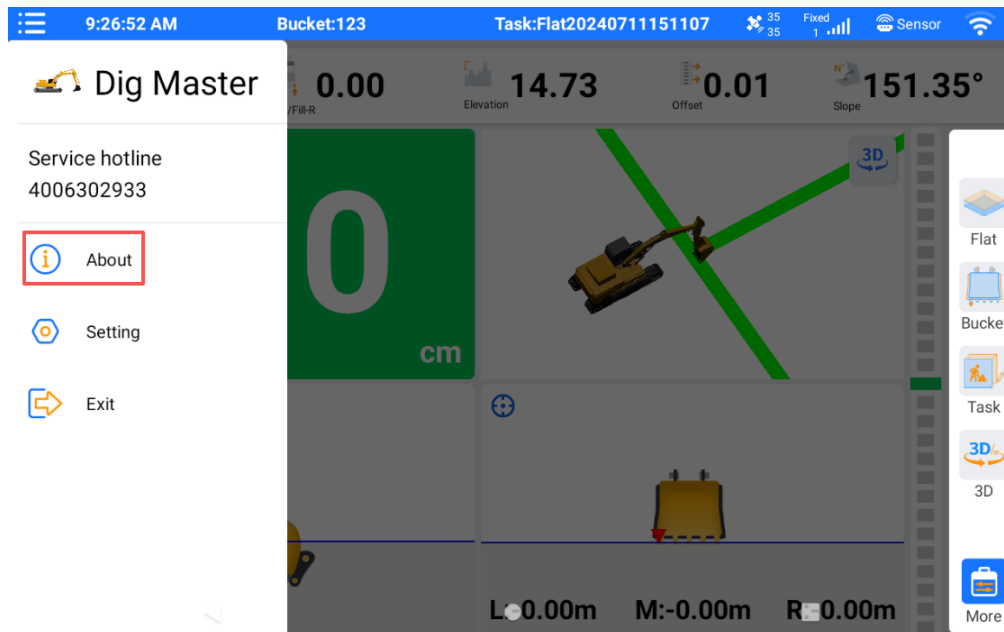
- Connect 4G port to 4G antenna.
- The GNSS1 interface is a positioning antenna interface.
- The GNSS2 interface is a directional antenna interface.
- A is the power interface.
- B is a reserved interface.
- C is the radio interface.

02

System Registration

2.1 System Registration

- Click on the icon  in the upper left corner of the main interface, select "About", view "Device ID", confirm the tablet's network connection, and then update the device ID. Notify the system supplier to register, the registration method is as follows:
- Remote registration: Connect the tablet to the internet and open the software, raise the device ID to the system supplier, and they will complete the remote registration and activation of the system.
- File registration: The system supplier provides registration files to customers, who can click the "Register" button to import the files and complete the registration.

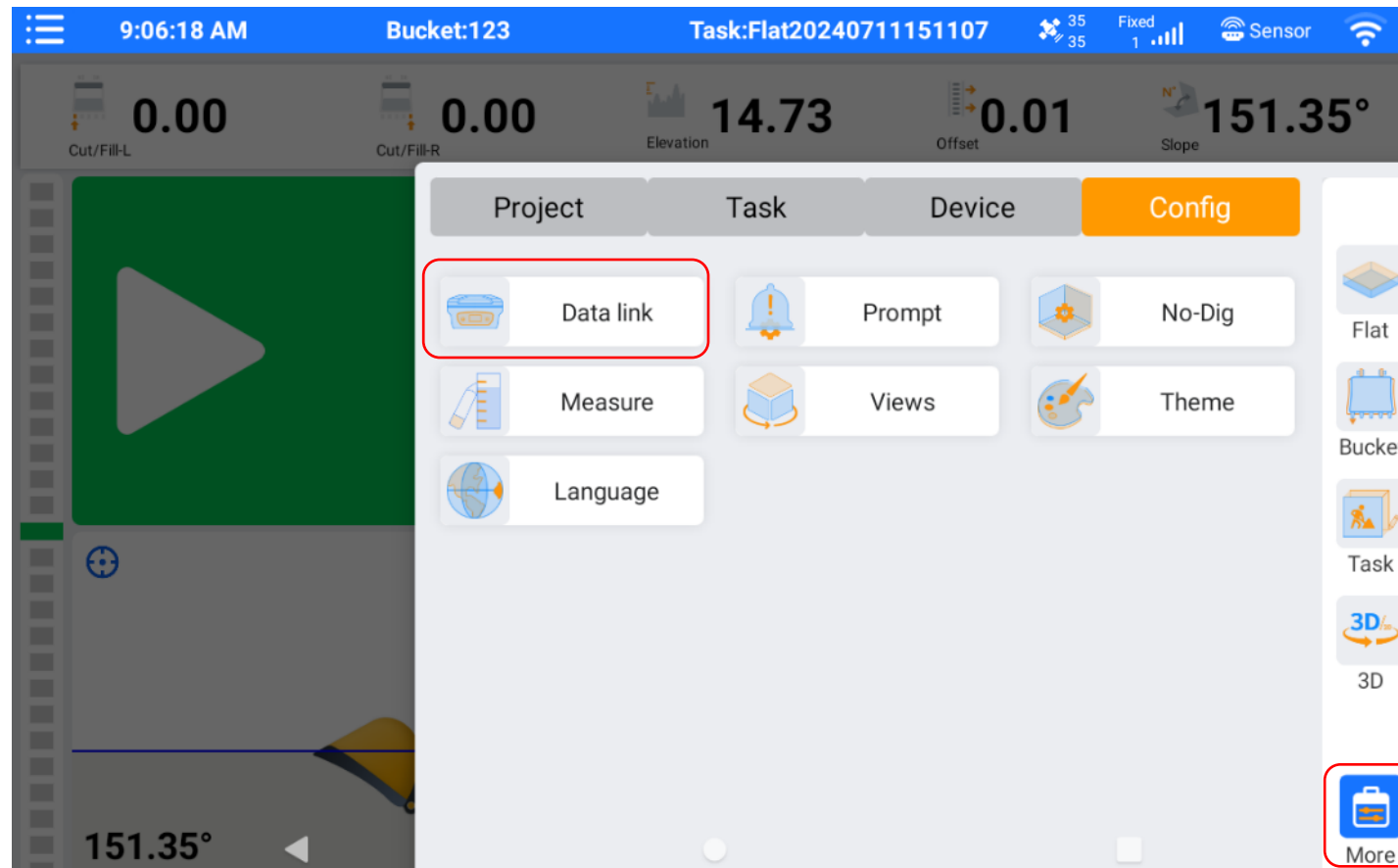


03

Datalink

3.1 Differential Method Selection

- Click on the icon  in the bottom right corner of the main interface and select "Config", then click on "Data link".



3.1 Differential Method Selection

Mobile stations have three differential methods, which are:

- SinoNet: The cors service independently developed by ComnavTech.
- CORS: It is necessary to purchase cors services provided by third-party operators and log in with information such as IP, port, source list, username, etc.
- Radio: Used when the differential data is transmitted through the radio.

Data link

Operate

IP

Port

Source List

User Name

Status

Fix Status

Heading Status

Delay

CLOSE

3.1.1 SinoNet and CORS

- Select "SinoNet" , IP, Port, Source, and User Name will be automatically obtained. Click "OPEN "to complete the setup.
- Select "CORS" , enter the IP of the corresponding CORS account, and choose the port. Click on the download icon (shown in the red box in the figure) to obtain the source list, enter your username and password, and click "OPEN "to complete the setup;
- After a successful SinoNet or CORS service connection, both the fix and heading status are displayed as 'Fixed', indicating normal operation.

The screenshot shows the 'Data link' configuration window for SinoNet. The 'Data link' dropdown is set to 'SinoNet'. Under the 'Operate' section, the IP is 'cors.sinognss.com', Port is '8003', Source List is 'RTCM32_GCREJ', and User Name is 'X10100747'. The 'Status' section shows 'Fix Status' and 'Heading Status' as empty boxes, and 'Delay' as an empty box. A red box highlights the 'OPEN' button at the bottom.

The screenshot shows the 'DataLink' configuration window for CORS. The 'Data link' dropdown is set to 'CORS'. Under the 'Operate' section, the IP is 'cors.sinognss.com', Port is '8003', Source List is 'RTCM32_GRCEJ' with a download icon, User name is 'X10100747', and Password is '*****'. The 'Status' section shows 'Fix Status' as 'Single', 'Heading status' as 'Fixed', and 'Delay' as '99'. A red box highlights the 'OPEN' button at the bottom.

The screenshot shows the 'DataLink' configuration window for CORS after a successful connection. The 'Data link' dropdown is set to 'CORS'. Under the 'Operate' section, the IP is 'cors.sinognss.com', Port is '8003', Source List is 'RTCM32_GRCEJ' with a download icon, User name is 'X10100747', and Password is '*****'. The 'Status' section shows 'Fix Status' as 'Fixed', 'Heading status' as 'Fixed', and 'Delay' as '2'. A red box highlights the 'Fixed' status for both Fix Status and Heading status. A 'CLOSE' button is visible at the bottom.

3.1.2 Radio

- Complete the configuration of the base station radio and confirm its normal operation;
- Select "Radio", set the protocol, frequency, baud rate to be consistent with the base station, click the "OPEN" button, and the software will perform radio settings;
- After radio is successfully connected, the fix and heading states are displayed as "Fixed", indicating normal operation.

DataLink

Data link: Radio

Operate

Protocol: TRIMTALK

Air baudrate: 4800

Base: HX

Forward error correction: ☐

Channel: 6

Frequency(MHz): 460.0500

Status

Fix Status: Single Heading status: Fixed Delay: 99

OPEN

DataLink

Data link: Radio

Operate

Protocol: TRIMTALK

Air baudrate: 4800

Base: HX

Forward error correction: ☐

Channel: 6

Frequency(MHz): 460.0500

Status

Fix Status: Fixed Heading status: Fixed Delay: ?

OPEN

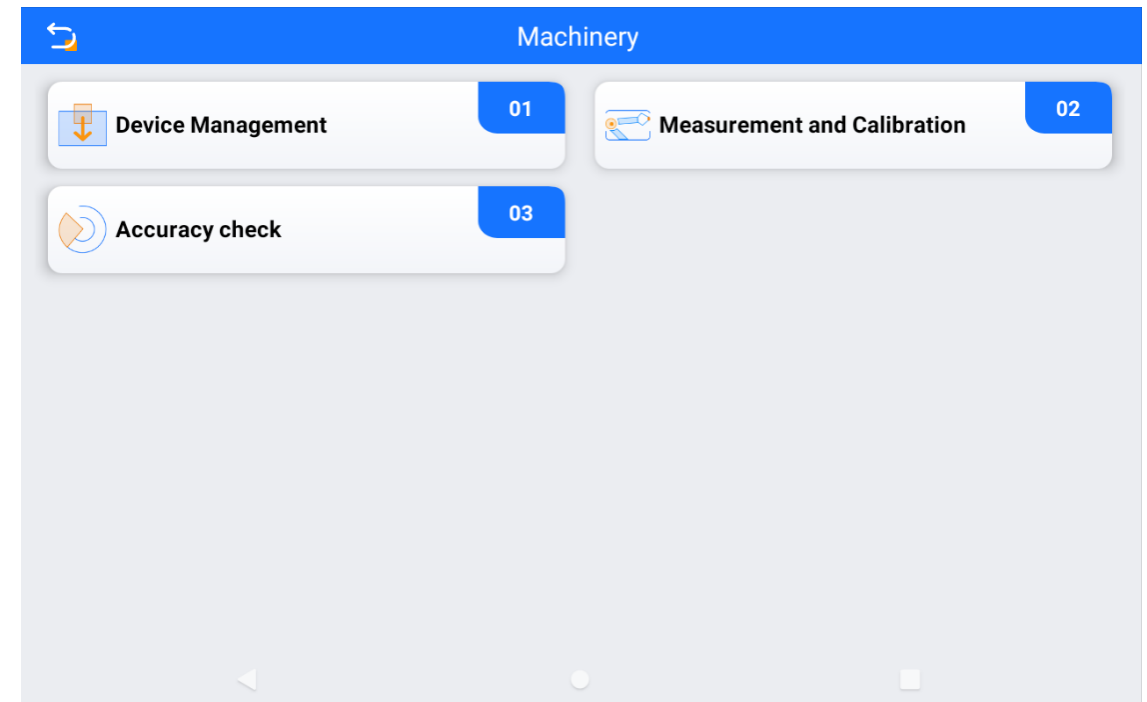
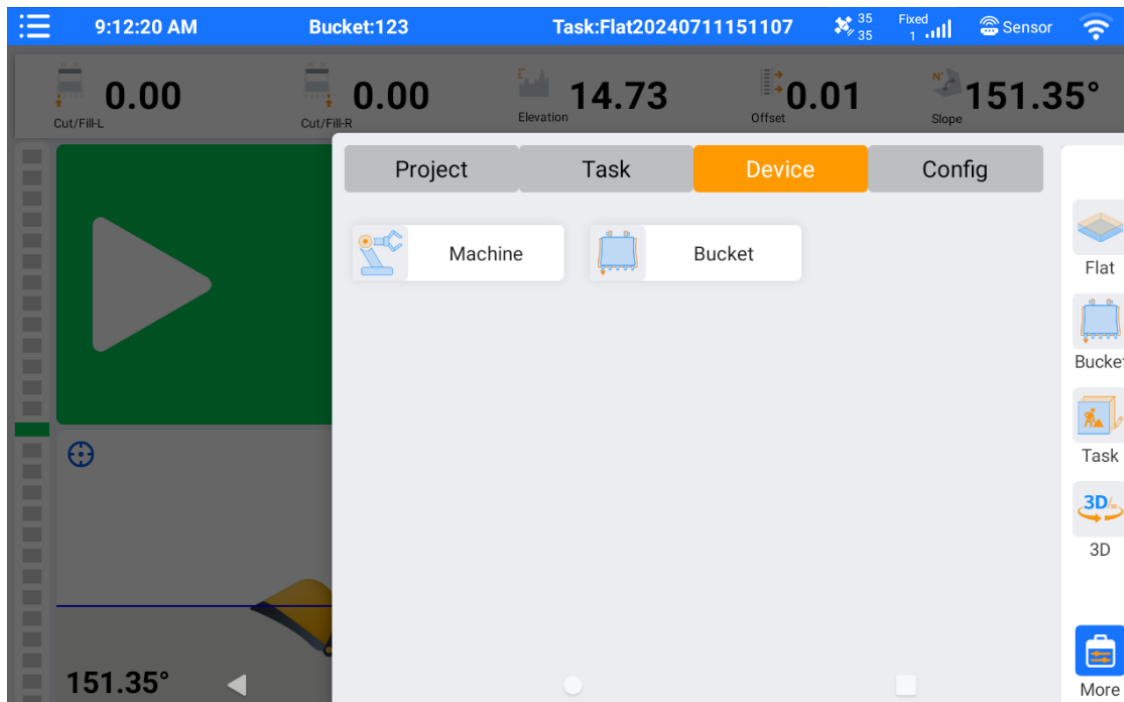
Note: The antenna type matches the hardware; Forward correction is turned off by default

04

System modeling

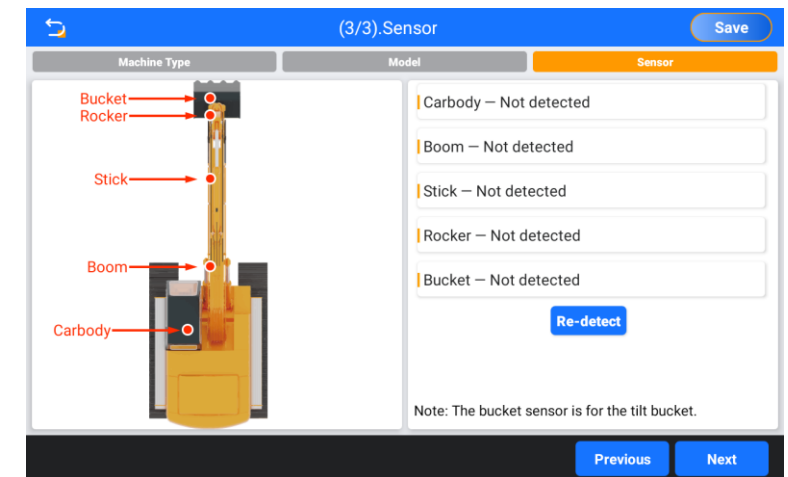
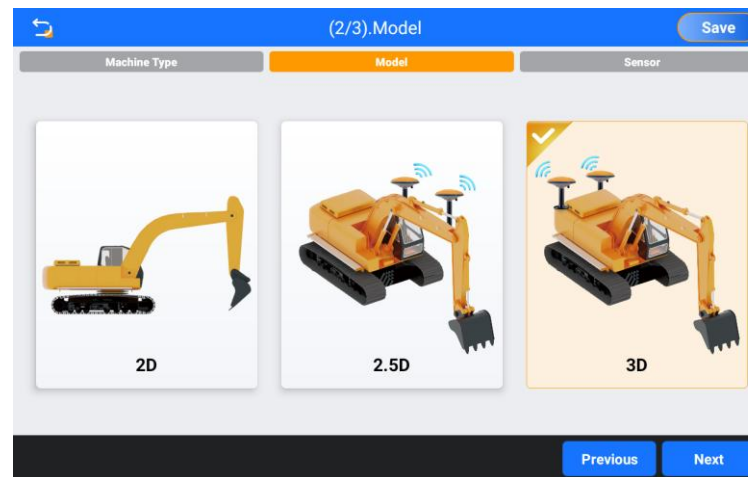
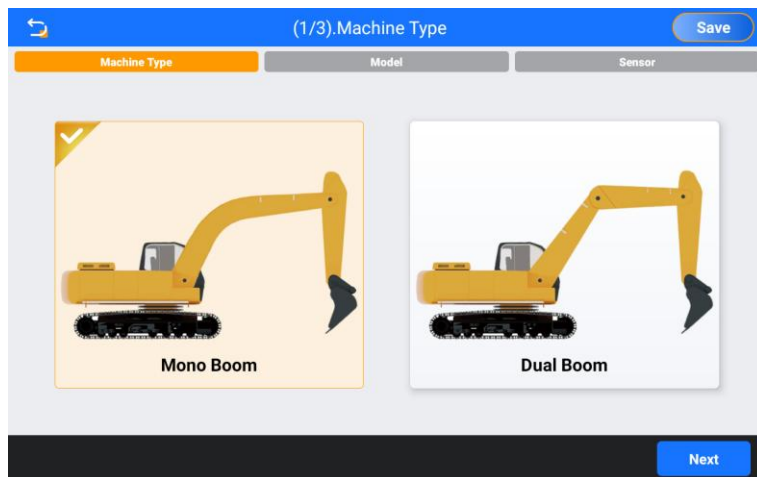
4.1 Machinery Management

- Click on the icon  in the bottom right corner of the main interface, select "Device", and enter the mechanical interface. The various entrances in the interface are:
- Device Management: Choose machine type and mode, Set the installation position of IMU sensors;
- Measurement and Calibration: Conduct mechanical dimension measurement and mechanical calibration;
- Accuracy check: Conduct elevation, plan, and modeling checks.



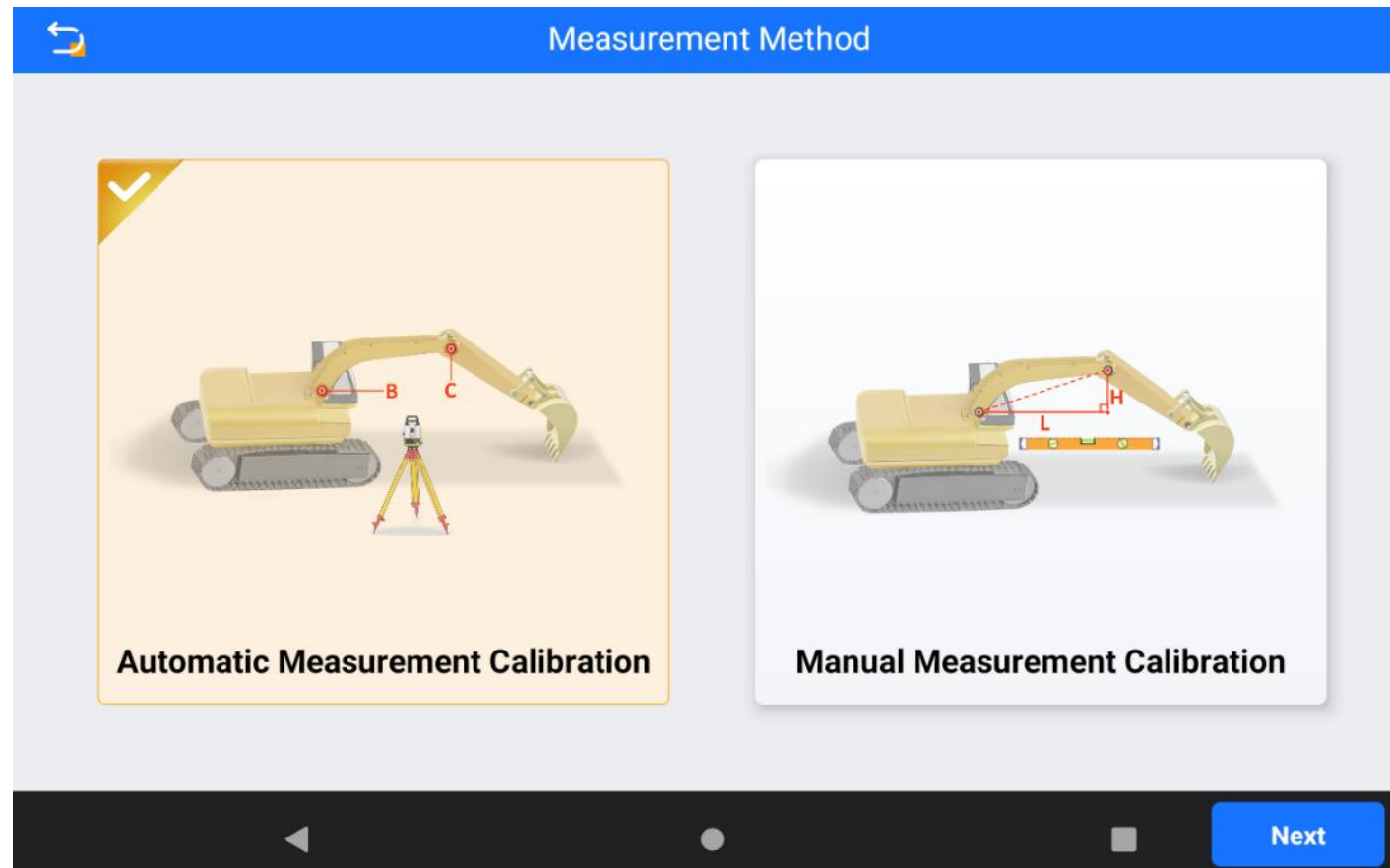
4.2 Decice Management

- Machine type: Including Mono Boom and Dual Boom types.
- Model: Including 2D, 2.5D and 3D.
- Sensor: After the vehicle body, boom, stick, and bucket sensors are connected, the software will recognize the corresponding sensor ID by default; Select the left and right sides according to the actual installation. (The left and right sides are based on the front direction of the cab).



4.3 Measurement and Calibration

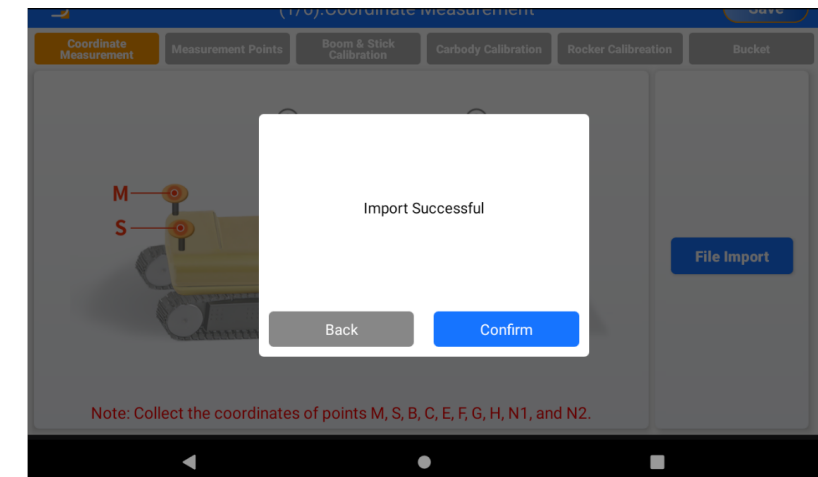
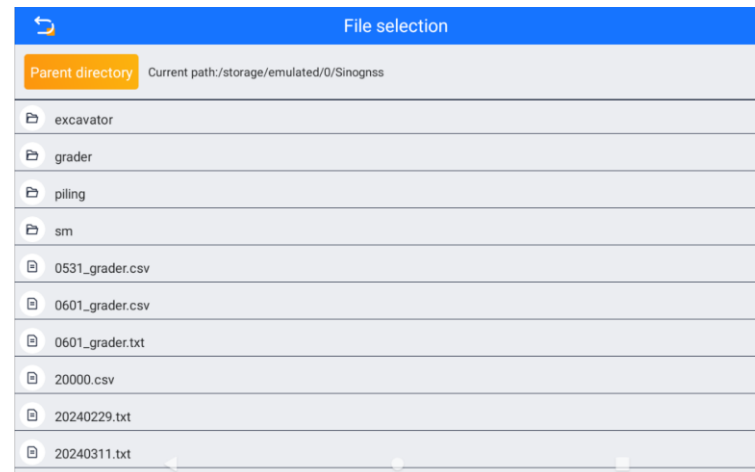
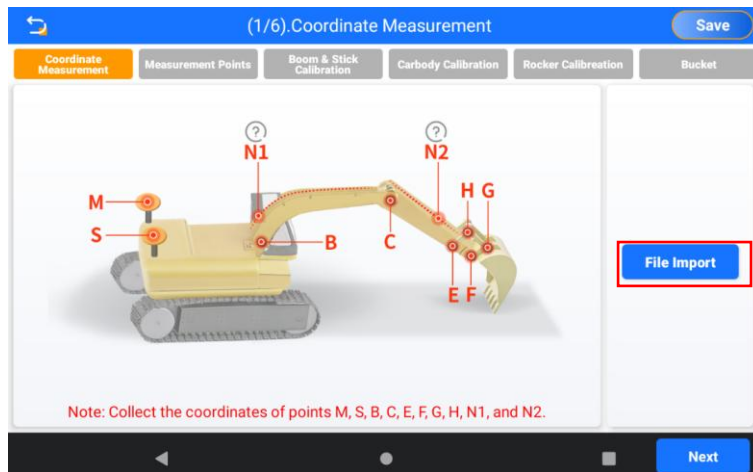
There are two methods for measurement and calibration: Automatic Measurement Calibration and Manual Measurement Calibration. Select "Automatic Measurement Calibration", then click "Next" to enter the Automatic Measurement Calibration interface.



4.3.1 Automatic Measurement Calibration

➤ Coordinate Measurement:

1. Please use a total station (the preferred option) or RTK to measure the coordinates of the points as shown in the figure in the same coordinate system. And import the coordinates of these points into the file(csv, txt). And import this file into the tablet
2. Click "File import", locate the file and import it.



4.3.1 Automatic Measurement Calibration

➤ Measurement Points:

The imported point coordinates will be displayed here. Clicking on "Edit" allows you to manually modify the coordinate values. Clicking on icon  allows you to check the final coordinates.

(2/6).Measurement Points Save

Coordinate Measurement **Measurement Points** Boom & Stick Calibration Carbody Calibration Rocker Calibration Bucket

Name	N	E	Z
M	0.000	0.000	0.000
S	0.000	0.000	0.000
B	0.000	0.000	0.000
C	0.000	0.000	0.000
E	0.000	0.000	0.000
F	0.000	0.000	0.000

Previous Next

(2/6).Measurement Points Save

Coordinate Measurement **Measurement Points** Boom & Stick Calibration Carbody Calibration Rocker Calibration Bucket

Name	N	E	Z
M	11110.000 m	22222 m	0.000 m
S	0.000	0.000	0.000
B	0.000	0.000	0.000
C	0.000	0.000	0.000
E	0.000	0.000	0.000
F	0.000	0.000	0.000

Previous Next

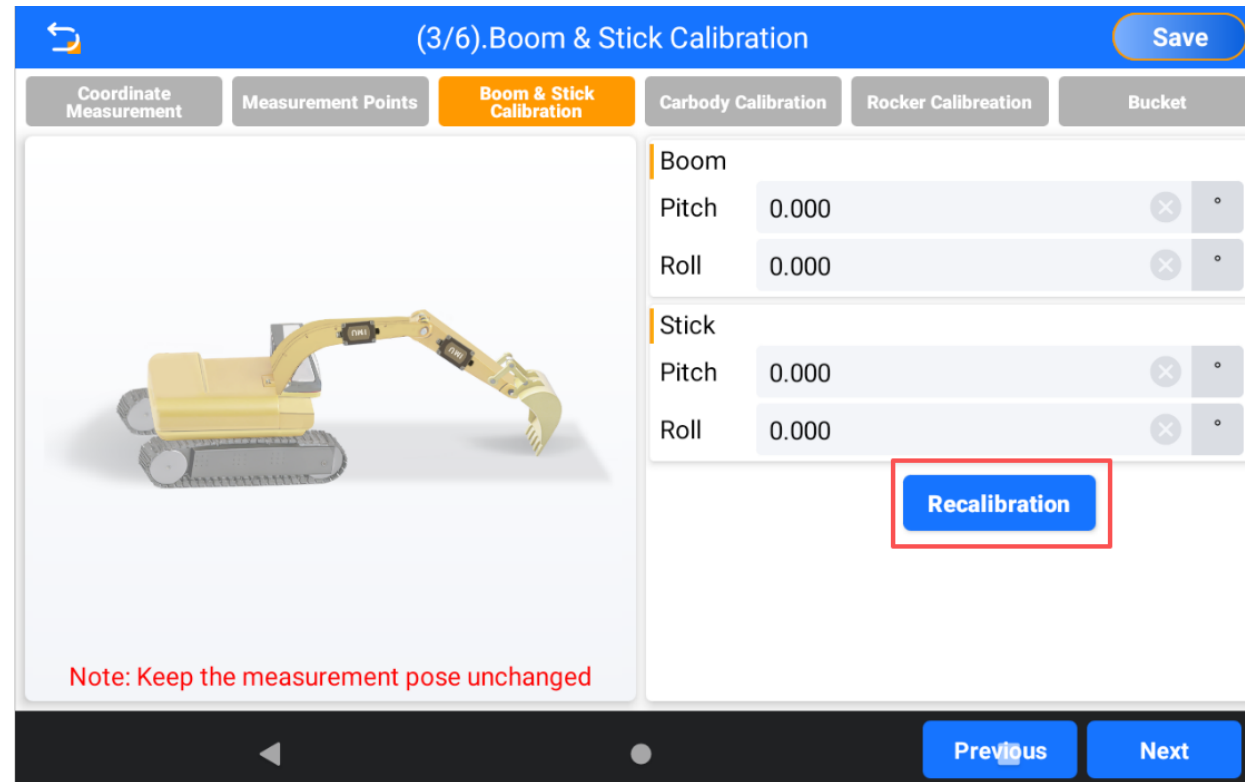
Calculated Points

Name	N	E	Z
M	0.000	0.000	0.000
S	0.000	0.000	0.000
B	0.000	0.000	0.000
C	0.000	0.000	0.000
E	0.000	0.000	0.000
F	0.000	0.000	0.000
G	0.000	0.000	0.000
H	0.000	0.000	0.000

4.3.1 Automatic Measurement Calibration

➤ Boom&Stick Calibration:

Click "Recalibration" to calibrate the Pitch and Roll angles of the excavator's boom and stick.



(3/6). Boom & Stick Calibration

Coordinate Measurement Measurement Points **Boom & Stick Calibration** Carbody Calibration Rocker Calibration Bucket

Boom

Pitch 0.000

Roll 0.000

Stick

Pitch 0.000

Roll 0.000

Recalibration

Note: Keep the measurement pose unchanged

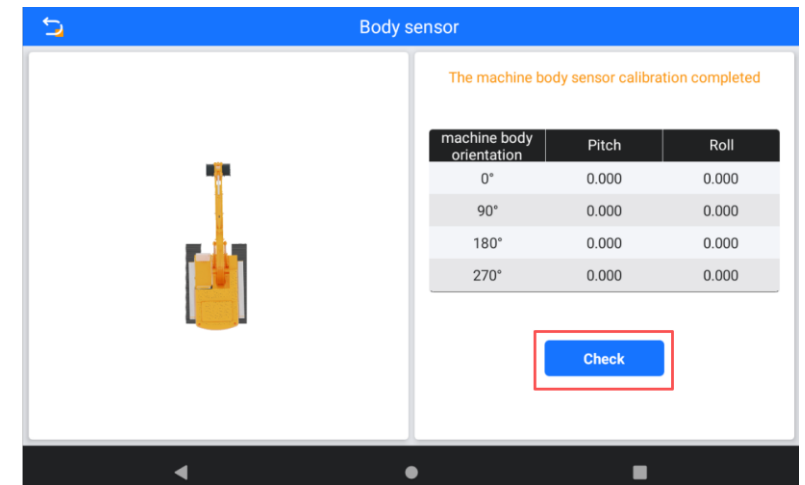
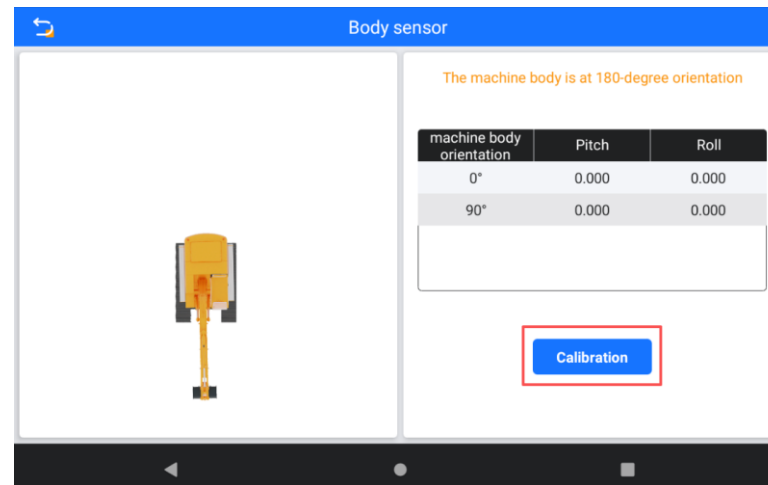
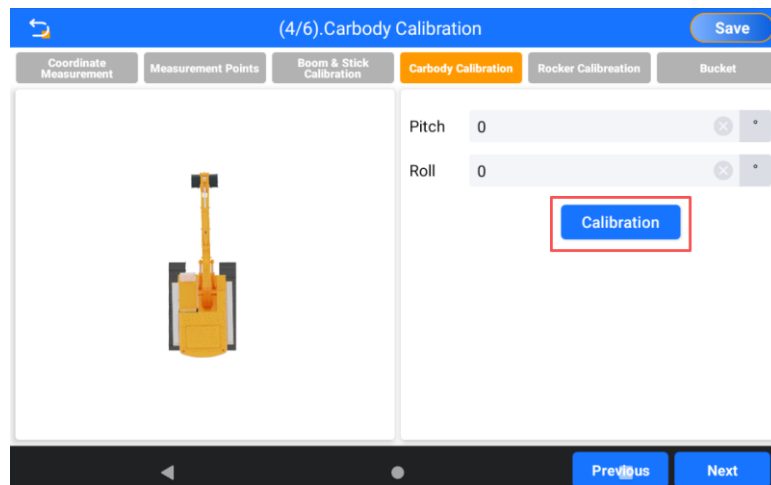
Previous Next

Note: Keep the measurement pose unchanged.

4.3.1 Automatic Measurement Calibration

➤ Carbody Calibration:

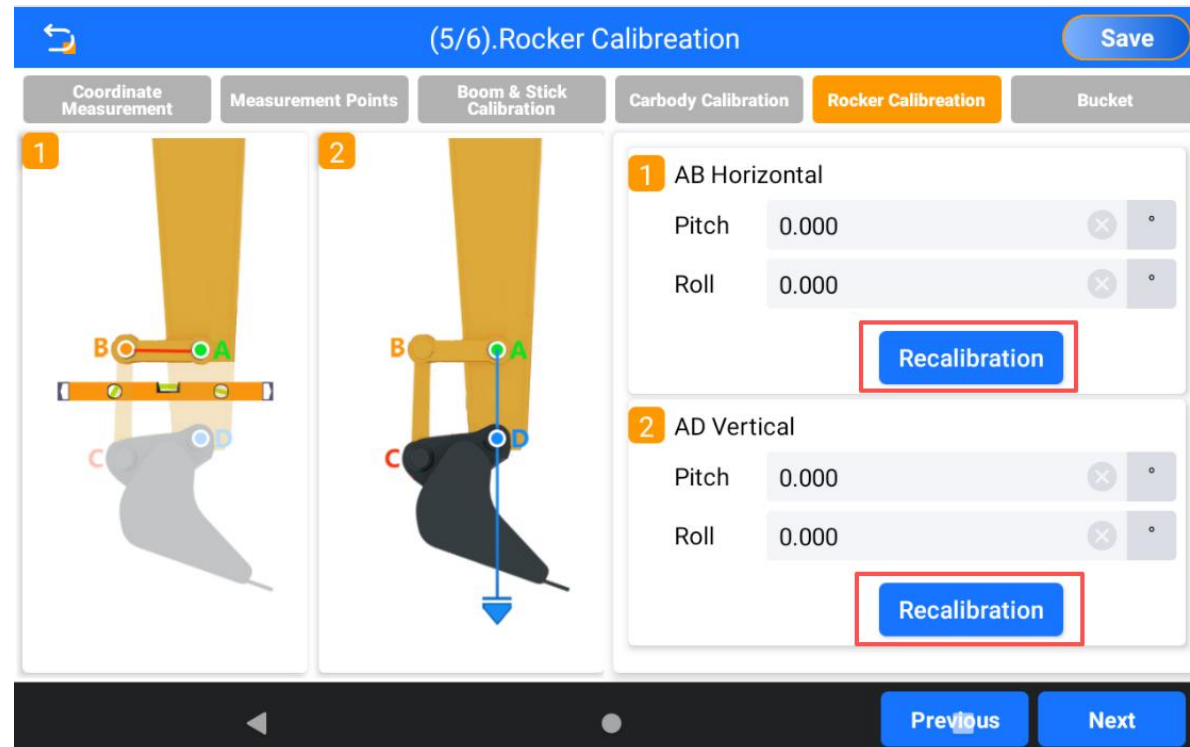
1. Click "Calibration" to enter the final calibration interface.
2. Click "Calibration" and follow the steps shown in the diagram to rotate the machine body step by step to complete the calibration.
3. Click "Check" to return to the previous interface to check the Pitch and Roll of the machine body.



4.3.1 Automatic Measurement Calibration

➤ Rocker Calibration:

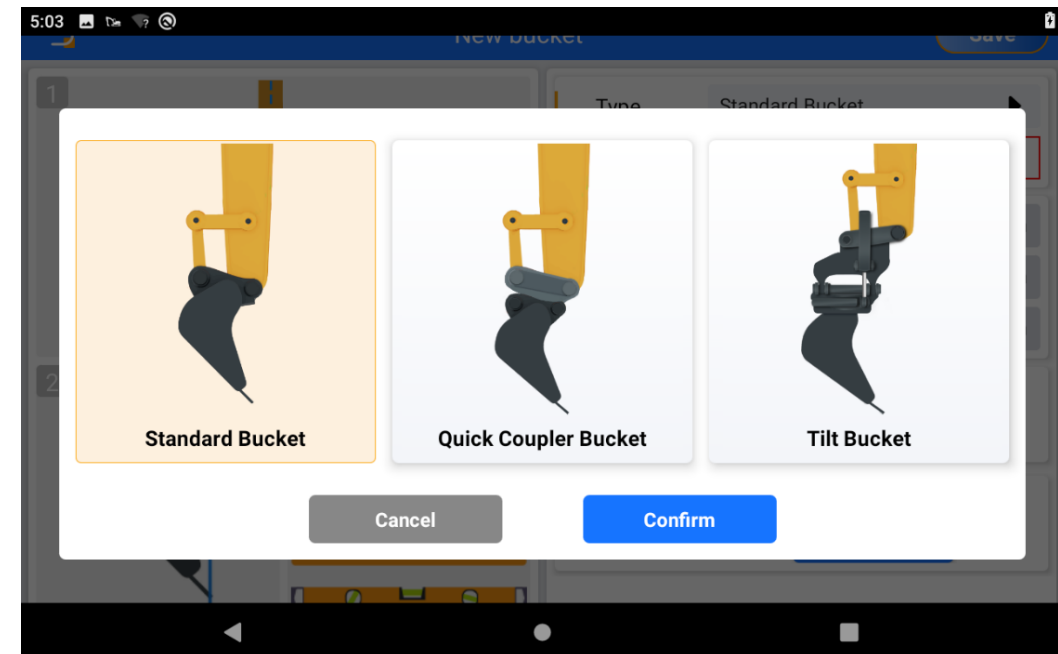
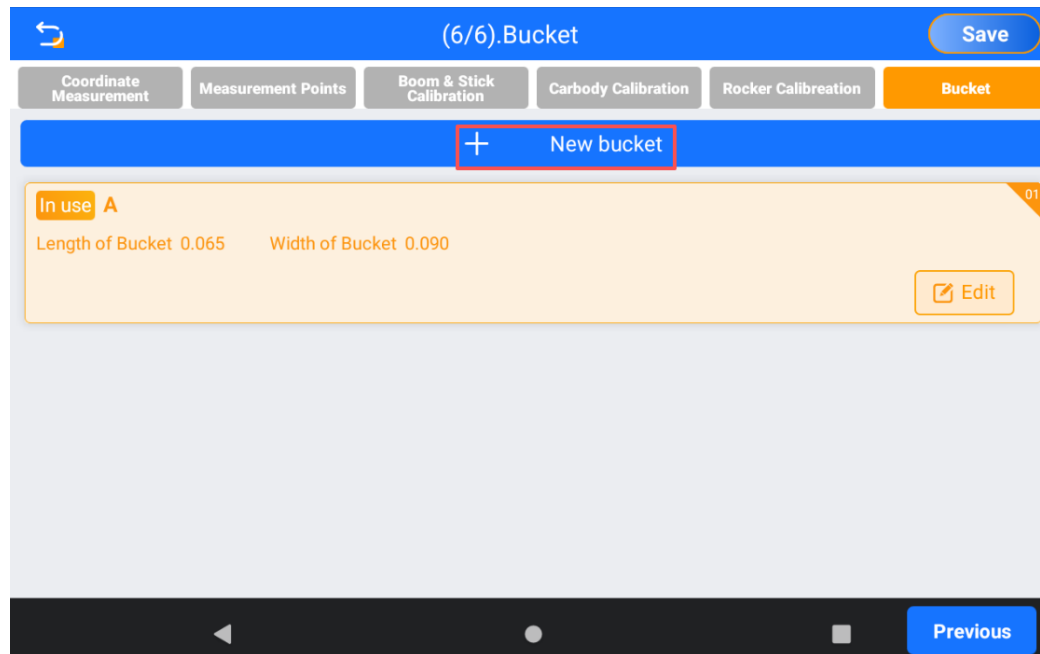
1. Operate the machine to position AB in a horizontal state, then click "Recalibration".
2. Operate the machine to position AD in a vertical state, then click "Recalibration" to complete the calibration.



4.3.1 Automatic Measurement Calibration

➤ Bucket:

1. Click on "New bucket" to enter the bucket modeling interface.
2. Click on "Type", and three bucket models will be displayed, namely Standard Bucket, Quick Coupler Bucket, and Tilt Bucket.



4.3.1 Automatic Measurement Calibration

➤ Bucket:

Standard Bucket:

1. Name: Give this bucket model a name.
2. Input W1, S1, F. W1: The distance from the tip of the left bucket to the tip of the right bucket; S1: The distance from bucket pivot to the tip of the central bucket; F: The offset distance from the bucket pivot to the center of the bucket.
3. Operate the machine so that the bucket pivot is in a vertical position relative to the bucket tip, and then click "Calibration"
4. Operate the machine to position the bottom of the bucket at a horizontal level, then click "Calibration".

New bucket

Save

Type: Standard Bucket

Name: Please enter

1 W1	0.000	m
S1	0.000	m
F	0.000	m

2 Vertical

Calibration

3 Horizontal

Calibration

4.3.1 Automatic Measurement Calibration

➤ Bucket:

Quick Coupler Bucket:

1. Name: Give this bucket model a name.
2. Input W1, S1, F. W1: The distance from the tip of the left bucket to the tip of the right bucket; S1 : The distance from Quick-release component pivot to the tip of the central bucket; F: The offset distance from the Quick-release component pivot to the center of the bucket.
3. Operate the machine so that the bucket povit is in a vertical position relative to the bucket tip, and then click "Calibration"
4. Operate the machine to position the bottom of the bucket at a horizontal level, then click "Calibration".

New bucket Save

Type Quick Coupler Bucket ▶

Name

1 W1	0.000	×	m
S1	0.000	×	m
F	0.000	×	m

2 Vertical ▼ Calibration

3 Horizontal ▼ Calibration

4.3.1 Automatic Measurement Calibration

➤ Bucket:

Tilt Bucket:

1. Name: Give this bucket model a name.
2. First, ensure that the connecting shaft of the tilting bucket remains horizontal in the front-back direction, and then make the bucket horizontal in the left-right direction. Final input H1, H2, L, and then click "Calibration". H1: The vertical distance from the bucket pivot to the connection shaft pivot of tilted bucket; H2: The vertical distance from the bucket pivot to the bottom of the bucket; L: The distance from the point where the bucket pivot projects to the bottom of the bucket to the tip of the bucket
3. Input W1, F. W1: The distance from the tip of the left bucket to the tip of the right bucket; F: The offset distance from the bucket pivot to the center of the bucket.
4. Operate the machine to position the bottom of the bucket at a horizontal level, then click "Calibration".

New bucket Save

Type: Tilt Bucket

Name:

1 Straighten

H1	0.000	m
H2	0.000	m
L	0.000	m

Calibration

2 W1

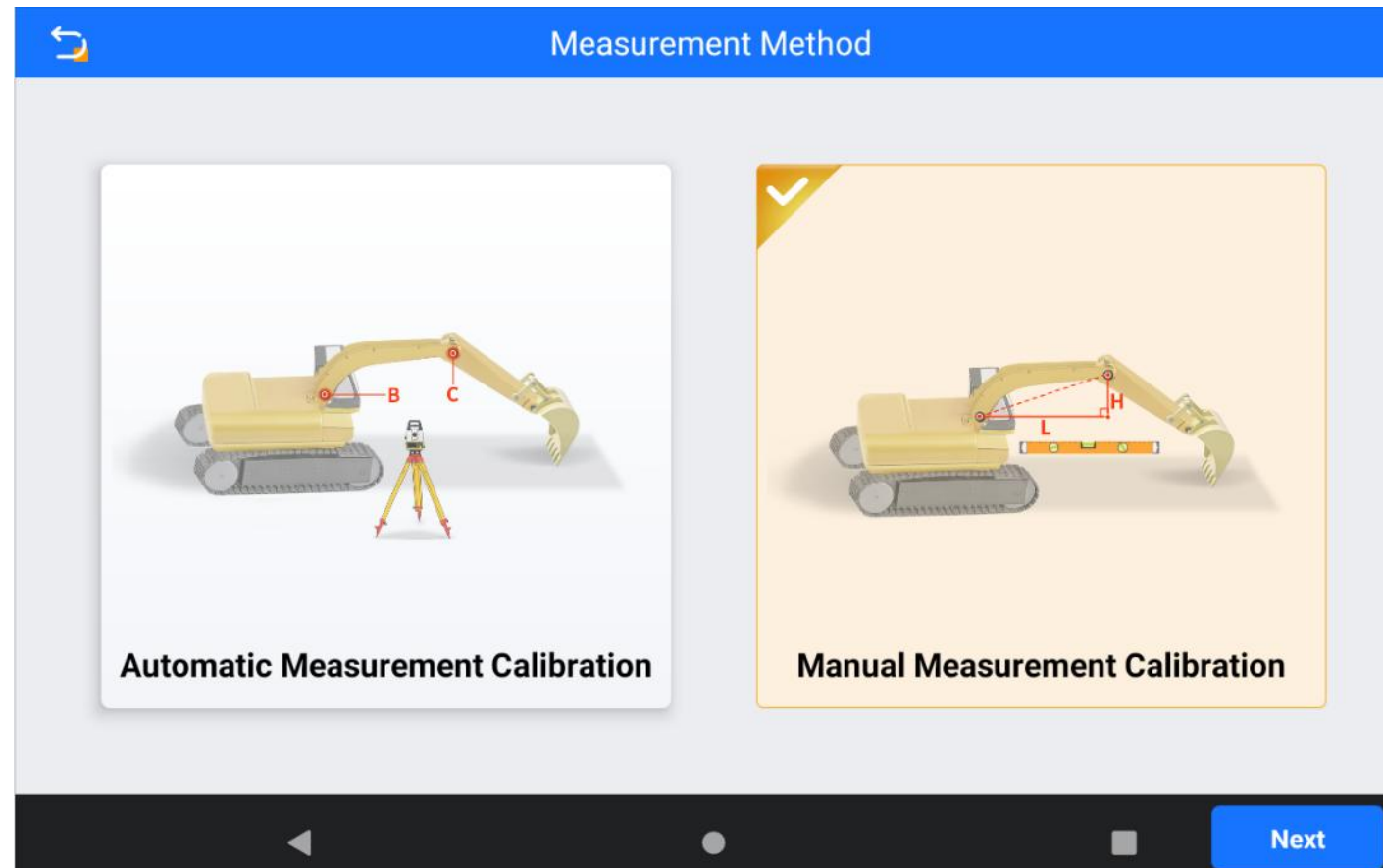
W1	0.000	m
F	0.000	m

3 Horizontal

Calibration

4.3.2 Manual Measurement Calibration

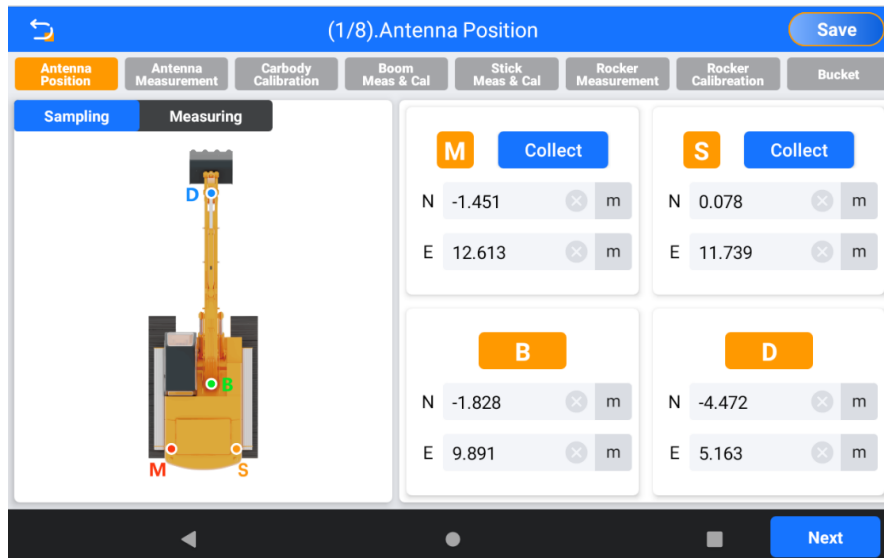
Select "Manual Measurement Calibration", then click "Next" to enter the Manual Measurement Calibration interface.



4.3.2 Manual Measurement Calibration

➤ Antenna Position

1. Click the "Collect" button or use the RTK/Total Station to obtain the coordinates of the main and slave antenna. Or use
2. Use RTK / Total Station to collect and calculate the center pivot point B of the boom and the center point D of the bucket. B: Center pivot point of the boom; D: Center pivot point of the connecting rod.
3. Click "Measuring" to check the values of L1, L2, L3 and L4 calculated based on M, S, B and D. Then click "Calculate" to obtain the angle between the main and slave antennas' baseline and the machine's central axis.



(1/8).Antenna Position

Antenna Position | Antenna Measurement | Carbody Calibration | Boom Meas & Cal | Stick Meas & Cal | Rocker Measurement | Rocker Calibration | Bucket

Sampling | Measuring

M Collect

N -1.451 m
E 12.613 m

S Collect

N 0.078 m
E 11.739 m

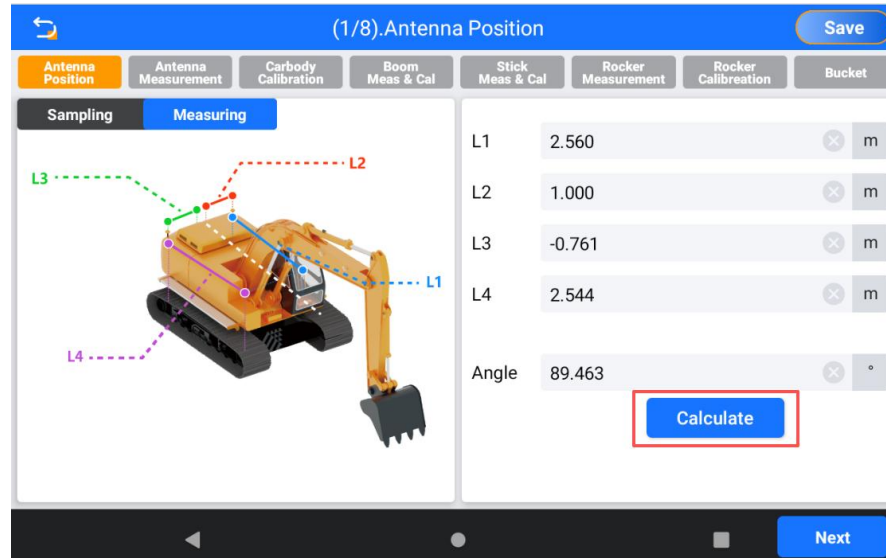
B

N -1.828 m
E 9.891 m

D

N -4.472 m
E 5.163 m

Next



(1/8).Antenna Position

Antenna Position | Antenna Measurement | Carbody Calibration | Boom Meas & Cal | Stick Meas & Cal | Rocker Measurement | Rocker Calibration | Bucket

Sampling | Measuring

L1 2.560 m
L2 1.000 m
L3 -0.761 m
L4 2.544 m

Angle 89.463 °

Calculate

Next

Note: When using RTK for mobile station coordinate measurement, set the mobile station coordinate system to be consistent with the excavator software coordinate system.

4.3.2 Manual Measurement Calibration

➤ Antenna Measurement

Measure and input the values of H1 and H2 using RTK/Total Station. H1: The vertical distance from the main antenna to the ground. H2: The vertical distance from the Boom pivot to the ground.

←

(2/8).Antenna Measurement

Save

Antenna Position

Antenna Measurement

Carbody Calibration

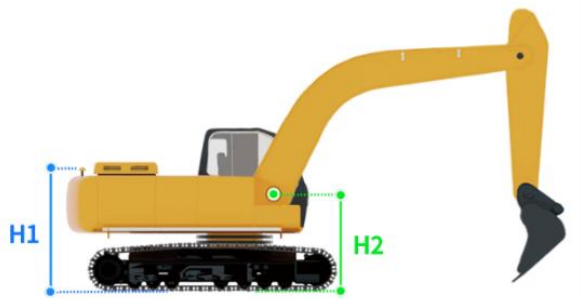
Boom Meas & Cal

Stick Meas & Cal

Rocker Measurement

Rocker Calibration

Bucket



H1

1.271

×

m

H2

0.375

×

m

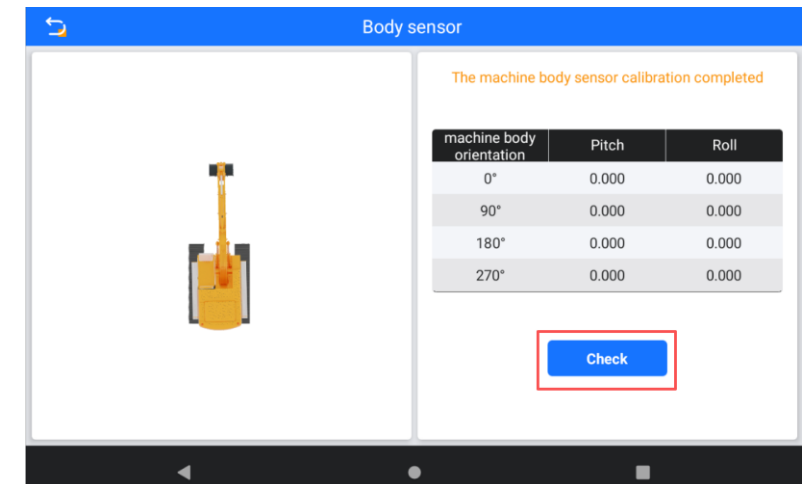
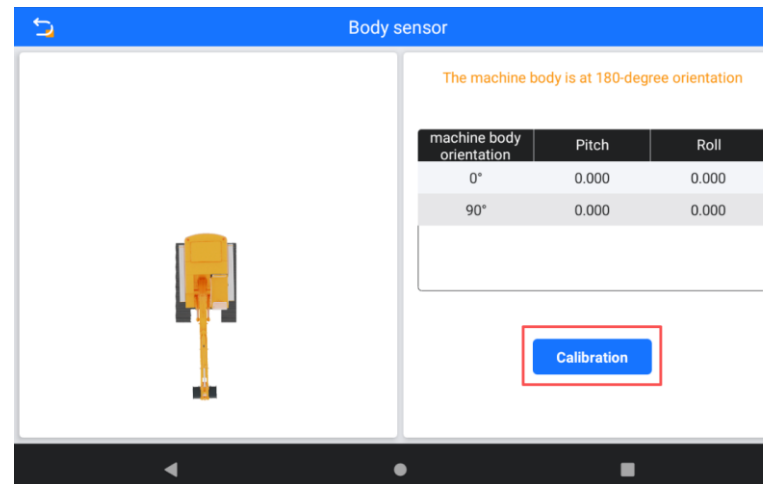
Previous

Next

4.3.2 Manual Measurement Calibration

➤ Carbody Calibration:

1. Click "Calibration" to enter the final calibration interface.
2. Click "Calibration" and follow the steps shown in the diagram to rotate the machine body step by step to complete the calibration.
3. Click "Check" to return to the previous interface to check the Pitch and Roll of the machine body.

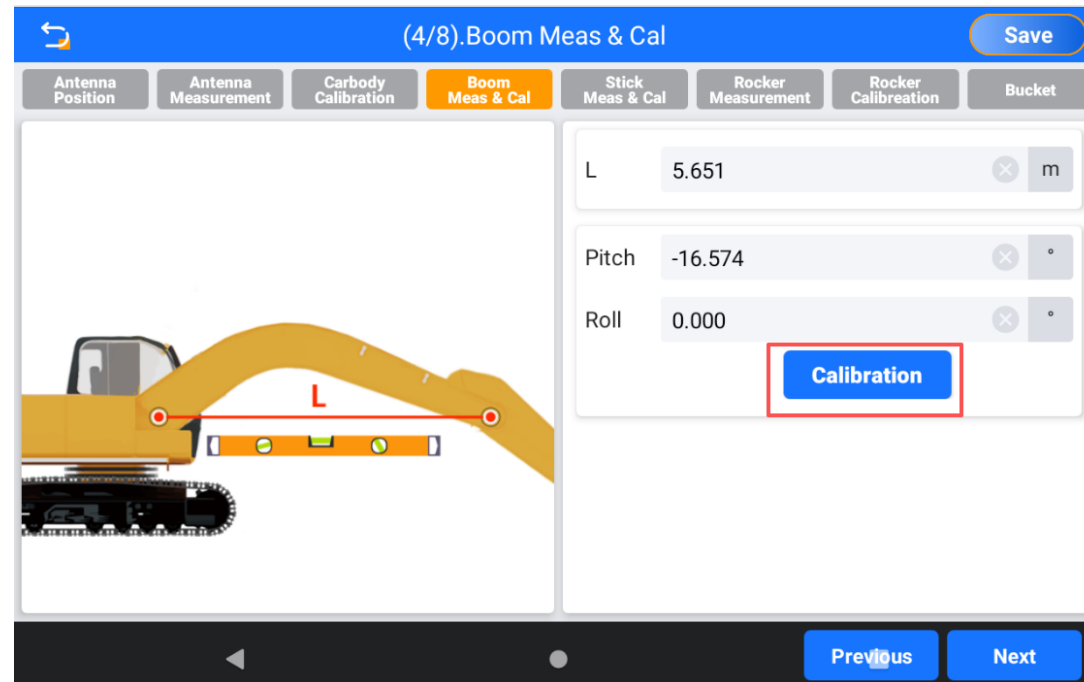


4.3.2 Manual Measurement Calibration

➤ Boom Meas & Cal

This process is used to eliminate errors caused by the installation position of the boom sensor during the installation process.

1. Park the excavator on a roughly flat surface and adjust the pivot points of the boom and the stick to the horizontal position as shown in the picture.
2. Measure the L value using RTK/Total Station and input it. Then click on "Calibration", and the system will automatically calculate the pitch angle and roll angle of the boom.



(4/8) Boom Meas & Cal

Save

Antenna Position Antenna Measurement Carbody Calibration **Boom Meas & Cal** Stick Meas & Cal Rocker Measurement Rocker Calibration Bucket

L 5.651 m

Pitch -16.574 °

Roll 0.000 °

Calibration

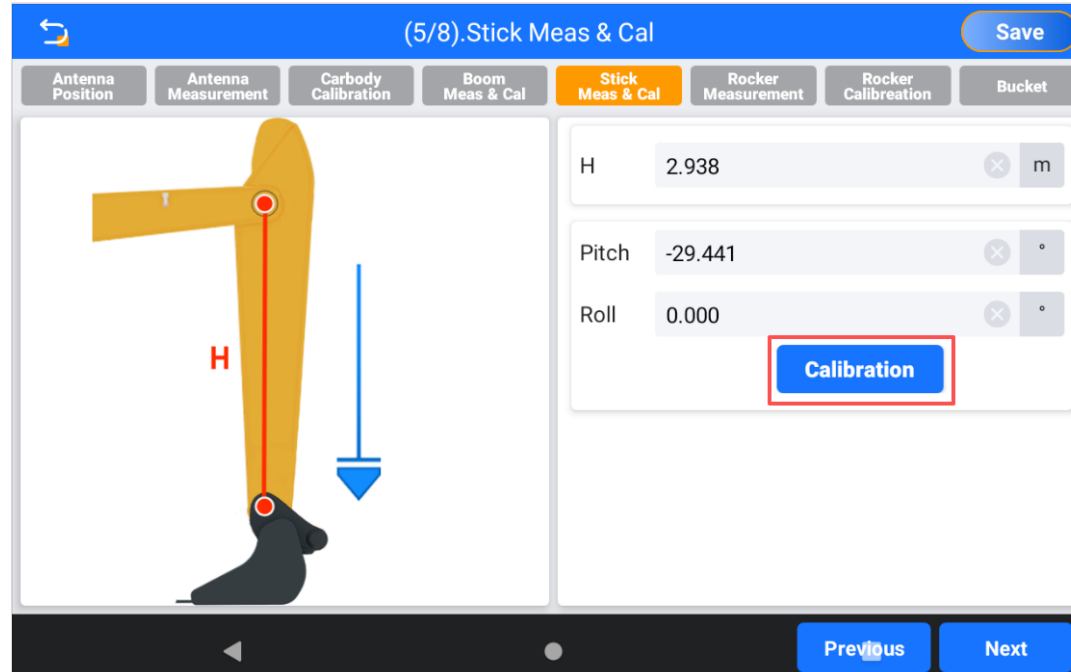
Previous Next

4.3.2 Manual Measurement Calibration

➤ Stick Meas & Cal

This process is used to eliminate errors caused by the installation position of the stick sensor during the installation process.

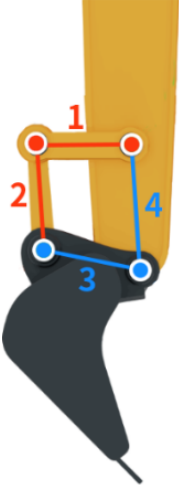
1. Park the excavator on a roughly flat surface and adjust the pivot points of the stick and the bucket to the vertical position as shown in the picture.
2. Measure the H value using RTK/Total Station and input it. Then click on "Calibration", and the system will automatically calculate the pitch angle and roll angle of the stick.



4.3.2 Manual Measurement Calibration

➤ Rocker Measurement

Measure the length values of 1, 2, 3, and 4 as shown in the diagram and input them.



The diagram shows a robotic arm joint. Point 1 is at the top pivot, point 2 is at the bottom pivot, point 3 is at the end of the lower arm, and point 4 is at the end of the upper arm. Lines connect these points to indicate the measurement paths.

(6/8).Rocker Measurement

Save

Antenna Position

Antenna Measurement

Carbody Calibration

Boom Meas & Cal

Stick Meas & Cal

Rocker Measurement

Rocker Calibration

Bucket

Length(1) 0.627 × m

Length(2) 0.611 × m

Length(3) 0.430 × m

Length(4) 0.420 × m

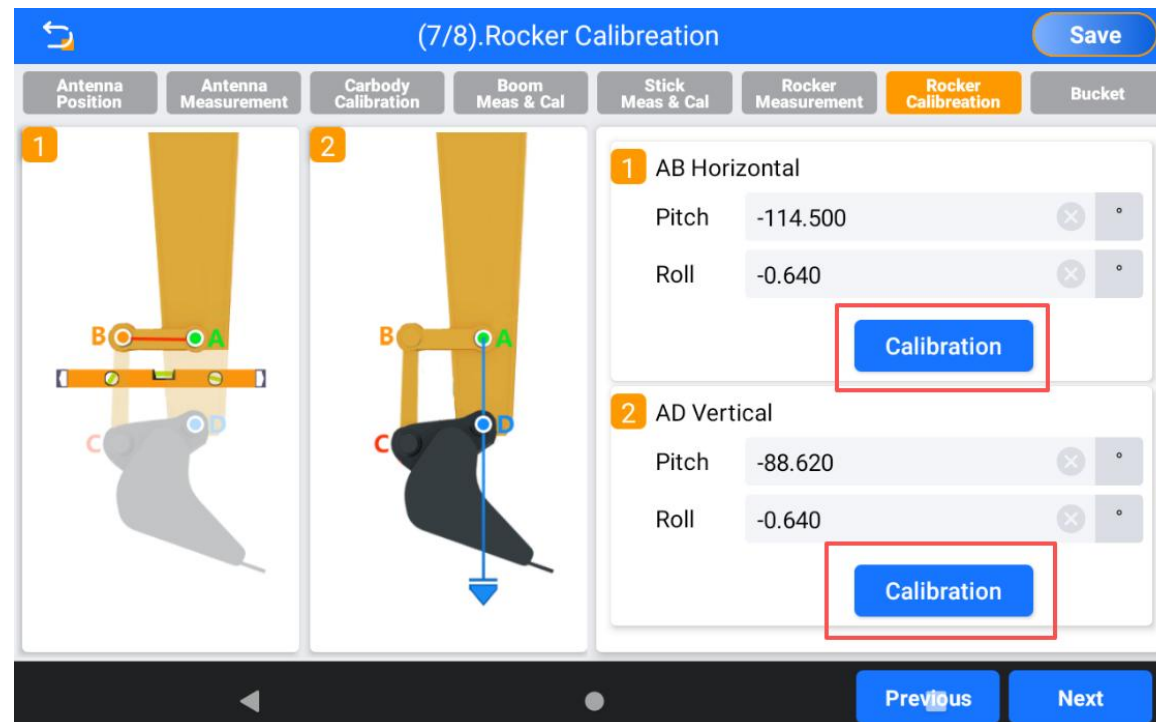
Previous

Next

4.3.2 Manual Measurement Calibration

➤ Rocker Calibration

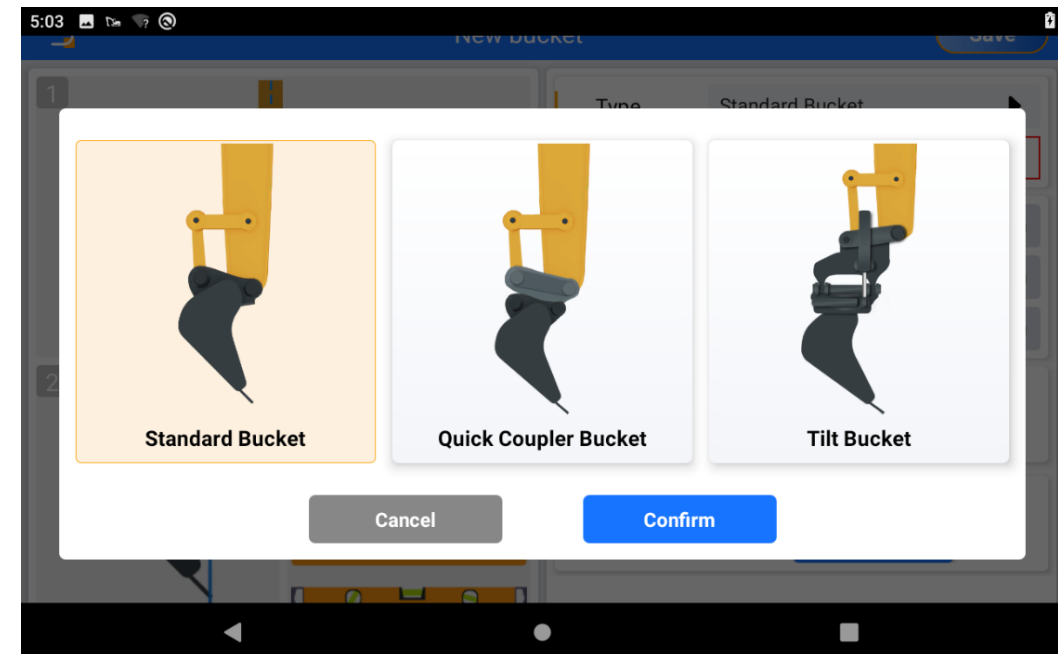
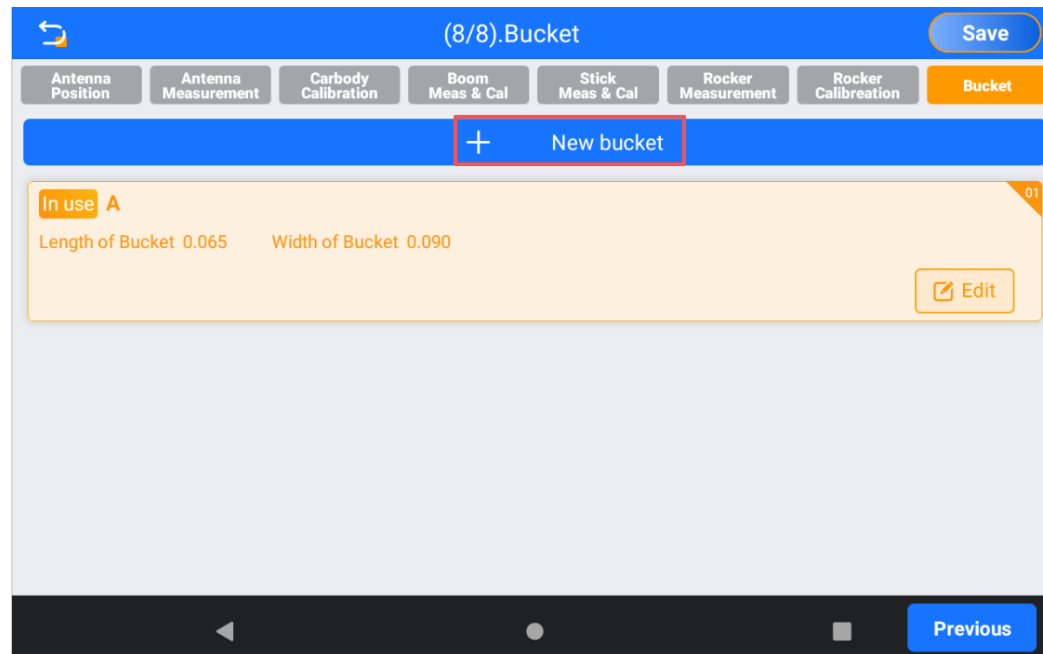
1. Operate the machine to position AB in a horizontal state, then click "Recalibration".
2. Operate the machine to position AD in a vertical state, then click "Recalibration" to complete the calibration.



4.3.2 Manual Measurement Calibration

➤ Bucket:

1. Click on "New bucket" to enter the bucket modeling interface.
2. Click on "Type", and three bucket models will be displayed, namely Standard Bucket, Quick Coupler Bucket, and Tilt Bucket.



4.3.2 Manual Measurement Calibration

➤ Bucket:

Standard Bucket:

1. Name: Give this bucket model a name.
2. Input W1, S1, F. W1: The distance from the tip of the left bucket to the tip of the right bucket; S1: The distance from bucket pivot to the tip of the central bucket; F: The offset distance from the bucket pivot to the center of the bucket.
3. Operate the machine so that the bucket pivot is in a vertical position relative to the bucket tip, and then click "Calibration"
4. Operate the machine to position the bottom of the bucket at a horizontal level, then click "Calibration".

New bucket

Save

Type: Standard Bucket

Name: Please enter

1 W1	0.000	m
S1	0.000	m
F	0.000	m

2 Vertical Calibration

3 Horizontal Calibration

4.3.2 Manual Measurement Calibration

➤ Bucket:

Quick Coupler Bucket:

1. Name: Give this bucket model a name.
2. Input W1, S1, F. W1: The distance from the tip of the left bucket to the tip of the right bucket; S1 : The distance from Quick-release component pivot to the tip of the central bucket; F: The offset distance from the Quick-release component pivot to the center of the bucket.
3. Operate the machine so that the bucket povit is in a vertical position relative to the bucket tip, and then click "Calibration"
4. Operate the machine to position the bottom of the bucket at a horizontal level, then click "Calibration".

New bucket Save

Type Quick Coupler Bucket ▶

Name

1 W1	0.000	×	m
S1	0.000	×	m
F	0.000	×	m

2 Vertical ▼ Calibration

3 Horizontal ▼ Calibration

4.3.2 Manual Measurement Calibration

➤ Bucket:

Tilt Bucket:

1. Name: Give this bucket model a name.
2. First, ensure that the connecting shaft of the tilting bucket remains horizontal in the front-back direction, and then make the bucket horizontal in the left-right direction. Final input H1, H2, L, and then click "Calibration". H1: The vertical distance from the bucket pivot to the connection shaft pivot of tilted bucket; H2: The vertical distance from the bucket pivot to the bottom of the bucket; L: The distance from the point where the bucket pivot projects to the bottom of the bucket to the tip of the bucket
3. Input W1, F. W1: The distance from the tip of the left bucket to the tip of the right bucket; F: The offset distance from the bucket pivot to the center of the bucket.
4. Operate the machine to position the bottom of the bucket at a horizontal level, then click "Calibration".

New bucket Save

Type: Tilt Bucket

Name:

1 Straighten

H1	0.000	m
H2	0.000	m
L	0.000	m

Calibration

2 W1

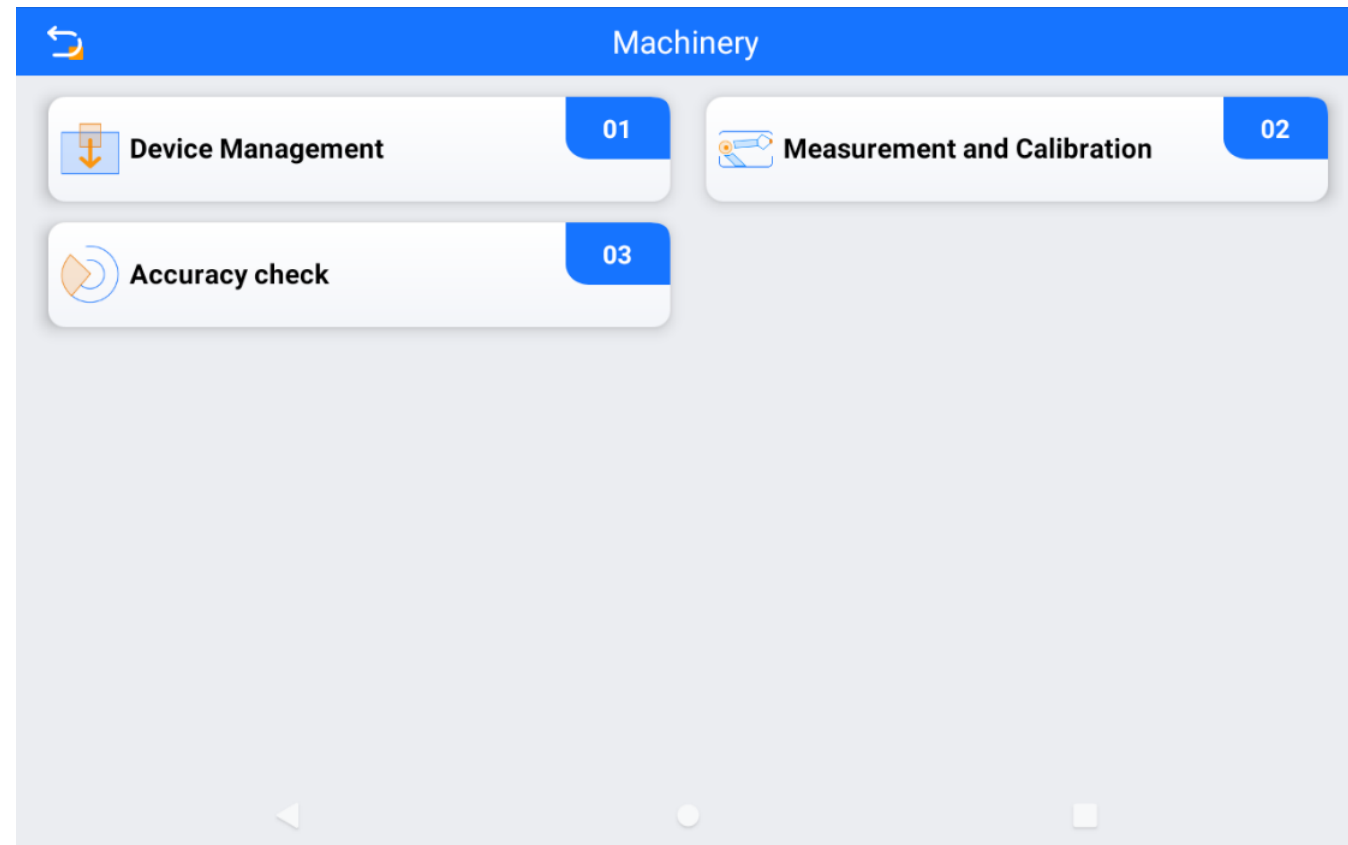
W1	0.000	m
F	0.000	m

3 Horizontal

Calibration

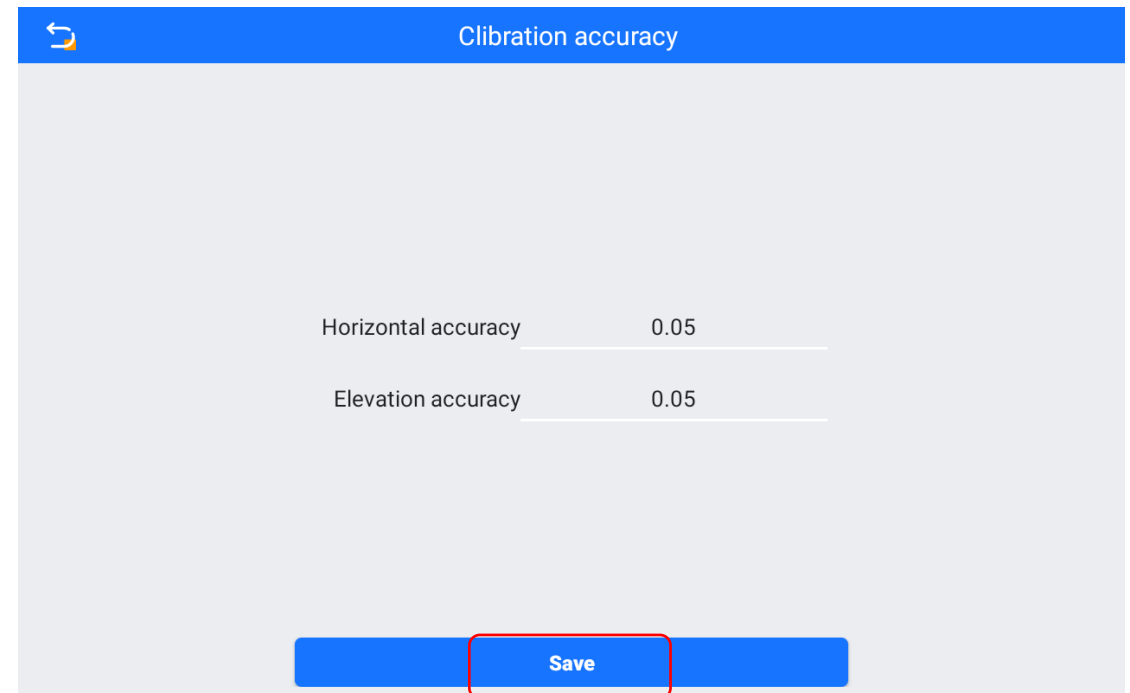
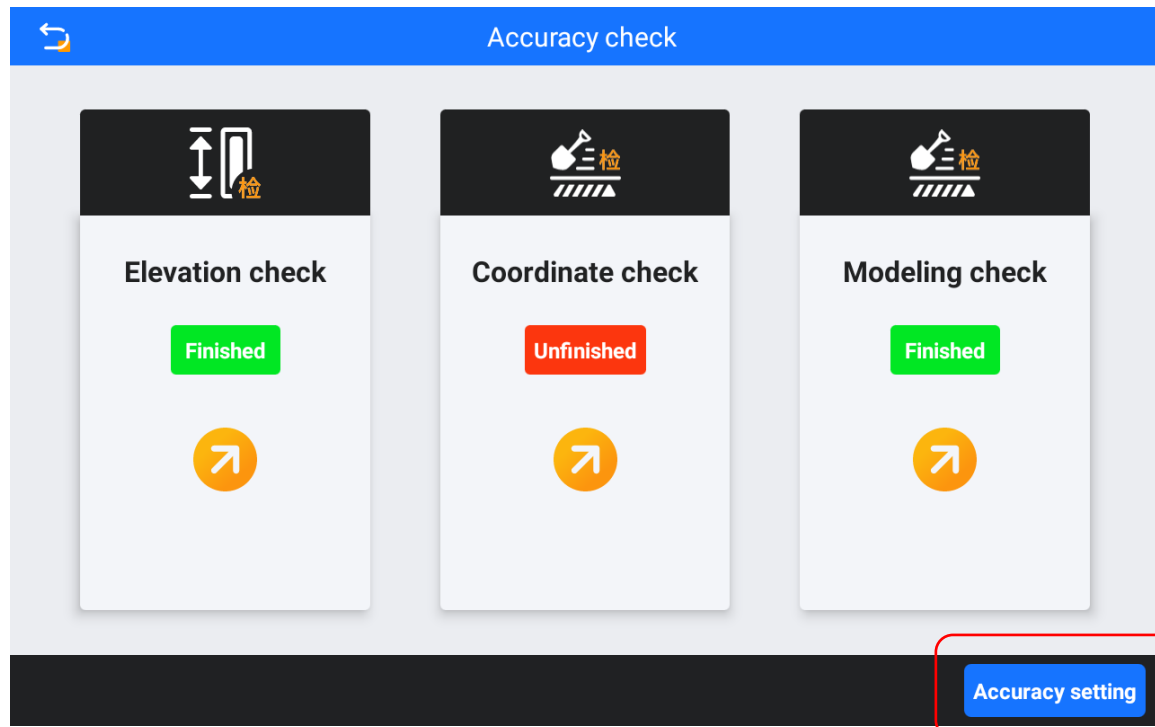
4.4 Accuracy check

- Click on " Accuracy check " to perform elevation, plan, and modeling checks.



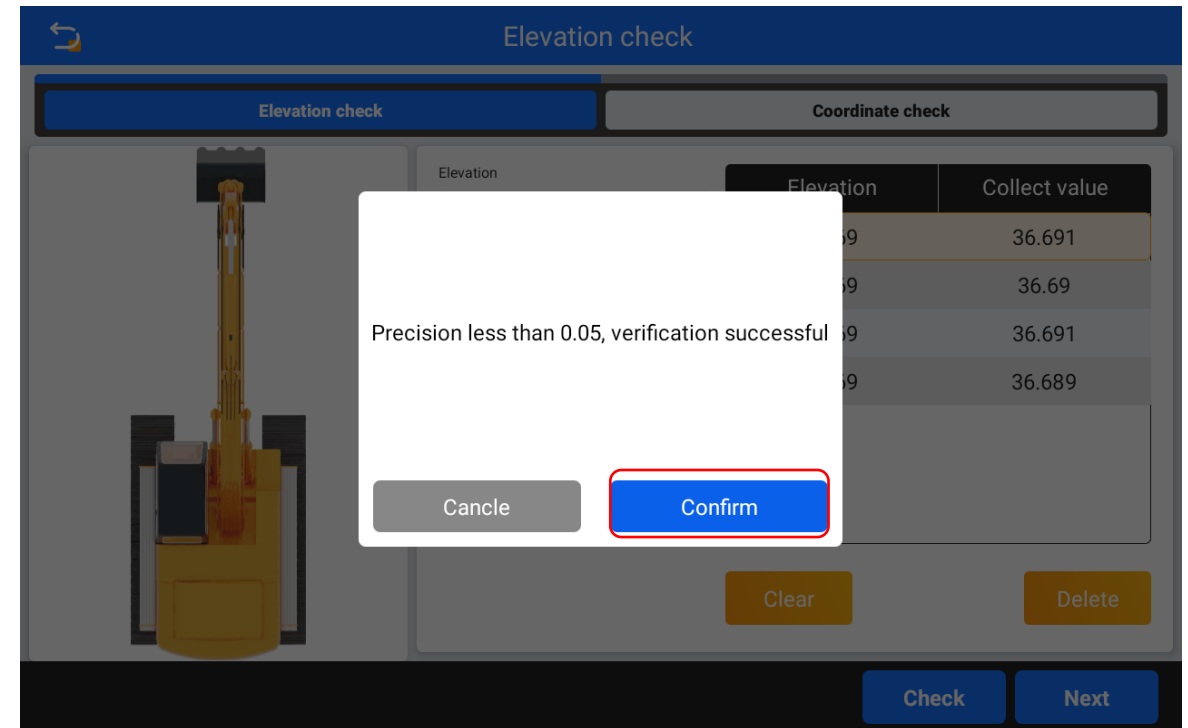
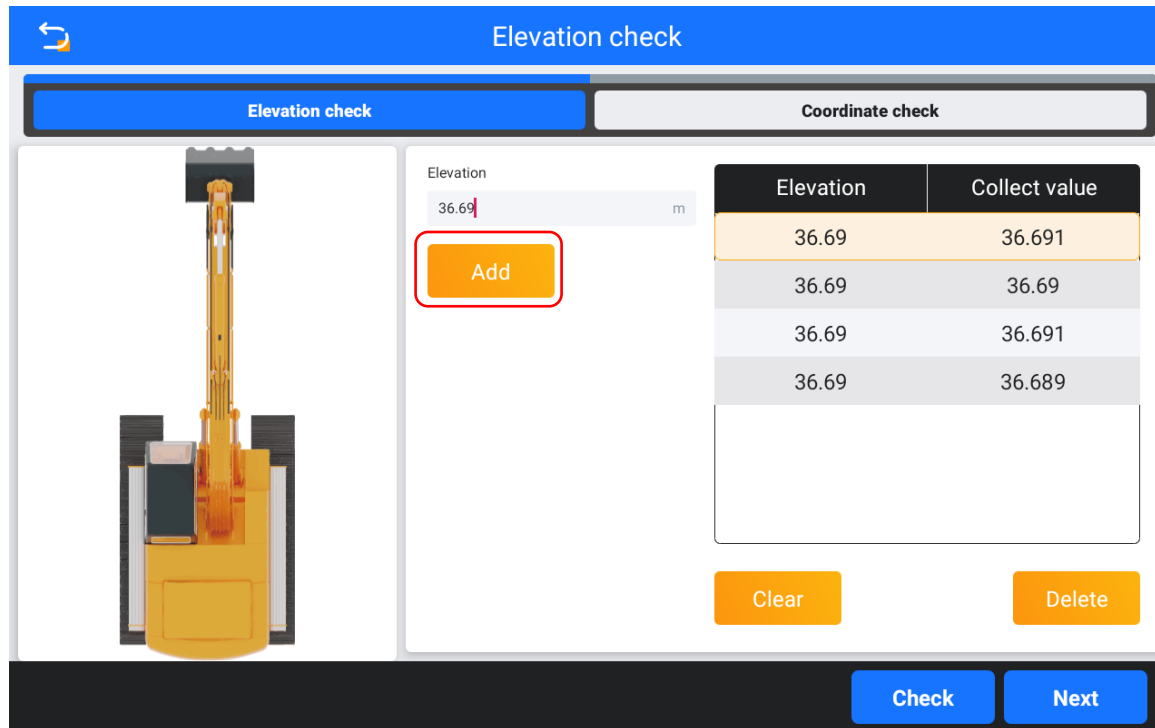
4.4.1 Manual Measurement Calibration

- Click on "Accuracy setting" and enter the required plane accuracy and elevation accuracy for verification;
- Click "Save" to complete the settings. The accuracy verification of subsequent elevation, plan, and modeling will be evaluated based on the set parameters.



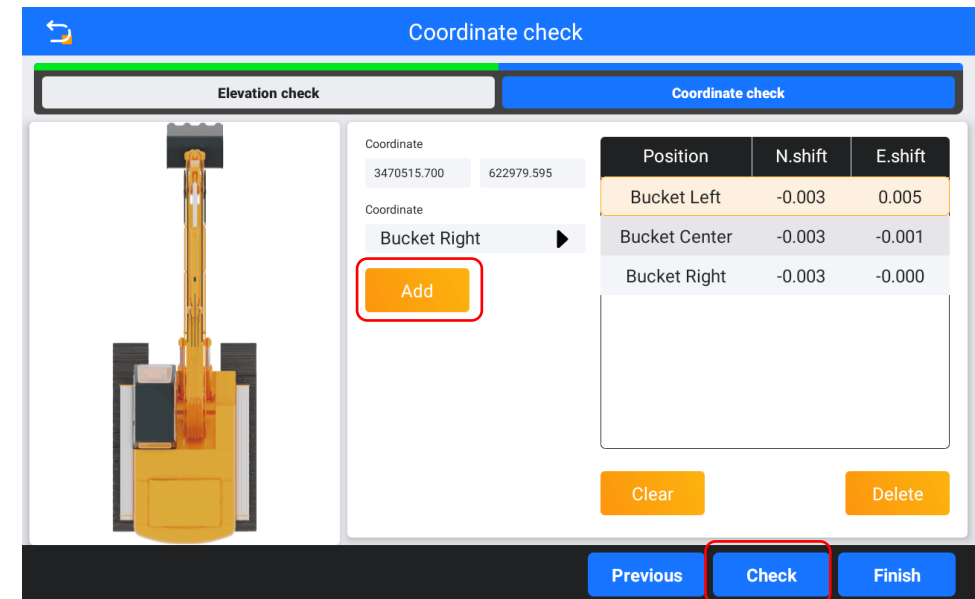
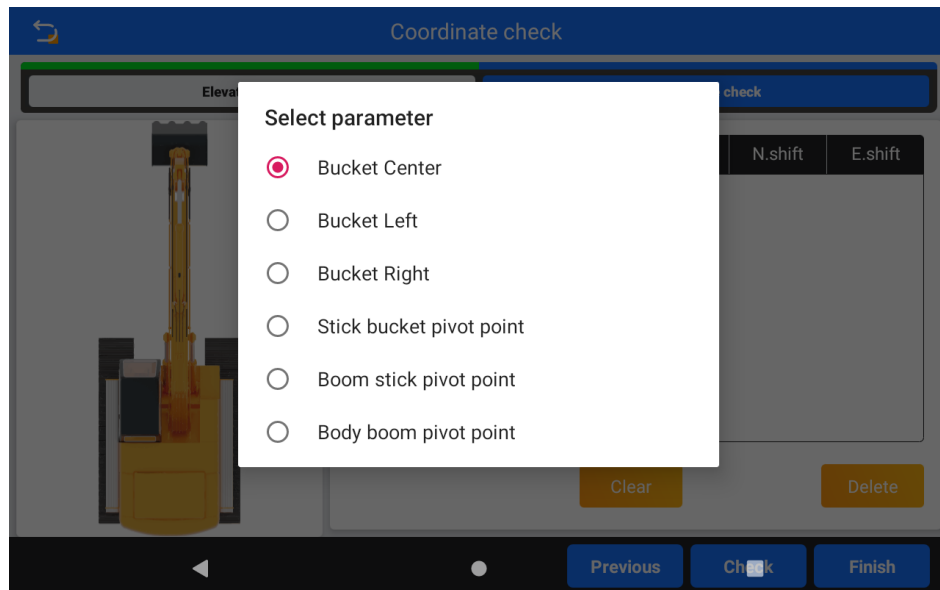
4.4.2 Elevation check

- Click on " Elevation check" to enter the verification interface;
- Enter the design elevation value, add it to the right comparison bar, and verify it with the collected elevation value;
- Click the " Check" button. If the elevation accuracy requirements are met, the elevation verification is completed.



4.4.3 Coordinate Check

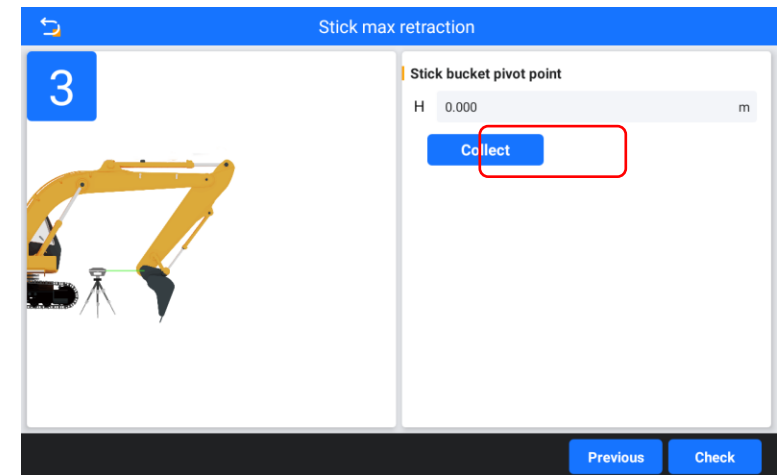
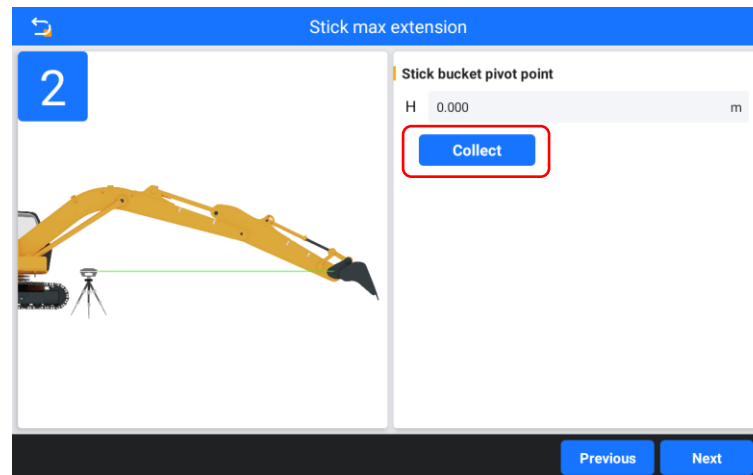
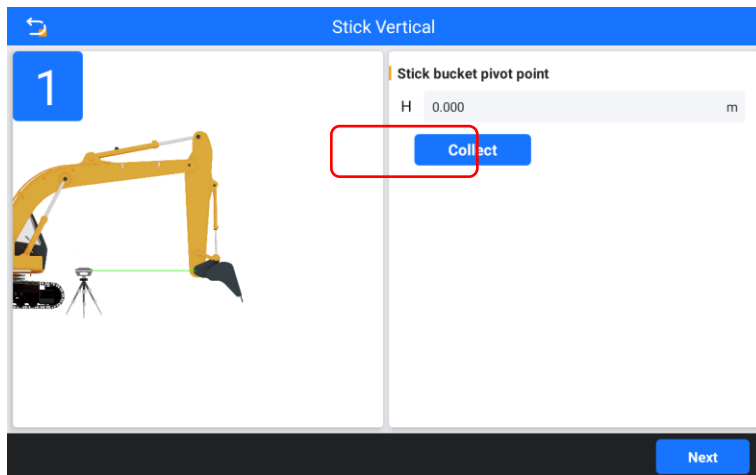
- Click on "Coordinate Check" to enter the inspection interface;
- Collect the coordinates of each position in the list in Figure 1 through RTK and input them. After switching to the corresponding position of the excavator, click "Add" to place the coordinates in the right column for verification;
- Click the "Check" button. If the plane accuracy requirements are met, the plane verification is completed. Finally, click "Finish".



Note: When using RTK for mobile station coordinate measurement, set the mobile station coordinate system to be consistent with the excavator software coordinate system.

4.4.4 Modeling Check

- Click on "Modeling check" to enter the verification interface;
- Adjust the excavator status according to the diagram, and click on "Collect" and "Next" in sequence;
- Click the "Check" button. If the modeling accuracy is less than 5cm, it means that the modeling check is completed and construction work can begin.

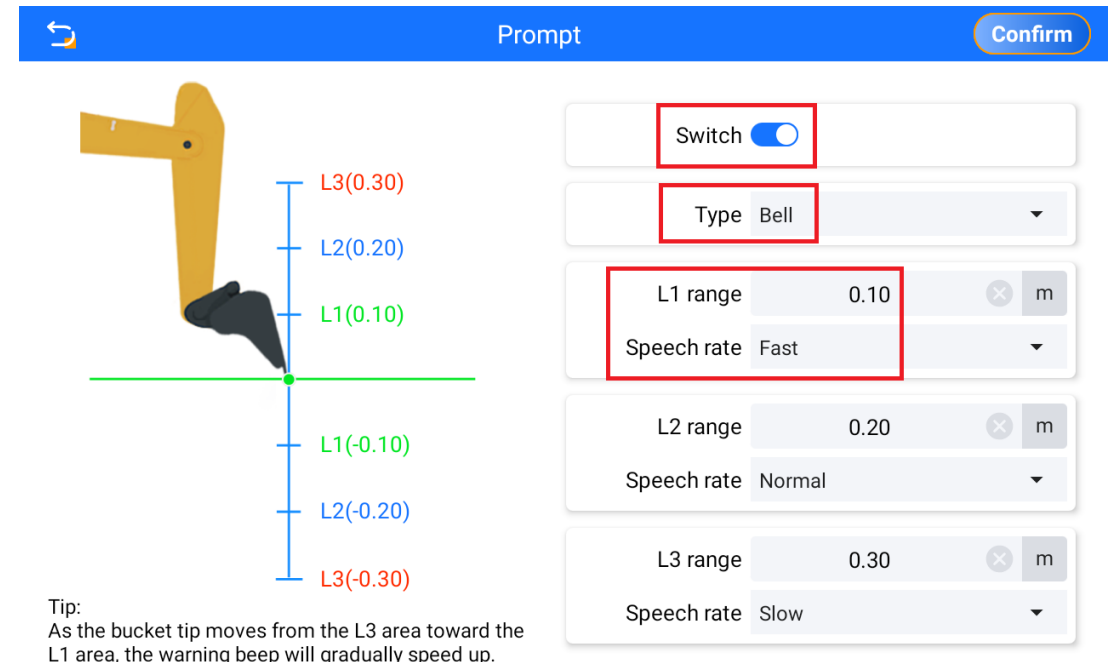
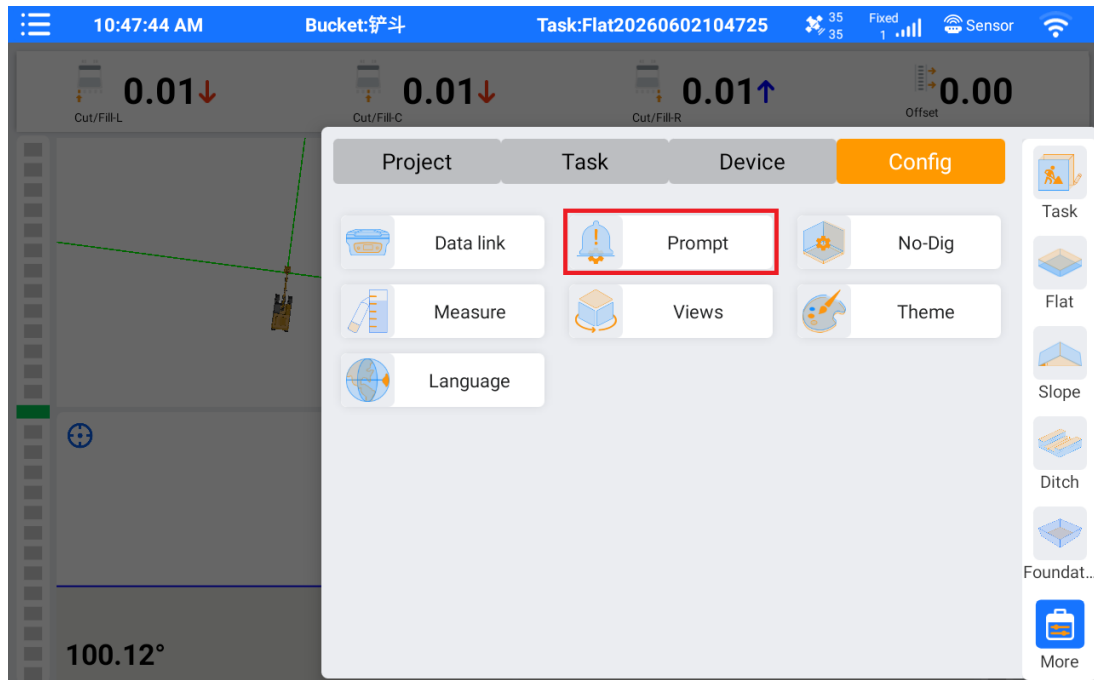


05

Function Introduction

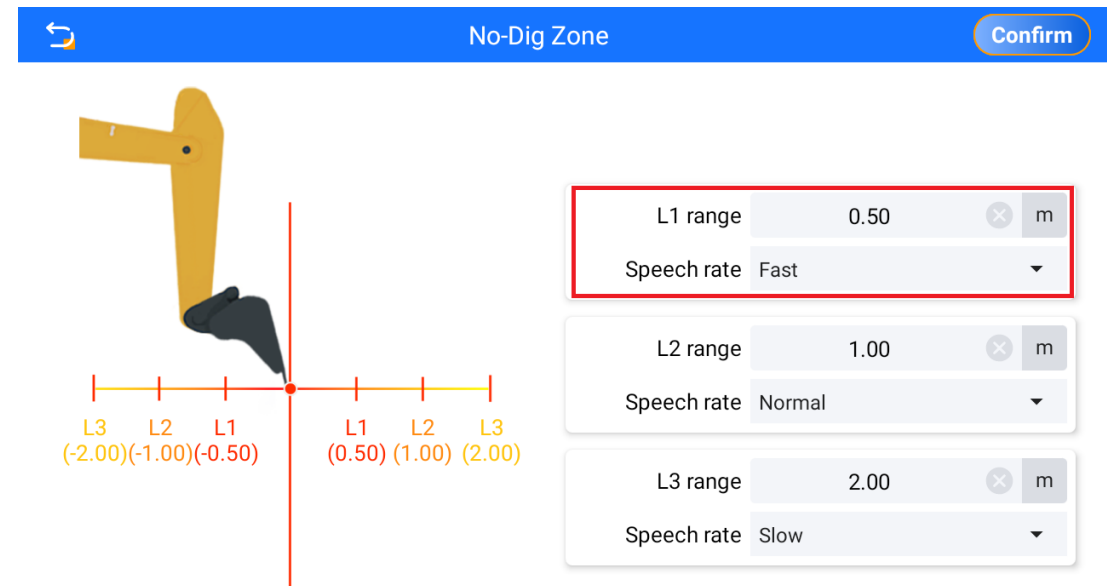
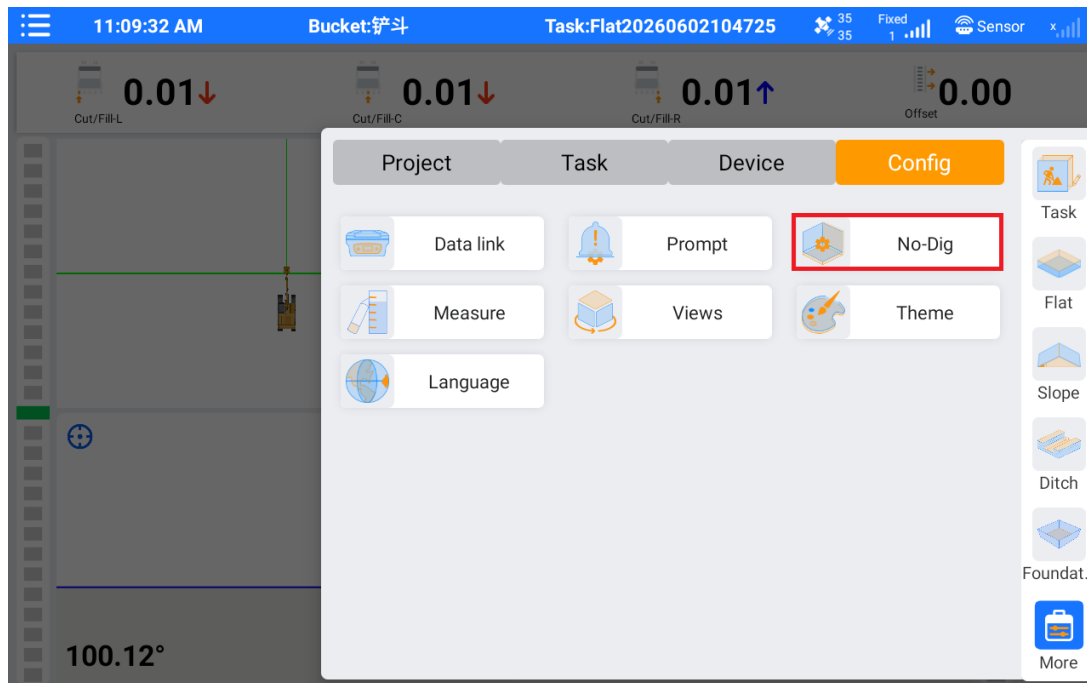
5.1 Prompt

- Click the icon  at the bottom right of the main interface, then click "Prompt" in "Config".
- Click the "switch" button to turn the beep sound on or off.
- Click "Type" to change the type of alert tone.
- The range of prompt tones and the Speech rate can be adjusted according to actual needs.



5.2 No-Dig

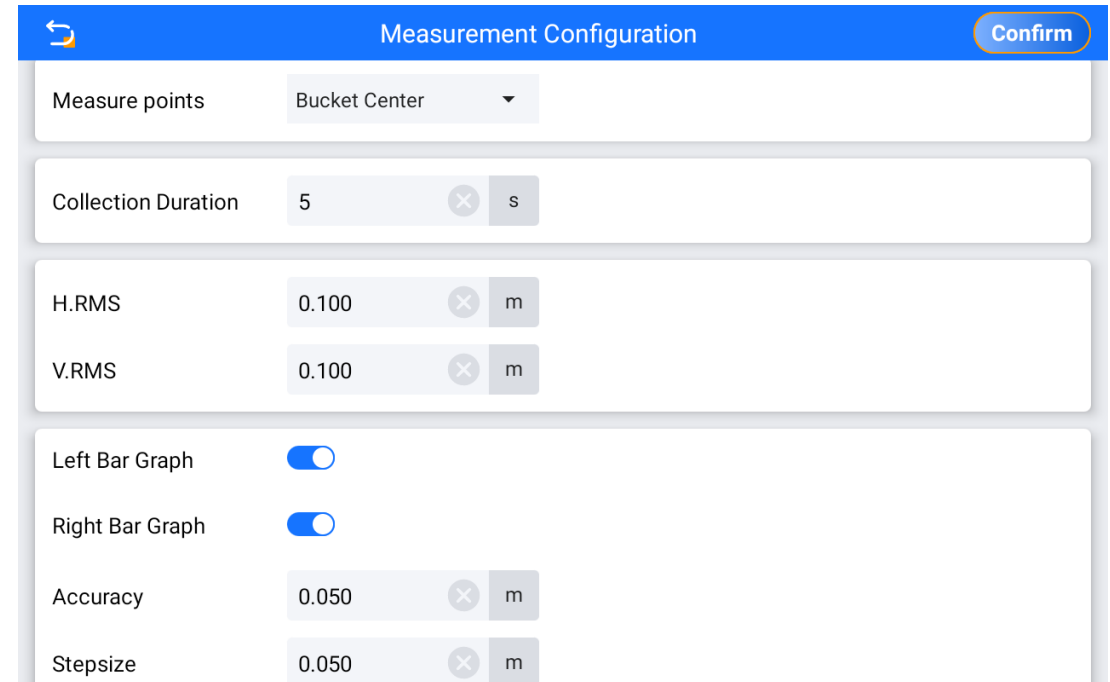
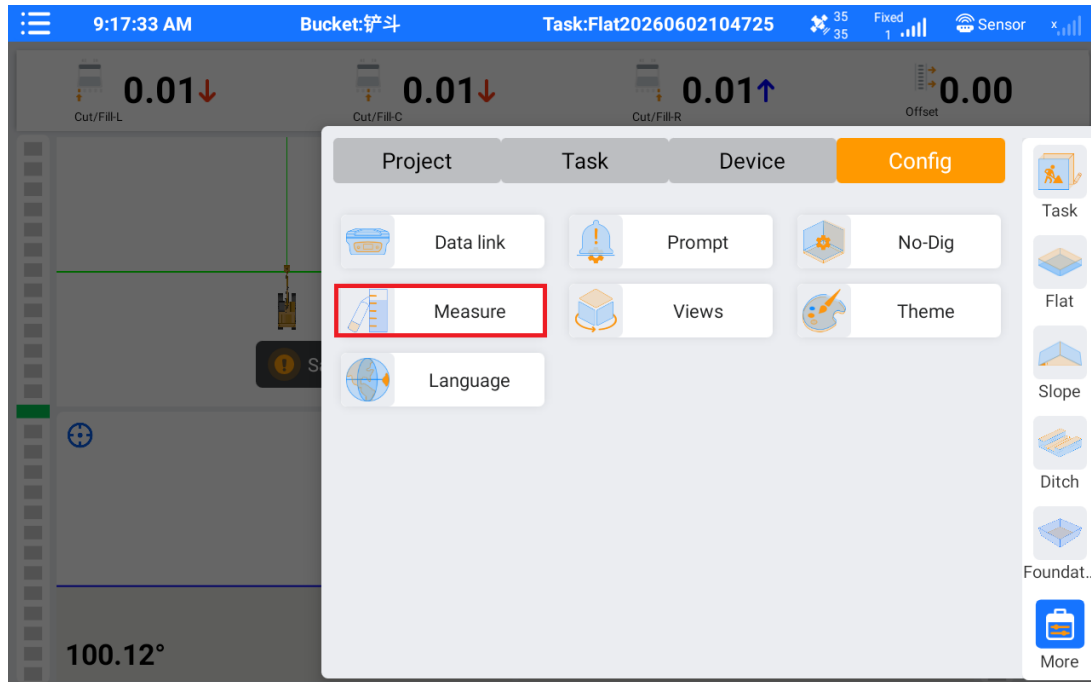
- Click the icon  in the lower right corner of the main interface, then click "No-Dig" in "Config" .
- Set the range of the avoidance zone (values of L1, L2, L3) and the rate of the alarm sound according to the actual job requirements.
- Click 'Confirm' in the upper right corner to save.



Tip:
As the bucket tip moves from the L3 area toward the L1 area, the warning beep will gradually speed up.

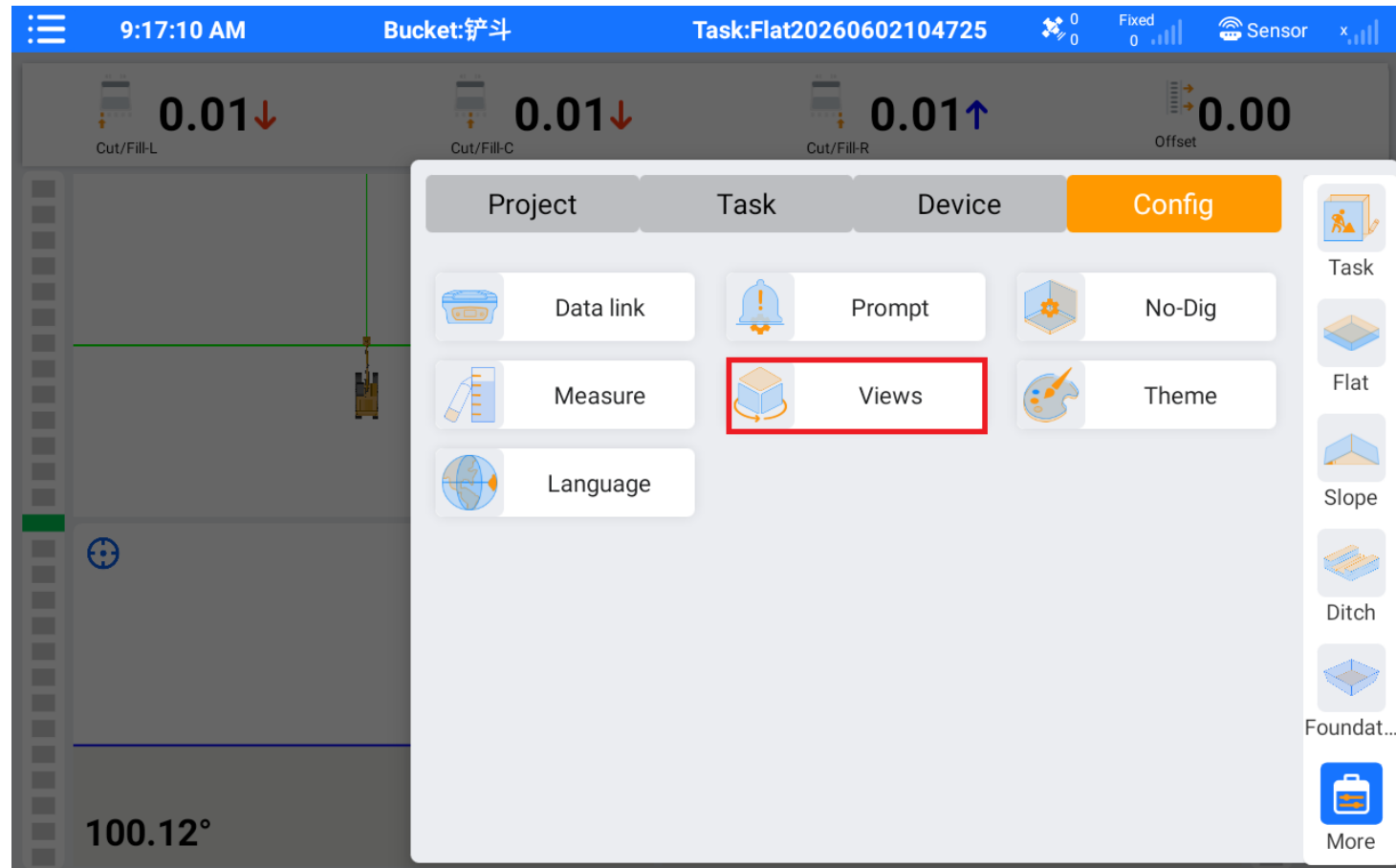
5.3 Measure

- Click the icon  in the lower right corner of the main interface, then click "Measure" in "Config".
- According to the actual operational requirements, the position of the shovel tip, the duration of data collection at each point, and the accuracy factor can be set; the optical target can also be adjusted according to operational needs.
- Click the "Confirm" in the top right corner to save the configuration.



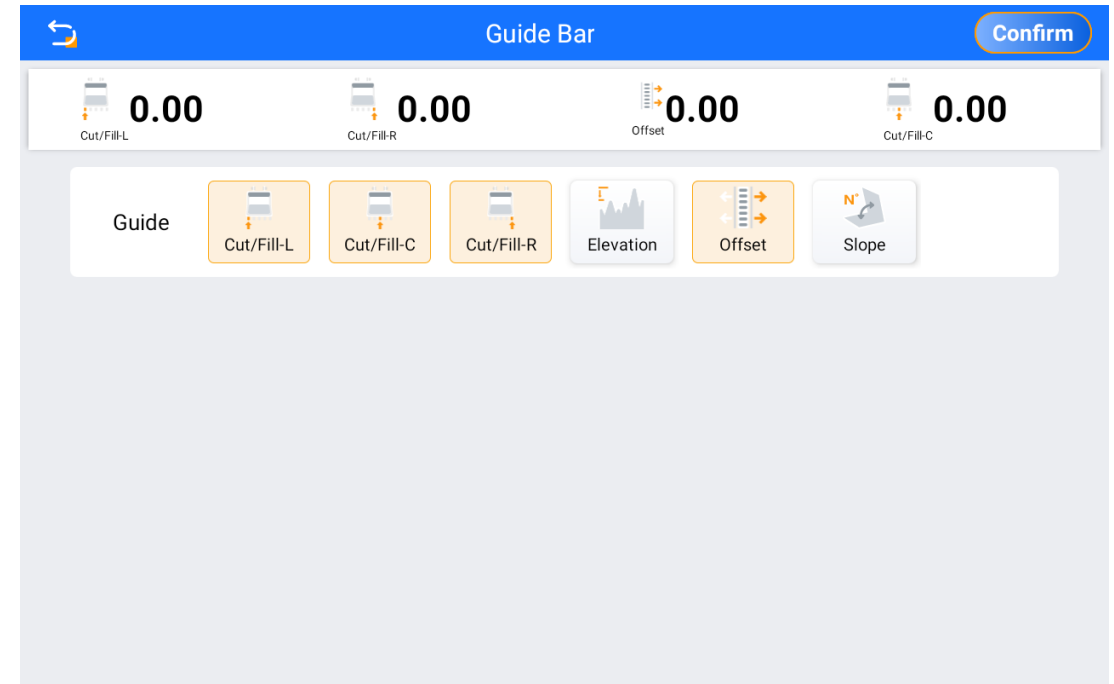
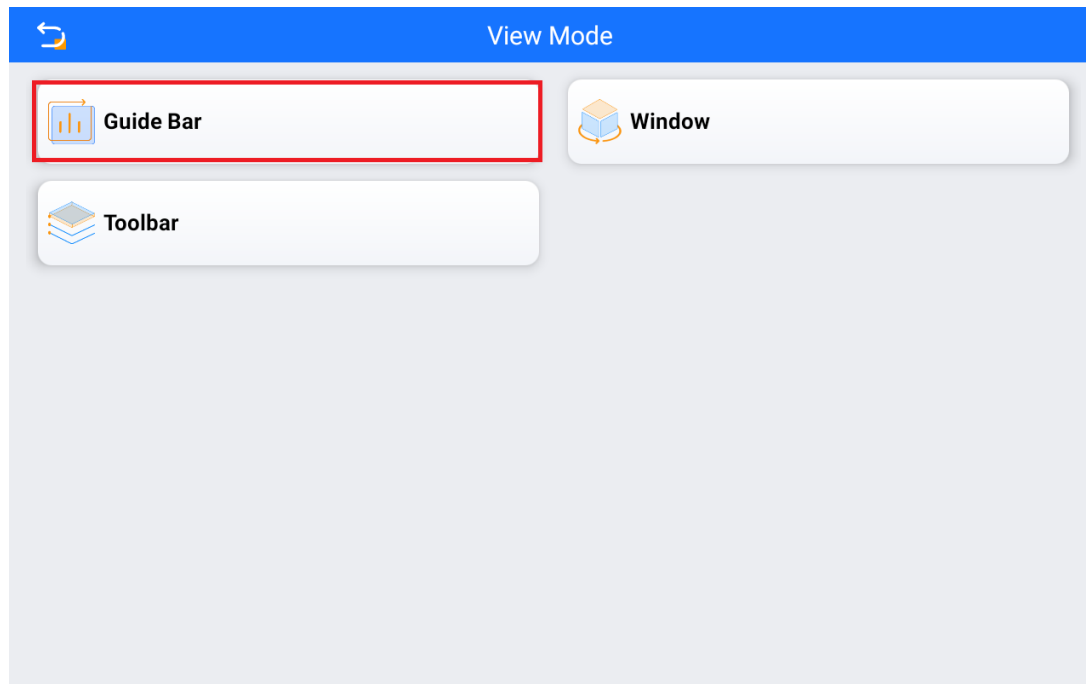
5.4 Views

- Click the icon  in the lower right corner of the main interface, then click “View” to enter the view configuration interface.



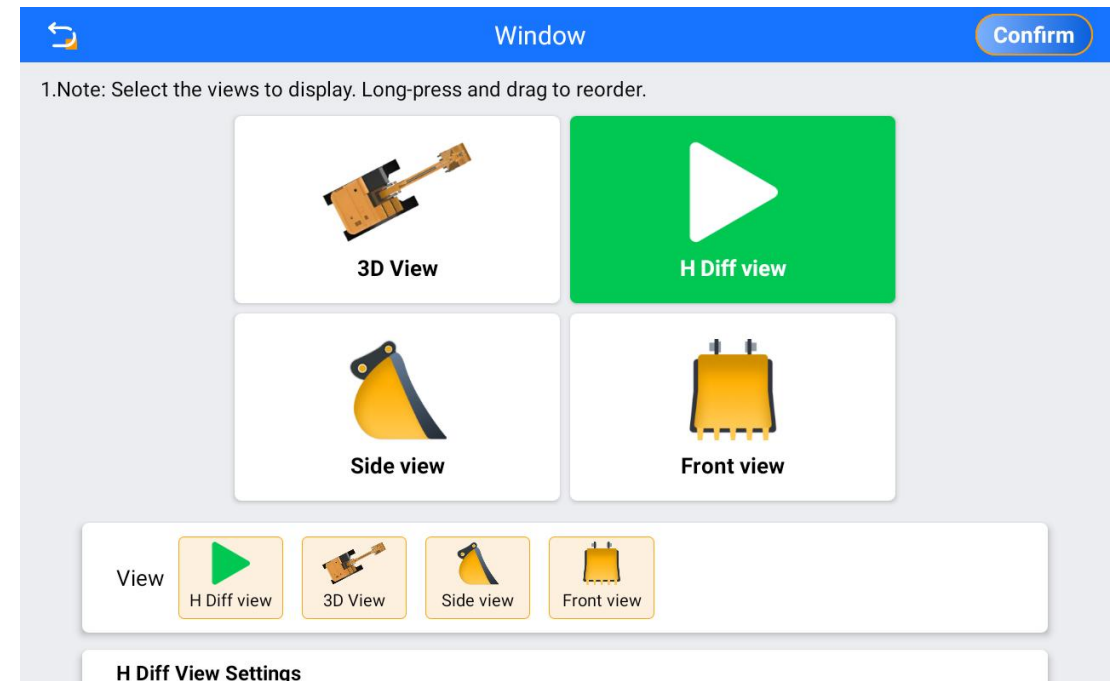
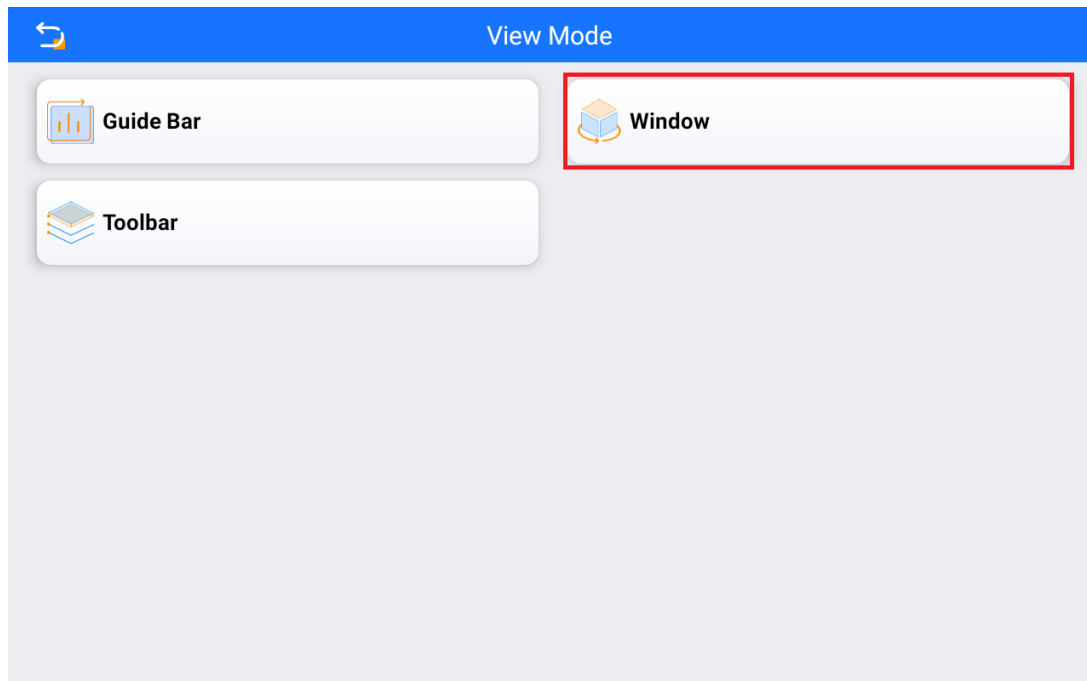
5.4.1 Guide Bar

- Click the “Guide Bar” button to enter the Guide Bar configuration interface;
- Clicking the guide function allows you to add it to the guide bar, and the added guide function can be displayed on the main interface;
- Click the “Confirm” button in the upper right corner to complete the configuration.



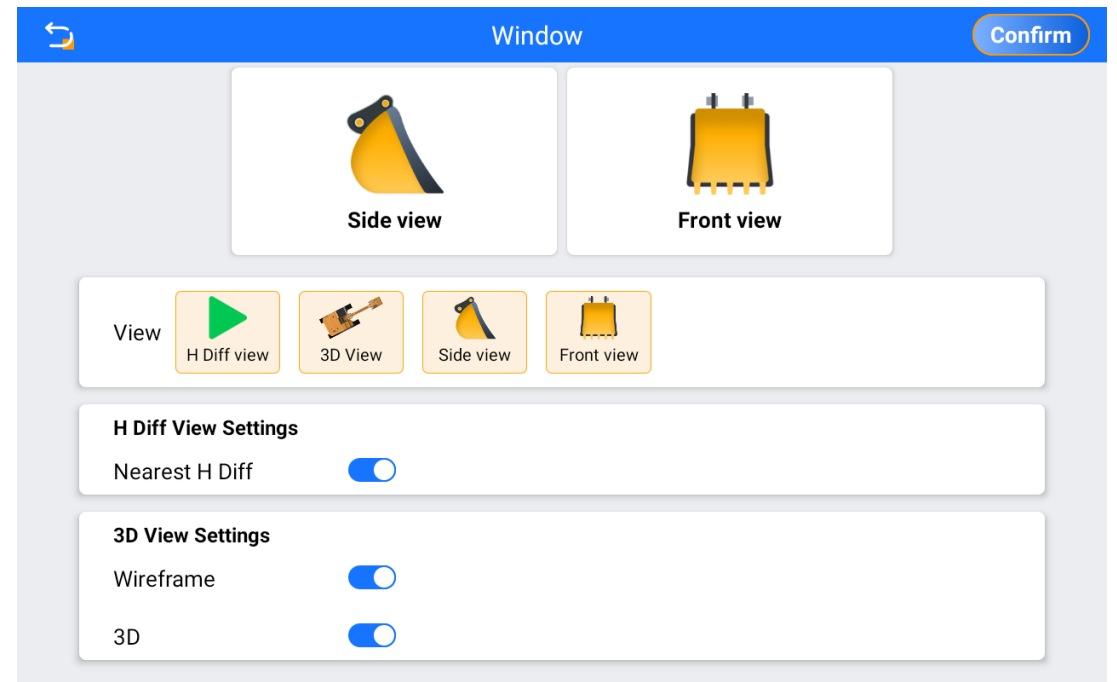
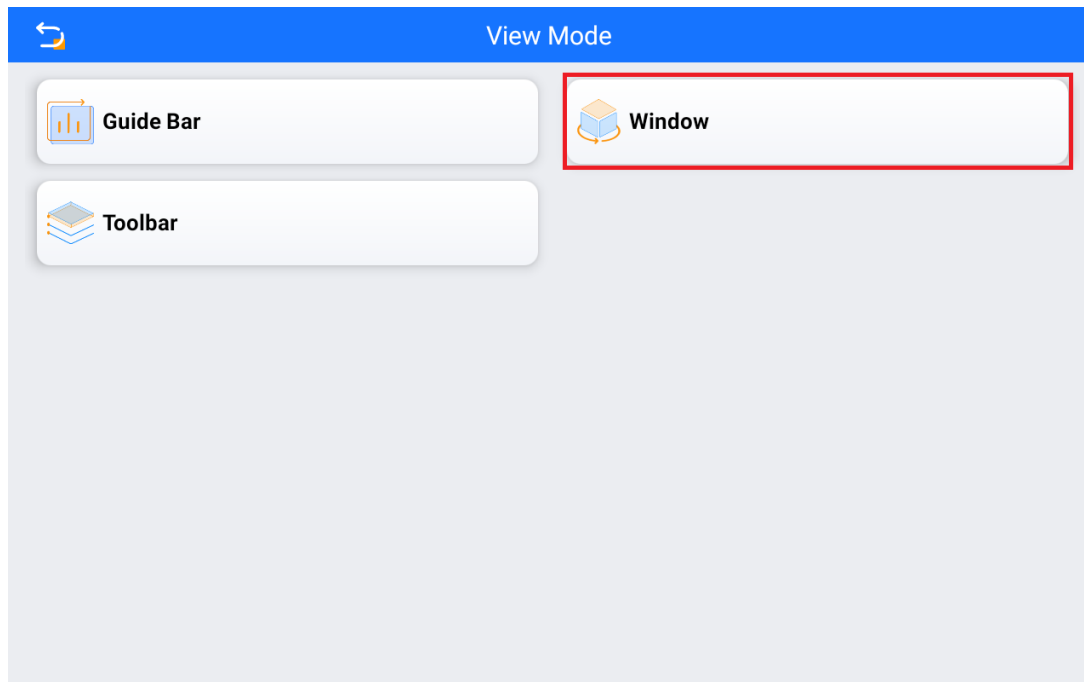
5.4.2 Window

- Click the “Window” button to enter the view configuration interface.
- Click to select the view window, and the selected view will be displayed on the main interface.
- Long press to drag the corresponding view to sort.
- Click the “Confirm” button in the top right corner to complete the configuration.



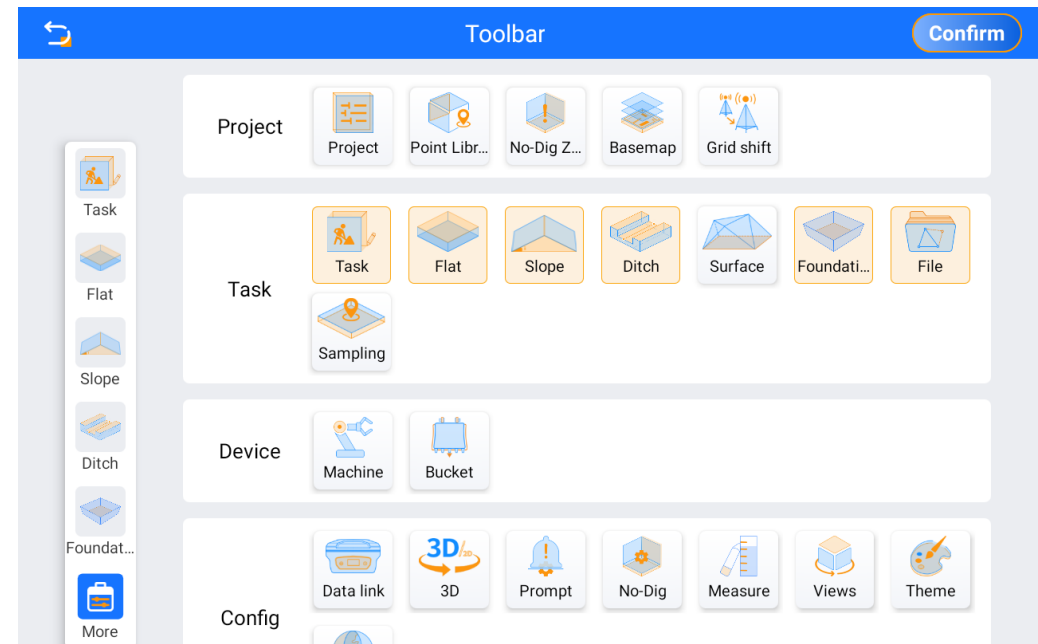
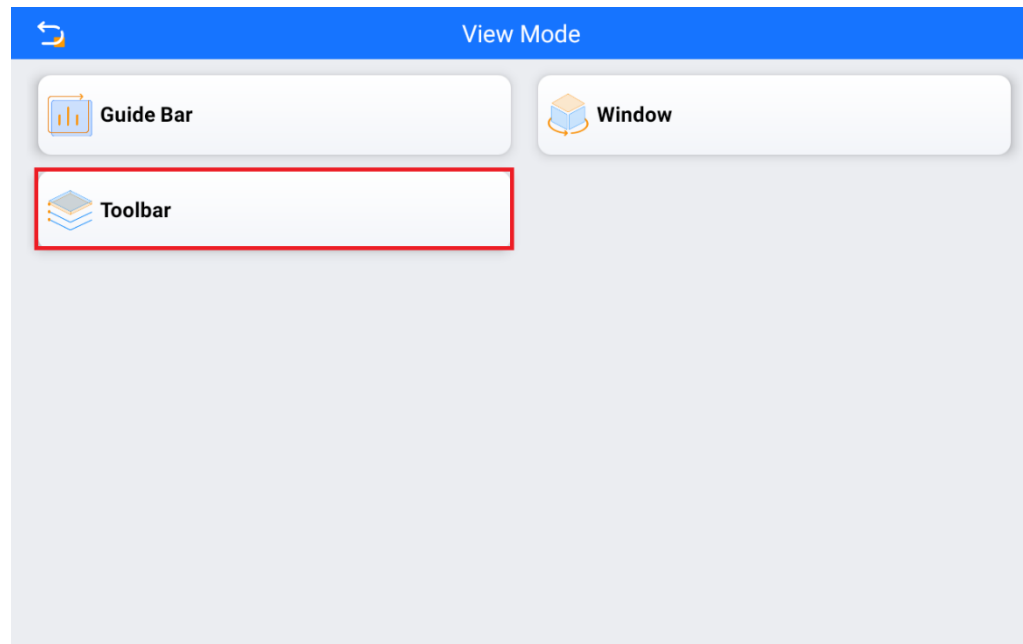
5.4 Window

- Clicking the recent height difference switch button can turn the recent height difference of the operation on or off; when the recent height difference is turned on, the height difference between points exceeding the operation range and the most recent operation point will be displayed during the operation.
- You can choose the display mode of the working model through wireframe and 3D switches.
- Click the “Confirm” button in the upper right corner to complete the configuration.



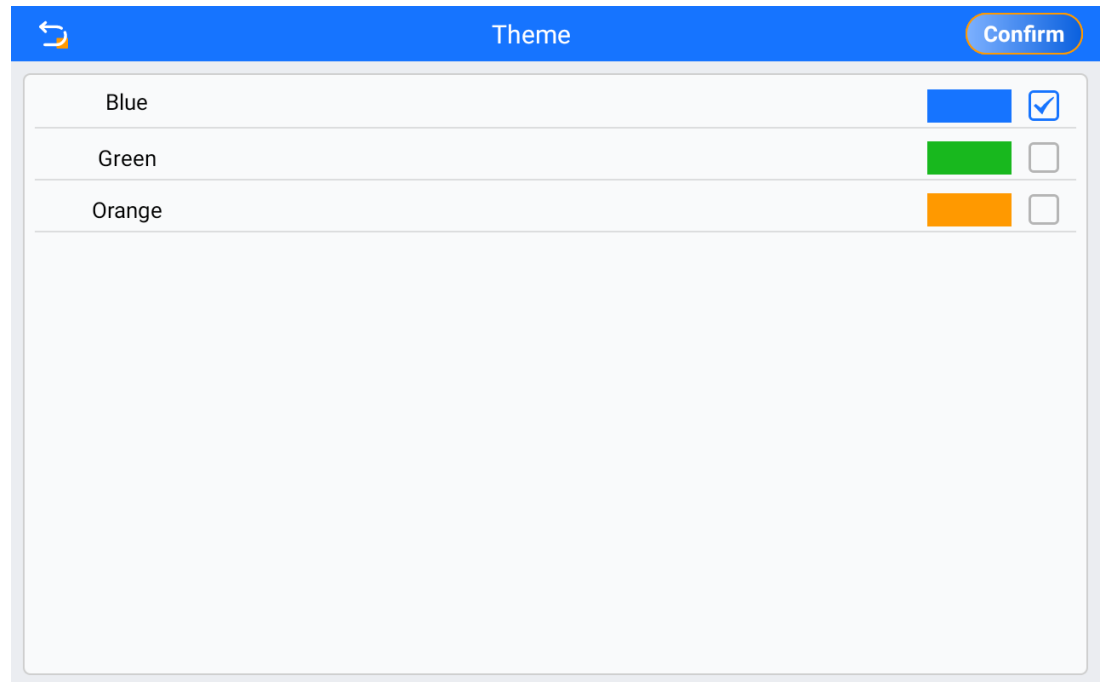
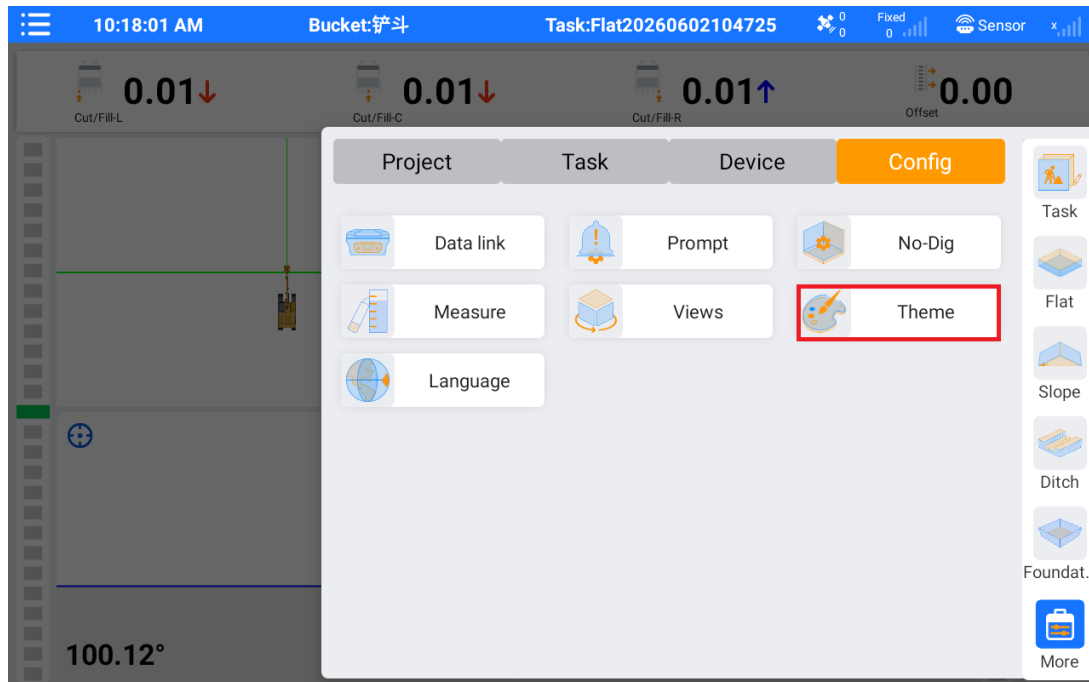
5.4.3 Toolbar

- Click the “Toolbar” button to enter the toolbar configuration interface;
- Clicking the shortcut button of a function can add it to the toolbar. The added function can be displayed on the main interface and used quickly;
- Click the “Confirm” button in the top right corner to complete the configuration.



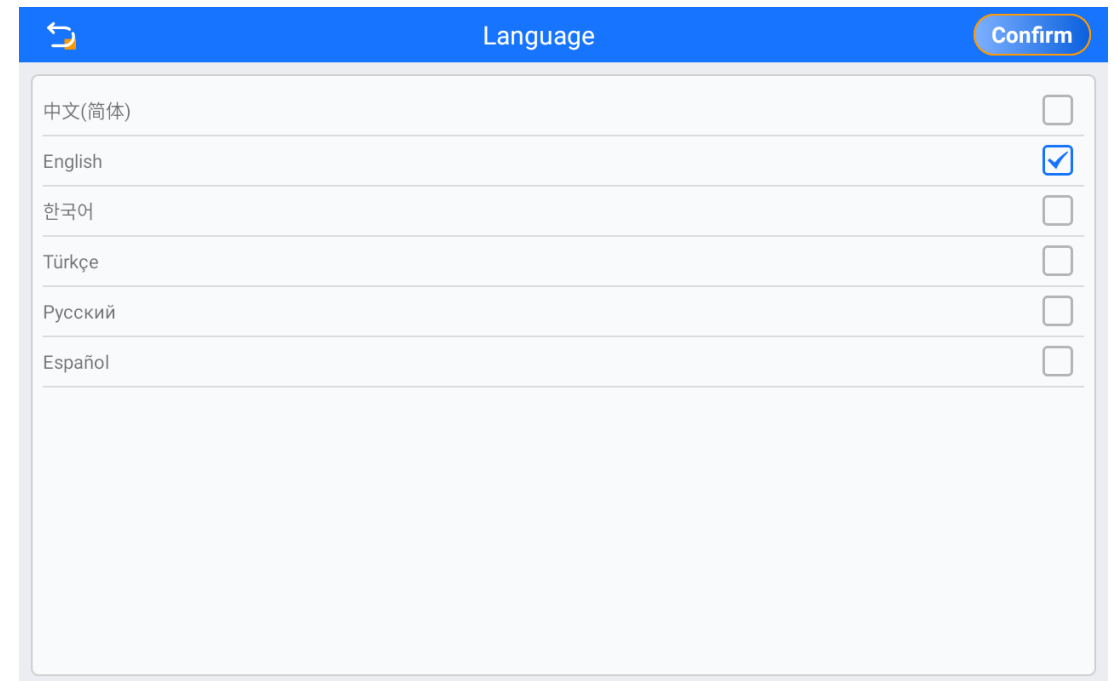
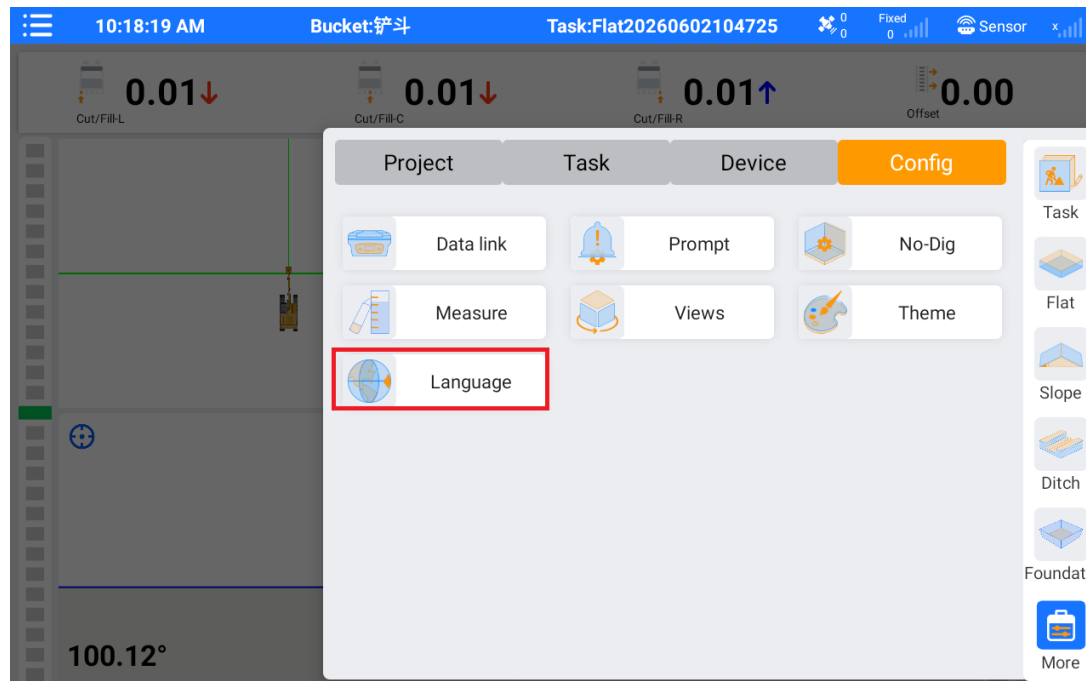
5.5 Theme

- Click the icon  in the lower right corner of the main interface, and click "Theme".
- According to the actual work requirements, different color themes can be set.
- Click the "Confirm" in the top right corner to save the configuration.



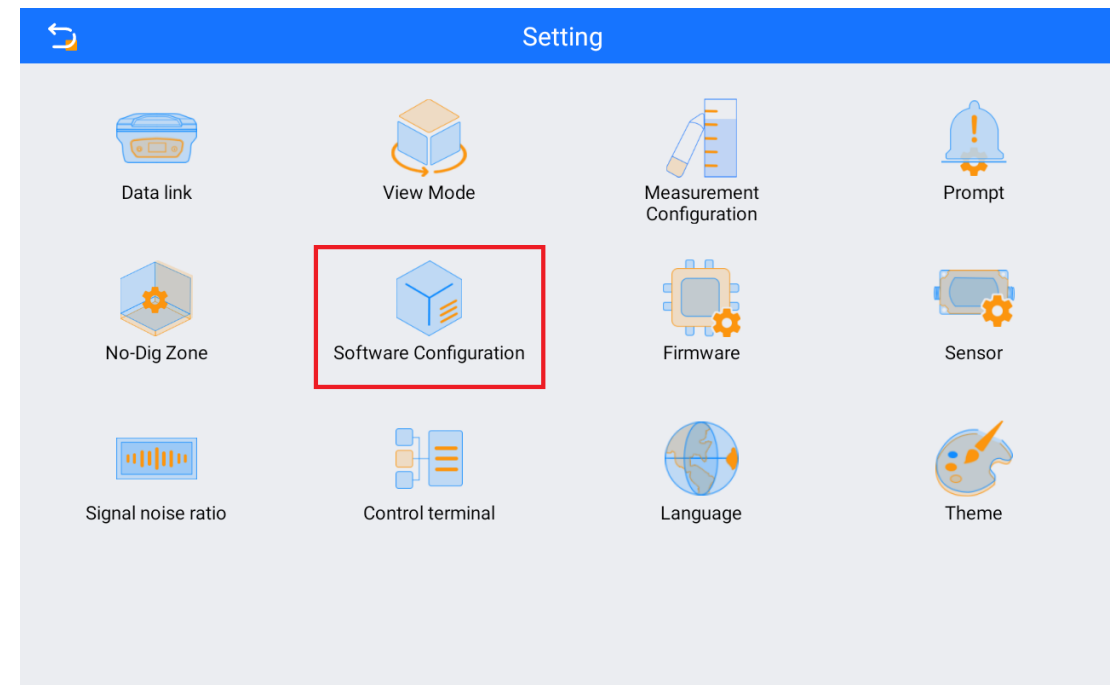
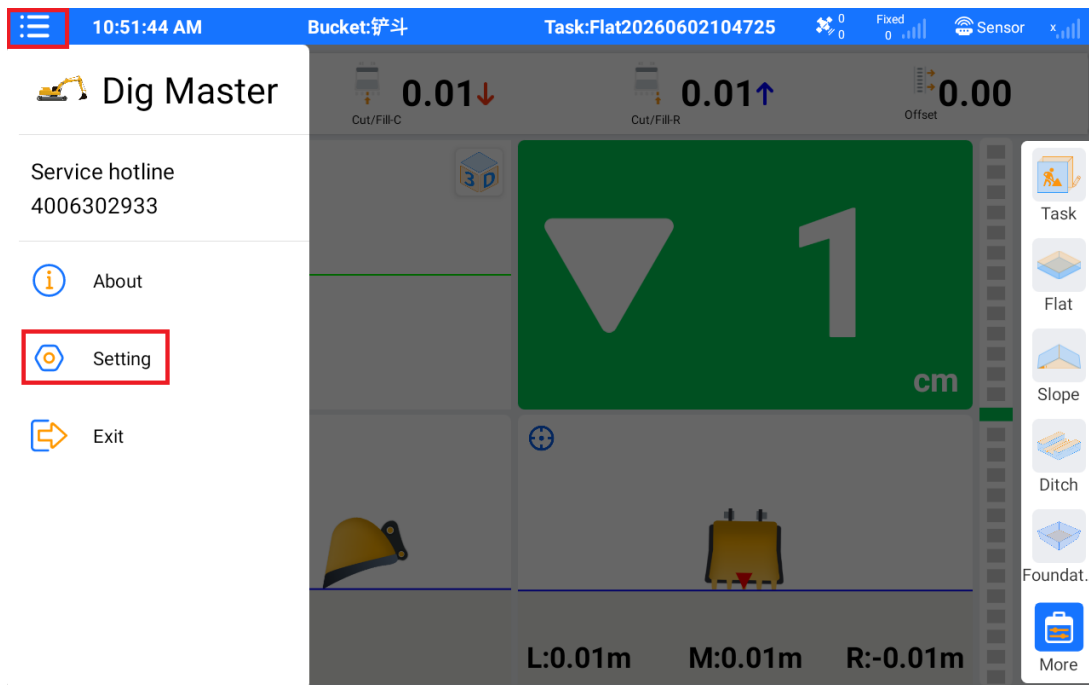
5.6 Language

- Click the icon  at the bottom right of the main interface, then click “Language” .
- According to the actual assignment requirements, the corresponding language can be chosen to complete the assignment.
- Click the “Confirm” in the top right corner to save the configuration.



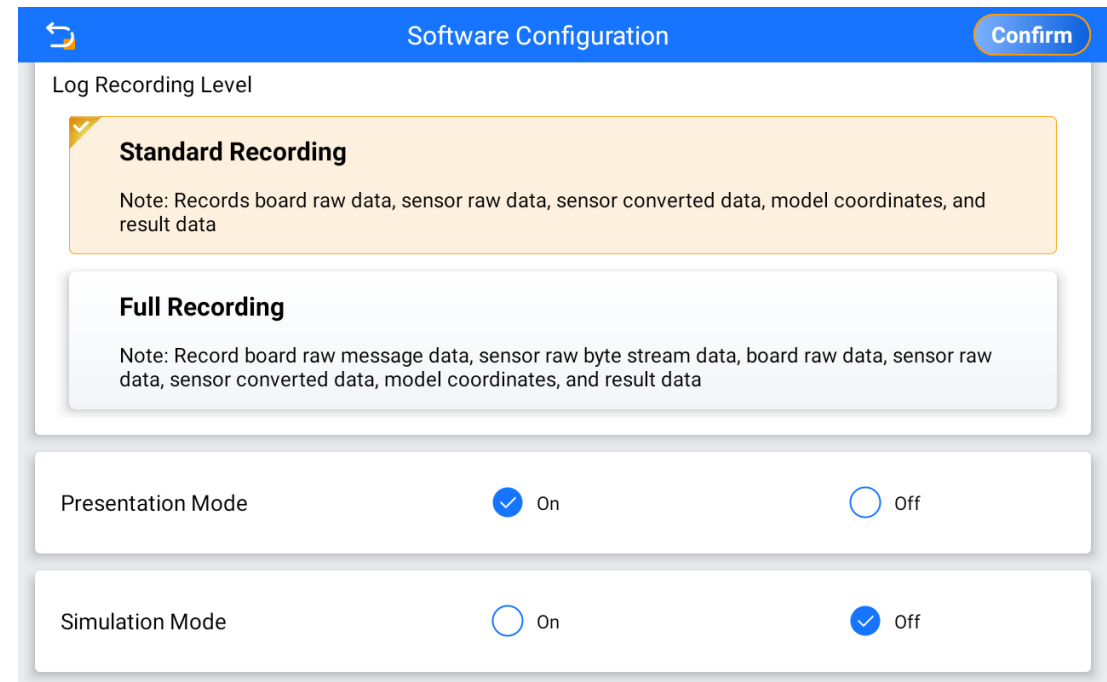
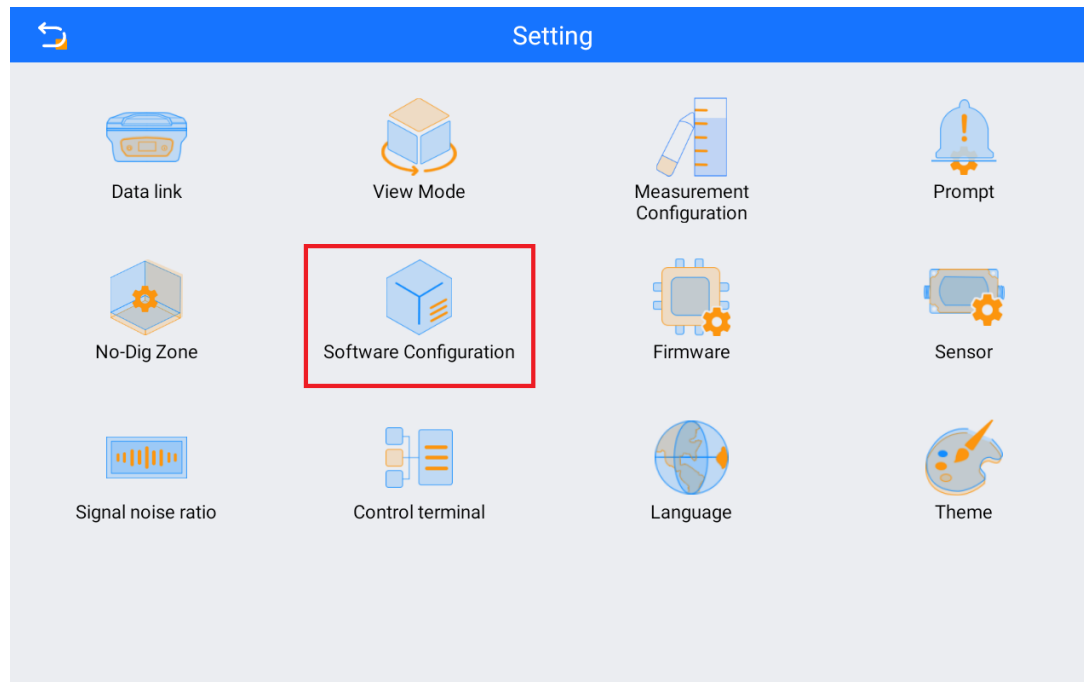
5.7 Software Configuration

- Click the icon  in the upper left corner of the main interface, and click “Settings” to enter the settings interface;
- Select the “Software Configuration” option to make settings.



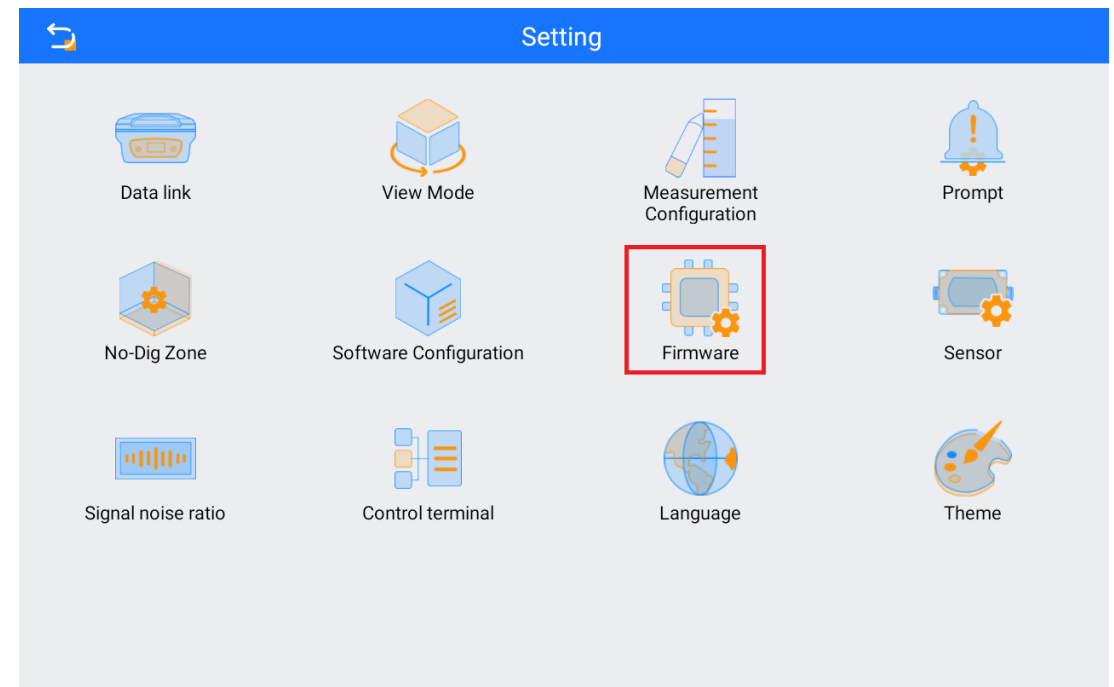
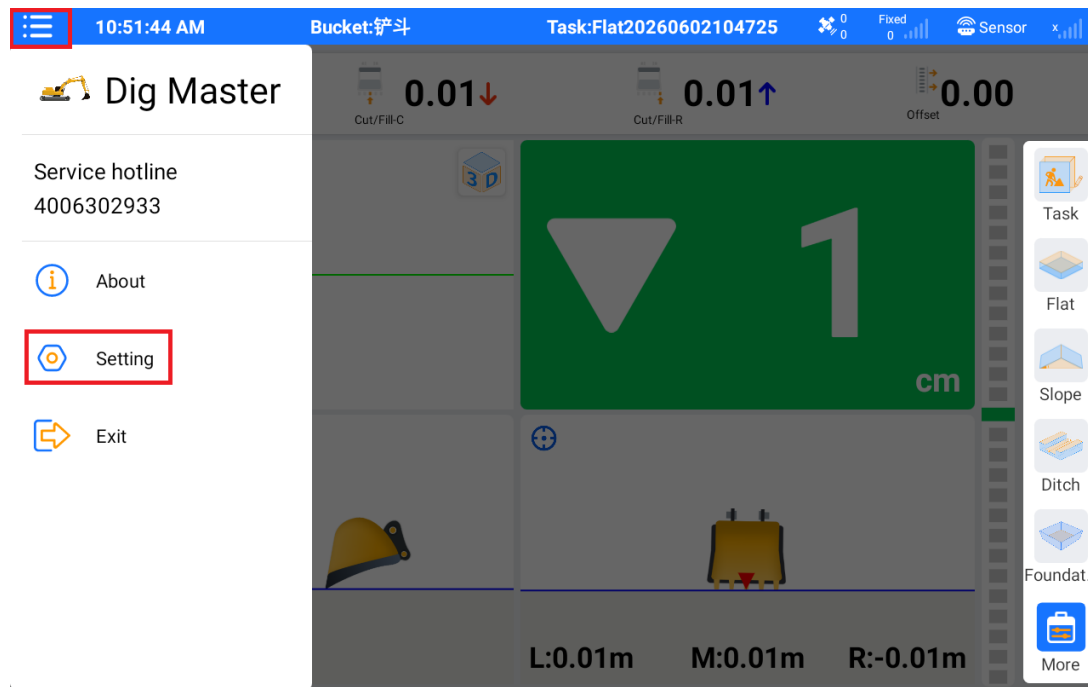
5.7 Software Configuration

- Click the “Software Configuration” button to make the relevant settings.
- Different types of logs can be selected according to the actual working environment to record different log content.
- By turning on demo mode and simulation mode, relevant demonstration work can be carried out.



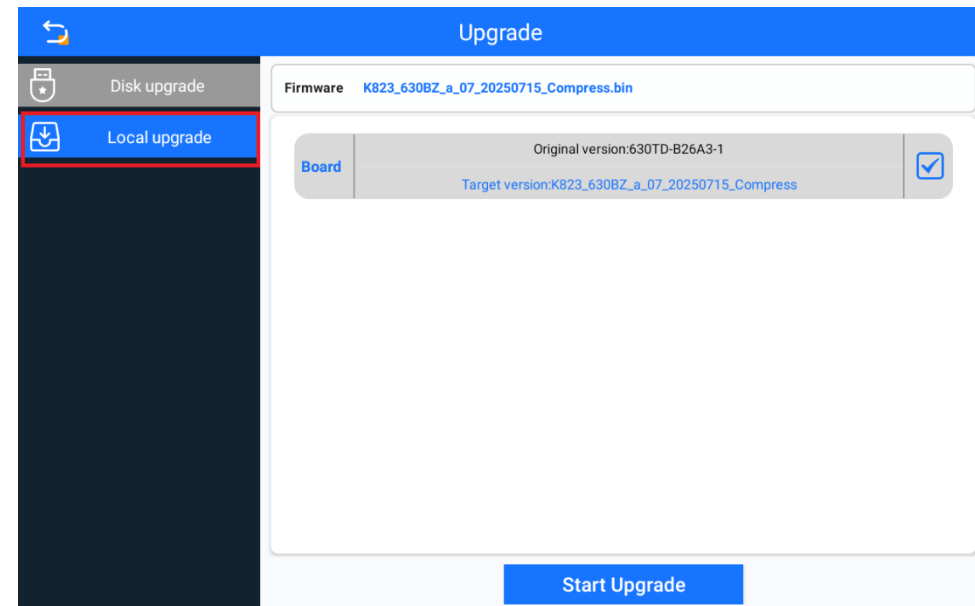
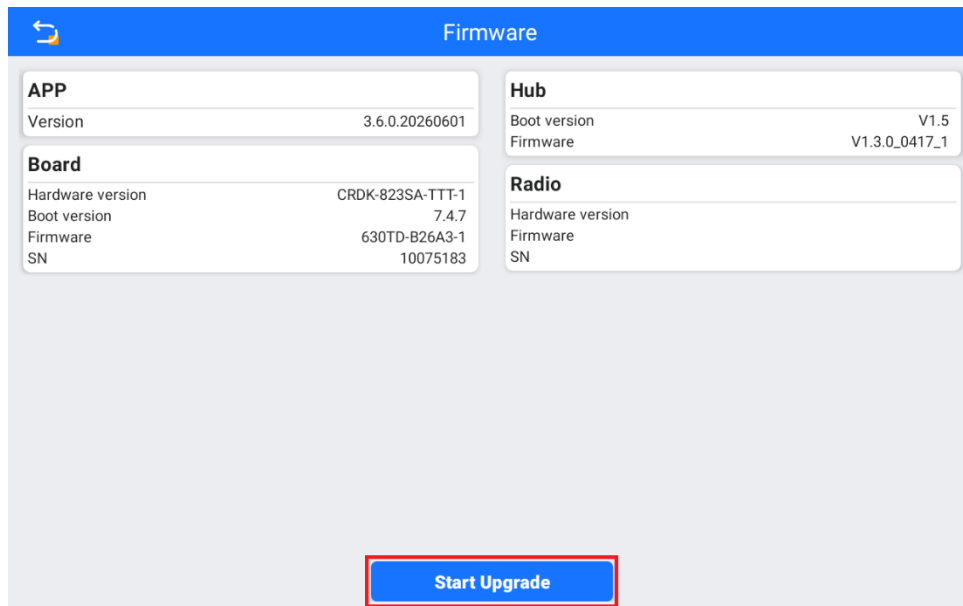
5.8 Firmware

- Click the icon  in the upper left corner of the main interface, and click "Settings" to enter the settings interface;
- Select the "Firmware" option to configure firmware-related settings.



5.8 Firmware

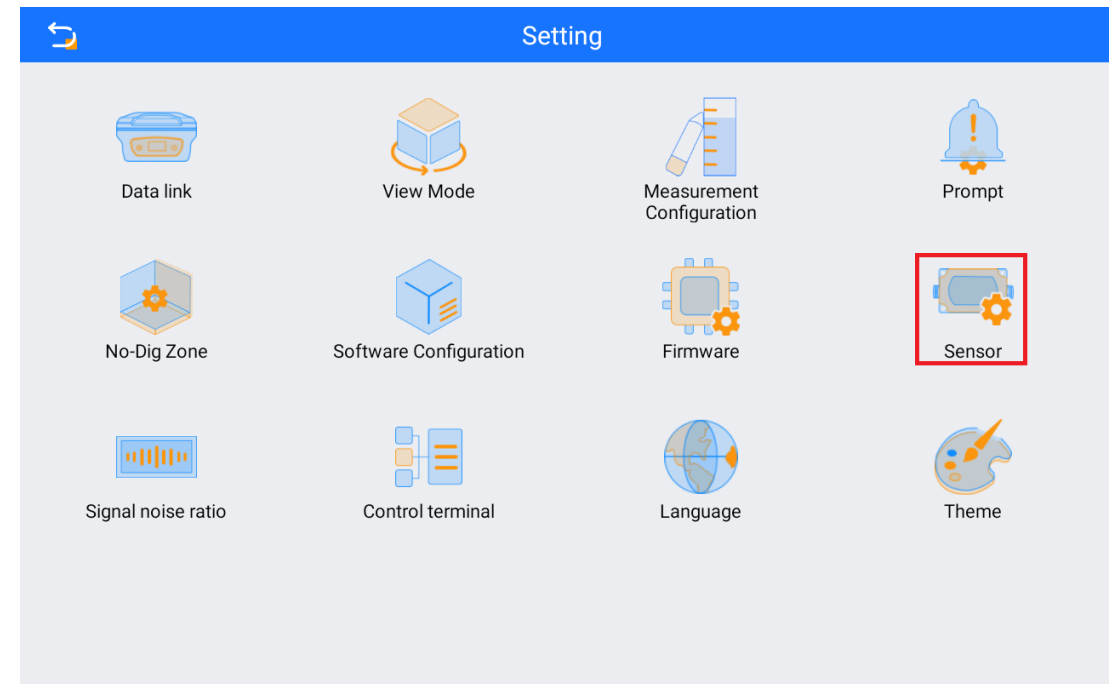
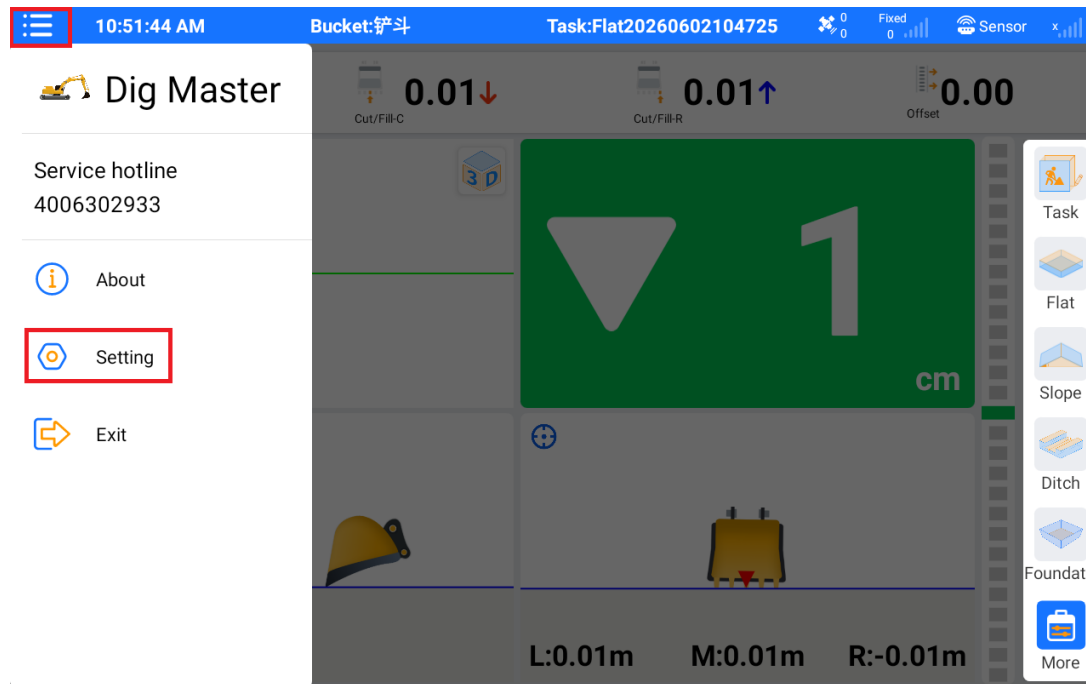
- The software version and firmware information can be viewed through the firmware management interface.
- Click the “Start Upgrade” button and choose “Local Upgrade” or “USB Upgrade” .
- Select the corresponding firmware version, click “Start Upgrade” and wait for the progress bar to reach 100% to complete the upgrade.



Note: After the board firmware upgrade is completed, the software will restart. Please wait for it to reboot.

5.9 Sensor

- Click the icon  in the upper left corner of the main interface, and click "Settings" to enter the settings interface;
- Select the "Sensor" option to configure sensor-related settings.



5.9 Sensor

- B1, R2, and F3 are sensor types. You can choose the corresponding type based on the actual situation of the sensor.
- Click the “Edit Sensor” button to configure sensor-related settings.
- According to the actual situation, the sensor ID can be modified (change the sensor ID to be modified to the target sensor ID).

Sensor

☐ B1 ☐ R2 ☒ F3

Edit Sensor

Edit Sensor

Sensor to modify Body sensor – 5

Target sensor Stick sensor – 7

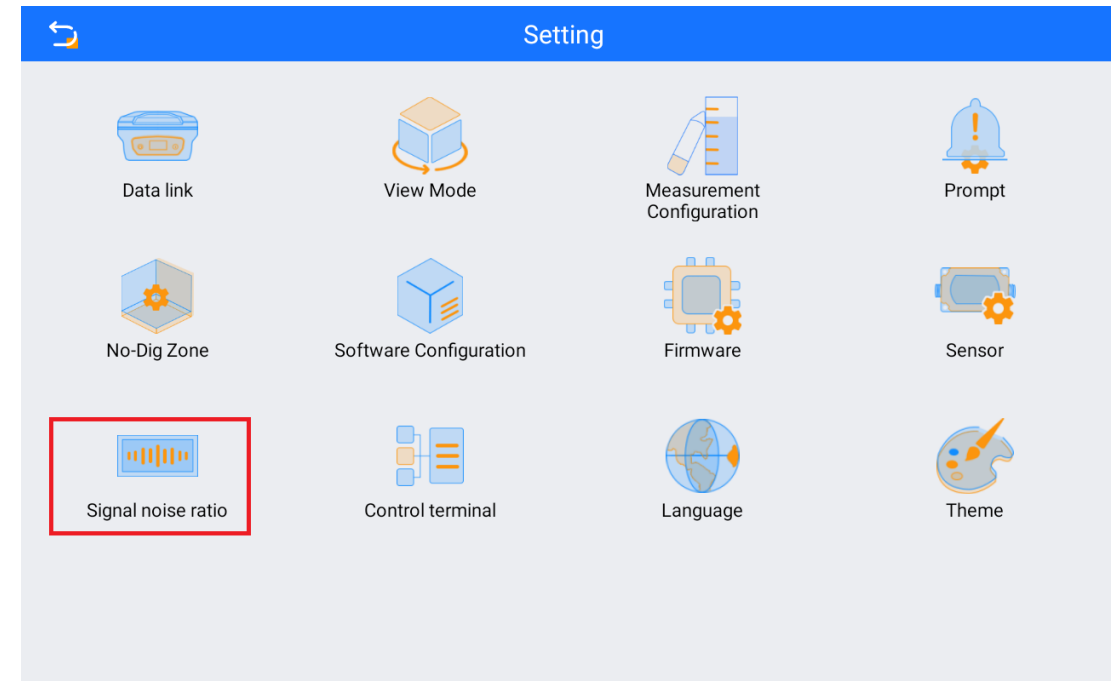
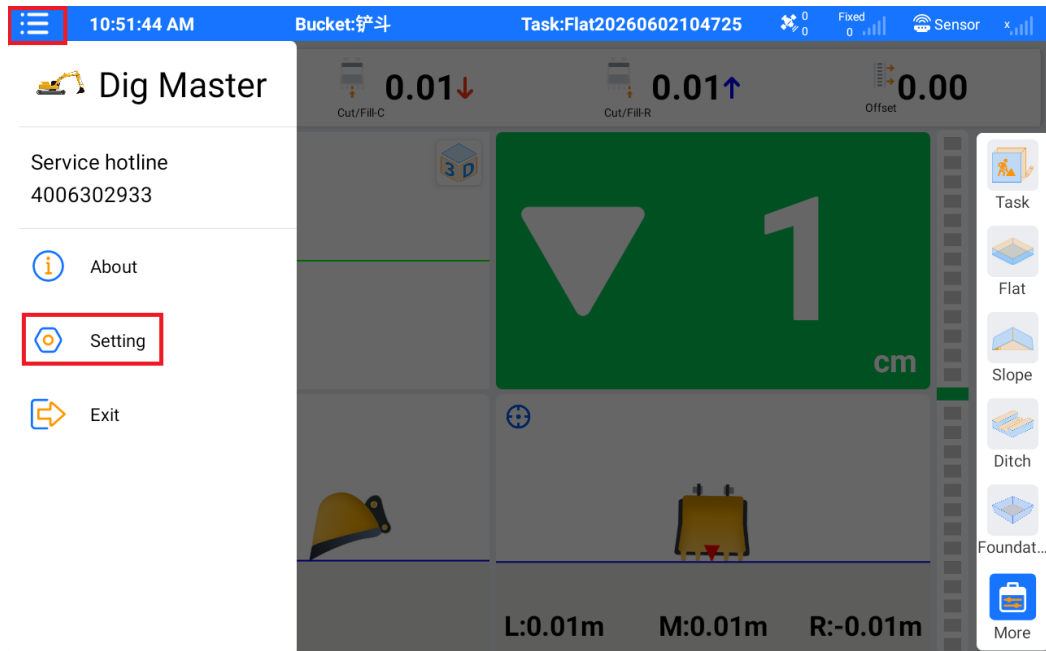
Confirm changes Re-detect

Sensor configuration 0.003

Confirm changes

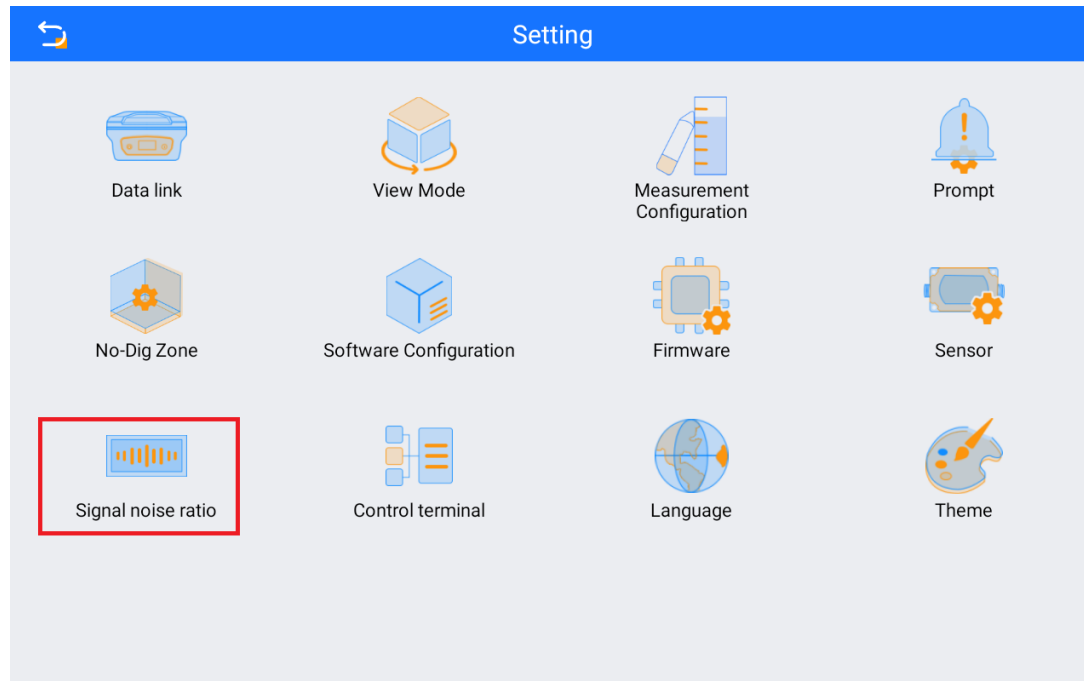
5.10 Signal Noise Ratio

- Click on the icon  in the upper left corner of the main interface, select "Setting" and select "Signal noise ratio" from the "Setting" menu.



5.10 Signal Noise Ratio

- View satellite information found on the tablet (including name, satellite azimuth, pitch, satellite frequency band and Antenna Signal Quality).

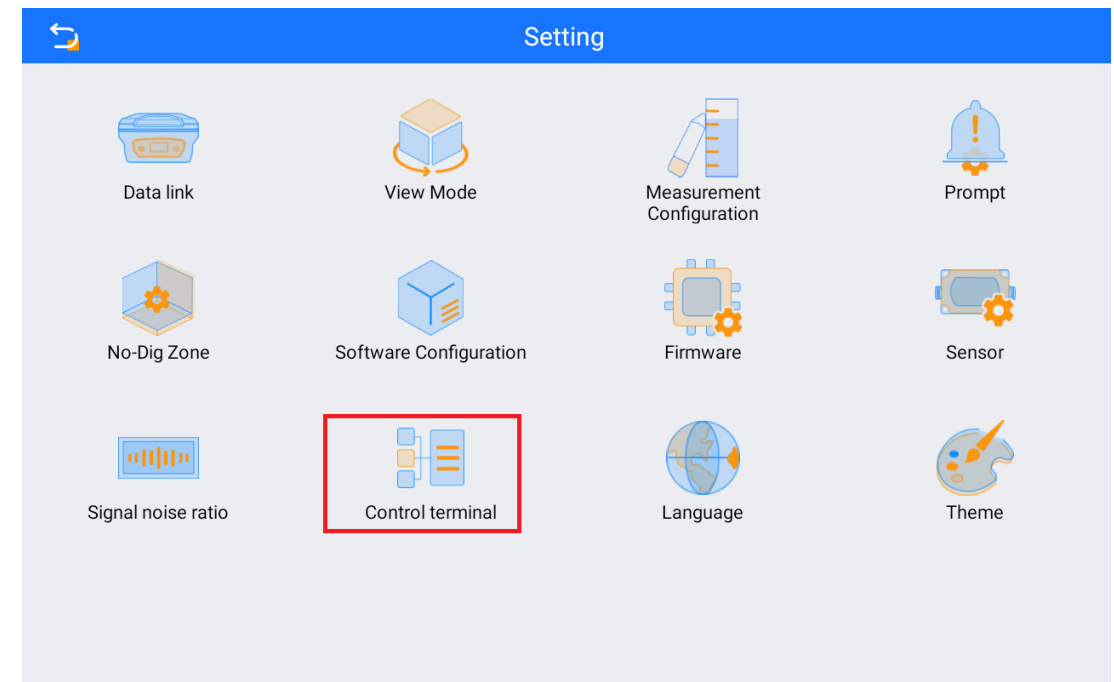
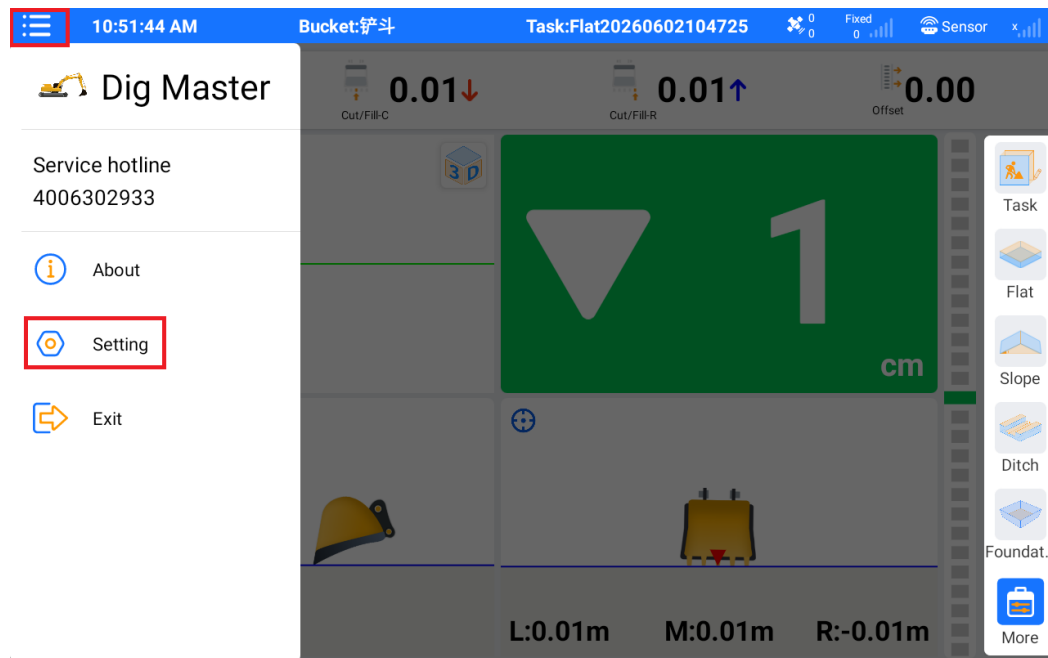


Signal noise ratio								
No.	SV	Azimuth	Pitch	L1	L2	L5	B1C	B2A
1	G10	189	33	44	42	0	-	-
2	G25	45	39	43	42	0	-	-
3	G26	218	38	43	43	0	-	-
4	G28	336	60	46	48	0	-	-
5	G29	108	22	39	43	0	-	-
6	G31	289	43	46	44	0	-	-
7	G32	73	73	50	48	0	-	-
8	S13	125	55	45	47	0	-	-
9	S18	169	53	38	48	0	-	-
10	C01	141	46	44	45	41	0	0
11	C02	239	38	40	44	39	0	0
12	C03	200	52	44	46	42	0	0
13	C04	124	34	40	44	40	0	0
14	C05	257	16	37	42	37	0	0
15	C06	302	58	44	46	43	0	0
16	C08	208	51	42	46	42	0	0
17	C09	284	49	43	45	41	0	0
18	C13	225	54	44	45	43	0	0

Antenna Signal Quality
Main: Average(84%)
Slave: Average(83%)

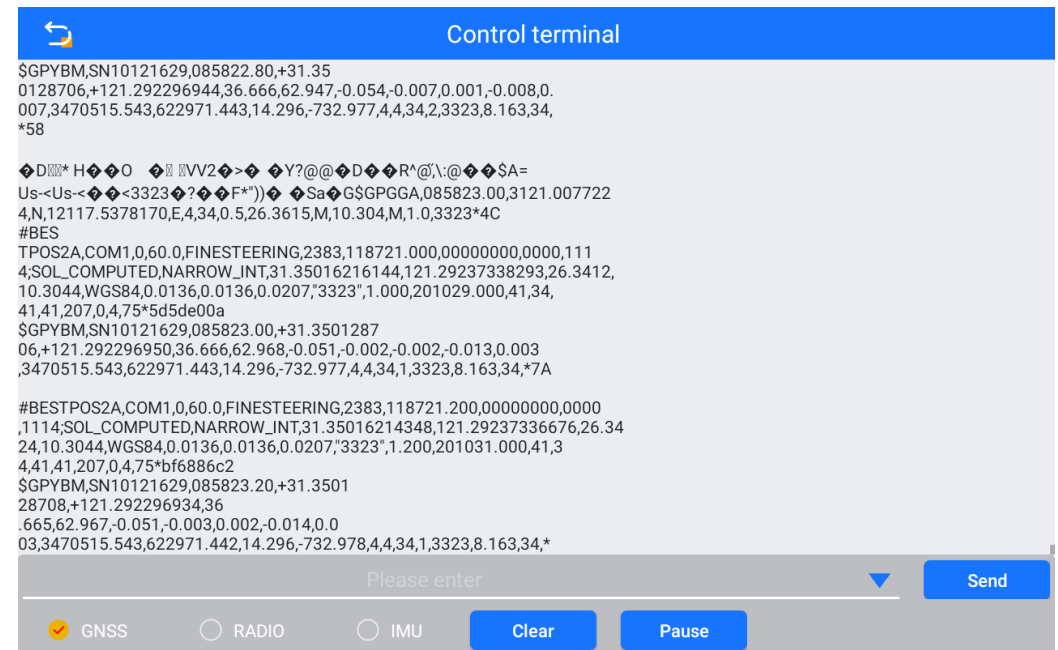
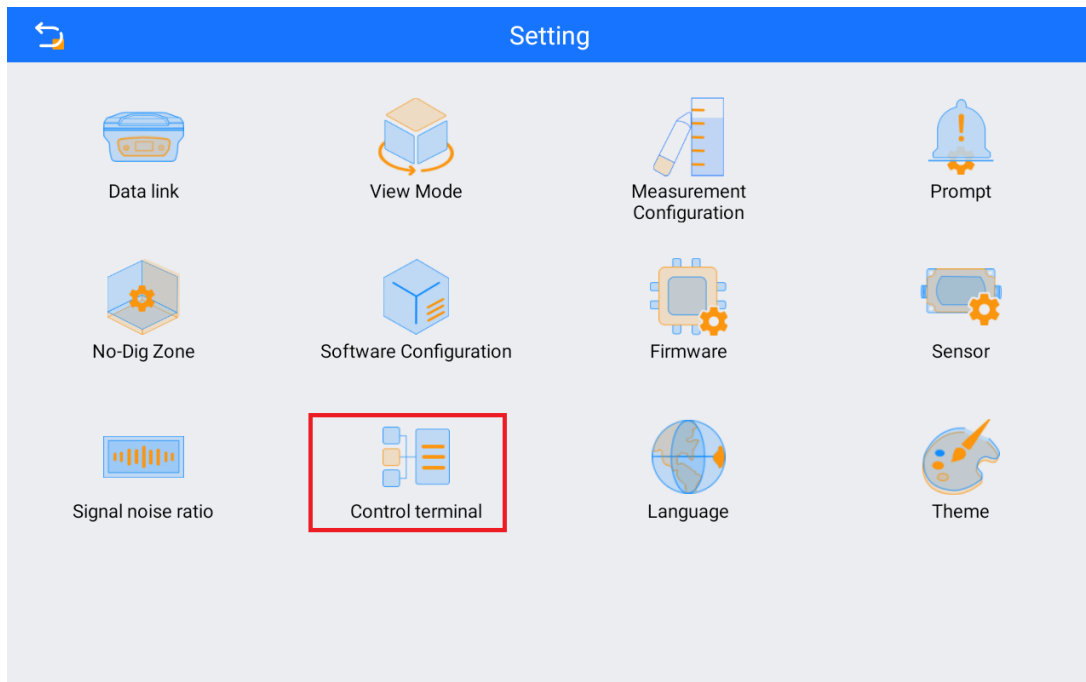
5.11 Control terminal

- Click on the icon  in the upper left corner of the main interface, select "Setting" and select "Control terminal".



5.11 Control terminal

- View satellite message data or send command instructions to the tablet through the "Control terminal" function And through this interface, you can view the transmission information of the station and the IMU attitude information. (download the board instruction manual from Sino official website).

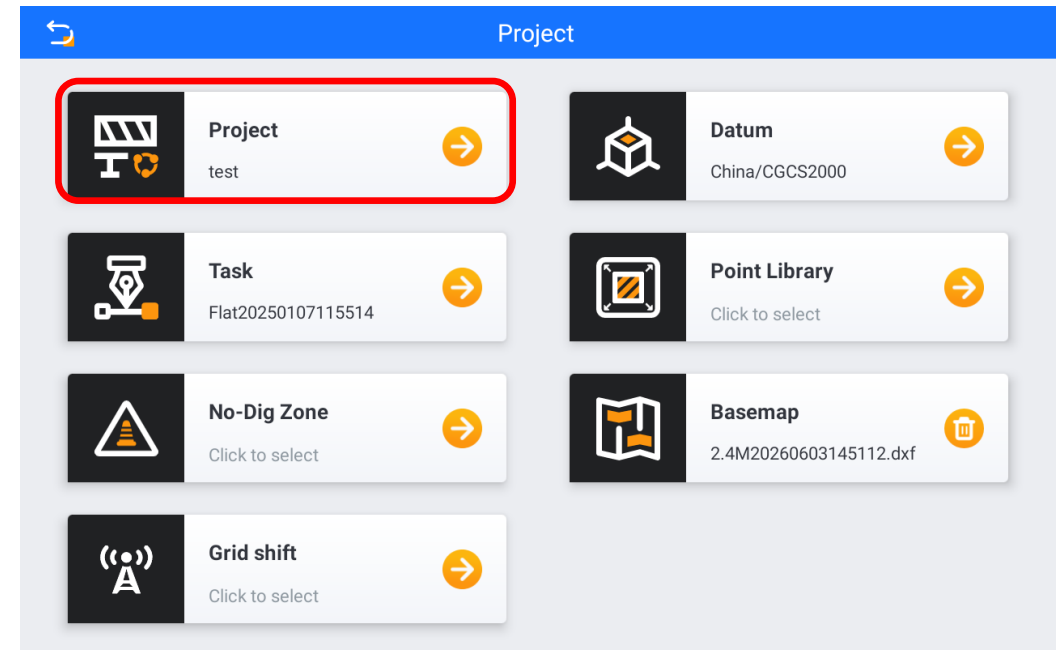
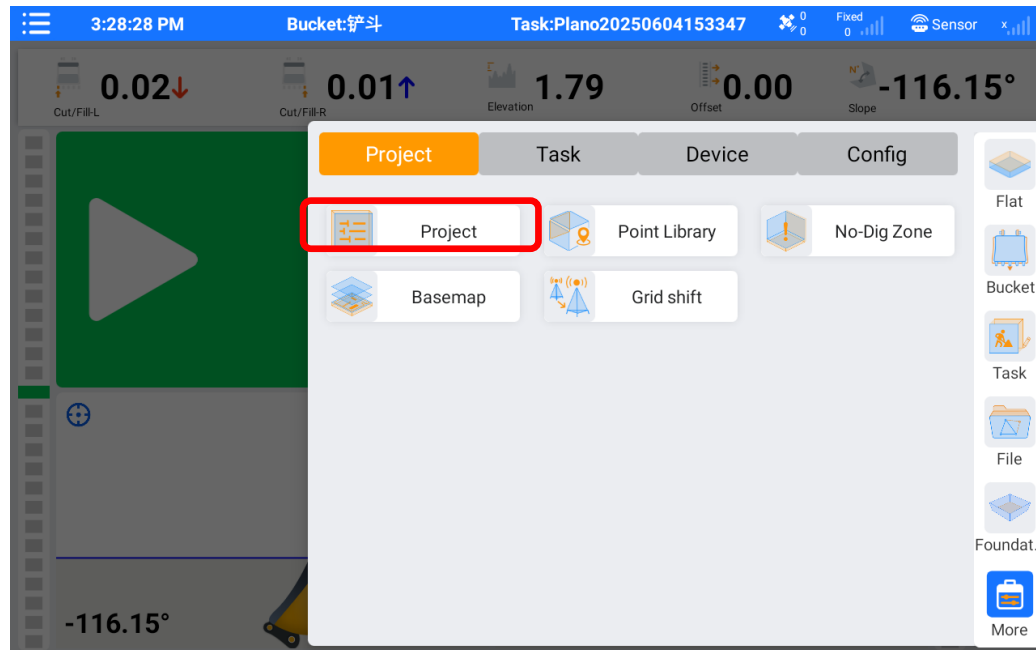


06

Create project

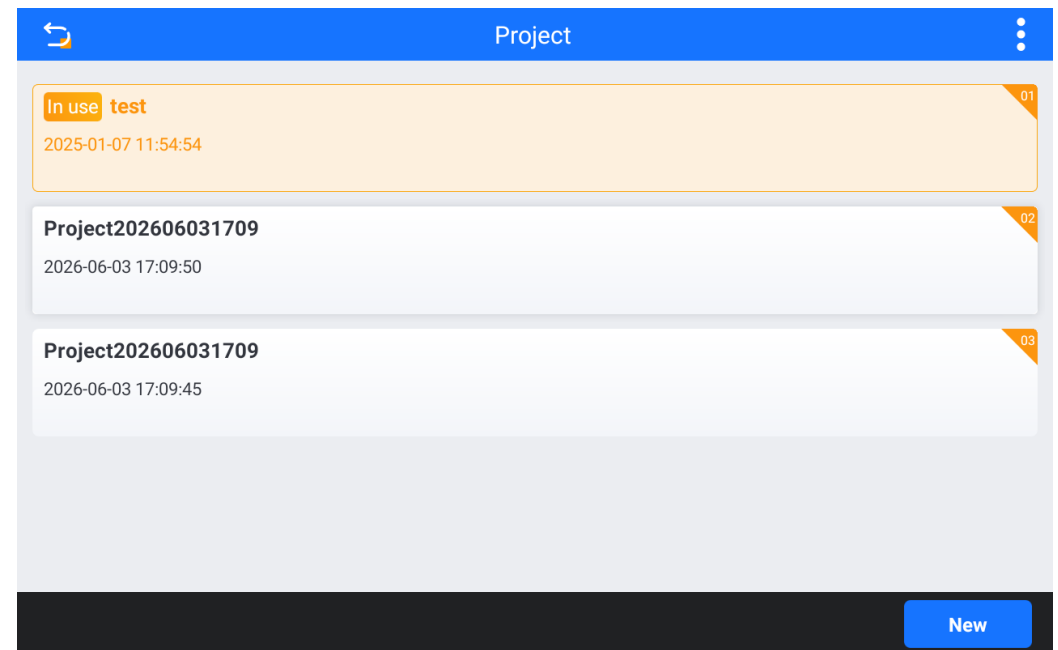
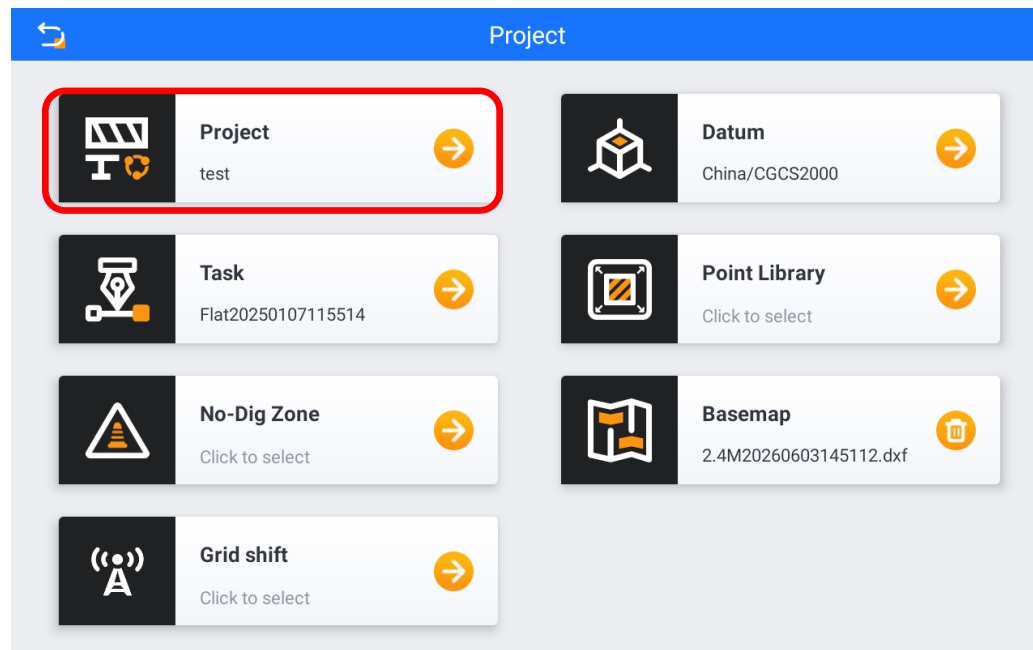
6.1 Project

- Click on the icon  in the bottom right corner of the main interface, select "Project", and enter the project page.
- Click on "Project" to enter the project list page.



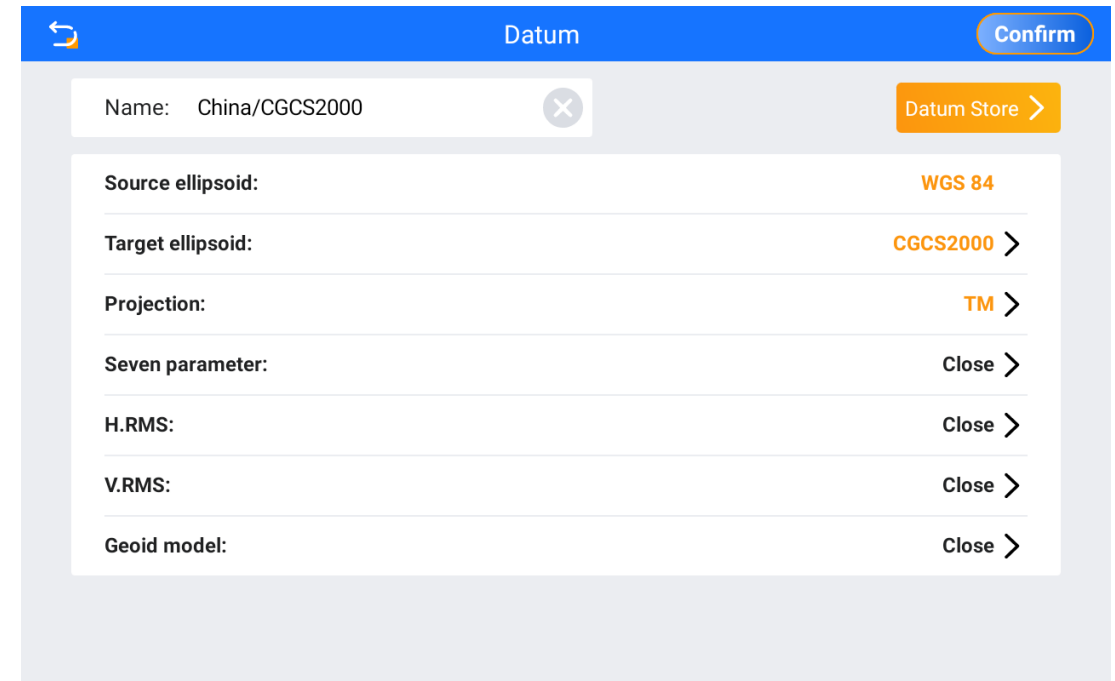
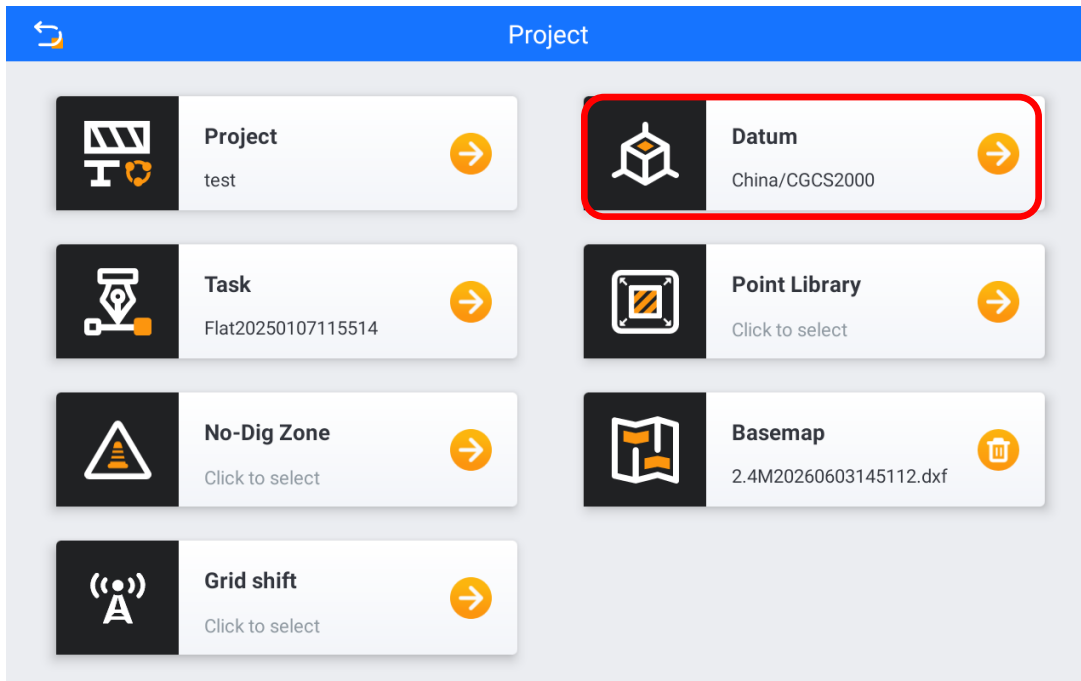
6.1 Project

- On the project list page, you can select, create, edit, and delete projects;
- When selecting a project, the datum, point store, basemap, no-dig zone, and other information related to the project will change with the changes in the project.



6.2 Datum

- The "Project" page displays the name of the datum applied in the current project.
- Click on the "Datum" option to enter the datum parameter setting interface under the current project.
- In the settings interface, set relevant parameters according to the project site situation.



6.2.1 Datum Store

- In the "Datum" editing interface, click the "Datum Store" button to enter the datum selection list interface.
- Users can add datum to the datum list by creating a new datum or selecting from predefined datums.
- The datum in the datum list can be selected and used in project.

Datum

Name: China/CGCS2000

Datum Store >

Source ellipsoid: WGS 84

Target ellipsoid: CGCS2000 >

Projection: TM >

Seven parameter: Close >

H.RMS: Close >

V.RMS: Close >

Geoid model: Close >

Datum List

In use China/CGCS2000 01

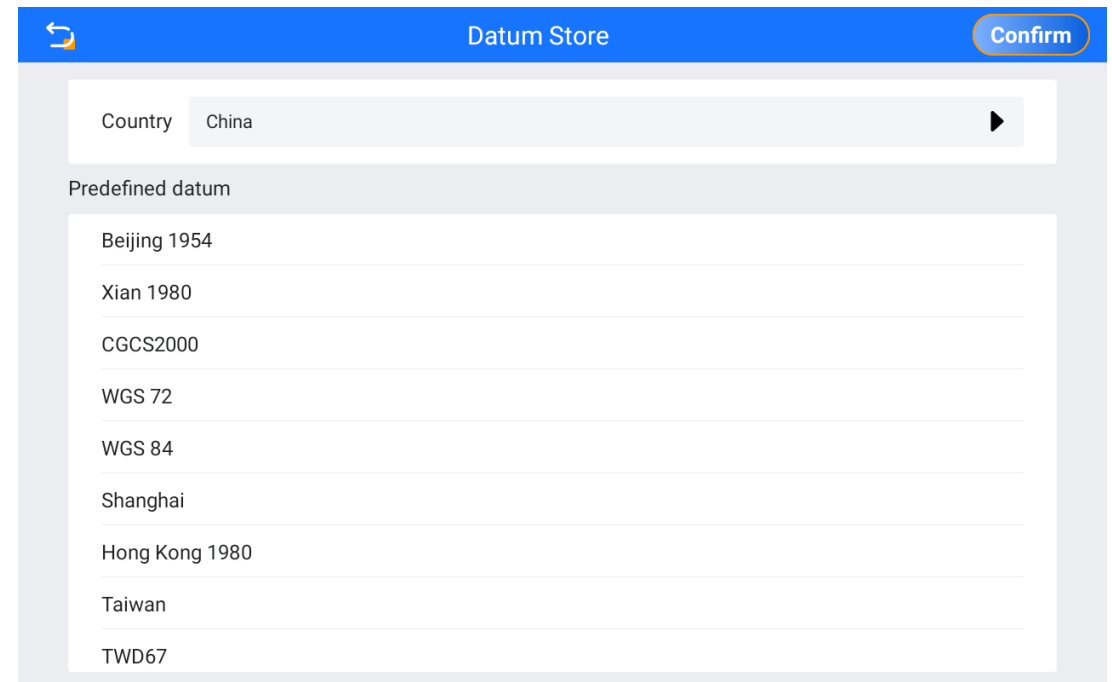
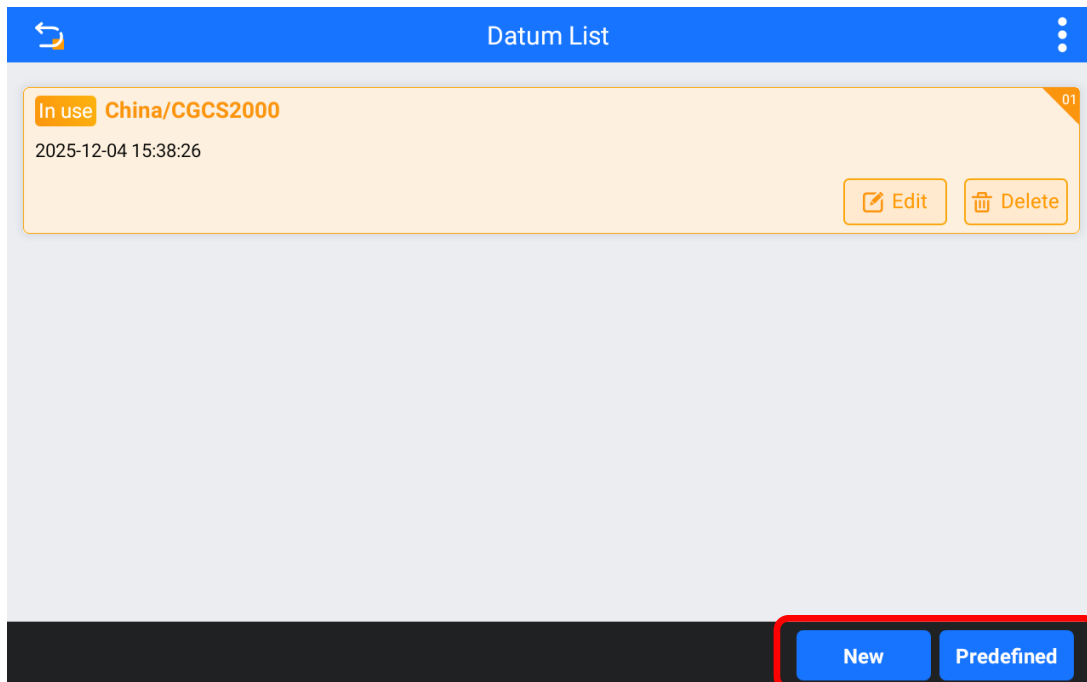
2025-12-04 15:38:26

Edit Delete

New Predefined

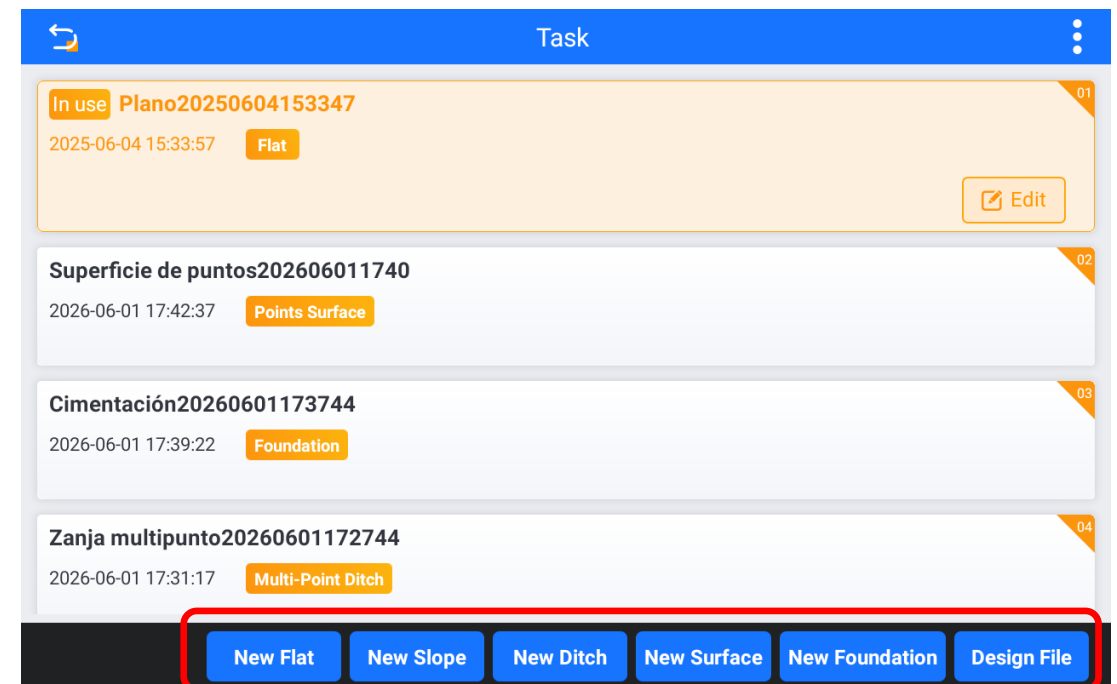
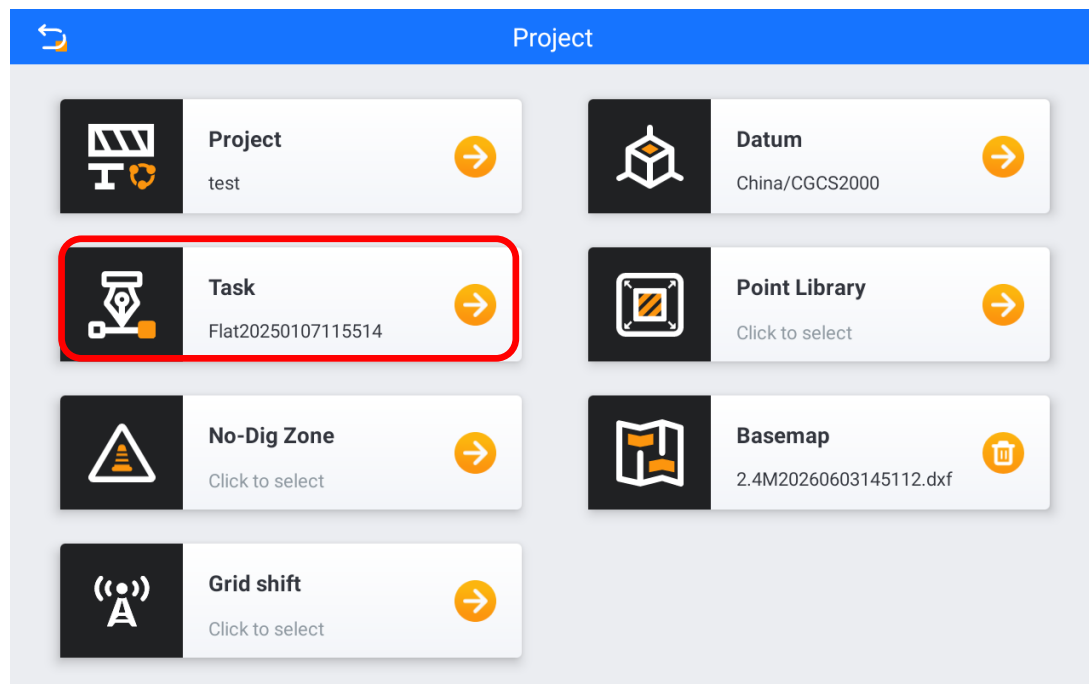
6.2.2 Create Datum

- Click the "New" button to enter the new page of the datum. According to the actual project needs , set parameters such as target ellipsoid and projection, click "confirm", and complete the creation of a new datum.
- Click the "Predefined" button to enter the selection interface of the predefined datum, and select the corresponding datum according to the "Country" classification.



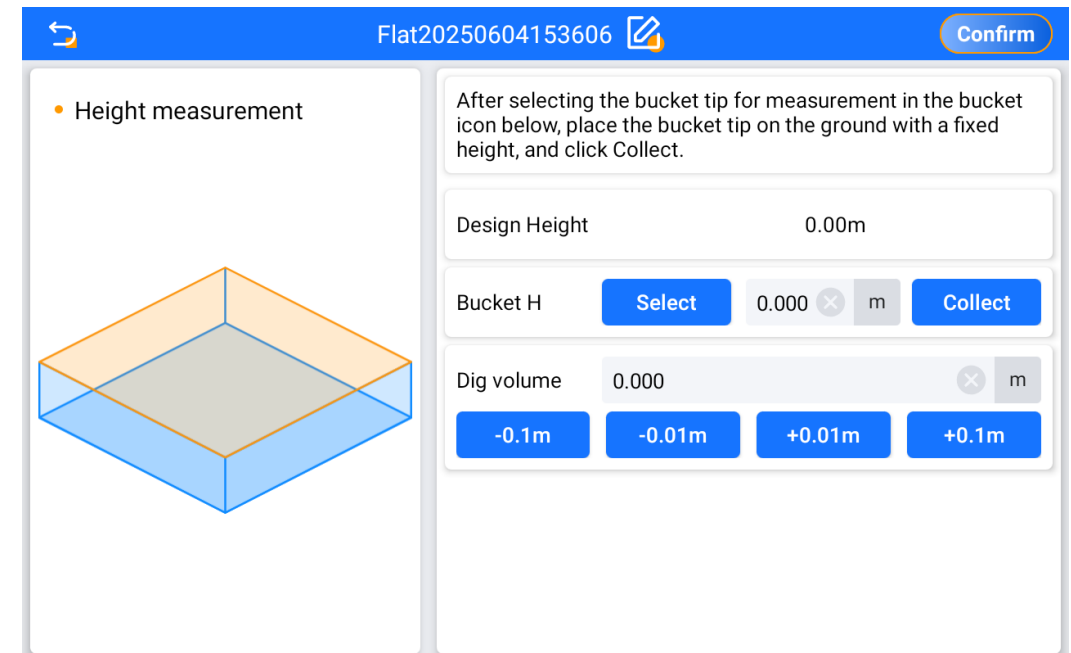
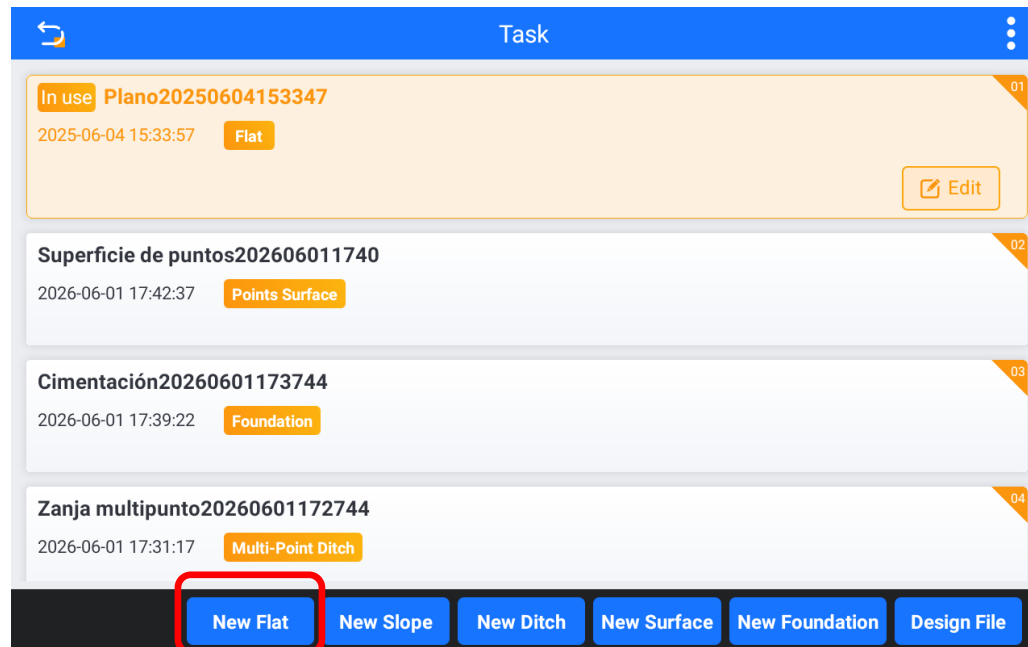
6.3 Task

- Click on the icon  in the bottom right corner of the main interface, select "Project", click on "Task", and enter the data list page;
- Select the following six functions to edit design data according to construction needs.



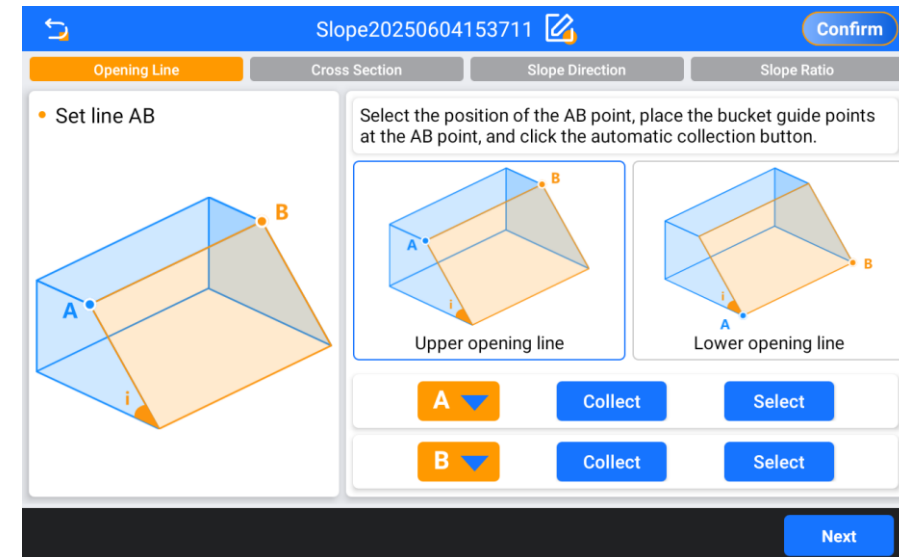
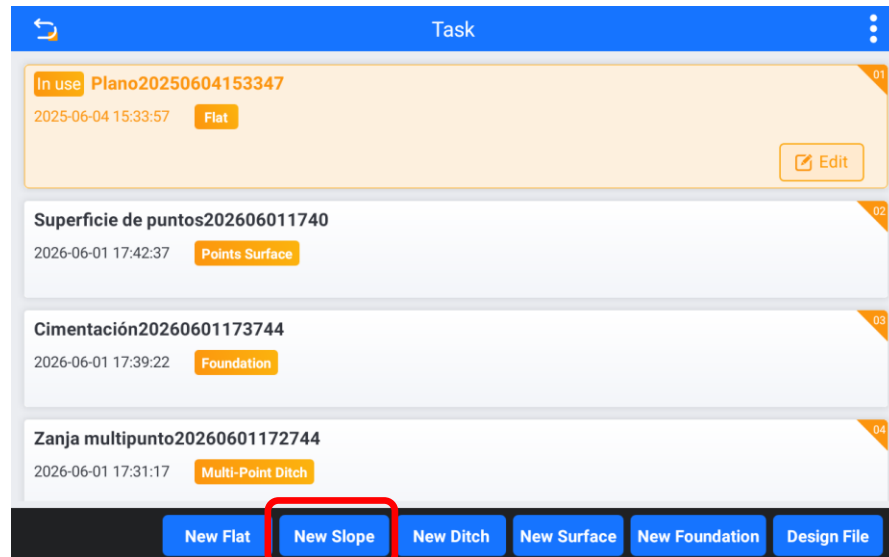
6.3.1 Task-New Flat

- Use the given design height input as the elevation reference for leveling the site operation.
- Alternatively, click on "Select" to obtain the point height, or use "Bucket H" to automatically obtain the elevation of the current point where the shovel tip is located. Based on this elevation, establish a virtual work flat and carry out site leveling operations.
- Dig volume: suitable for manually adjusting height, fine-tuning elevation, and establishing design workfaces.



6.3.2 Task-New Slop

- According to the software operation diagram, place the bucket tip of excavator at the bottom or top of the slope, and click on automatic collection to obtain the coordinates of point A. Move excavator, the bucket tip of the excavator obtains the coordinates of point B, and the distance between point B and point A should be greater than 3m.

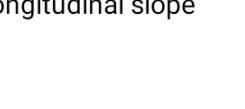


(The "Collect" button collects the coordinates of the bucket slope points; "Select" selects the existing coordinates of the point library file)

- ←
Slope20250604153711
Confirm

Opening Line
Cross Section
Slope Direction
Slope Ratio

• Adjust longitudinal slope



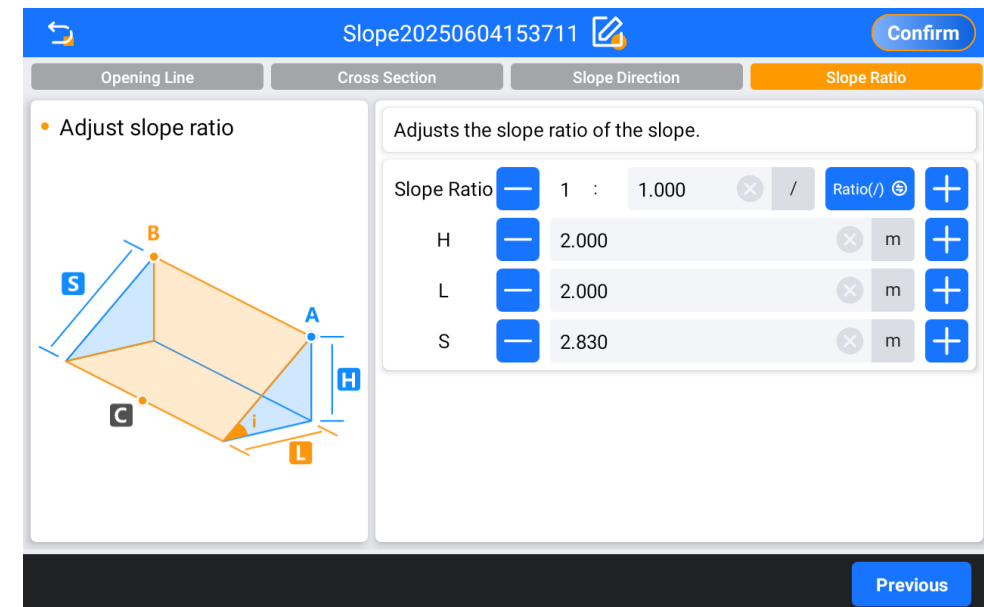
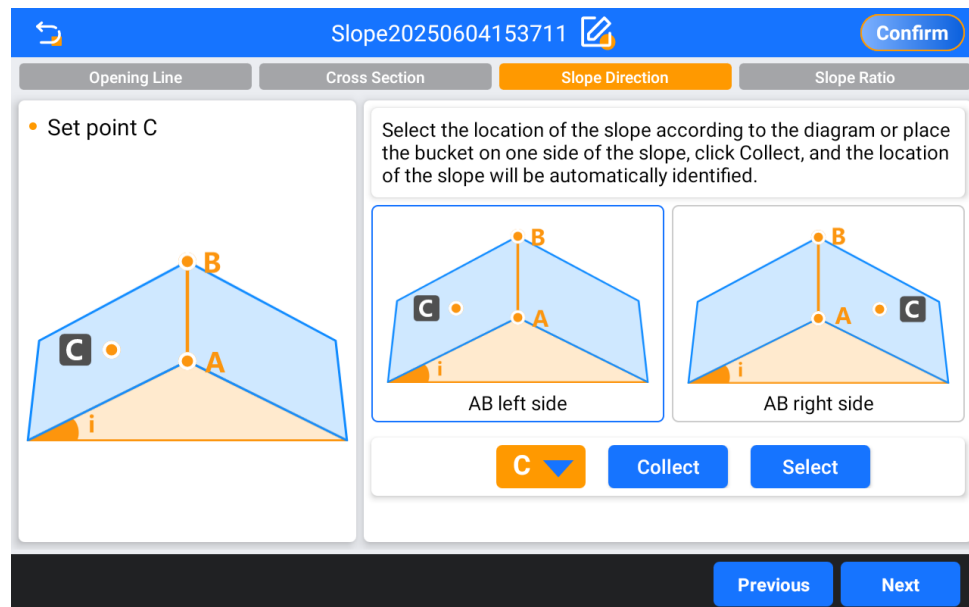
Adjust the longitudinal slope value of the AB line, and enter the Dig value when you are done.

AB H diff	—	0.000	×	m	+	
AB slope	—	0.000	×	%	Slope(%)⊖	+
Add Boundary	☐	500.000	×	m		
Dig volume	—	0.000	×	m	+	

Previous
Next

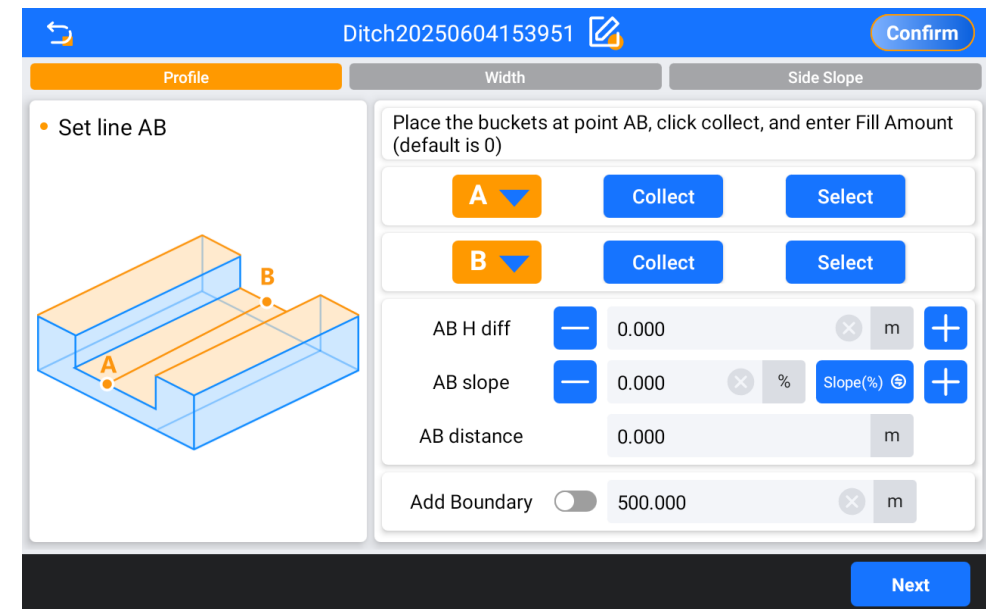
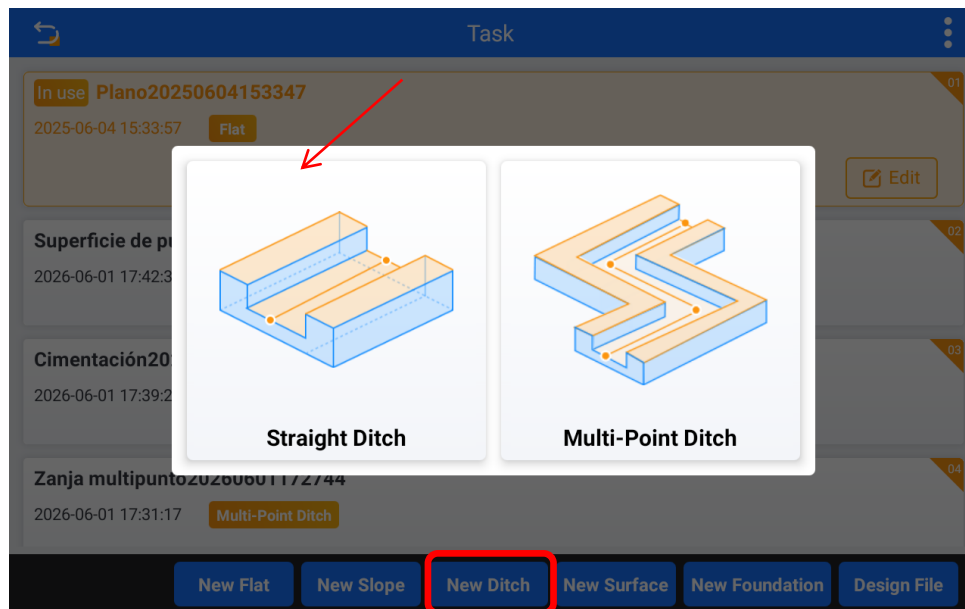
6.3.2 Task-New Slop

- Point C: Determine the position of the slope according to the diagram, place the bucket on the left or right side of the slope, and click "Collect" to obtain the coordinates of point C.
- Adjust the slope ratio parameters and input them according to the design slope ratio.
- Click the "Confirm" button to complete the slope design; Return to the main interface and proceed with slope construction.



6.3.3 Task-New Straight Ditch

- Place the bucket tip of excavator at the center point A of the ditch, click "Collect", and obtain the starting point coordinates A.
- Move the excavator, place the bucket tip of excavator at the endpoint B, click "Collect" to obtain the coordinates of point B.(the distance between point B and point A should be greater than 3m)
- Manually adjust the AB elevation difference and AB longitudinal slope value.



6.3.3 Task-New Straight Ditch

- Input ditch width and input data according to design requirements; enter the width of the ditch on the left (L) and right (R) according to the design.
- Dig volume: Set the depth of the ditch and complete the ditch design.

↶

Ditch20250604153951

✎

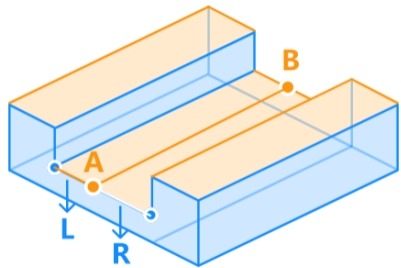
Confirm

Profile

Width

Side Slope

• Adjust width



Enter "width" and "dig volume".

Left Width(L)

—

0.00

×

m

+

Right Width(R)

—

0.00

×

m

+

Dig volume

—

0.00

×

m

+

Previous

Next

6.3.3 Task-New Straight Ditch

- Set the hypotenuse and adjust the hypotenuse values on the left and right sides of the AB line segment based on the AB line. The default value is 0, indicating a vertical state.

Ditch20250604153951

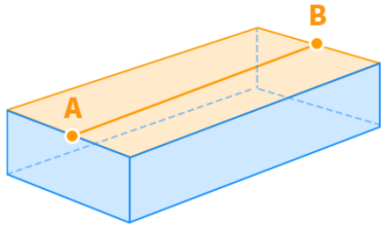
Confirm

Profile

Width

Side Slope

• Set hypotenuse



Set the left and right diagonal values of AB line (default is 90 °, vertical state). If no adjustment is needed, click Confirm in the upper right corner to complete the setting.

Left slope

—

90.00

×

°

+

Right slope

—

90.00

×

°

+

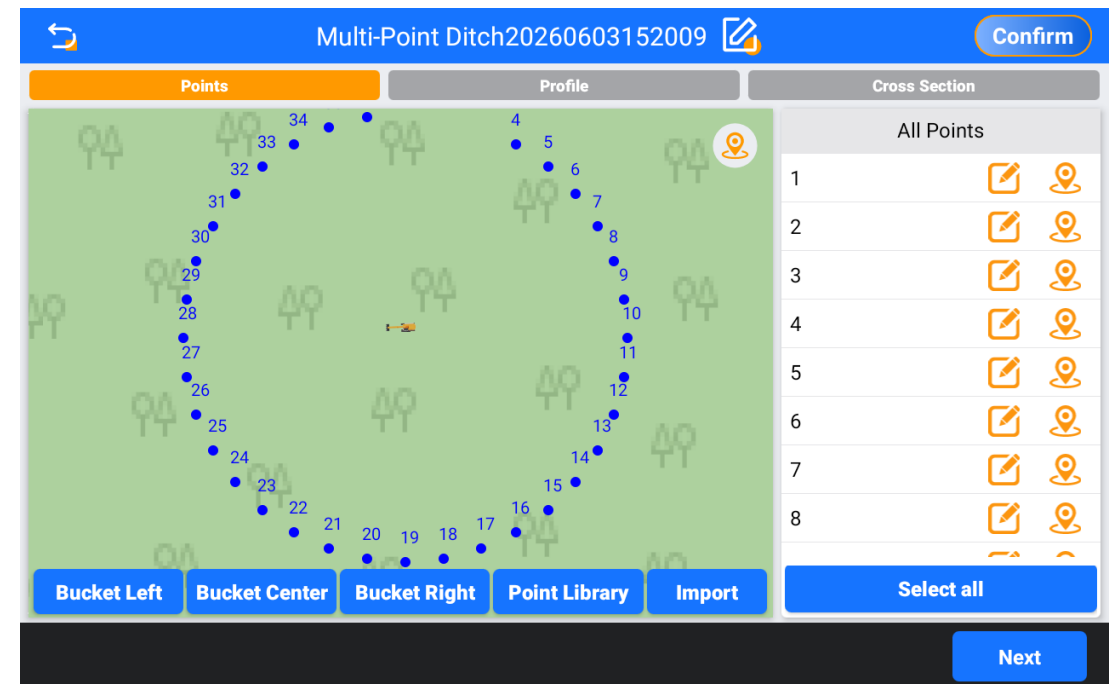
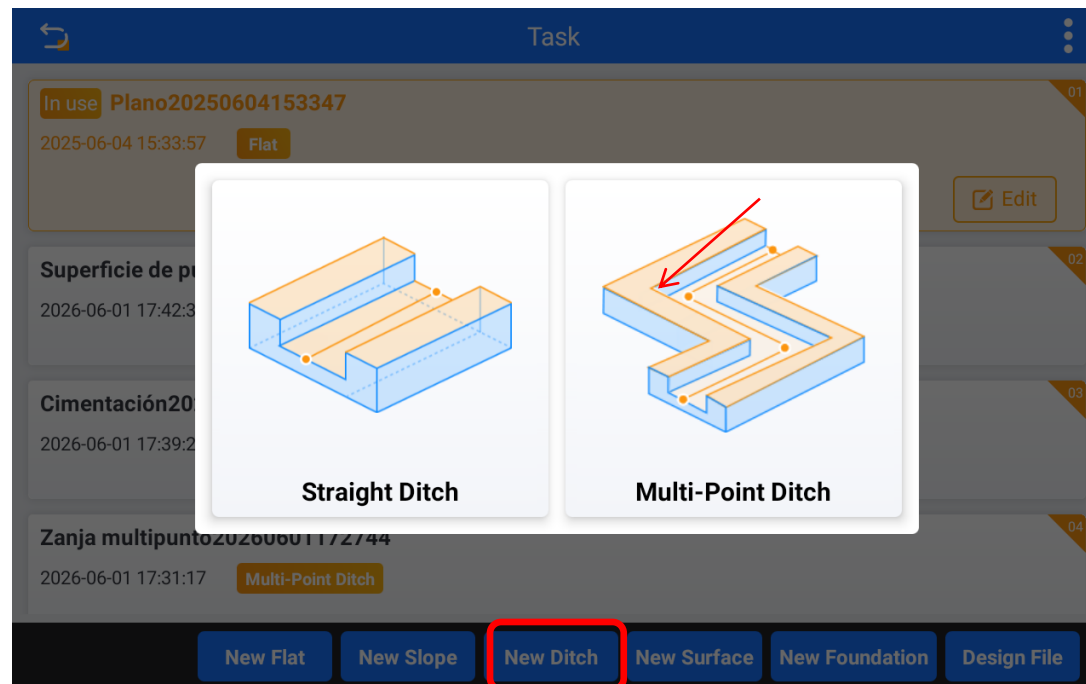
Angle(°)

⊖

Previous

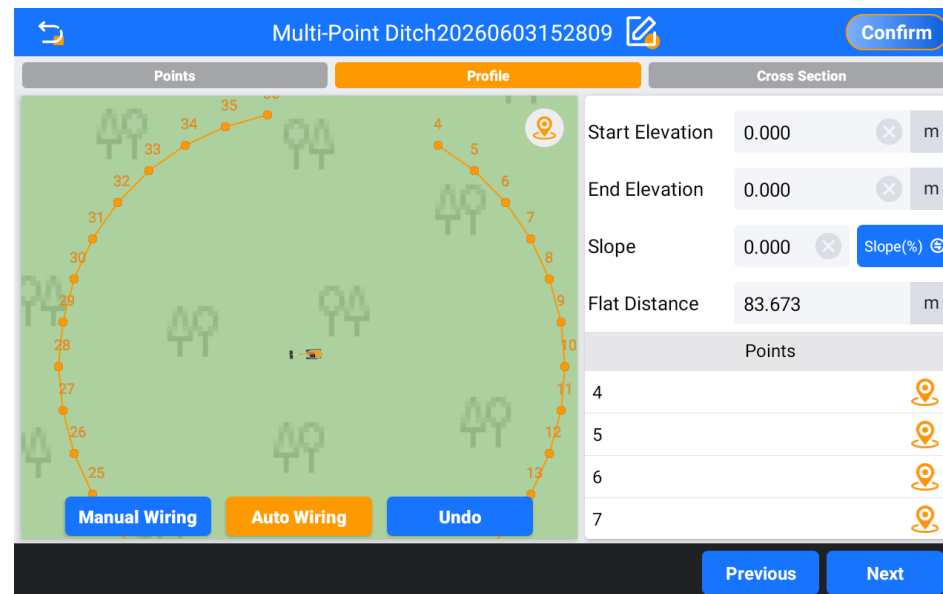
6.3.3 Task-New Multi-Point Ditch

- Click the "New Ditch" button, select "Multi-point Ditch" to enter the customization interface.
- Prepare Points: Obtain the design points of the ditch by using the left, center, and right bucket tips for collection; Or obtain the design points by importing a coordinate point file.
- The collected or imported design points will be displayed in the "All Points" list.



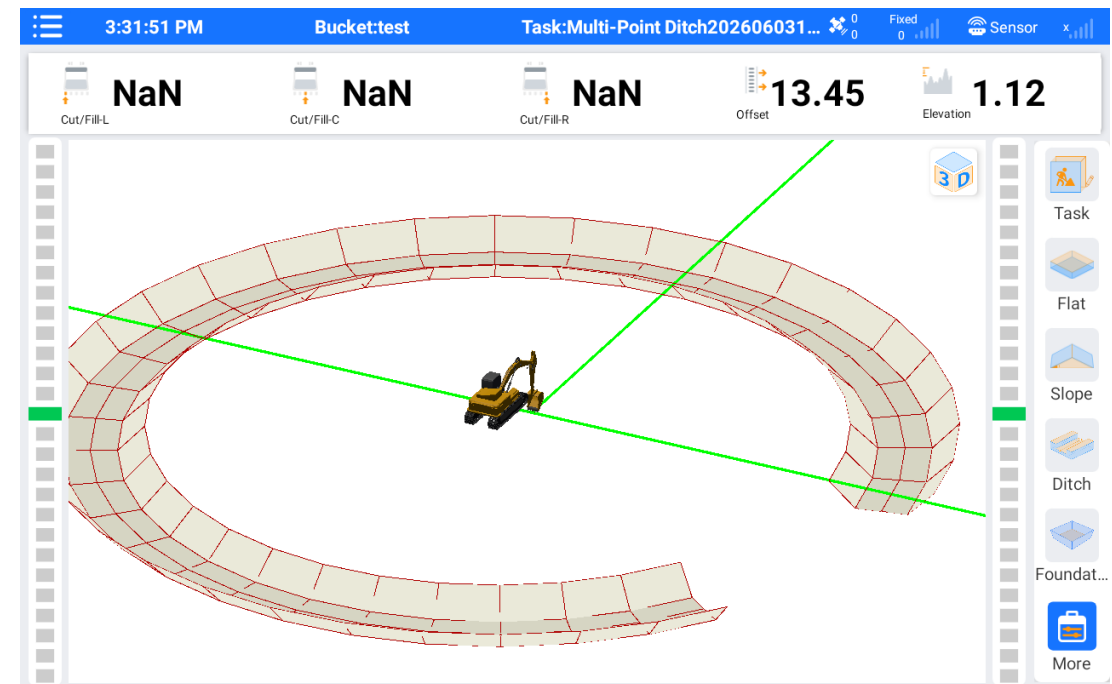
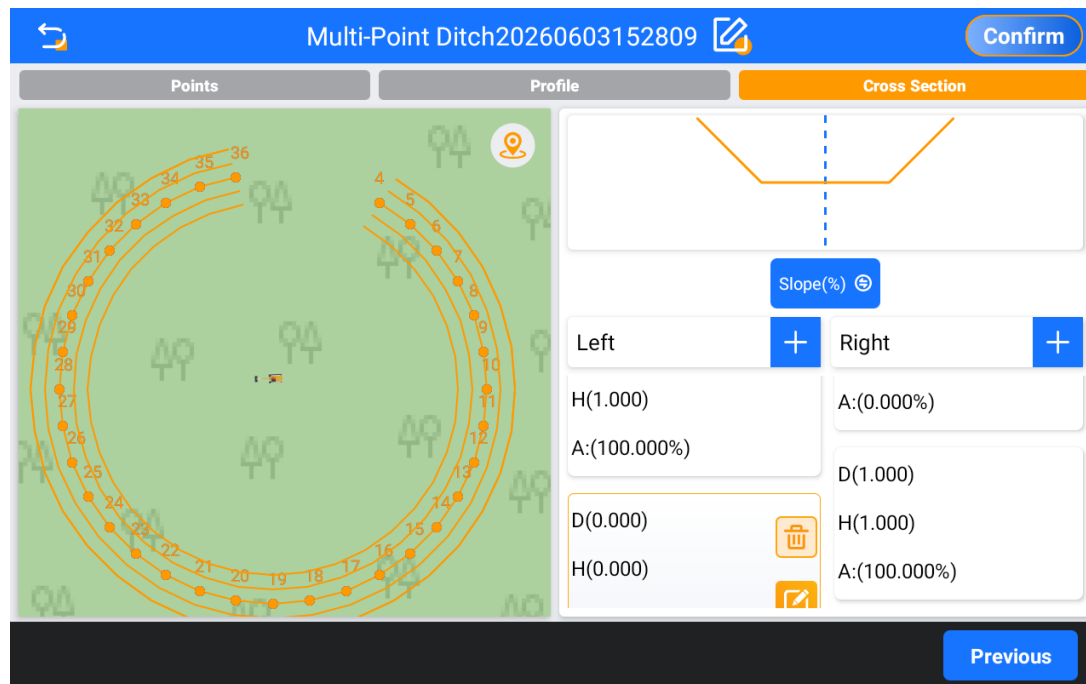
6.3.3 Task-New Multi-Point Ditch

- Profile: 1. Manual Wiring: Manually wire to determine the ditch direction; 2. Auto Wiring: Automatically wire the points in sequence according to their coordinates and determine the direction of the ditch; Click the “Undo” to re-determine the direction of the ditch.
- After completing the wire and determining the ditch direction, the system will automatically calculate the Start Elevation, End Elevation, Slope, Flat Distance; you can adjust this data according to the actual situation.



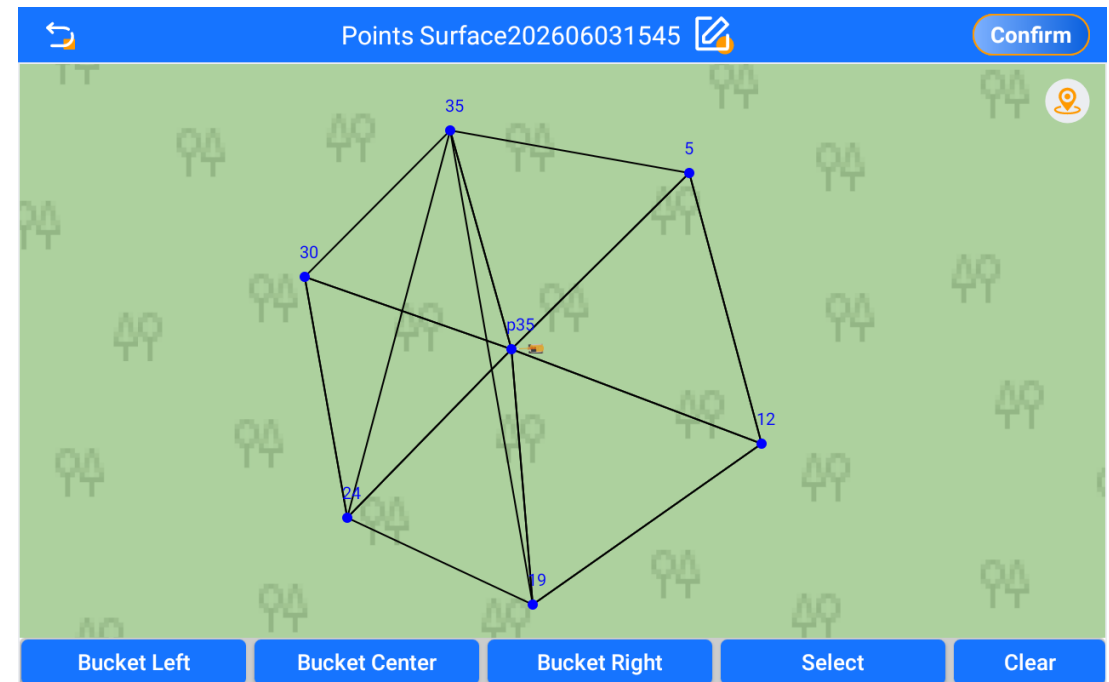
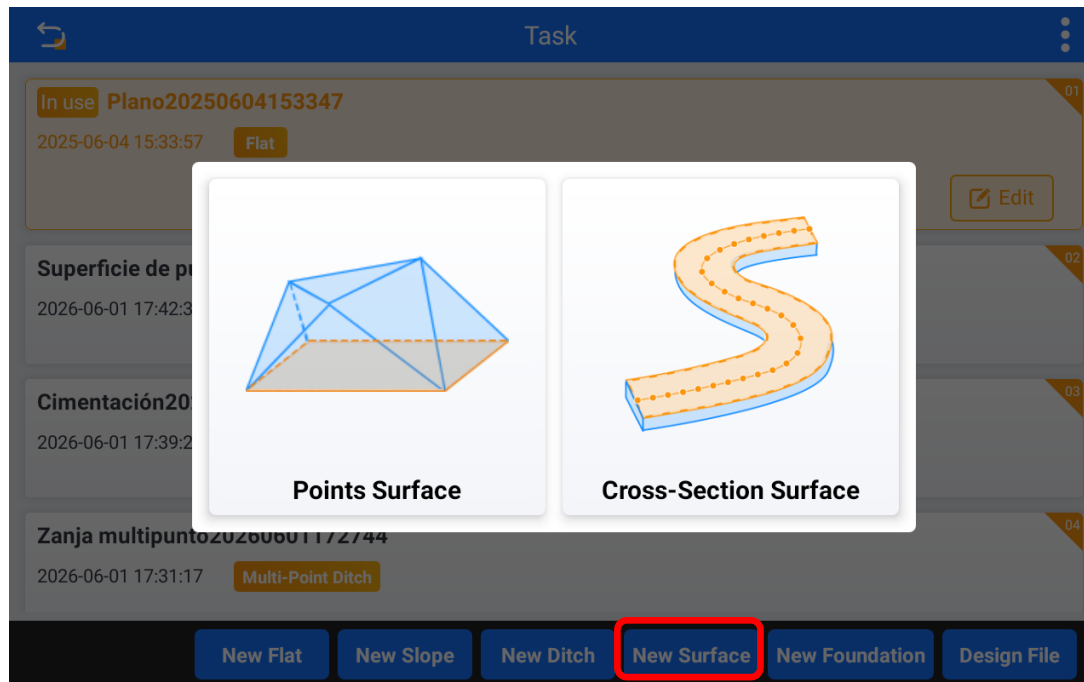
6.3.3 Task-New Multi-Point Ditch

- Cross Section: Determine the slopes of multiple ditches; Based on the actual construction operation, the cross section can be determined by setting the distance (D) and height (H).
- Click the "Confirm" button on the upper right corner to complete the setting of multiple ditches; The designed task model will be displayed on the main interface.



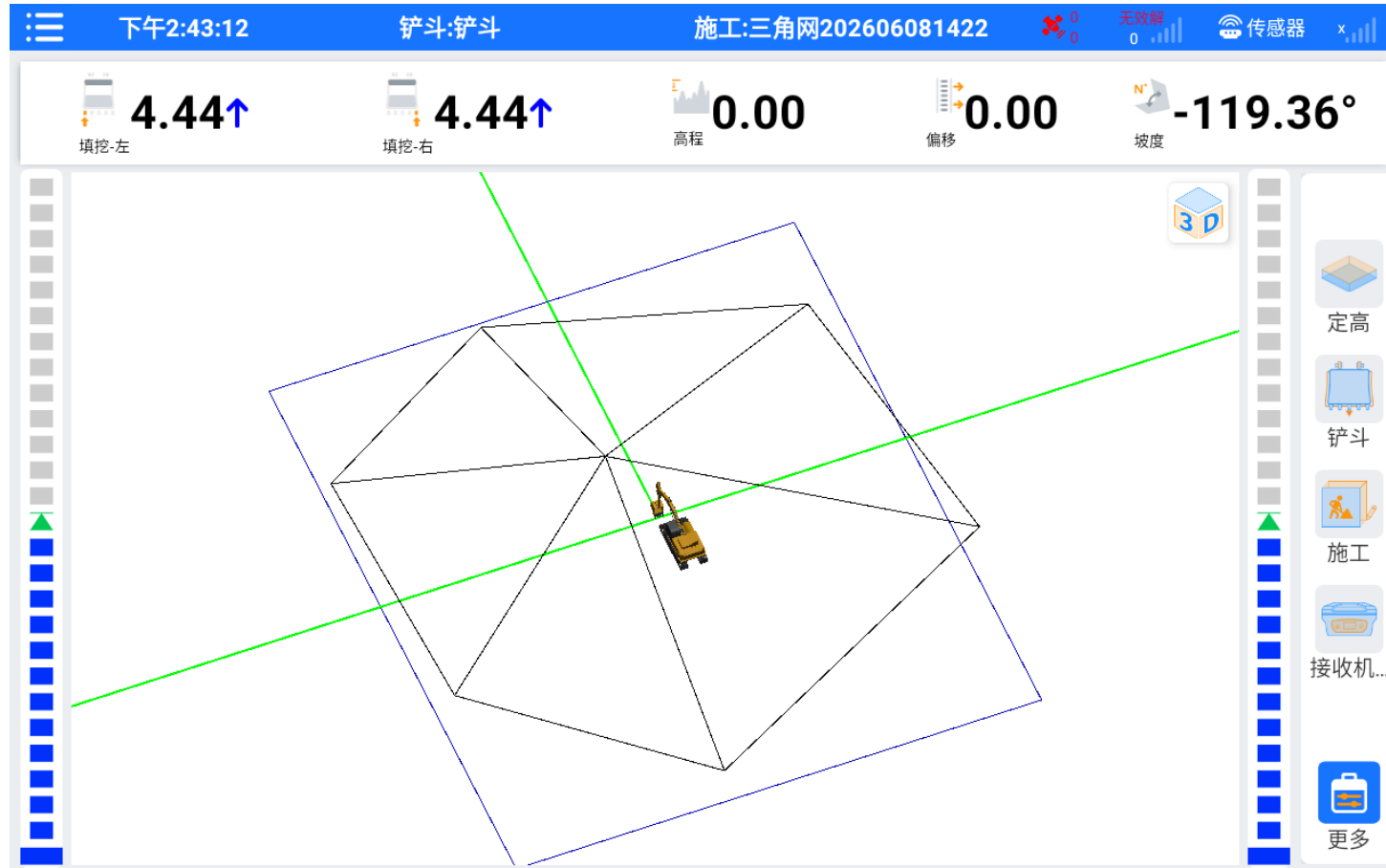
6.3.4 Task-New Surface- Points Surface

- Click the "New surface" button, select the "Points Surface" .
- The tip of the bucket is used to obtain the position coordinates of the surface points; Or import the coordinate point file as the design points;



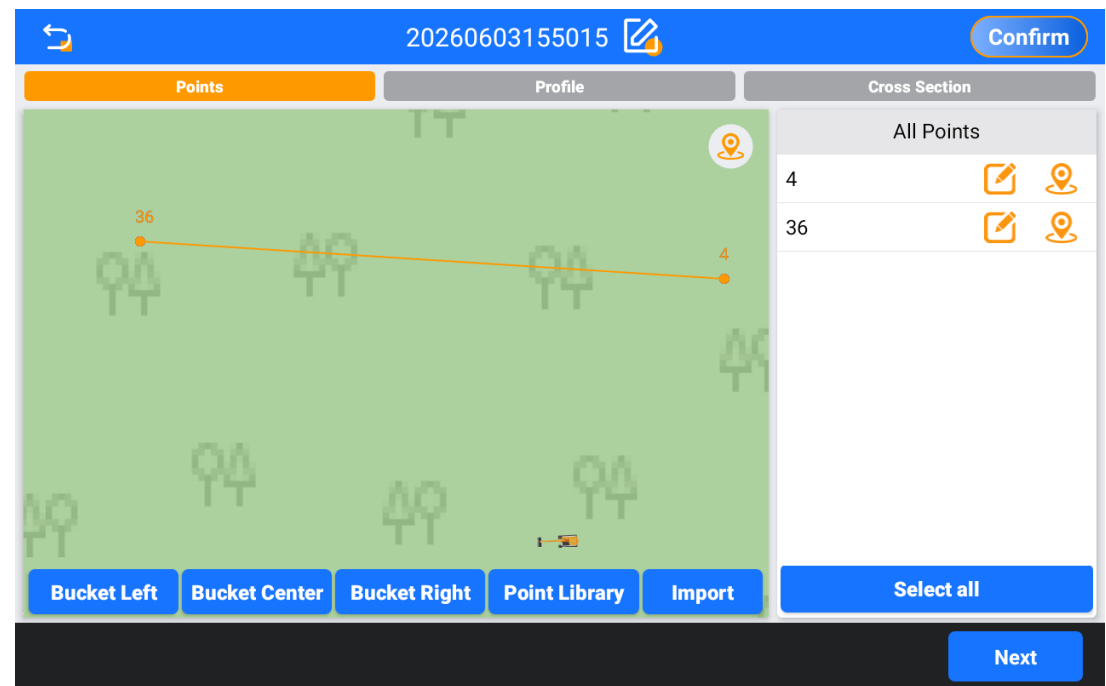
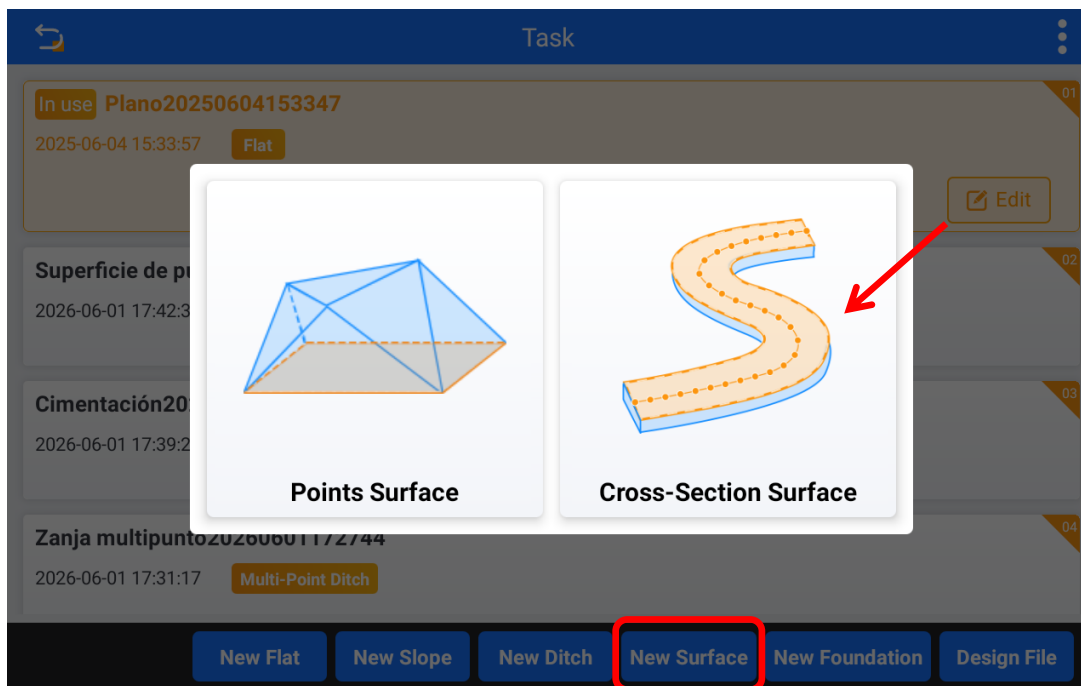
6.3.4 Task-New Surface- Points Surface

- Click "Confirm" to determine the "Points Surface", and the designed "Points Surface" model will be displayed on the main interface.



6.3.4 Task-New Surface- Cross Section Surface

- Click the "New surface" button, select the "Cross-Section Surface" interface.
- Points preparation: Design points can be obtained by using the left, center, and right bucket tips for collection; or import a coordinate point file.



6.3.4 Task-New Surface- Cross Section Surface

- Profile: 1. Manual Wiring: Manually wire to determine the slope of the stake out model; 2. Auto Wiring: Automatically wire the points in sequence according to their coordinates and determine the slope of the stake out model; Click the "Undo" to re-determine the stake out model.
- After completing the wire and determining the stake out model, the system will automatically calculate the Start Elevation, End Elevation, Slope, Flat Distance; you can adjust this data according to the actual situation.

The screenshot displays the 'Profile' tab of the ComAvTech software. The top bar shows a unique identifier '20260603155015' and a 'Confirm' button. Below the bar are three tabs: 'Points', 'Profile' (selected), and 'Cross Section'. The main area is divided into a map view on the left and a data panel on the right. The map shows a green field with several points marked by location icons. Two points, labeled '36' and '4', are connected by a yellow line. The data panel on the right contains the following fields:

Cross Section	
Start Elevation	0.000 m
End Elevation	0.000 m
Slope	0.000 %
Flat Distance	27.558 m

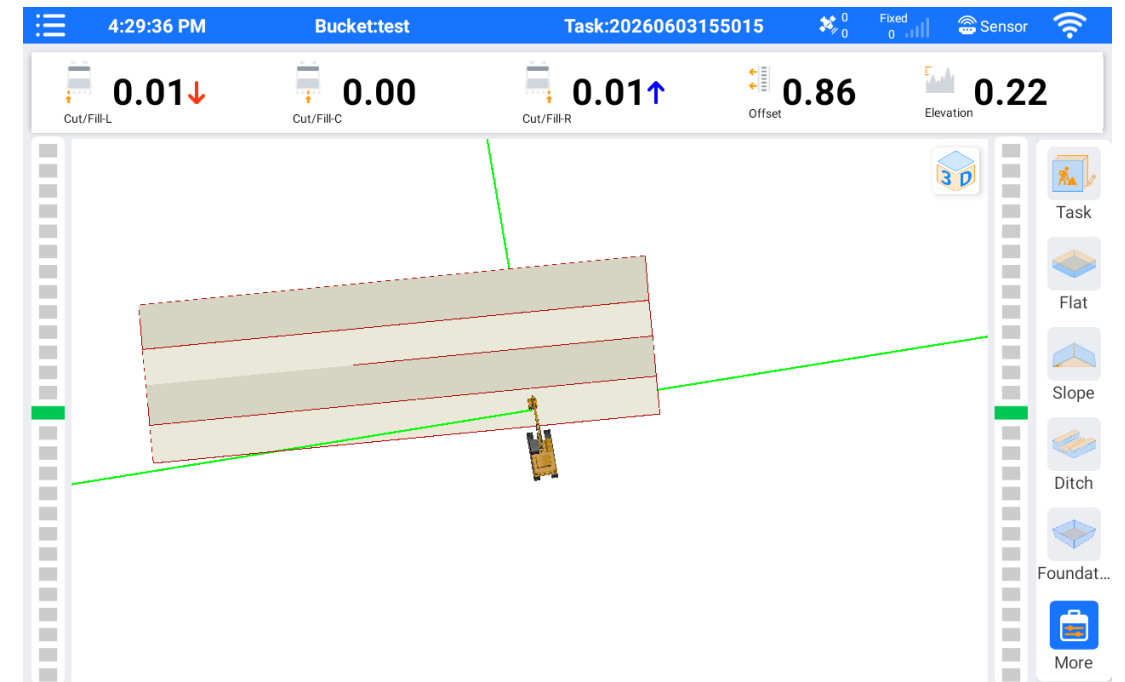
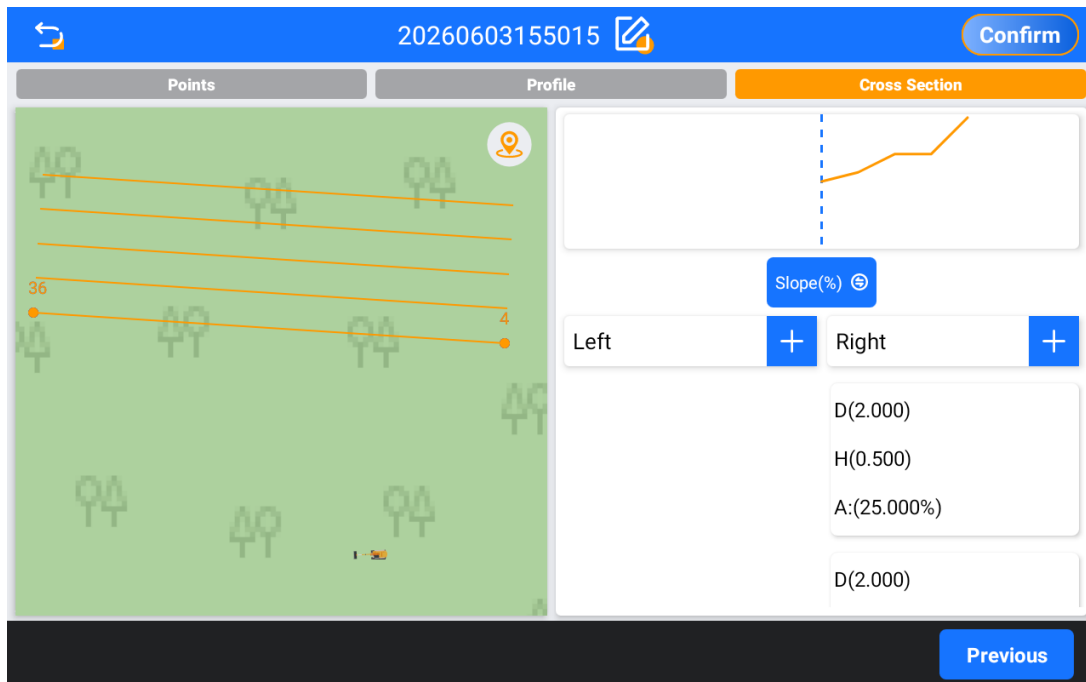
Below the data panel is a 'Points' table:

Points	
4	
36	

At the bottom of the interface are three buttons: 'Manual Wiring' (highlighted in blue), 'Auto Wiring' (orange), and 'Undo' (blue). At the very bottom are 'Previous' and 'Next' buttons.

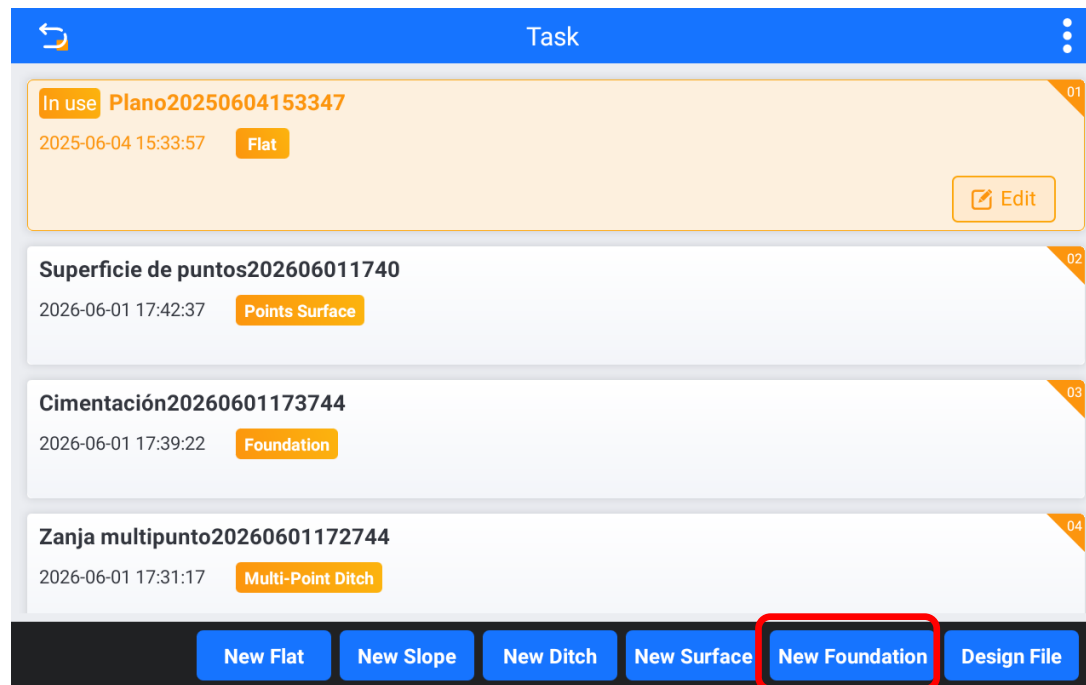
6.3.4 Task-New Surface- Cross Section Surface

- Cross Section: Determine the slopes of the stake out model; Based on the actual construction operation, the cross section can be determined by setting the distance (D) and height (H).
- Click the "Confirm" button on the upper right corner to complete the setting; The designed task model will be displayed on the main interface.



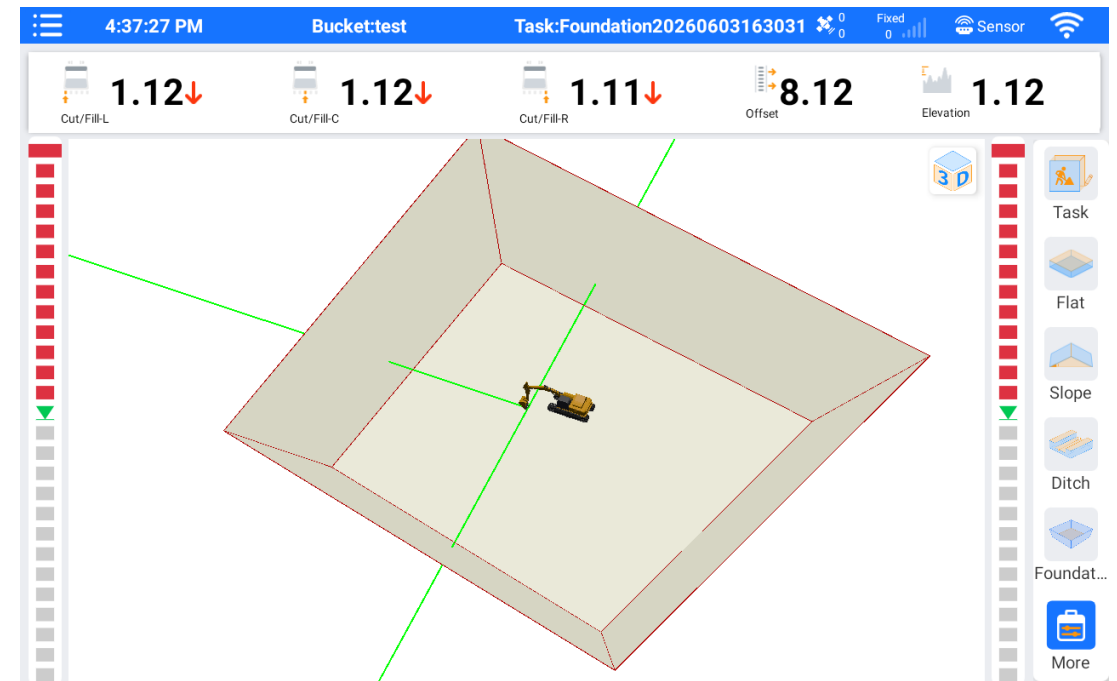
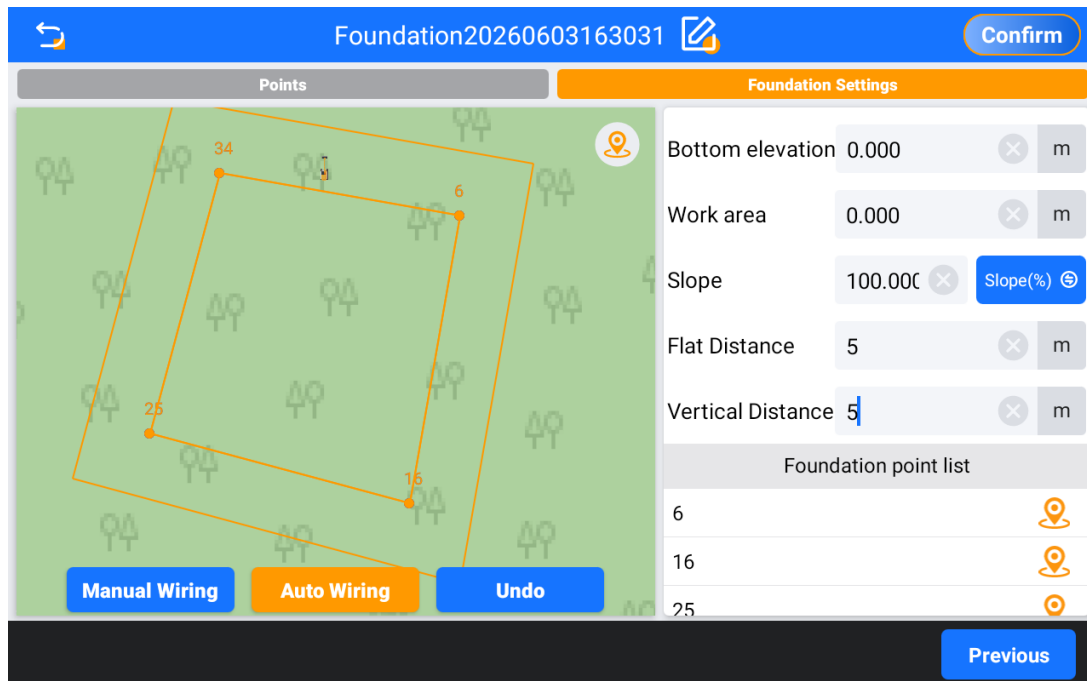
6.3.5 Task-New Foundation

- Click the "New Foundation" button to enter the customization interface.
- Points preparation: Design points can be obtained by using the left, center, and right bucket tips for collection; Or import a coordinate point file.



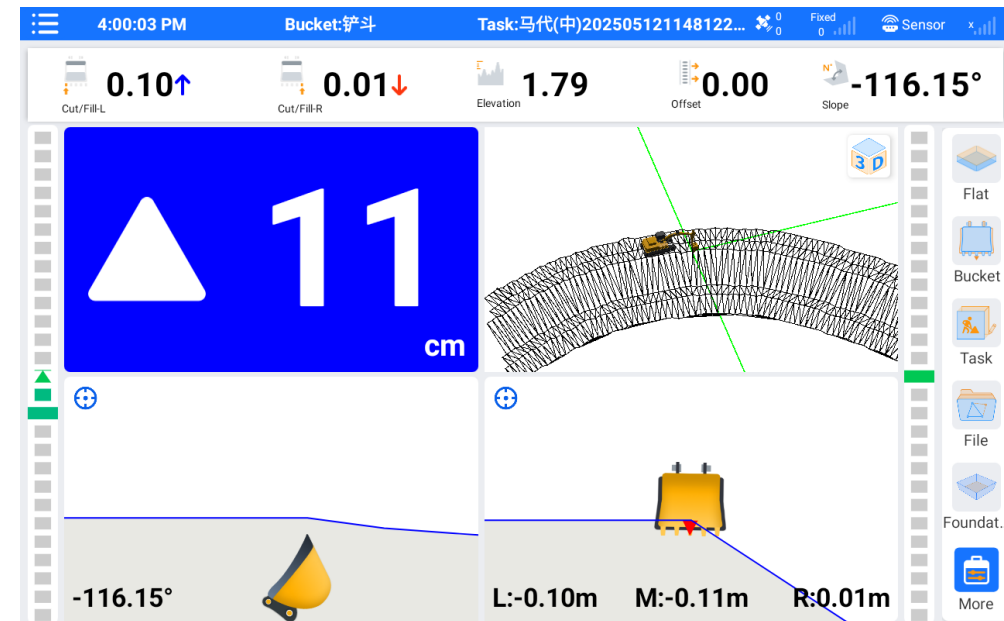
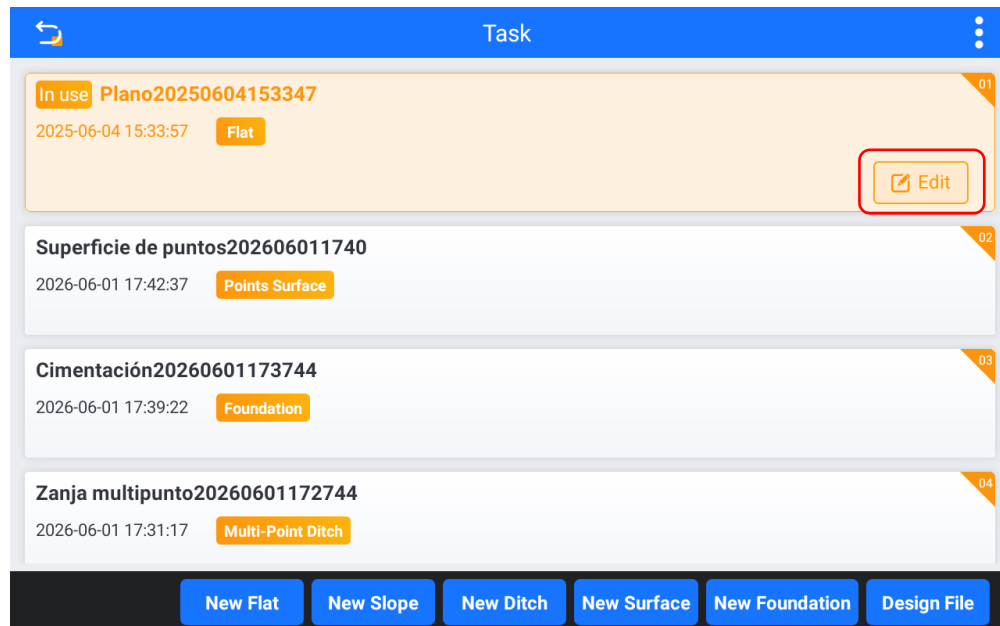
6.3.5 Task-New Foundation

- Foundation setting: After determining the design point; according to the actual construction requirements, set parameters such as bottom elevation, working area, flat distance, and vertical distance.
- Click the "Confirm" button on the upper right corner to complete the setting of the foundation; the designed foundation model will be displayed on the main interface.



6.3.6 Task-Design File

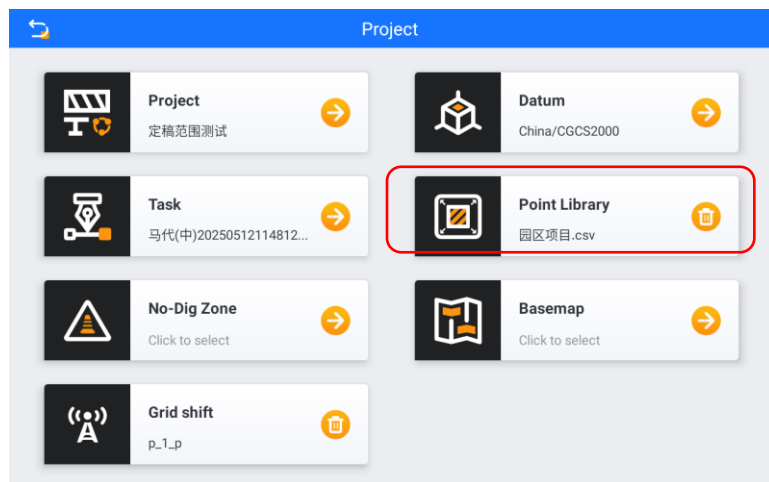
- Click the "File" button to enter the "Coordinate File" interface. Through the "Import" button at the bottom right corner, select the triangular mesh data from the file selection based on the path and make the selection.
- After importing to the "Coordinate File" option, click "Apply". The main interface will display the imported triangular mesh model data.



6.4 Coordinate Point Library

This function is mainly used to manage point library data, including import, export, and new coordinate file functions.

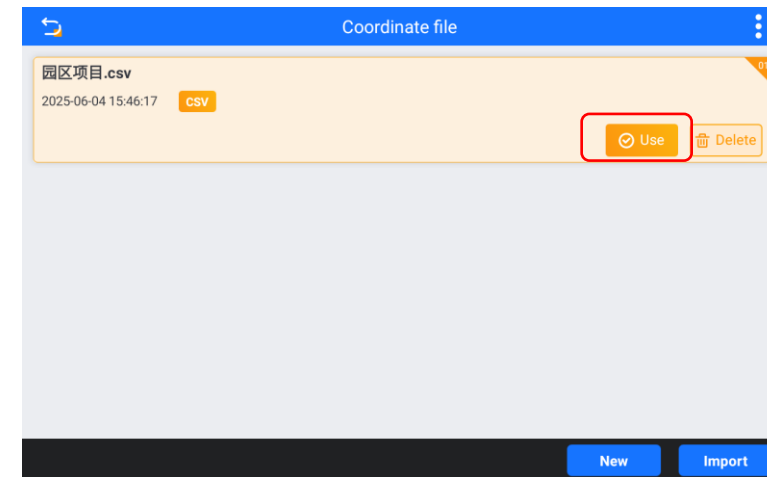
- Select "Point Library" to enter the edit interface and import the required design coordinate files.
- Click "Import" to enter the file storage path and select the coordinate file.
- Click "Use" to return to the edit interface for previewing. The coordinate point library will be stored in the current project file.



The screenshot shows the 'Point Library' interface. It displays a table with the following data:

Id	Name	N	E	H	Code
0	SN-1	3470494.178	622920.684	13.977	
1	SN-2	3470498.465	622918.432	14.058	
2	SN-3	3470500.449	622922.317	14.048	
3	SN-4	3470496.064	622924.614	13.993	
4	SN-5	3470498.786	622920.837	14.060	
5	SN-6	3470491.786	622921.208	14.021	
6	SN-7	3470497.475	622918.121	14.070	
7	SN-8	3470503.902	622914.559	14.113	
8	SN-9	3470505.192	622917.440	14.083	
9	SN-10	3470497.383	622921.694	14.015	

At the bottom, the 'Current file' is '园区项目.csv'. The 'Import' button is highlighted with a red box.

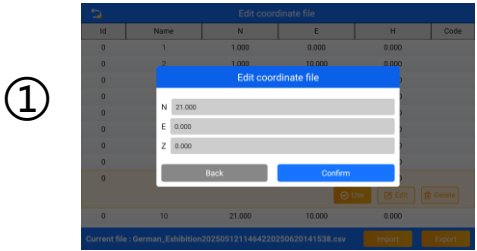


6.4.1 Coordinate Point Library

Point Library					
Id	Name	N	E	H	Code
0	SN-1	3470494.178	622920.684	13.977	
1	SN-2	3470498.465	622918.432	14.058	
2	SN-3	3470500.449	622922.317	14.048	
3	SN-4	3470496.064	622924.614	13.993	
4	SN-5	3470498.786	622920.837	14.060	
5	SN-6	3470491.786	622921.208	14.021	
6	SN-7	3470497.475	622918.121	14.070	
7	SN-8	3470503.902	622914.559	14.113	
8	SN-9	3470505.192	622917.440	14.083	
9	SN-10	3470497.383	622921.694	14.015	

Current file : 园区项目.csv

ImportExportEnter



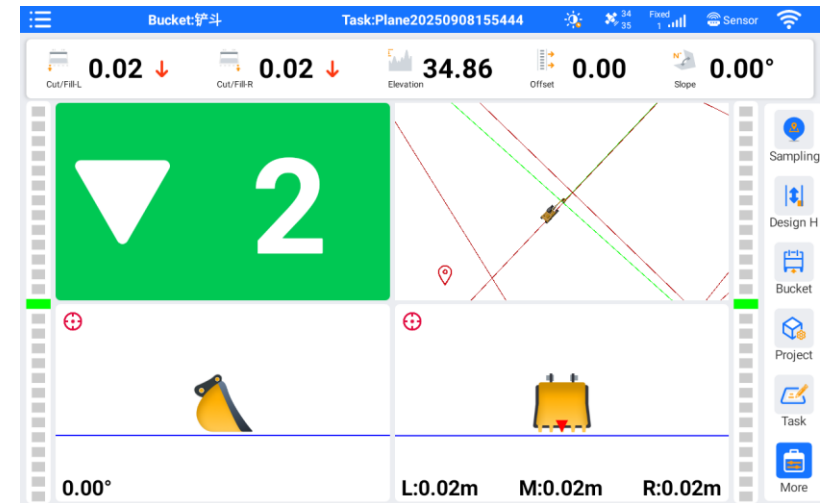
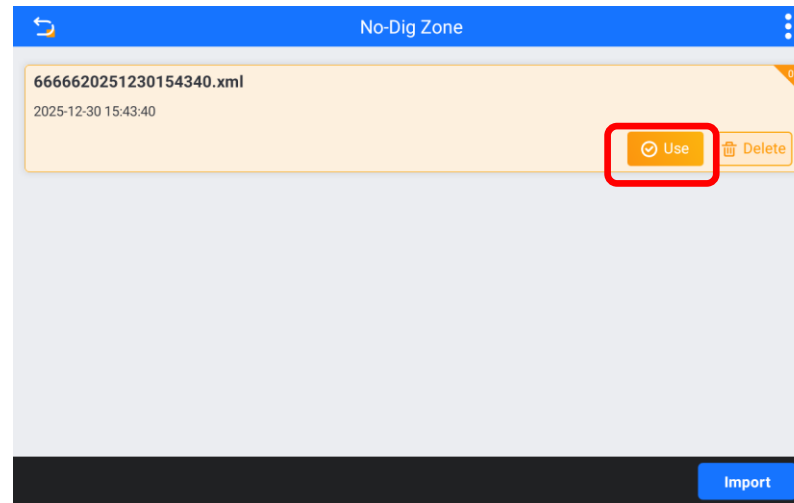
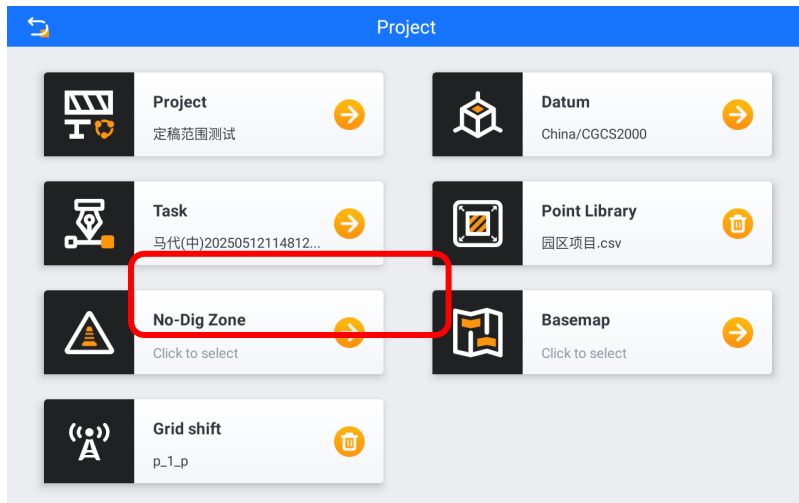
Edit: You can select any coordinate in the point library for modification.



Delete: Delete the specified point in the point library.

6.5 No-Dig Zone

- Click on "No-Dig Zone", select "Import", and choose the folder where the no-dig zone file is located to import.
- The imported no-dig zone will be displayed on the main interface.
- When the pile driver enters the no-dig zone, an alarm will be triggered.



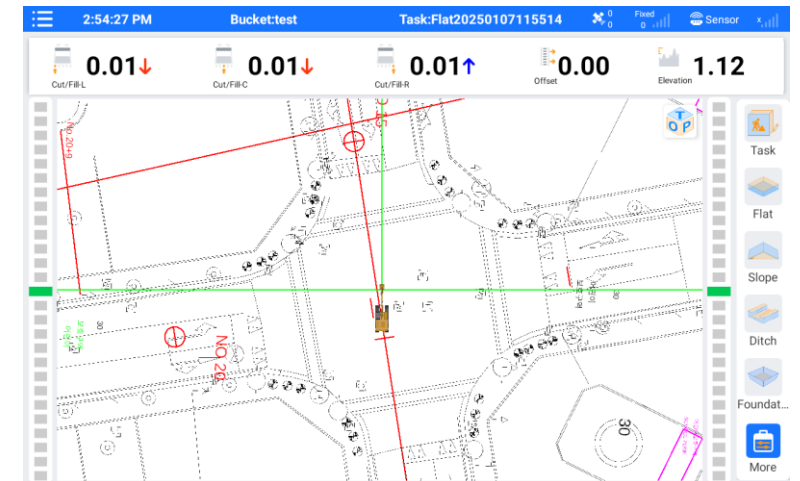
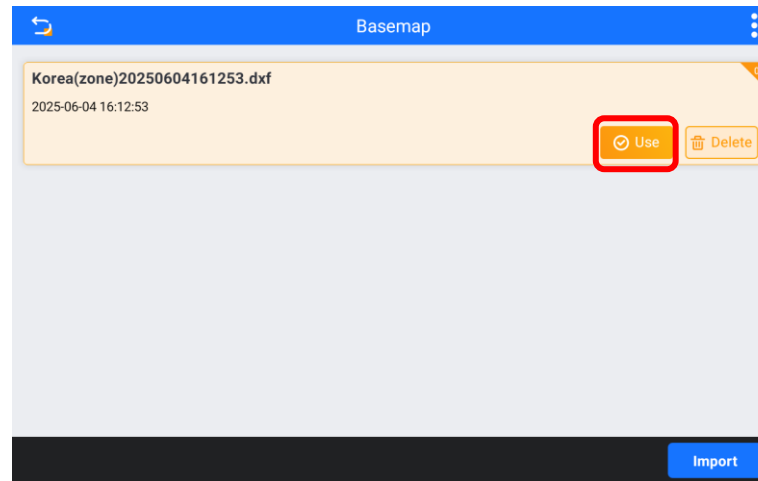
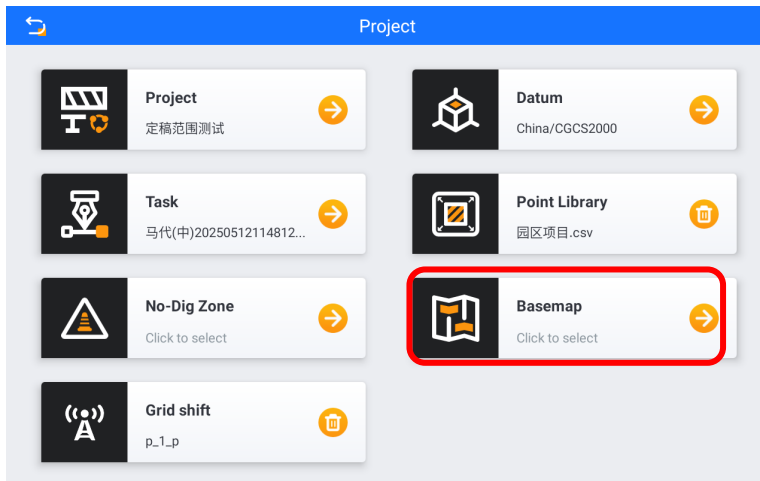
Note: 1. When importing the no-dig zone, the no-dig zone files are CSV and XML;

2. There are three forms of no-dig zones, namely point no-dig zones, linear no-dig zones, and planar no-dig zones (as shown in the figure, point no-dig zones).

6.6 Basemap

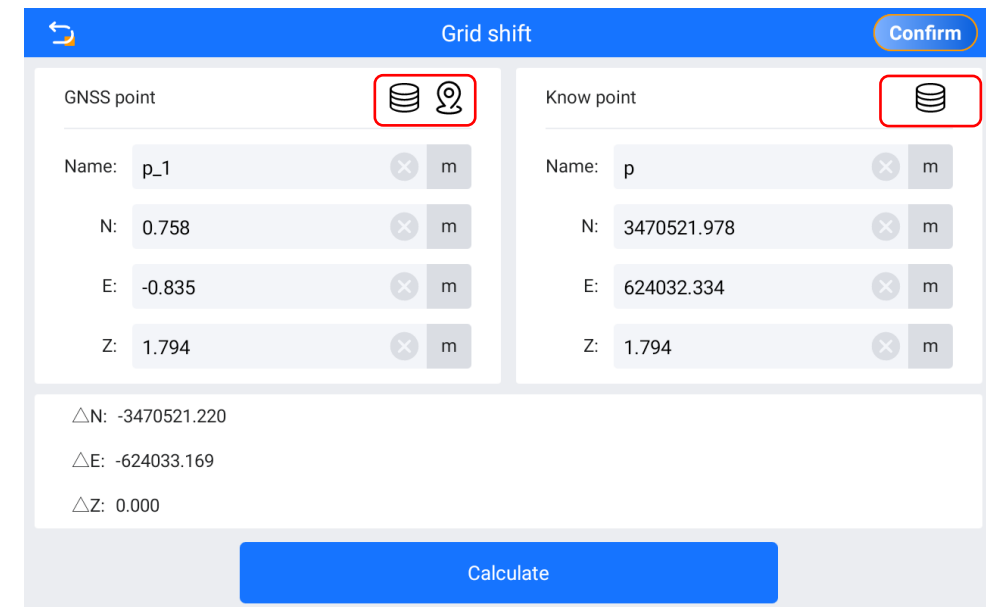
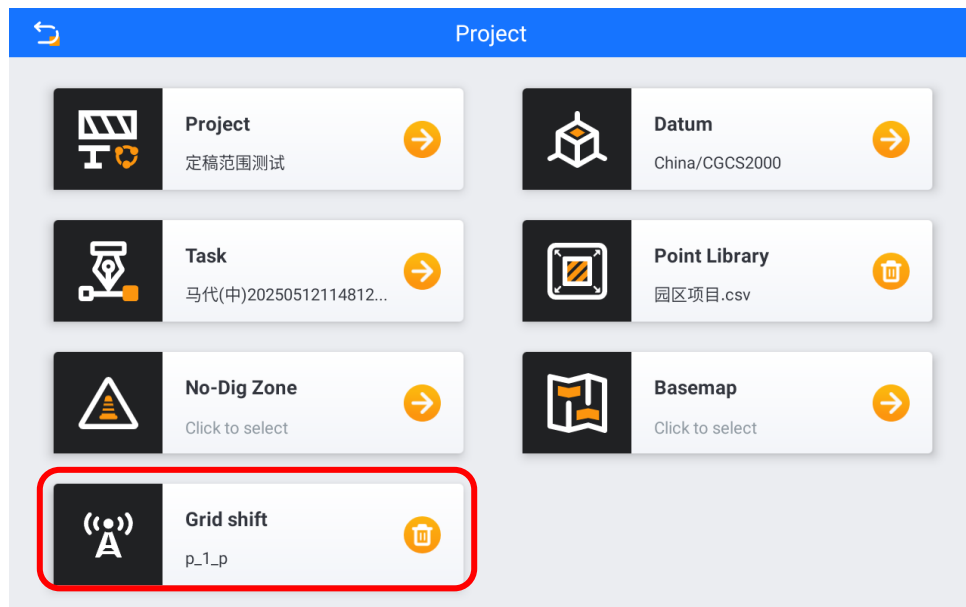
Import the engineering base map as the basis for construction drawings. Select "Basemap" from "Project Configuration" to enter the engineering base map interface.

- Click "Import" to enter the file storage path and select the base image file (. dxf);
- After selecting the base map, jump to the "Basemap" interface and click "Confirm" in the upper right corner to return to the main interface for viewing, as shown in the following figure:



6.7 Grid shift

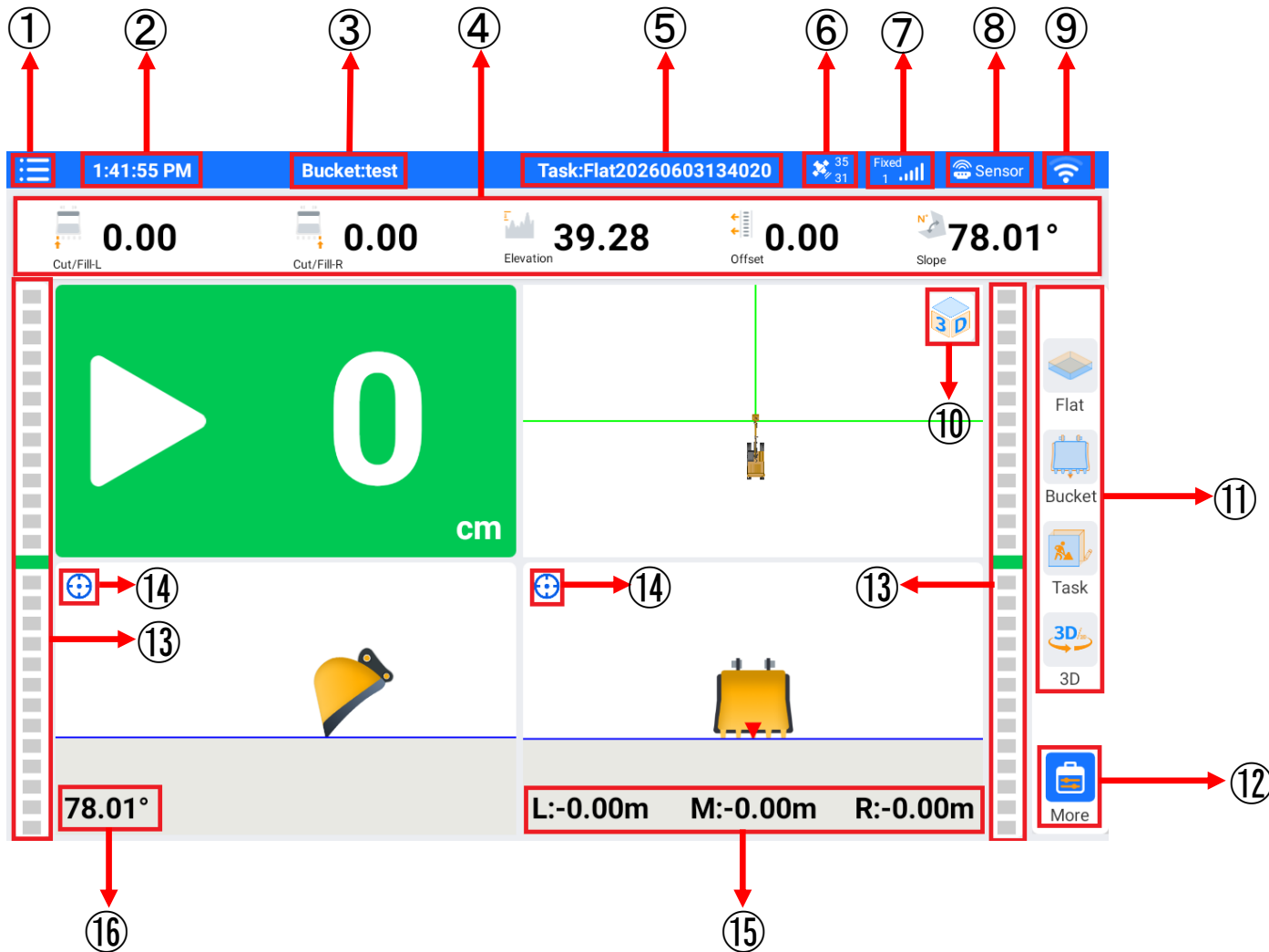
- Click on the "Grid shift", and enter the settings page.
- Click on the "Collection" button to obtain the coordinates of the measurement point; Or select the measurement point through the "points library" button.
- Manually input the coordinates of the "know point"; Or select the known point through the "points library" button;
- Click the calculate button, and you can obtain the difference between the measurement point and the target point;
- Click the "Confirm" button at the top right corner to move the coordinates as a whole to the target point.



07

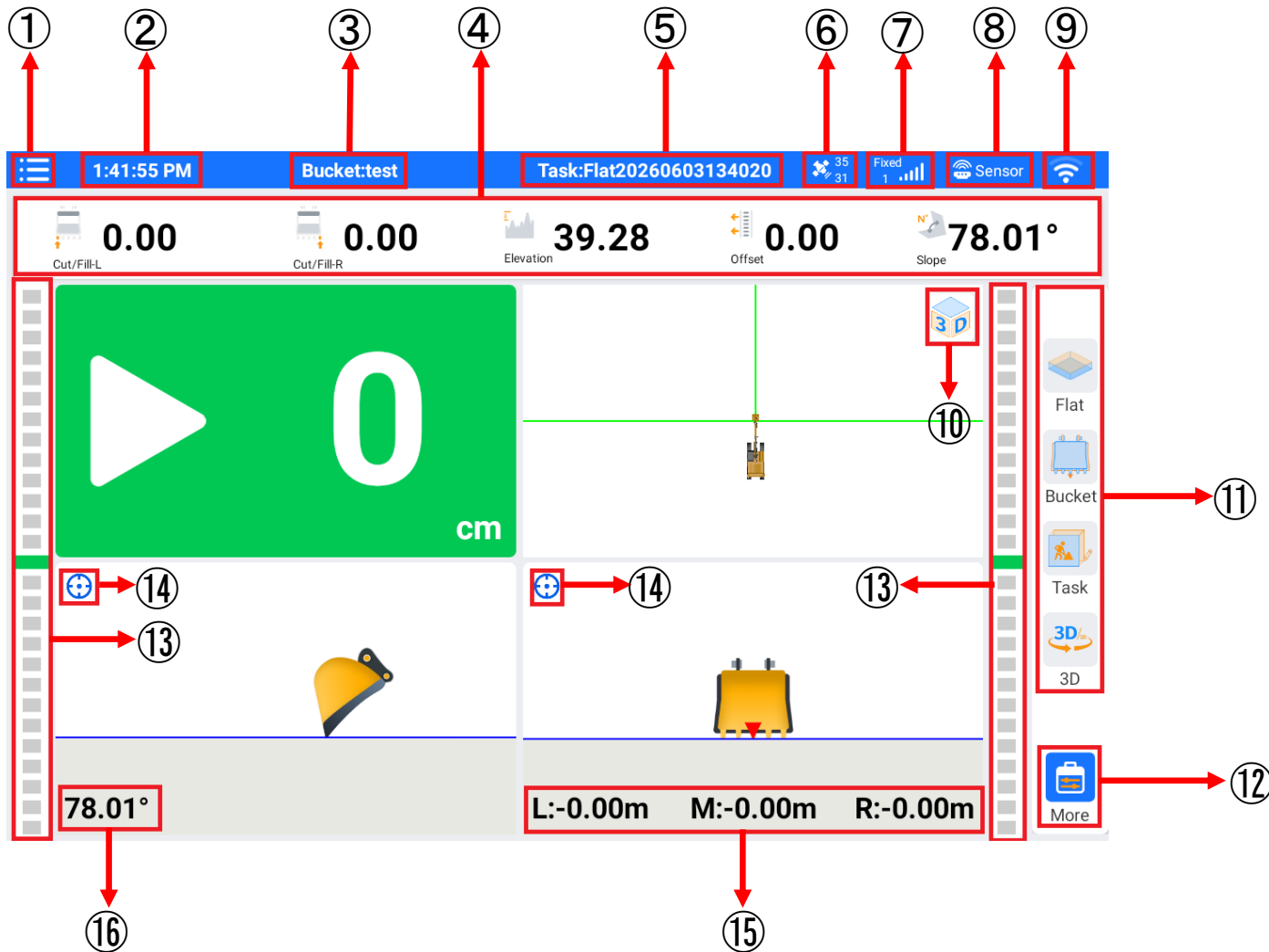
Main interface introduction

7 Main interface introduction



- ① Information Bar: sales information, software version, logs, terminal information, configuration information, and software exit;
- ② Time Information: Displays the local real-time time;
- ③ Bucket: Shows the current application's bucket name;
- ④ Guidance Bar: Displays current left and right bucket tip filling and excavation volume, on-site elevation, offset, etc. Information can be customized in the configuration of the guidance bar according to actual needs;
- ⑤ Task: Displays the current task name;
- ⑥ Number of Antenna Tracking Stars: Right upper is the positioning(main) antenna, and right lower is the directional(slave) antenna;

7 Main interface introduction



⑦ Differential Status: Fixed, float, single;
 ⑧ Sensor Information Bar: Clicking on it allows viewing data such as GNSS antenna and sensor orientation;

⑨ Tablet Network Signal Status;

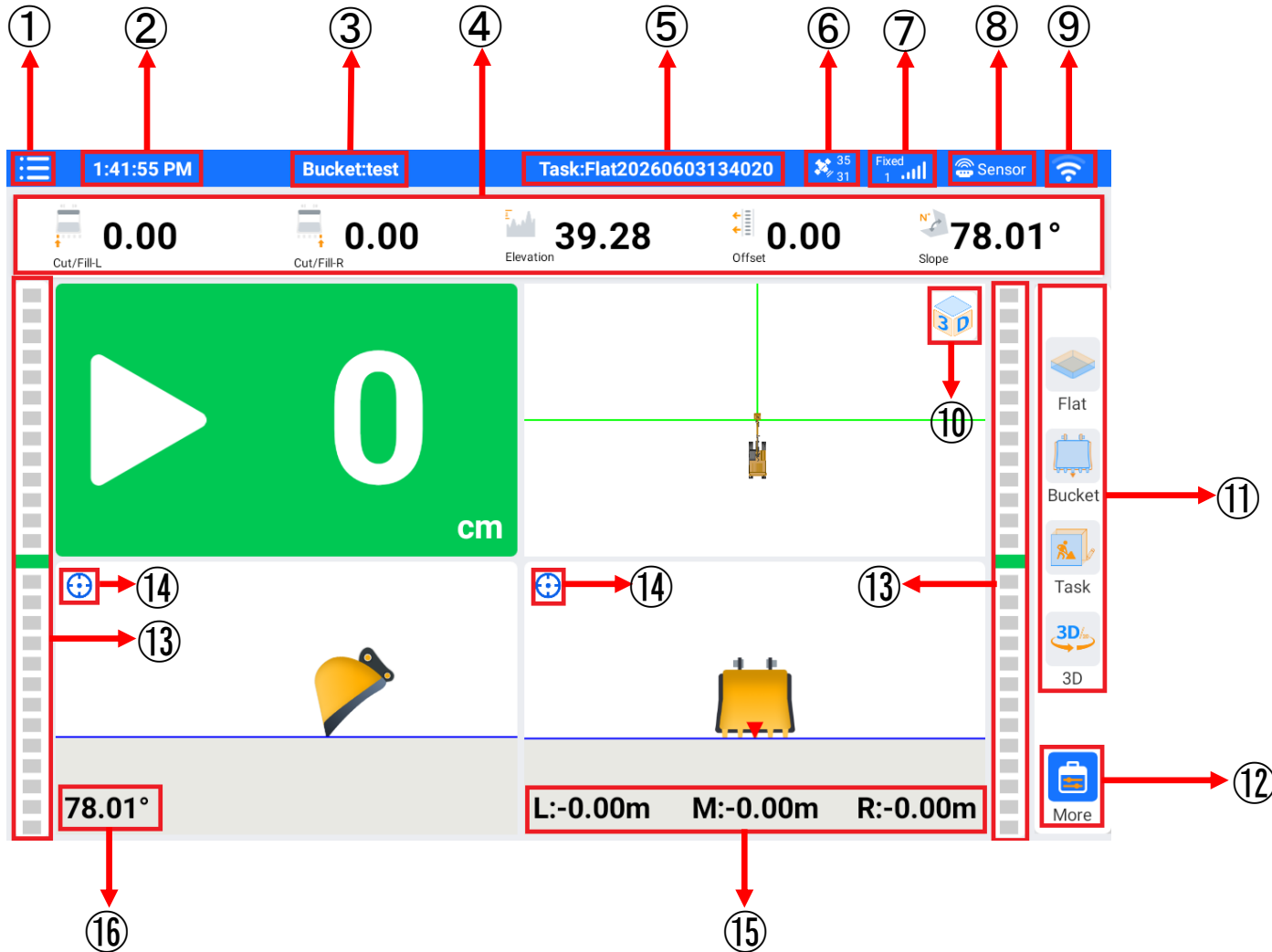
⑩ 3D/TOP View Switch Button: Clicking this button to switch between 3D and TOP views.

⑪ Toolbar: You can add frequently used functions. Clicking the corresponding icon enables you to use the function quickly;

⑫ More: Includes information, such as project task, device, config;

⑬ Left and Right Light Targets: The light targets display the filling and excavation volumes of the left and right shovel tips;

7 Main interface introduction



⑭ Positioning Button: Clicking this button positions the view at the bucket tip;

⑮ Bucket Tip Filling and Excavation Information: Displays the filling and excavation volumes of the left, middle, and right shovel tips;

⑯ Angle: The angle between the bucket operation and the horizontal line.

08

Handling of common problems

8 Handling of Common Problems

Common problem	Solution
The system doesn't search satellites	1. Check if the antenna is obstructed. 2. Check whether the 2 GNSS antenna ports, the corresponding 2 GNSS ports on the tablet are loose and whether the cables between them are intact. 3. Check that the 2 GNSS ports on the tablet have a voltage output of about 5V.
No differential signals to reach a fixed solution	1. Check if CORS account has expired. 2. Check if the tablet has a network signal.
No network signal from the system	1. Whether the 4G antenna on the tablet is connected properly. 2. Whether the SIM card in the tablet is normal.
Tablet cannot boot up	1. Check whether the power cord of the tablet is supplied normally.
System software jamming	1. Exit the system software and re-enter.
Under normal hardware conditions, the system accuracy error is large	1. Check whether the measurement of each dimension in the modeling process is correct or the error is large. 2. Is the sensor's attitude calibrated correctly.
No data from sensor	1. Check whether the joints of each sensor are loose and whether the cables connecting each sensor are intact. 2. Check if the Hub firmware version is updated.