PRECISE

PRECISE X

GNSS Receiver

Think PRECISE!

USER MANUAL

Release Month 2025/03

WWW.PRECISE-GEO.COM / SALES@precise-geo.com / @PRECISE-GEO

Preface

Introduction

Welcome to the PRECISE X GNSS receiver. This introduction describes how to use this product.

Tips for Safe Uses

Notice
The contents here are special operations and need your special attention. Please read them carefully.

Warning
The contents here are generally very important as the wrong operation may damage the machine. This can lead to the loss of data, or even break the system and endanger your safety.

Exclusions

Before using the product, please read these operating instructions carefully, they will help you to use it better. Zhuhai Precise Technology Co., Ltd. assumes no responsibility if you fail to operate the product according to the instructions or operate wrongly due to misunderstanding the instructions.
Precise is committed to constantly perfecting product functions and performance, improving service quality and reserves the rights to change these operating instructions without notice.
We have checked the contents of the instructions and the software & hardware, without eliminating the possibility of deviation. The pictures in the operating instructions are for reference only. In case of non-conformity with products, the products shall prevail.

Technology and Service

If you have any technical issues, please call technical support for help, we will answer your question.

Menu

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Chapter 1

Overview

This chapter contains:

Software Introduction

Software interface

Software installation and uninstallation

1.1 Software Introduction

xField software for Android is a collection GNSS integrates equipment control, location data collection, measurement, layout, road design layout and other functions GNSS measuring device data acquisition control software. The software has convenient operation process, humanized graphic interaction and professional measurement functions. This book mainly introduces the actual basic operating procedures and the menu functions of the xField software.

The xField main menu has four options: 【Project】, 【Device】, 【Measurement】, and 【Tools】.

【Project】 is mainly used to operate engineering projects. The main menus include project management, coordinate system, point management, line management, base station translation calibration, etc. A new project file is created in the project management. Coordinate parameters can be set in the coordinate system. Points collected during the measurement process can be viewed in the point management.

【Device】 is mainly used to set the working mode of the Receiver and view the Receiver information after connecting to the Receiver. The main menus include communication settings, rover station settings, base station settings, static settings, etc. After successfully connecting the device via Bluetooth or WIFI in the communication connection, after selecting the base station, rover station or static station working mode, you can view the positioning status of the device in positioning. If you want to calibrate the device, you can first turn on the tilt measurement in the device settings, and then you can calibrate the operation in the tilt calibration.

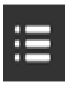
【Measurement】 The main menu includes point measurement, CAD surveying, CAD stakeout, point stakeout, line stakeout, site elevation control, survey area setting, etc., try to include various functions required for engineering surveying.

【Tools】 contains various calculation methods. The main functions include calculator, angle transformation, coordinate conversion, Grid to Ground, geometric calculation, post-measurement calibration, etc.

1.2 Software interface

Startup interface: On an Android device, run this software. If there is an existing project, it will directly enter the main interface, as shown in Figure 1.2-1, swiping left in sequence will enter the next navigation menu interface.
Main interface title bar:

The title bar mainly displays the project name of the currently opened project, the solution status after connecting to the device, and some shortcut functions.

 : About the software. Click to enter as shown in Figure 1.2-2. In the interface shown, you can view software copyright information, upgrade software, register and activate software, and provide feedback on your use of the software.

: Communication settings. Click to enter as shown in Figure 1.2-3 The interface shown can connect to the Receiver.

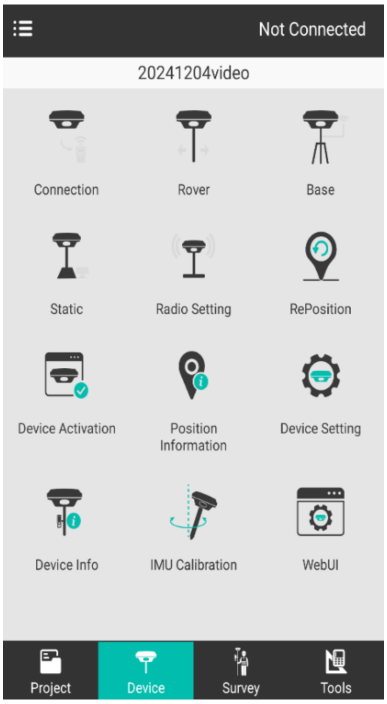


Figure 1.2-1

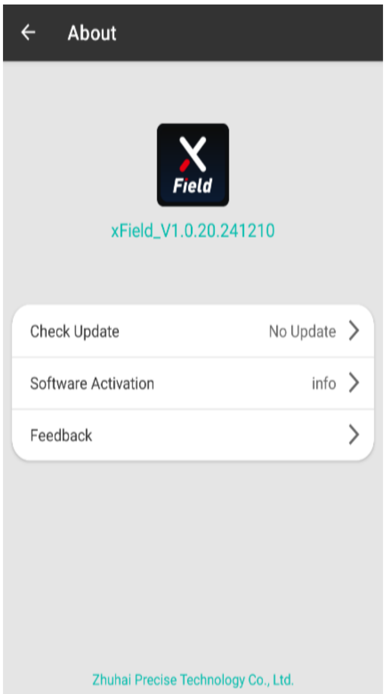


Figure 1.2-2

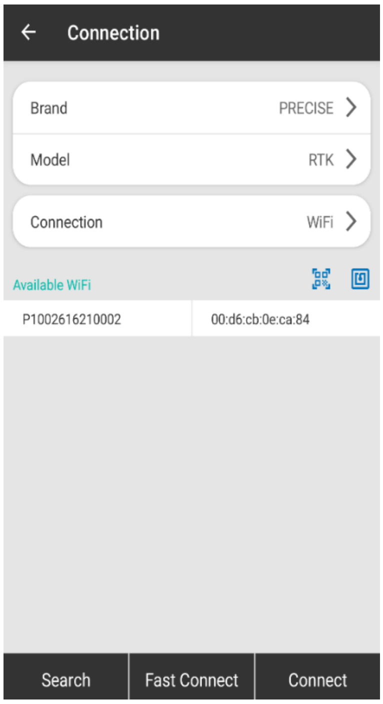
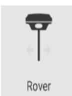


Figure 1.2-3

: Satellite status. After the device is successfully connected, click this icon to enter the status shown in Figure 1.2-4. The interface shown above can be used to view the current positioning information. Click 【Base Station Information】 above, as shown in Figure 1.2-5., you can view the base station information, click 【Save】 to save the current base station coordinates. Click 【Satellite Star Map】 above, as shown in Figure 1.2-6, you can view the reference position information of the satellite. Different colors represent different satellite systems. The circle in the upper left corner indicates the satellite system represented by each color. Click 【Satellite List】 below, as shown in Figure 1.2-7. As shown in the figure, it displays the satellite number, satellite system, L1\L2\L5 signal-to-noise ratio, altitude angle, azimuth angle, locking status and other information of each currently searched satellite. Click 

, in Figure 1.2-8. As shown, you can enter the current constellation switch state.



: Rover station settings. As shown in Figure 1.2-9. Click this button to go directly to the rover station settings.

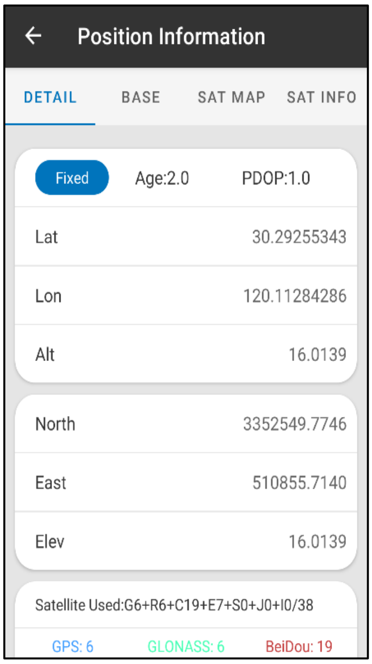


Figure 1.2-4

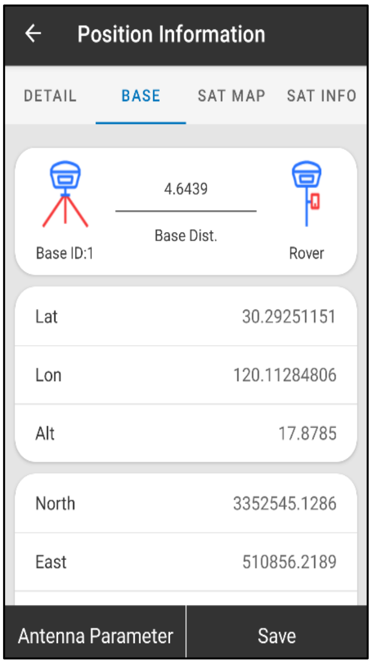


Figure 1.2-5

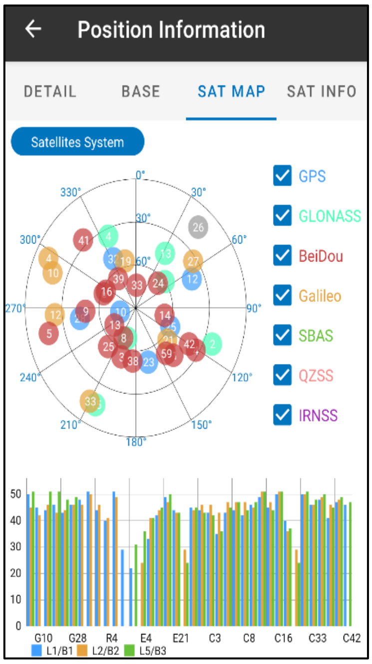


Figure 1.2-6

Figure 1.2-7

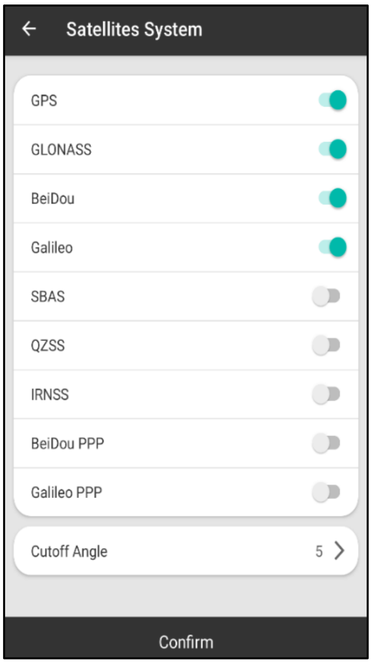


Figure 1.2-8

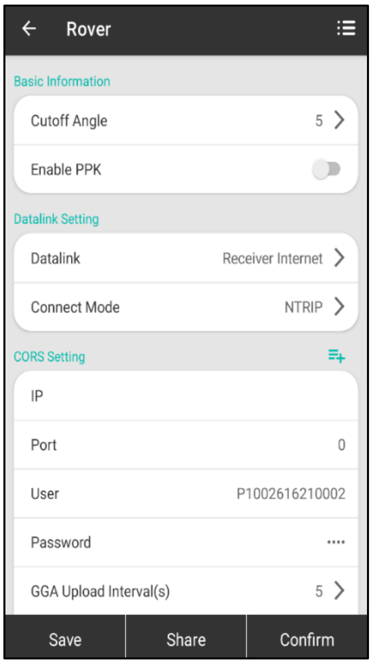


Figure 1.2-9

1.3 Software installation and uninstallation

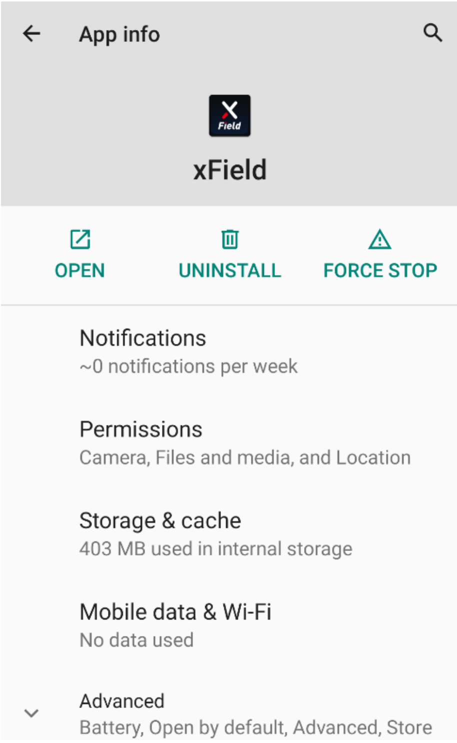
Installation process:

1.Download the Android xField software installer (*.apk).

2.Installation method: Copy the xField software installation program to the controller. In controller find the software installation program in the device 'the controller agent. Click the installation program and the installation dialog box pops up. Click【Install】,A dialog box for the preferred installation location will pop up. After a while, the installation completion dialog box will pop up, as shown Click "Finish" to return to the device desktop, click 【Open】Run the xField software.

Uninstallation process:

Uninstall method 1: Long press the software icon on the desktop and drag it 【uninstall】In the option box, as shown in Figure 1.3-5.A dialog box will pop up asking whether to uninstall, as shown in Figure 1.3-6. Click "OK". Complete software uninstallation.



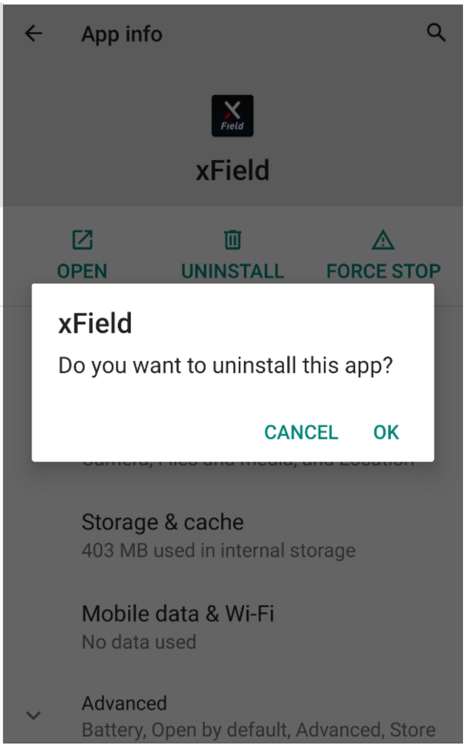


Figure 1.3-5 Figure 1.3-6

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Chapter 2

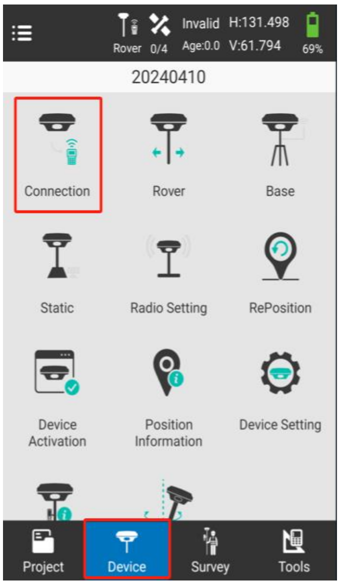
Quick start

This chapter contains:

GNSS receiver connection
Set a new project
Localization
Set Base station
Set Rover station
Survey and Stake out
Export data

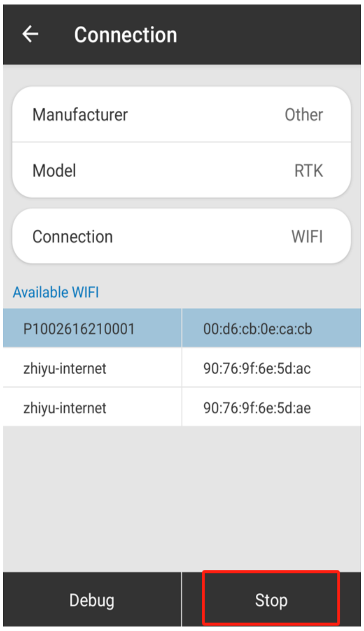
2.1 GNSS receiver connection

2.1.1 Open the xField on handheld controller, Tap Device and tap communication



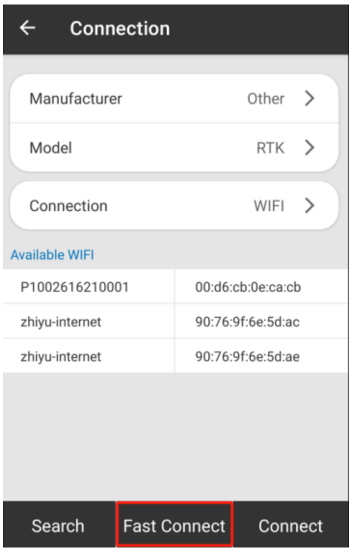
It can be connected to WIFI or Bluetooth.

If you connected to another GNSS receiver before, please tap "Stop" first.



The name of "Available WIFI" is same as GNSS receiver code.

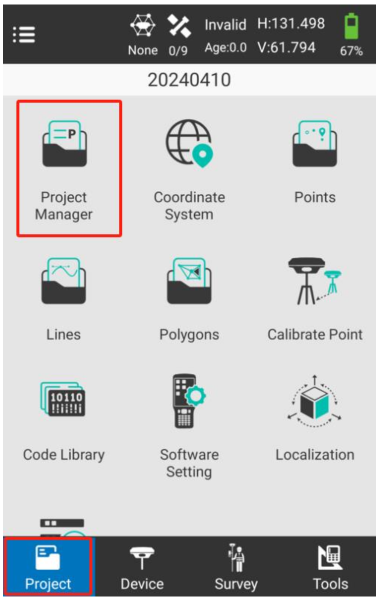
2.1.2 Fast connection with NFC

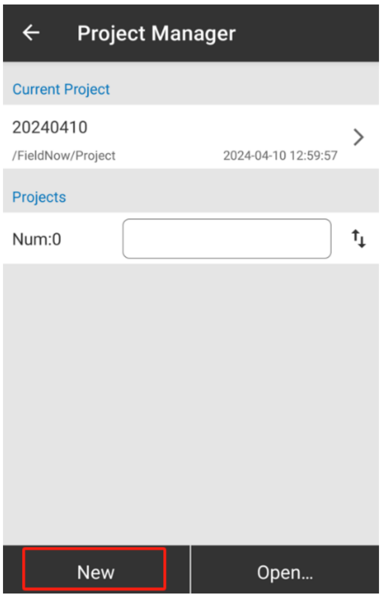


“Fast connect” means handheld controller could find your nearest GNSS receiver and connect fast by NFC. You do not need to choose any of the receivers on screen.

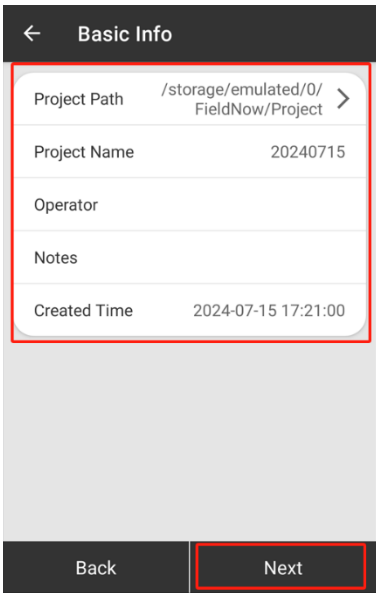
2.2 Set a new project

2.2.2 Tap “Project” and select “Project Management” and tap “New”

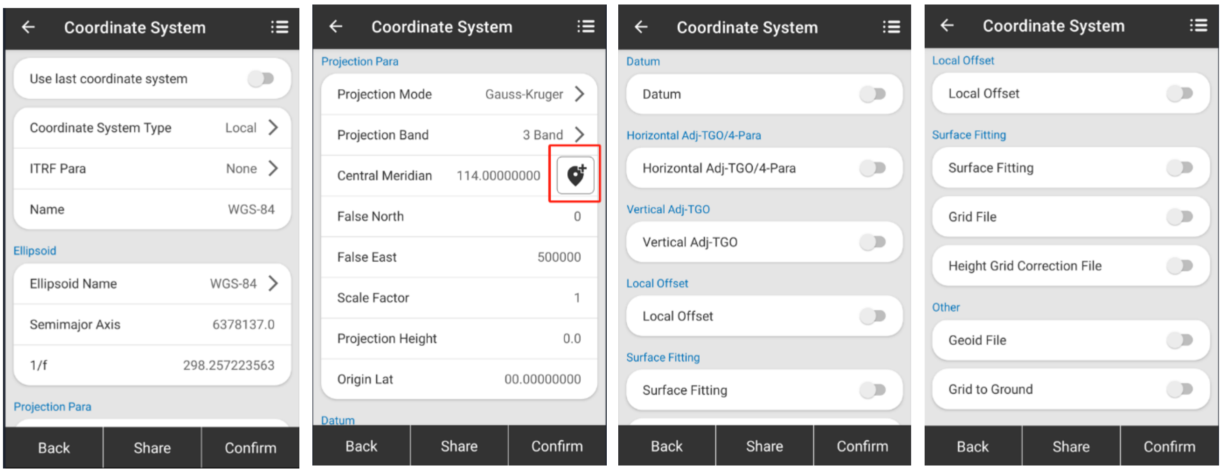




2.2.3 In Basic Info, you could change the project path, project name, operator and notes as you want. After that go next.



2.2.4In Coordinate System

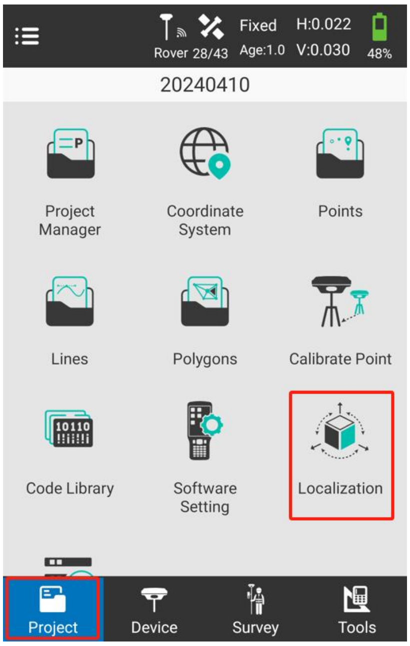


In this step. It is necessary to set "Central Meridian", you could tap  to acquire your local central meridian automatically.

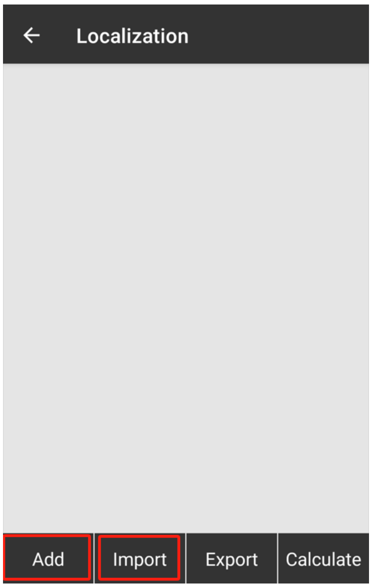
You also could change the ellipsoid of coordinate system such as "WGS-84" and other options as your requirements.

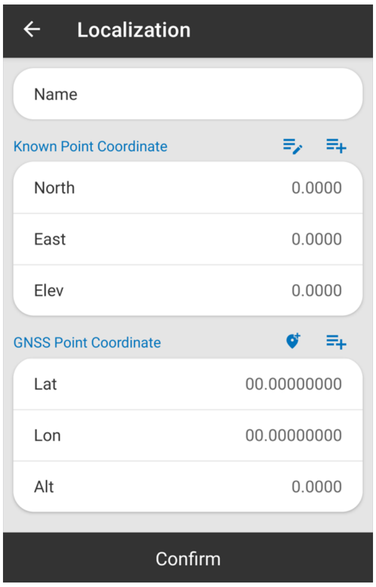
2.3 Localization

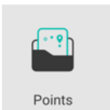
Localization means calculating conversion parameters. You could calculate the conversion parameters to convert coordinate system from the global standard to your local standard.



Tap “Project--Localization”





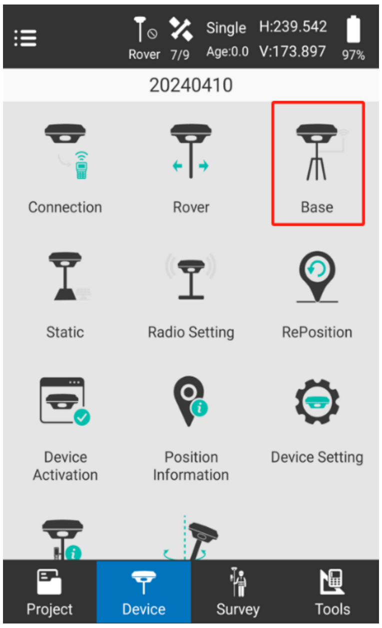
You could add known point coordinate and measure GNSS point coordinate and could import many points from the “Points” 

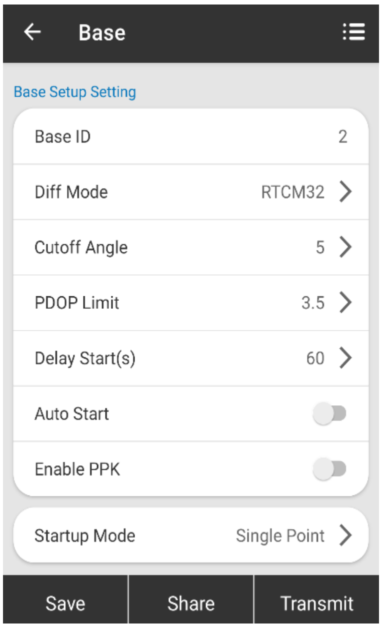
After that, you could calculate the conversion parameters and export them.

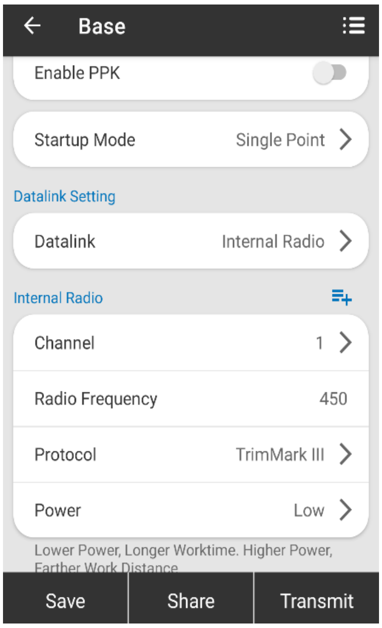
2.4 Set Base station

2.4.1 Making sure the GNSS receiver of Base is established, including tripod centered and leveled.

2.4.2 Tap based on the software



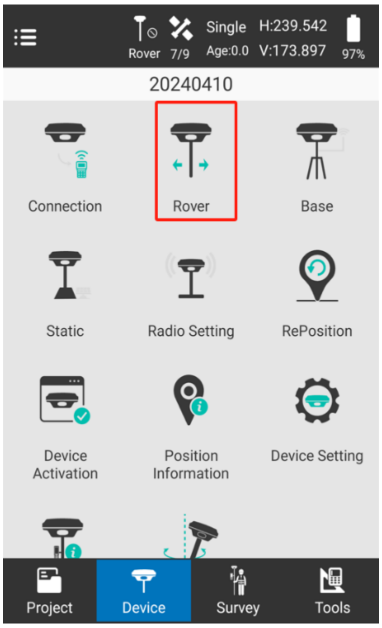


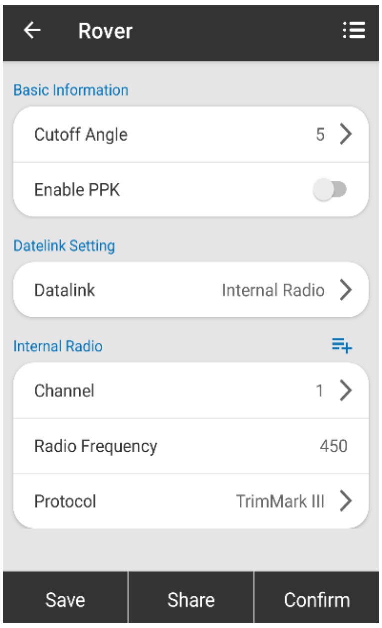


The meaning of all detail parameters is indicated in the User manual.

2.5 Set Rover station

2.5.1 Tap Rover

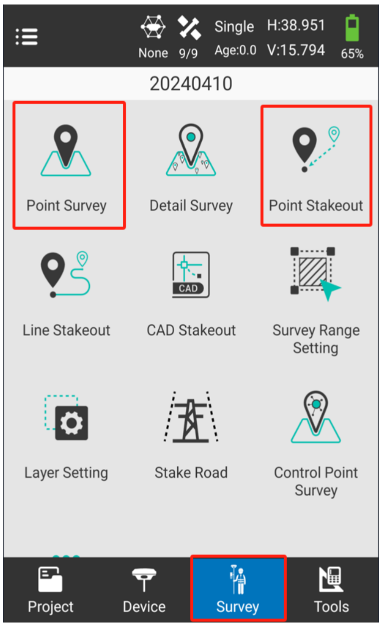




The meaning of all detail parameters is indicated in the User manual.

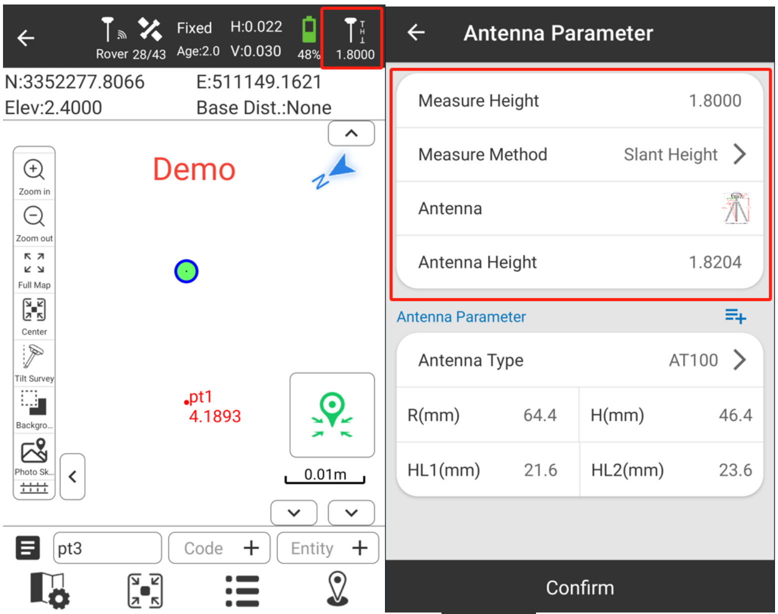
2.6 Survey and stake out

2.6.1 Tap “Survey”

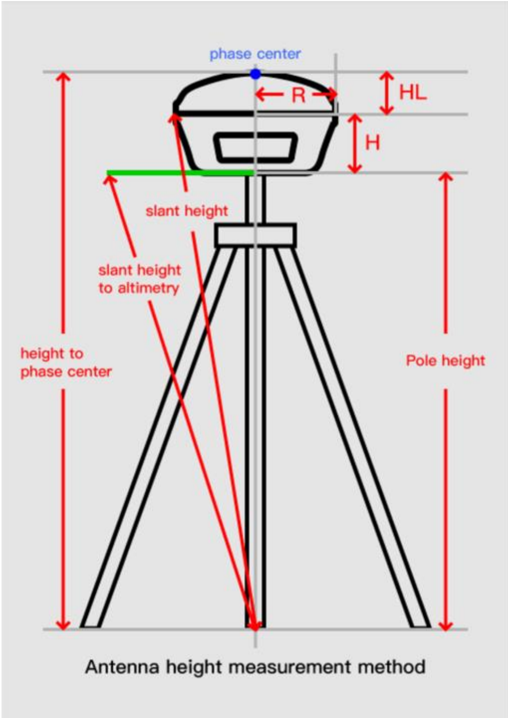


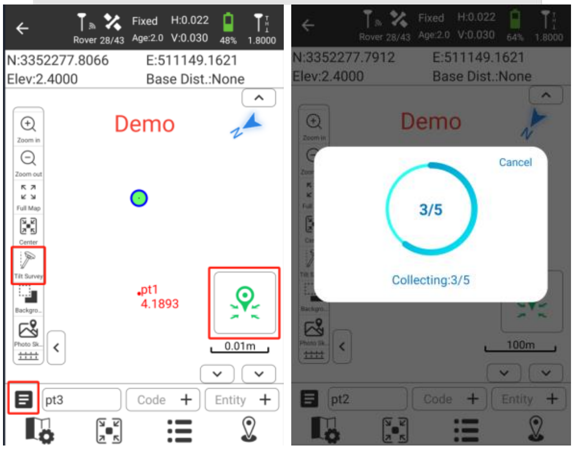
Currently, we have three surveys and three stakeouts. You could choose any of them to survey your work according to your requirements. Now I take Point Survey and Point Stakeout for example.

2.6.2 Point Survey



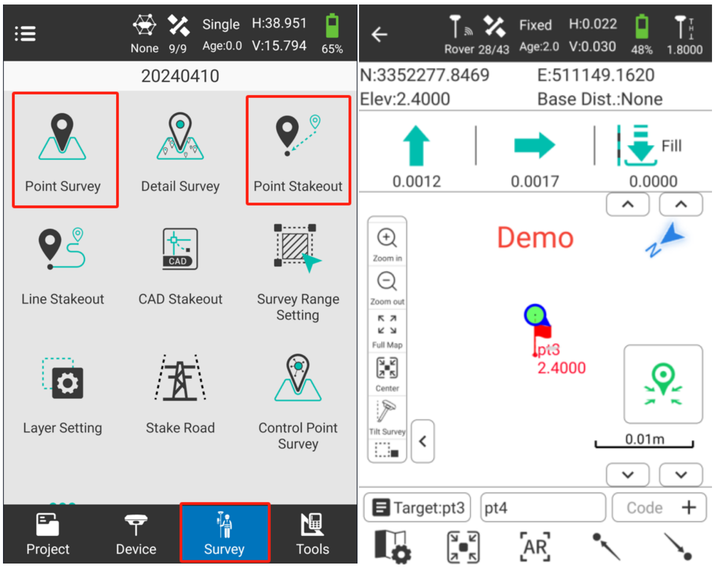
First, it is necessary to set the height of antenna. Tap  and change antenna parameters. The whole figure of measuring methods is as follows.





In addition, Tilt Survey is also supported. After initializing IMU you could tap to capture your point. Tapping you could find "Points" which you have been collected.

2.6.3 Point Stakeout



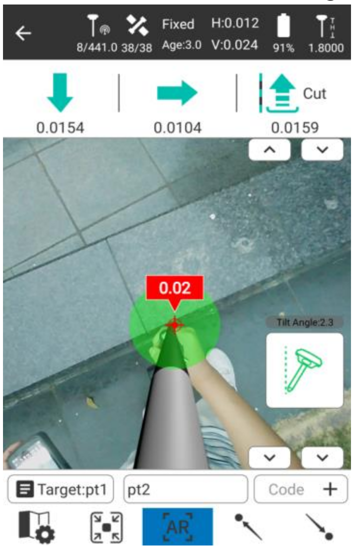
In Point Stakeout, you could see the direction clearly which you need to go forward or backward or ground filling.

It supports tilt stakeout. Tapping 

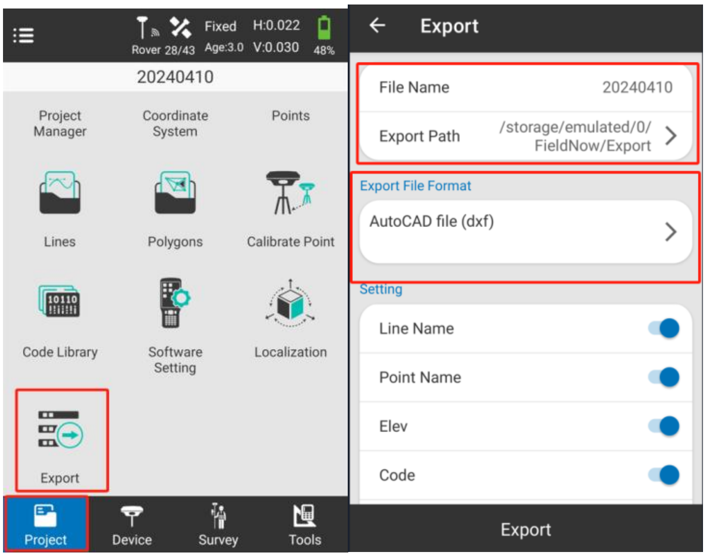
to use tilt survey.

It also supports AR stakeout. Tapping 

to use AR stakeout which means you could see the stake point directly with camera and follow the leading indicators to stake.

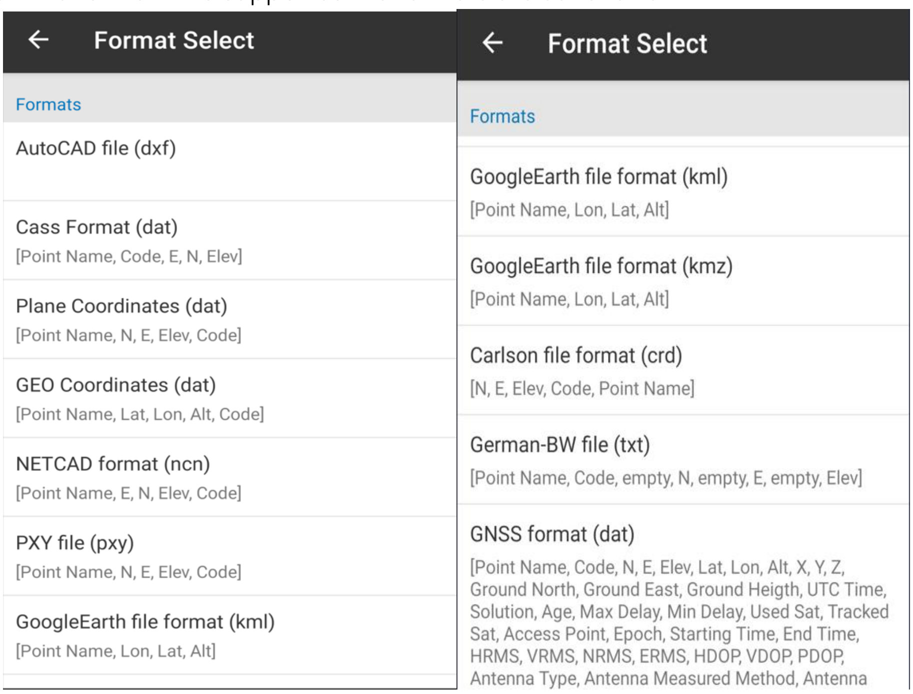


2.7 Export data



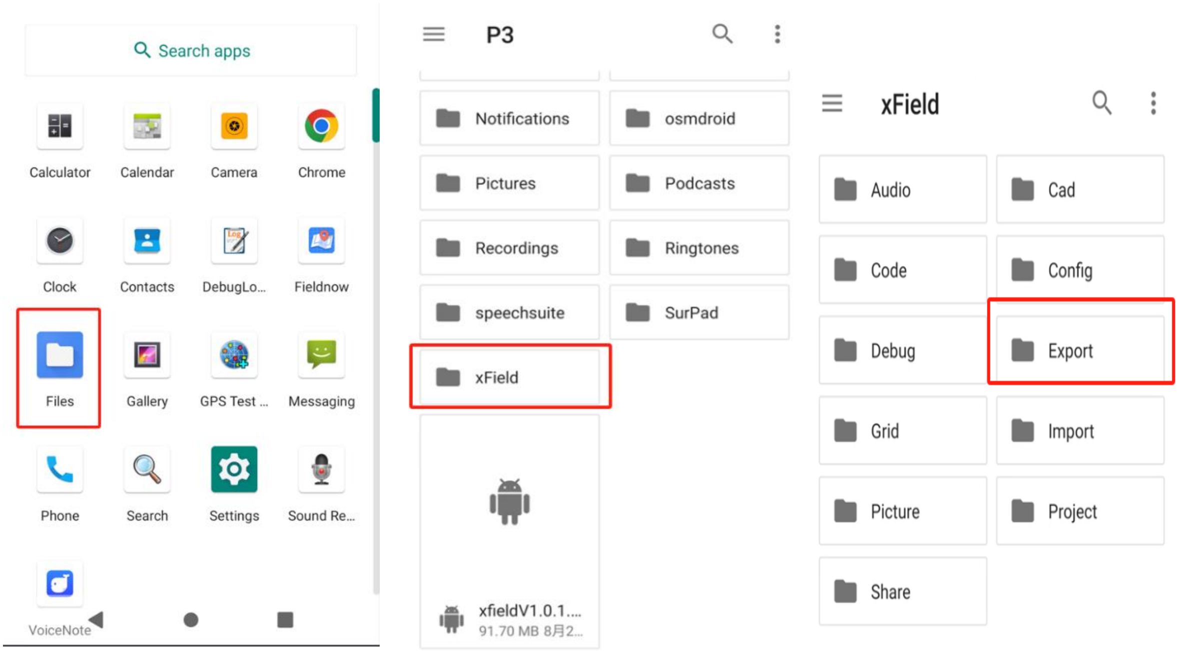
Tap “Project—Export”. You could export all points which you have been collected in different format.
In “Export”, you could change the file name, export path (In default, the path is P3/Internal shared storage/xField/Export) and Export file format.

For export file format. The supported file formats are as follows.

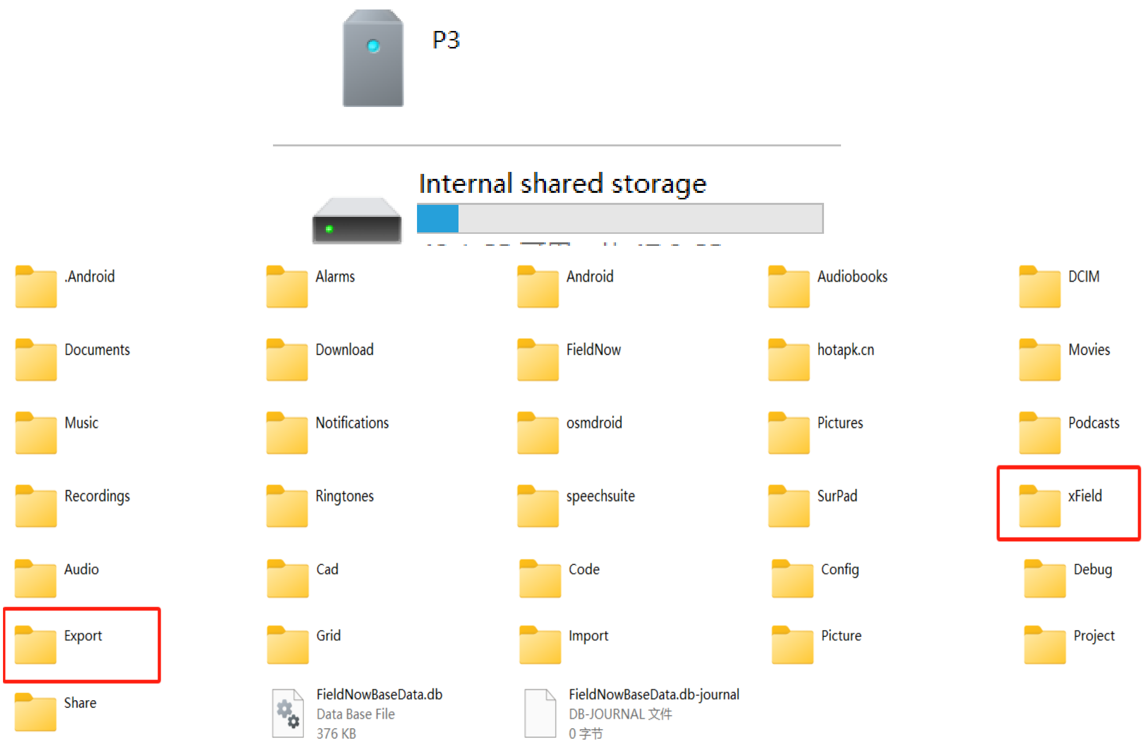


You could select any of file format as your requirements.
After that,you could find your export files both in the handheld controller and the PC with USB cable. The detail of export file paths are as follows.

2.7.1 Path of Handheld controller



6.2 Path of PC



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Chapter 3

Project

This chapter contains:

On the main interface of the software, click【project】The submenu that appears is shown in Figure 3-1. The Project submenu contains project management, coordinate system, point management, line management, surface management, base station translation calibration, code library management, software settings, calculation of conversion parameters and more.

xField software manages the software in the form of project files. All software operations are completed under a defined project. Each time you enter xField software, the software will automatically load the project file used when the software was last used. Generally, before starting a survey construction in a region, a new project file matching the current project coordinate system must be created. Rover device a folder with the same name as the project name will be generated by default in the storage disk, and all relevant data will be saved in it.

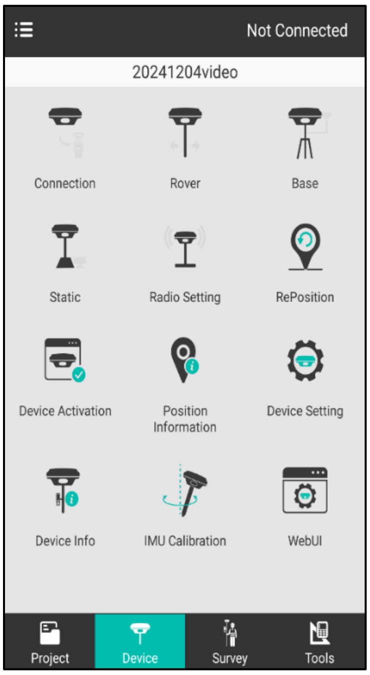


Figure 3-1

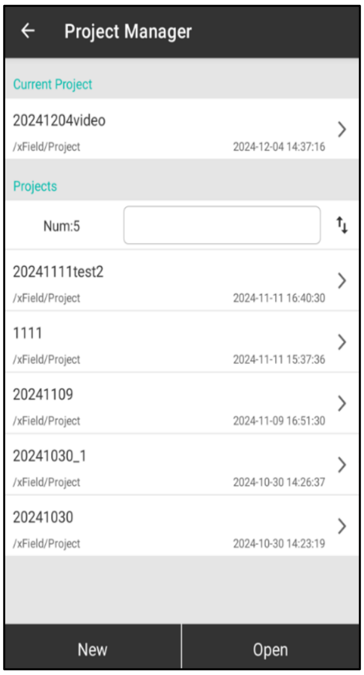


Figure 3.1-1

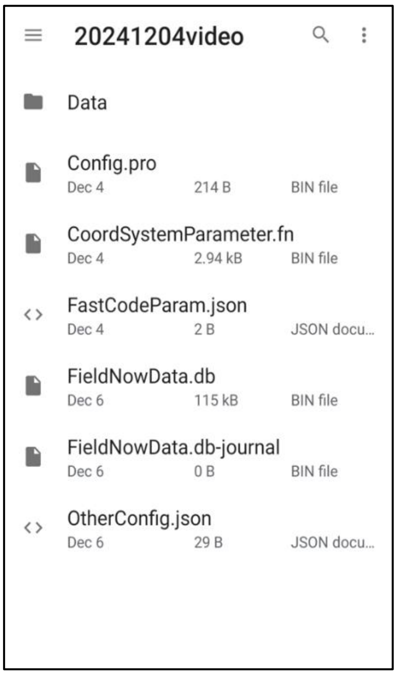


Figure 3.1-2

3.1 Project Management

Run xField software, execute 【Project】 -> 【Project Management】 ->【New】, create a new project, select the path, enter the project name, personnel, description, etc. Figure 3.1-3 shown. Click next, you can check to us the coordinate system parameters of the last project or reselect the parameters. Select the ellipsoid parameters, projection parameters, seven parameters, and geoid file. If necessary, select them. Click Finish, figure 3.1-4 shown. In China, the ellipsoid parameters default to CGCS2000 the projection method is Gaussian projection. You can set the coordinate system according to the actual situation.

Click 【Open】 to open other project files.

If you need to delete an item, drag the item to the left, as shown in Figure 3.1-5 as shown, click 【Remove】 and select 【OK】 in the pop-up prompt box to remove the project file. Remove from Project List, the project currently in use cannot be deleted.

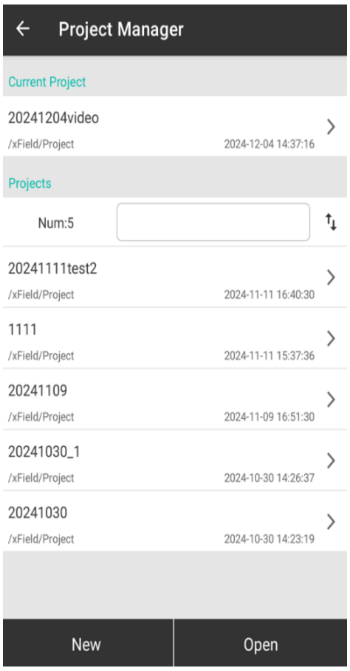


Figure 3.1-3

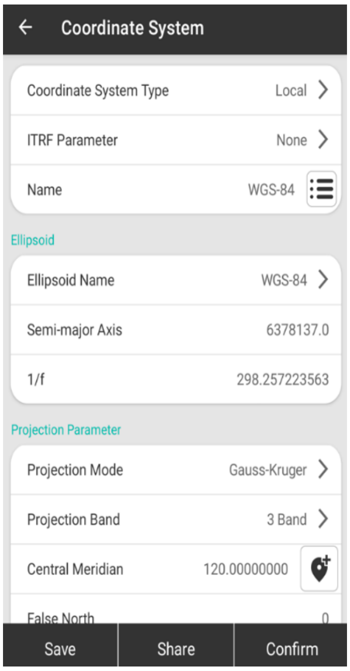


Figure 3.1-4

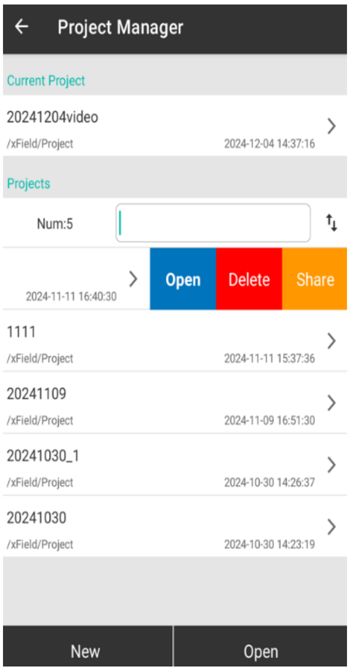


Figure 3.1-5

3.2 Coordinate system

1. Local Coordinate Parameters

Click【project】->【Coordinate system】The coordinate system parameter setting interface is shown in Figure 3.3-1. You can click on various parameter options to set various parameters of the coordinate system.

Click 【Template】,As shown in Figure 3.3-4, you can apply the saved coordinate system parameter template.

Click 【Share】 as shown in Figure 3.3-5. The QR code can be scanned on another controller to transfer coordinate parameters with one click.

Ellipsoid parameters: as shown 3.3-2, can set up Target Parameters. Target ellipsoid you can choose defined and custom of ellipsoid parameters, custom ellipsoid needing to set the ellipsoid set for the major axis and the inverse of the flattening parameters should be consistent with the ellipsoid used for the calculation parameters.

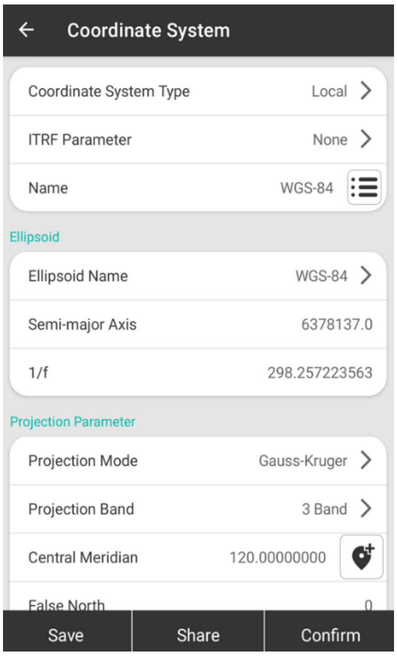


Figure 3.3-1

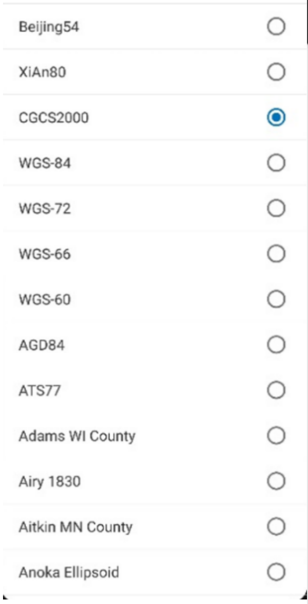


Figure 3.3-2

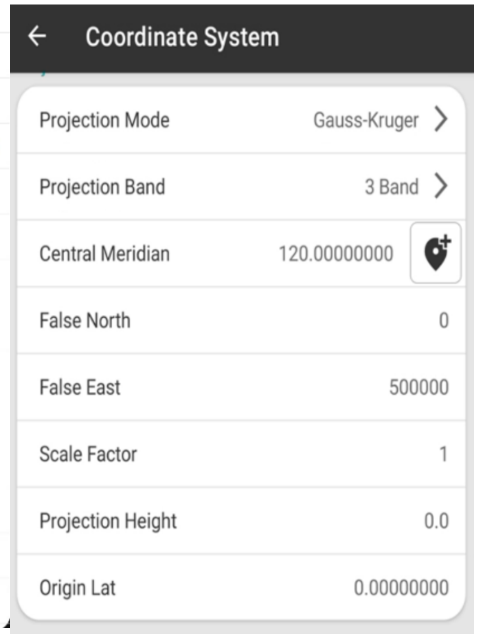


Figure 3.3-3

Figure 3.3-4

Figure 3.3-5

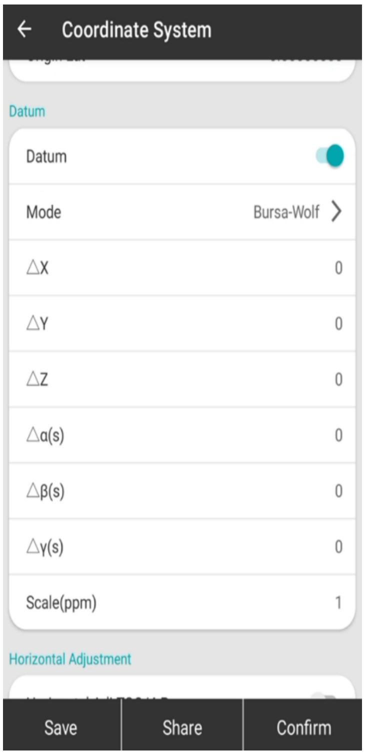


Figure 3.3-6

Projection parameters: Figure 3.3-3 as shown. In China, the commonly used projection method in China is Gaussian projection. After connecting the device, the central meridian can be clicked on the right. Automatically obtain or manually enter the accurate value. The general projection parameter settings are as follows: the north additive constant is 0, the east additive constant is 500000 (depending on your coordinate system), the projection scale is 1, the projection height is generally 0 in low altitude areas and can be modified as needed in high altitude areas. Other parameters are 0.

Seven parameters as shown in Figure 3.3-6, the seven-parameter model (a set of mathematical equations) is usually used when converting between two different three-dimensional cartesian coordinate systems. Usually, at least three commonly known points and six pairs of XYZ coordinate values in two different cartesian coordinate systems are required to deduce the seven unknown parameters. After calculating the seven parameters, the XYZ coordinate value of a point in one rectangular coordinate system can be converted to the XYZ coordinate value in another rectangular coordinate system through the seven-parameter equation set. There are seven unknown parameters in the seven-parameter model, namely:

(1) Three coordinate translations (△X, △Y, △Z), that is, the coordinate difference between the origins of the two spatial coordinate systems;

(2) Rotation angles of the three coordinate axes (△α, △β, △γ). By rotating the three coordinate axes in sequence by specified angles, the XYZ axes of the two spatial cartesian coordinate systems can be made to coincide with each other.

(3) Scale factor K, which is the ratio of the lengths of the same straight line in two spatial coordinate systems, realizes the proportional conversion of scale. Usually, the K value is almost equal to 1.

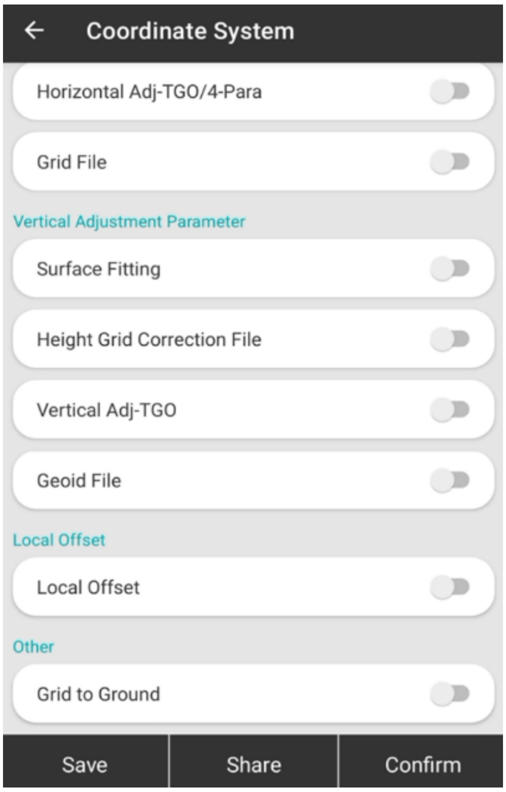


Figure 3.3-7

Surface Fitting: The GPS elevation system is geodetic height (ellipsoid height) and the elevation commonly used in measurement is normal height. Therefore, the elevation measured by GPS needs to be corrected before it can be used. The surface fitting parameters are the parameters to complete this fitting, as shown in Figure 3.3-7 set the surface fitting parameters as shown in the figure.

Vertical Adj-TGO: The elevation conversion model of Trimble TGO software includes five parameters: north origin, east origin, north slope, east slope, and adjustment parameters, as shown in Figure 3.3-7shown.

Grid file: as shown in Figure 3.3-7 grid model files are files provided by geodetic organizations in many countries (especially in North America and Australia) for different datums (such as NAD27 to NAD83 conversion). These grid shift files include the offset applied to each grid position. In practice, the grid shift is usually calculated based on the interpolation between the four grid points. Our software currently only supports. GSB format files.

Geoid file: as shown in Figure 3.3-7, the geoid file is used to correct the elevation. Our software imports the geoid file. Currently, our software supports*.GGF, *.SGF, *. UGF. Three formats, select the conversion mode (bilinear interpolation, biquadratic interpolation, bispline interpolation) to get the accurate elevation of the coordinate point.

Local offset: Know a known coordinate point and calculate the translation parameter. This parameter is used in a small range.

3.3 Base station translation calibration

Click 【Project】->Calibrate Point, the station calibration interface is shown in Figure 3.4-1.

Use rover point calibration: The base station is not erected at a known control point. Use rover station to known point correction is performed by enter Known Points Coordinates and rover stations get the current WGS84 coordinates, software calibration calculated station calibration parameters.

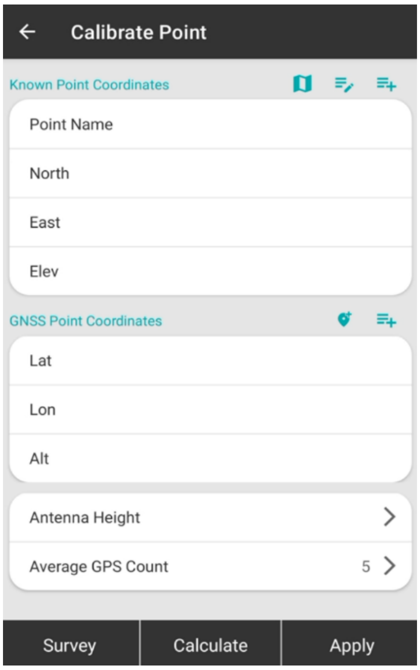


Figure 3.4-1

The calibration process using rover point is as follows:

(1)Check【Calibration using rover points】, input the known point north coordinate, easting coordinate and elevation. Click【 】, enter the point management interface, select the required point, and you can get the current WGS-84 coordinates.

(2)click【calculate】, you can see calculation results, click 【Apply】 to directly apply the calculation results.

The base station shift calibration is performed based on the already resolved and activated transformation parameters. The parameters generated by station calibration essentially correct the errors caused by the base station being turned on/off or moved, as well as errors from single-point positioning coordinates (note: the base station starts with single-point positioning, with positioning accuracy at the meter level). In the software, these are referred to as calibration parameters. Below are the scenarios for using the station calibration function:

When the base station startup parameters are set to single-point positioning coordinates

After the base station undergoes power cycles or positional changes, the rover station requires station calibration.

When the user knows the transformation parameters for the working area

The base station can be set up anywhere within the working area. By directly inputting the transformation parameters, the rover station can perform station calibration.

3.4 Point Management

Execute 【Project】 ->【Point Management】, after entering, you can see the collected point coordinates, and can edit, stake out, remove and export the collected points.

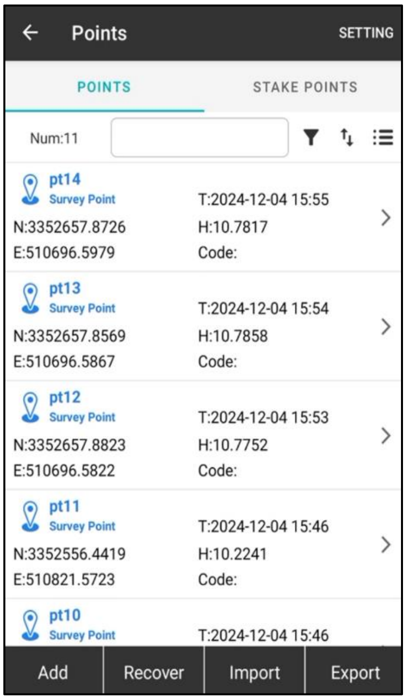


Figure 3.5-1

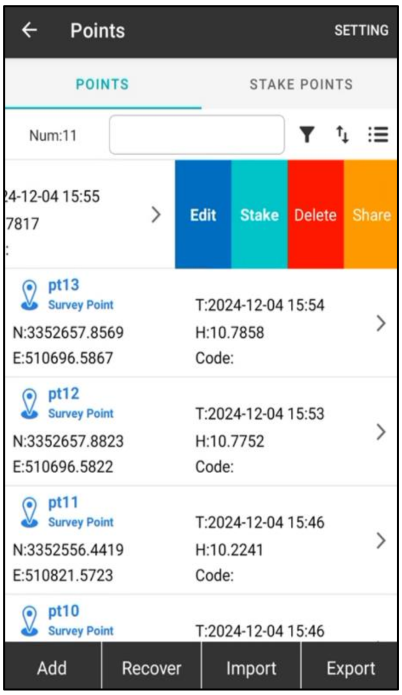


Figure 3.5-2

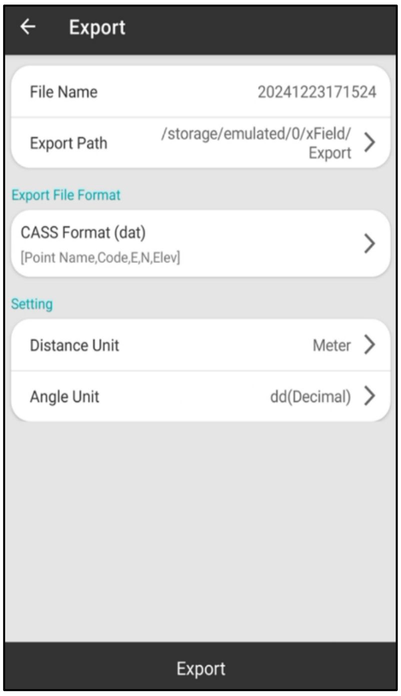


Figure 3.5-3

【Point Management】 it is used to uniformly manage various types of coordinate points, and to input the coordinates of points needed for operation, so as to facilitate calling during point stakeout. You can enter the point name or code in the search to quickly search for coordinate points.

Point Management includes adding, editing, detailing affection, delete, import, options, share and restore functions.

Click【Add】, as shown in Figure 3.5-4. Coordinate points can be divided into flat coordinates, geodetic coordinates. Coordinate points can be divided into control points and input points according to their attribute types. After selecting the coordinate type and coordinate attribute, enter the point name. Plane coordinates (Northing, Easting, Elevation) or longitude and latitude coordinates and codes to complete the parameter setting of the new coordinate point.

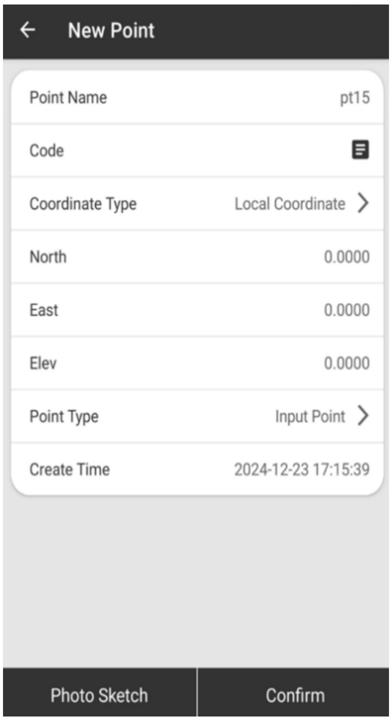


Figure 3.5-4

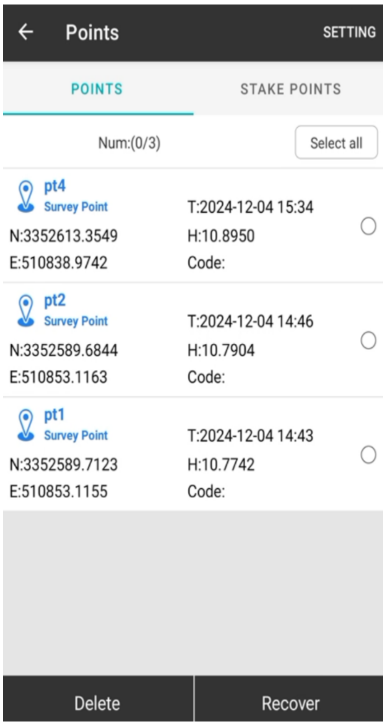


Figure 3.5-5

Figure 3.5-6

Select any coordinate point in the coordinate point library and click【Edit】,Figure 3.5-6 as shown, you can modify the name, code, image mark and antenna parameters, click 【OK】 to complete the modification and return to the coordinate point library interface; The coordinates of the input points can be edited, the measured points can only be edited by point name code, and only the collected points can be marked in the image.

Click【Recover】,Figure 3.5-5 as shown, the removed points can be restored.

3 3.6 About

About the software as shown in Figure 3.6-1 the following three functions are shown: software activation, feedback and checking for new versions.

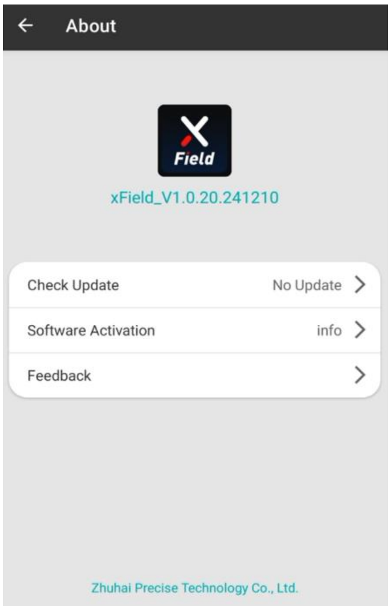


Figure 3.6-1

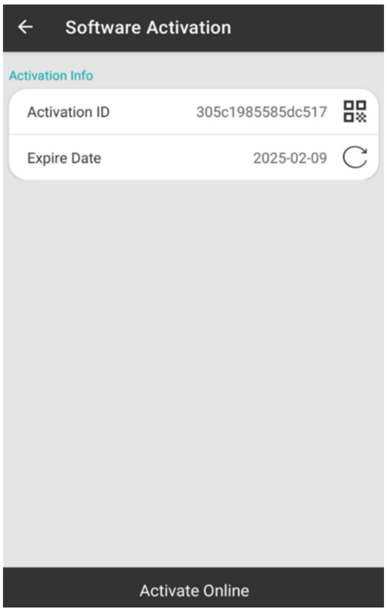


Figure 3.6-2

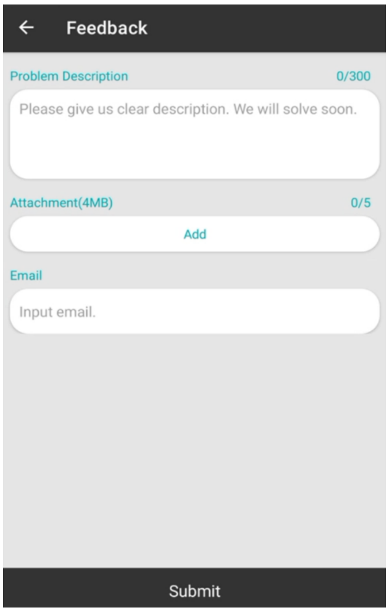


Figure 3.6-3

Software Activation: Click 【Software Activation】, as shown in Figure 3.6-2. Click 【Online Activation】, enter the registration code or scan QR code and click 【Confirm】.

Feedback: Thank you for using our software. Please leave your valuable comments. We will take your feedback, comments and suggestions seriously. You can write your comments in the text box shown as shown in figure 3.6-3, leave your contact information, and send it to us as an attachment. The attachment supports pictures and text. Click 【Submit】, and it will prompt that the submission is successful, and your comments will be automatically sent to us.

Check for new versions: Click 【Software Update】 Can Check Current xField is the latest version. If there is a new version, a software update prompt box will pop up. Click 【Update】 and the software will be automatically updated. If there is no new version, it will prompt that there is no new version at present.

PRECISE

Think PRECISE!

Chapter 4

Instrument

This chapter contains:

- Communication Settings
- Rover Station Mode
- Base Station Mode
- Static station mode
- Device Information
- Device Setup
- Tilt Calibration
- Repositioning
- Device Registration
- Default Radio Station Settings

4.1 Communication Settings

Click【device】->【communication set up】,As shown4.1-1.Set the device manufacturer and device type, select the communication mode, and click 【Connect】 to complete the device connection.

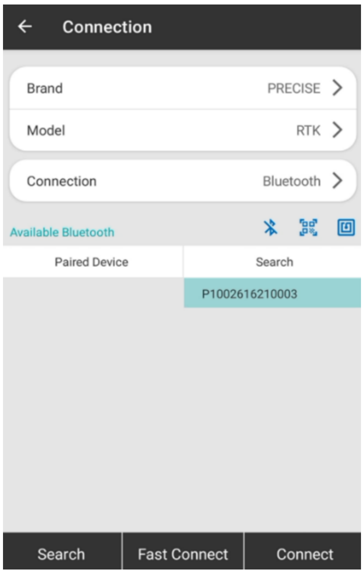


Figure 4.1-1

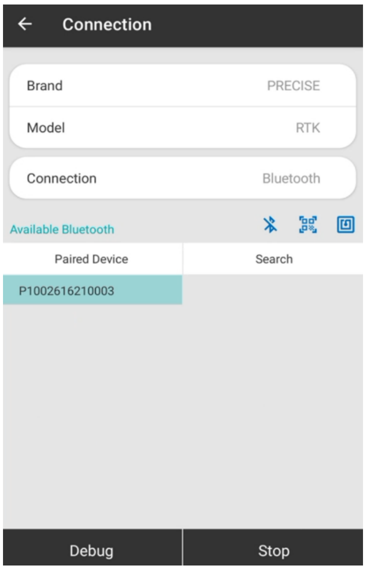


Figure 4.1-2

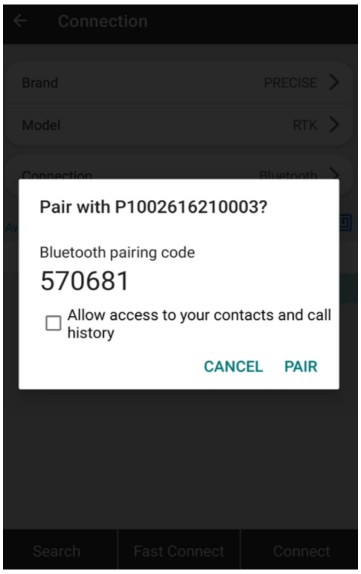


Figure 4.1-3

Device Type: The corresponding device type is displayed according to the selected manufacturer.

The following describes the communication modes that are displayed after connecting to RTK. Communication Mode: Bluetooth, WIFI.

1． Bluetooth connection

Choose【Bluetooth】communication mode, click【search】, as shown in the figure4.1-3. If the Bluetooth device you want to connect to is already in the "Bluetooth Device List", you can click【stop】, stop searching, select the name of the Bluetooth device to be connected to the device, and click【connect】, when the pairing dialog box appears, click Pair to successfully connect.【Quick Connection】 searches for Bluetooth signals around you and automatically connects to the one with the strongest signal strength.

2． WIFI CONNECTIVITY

In RTK type choose【WIFI】Communication Mode, then tap【search】,The WIFI device list will be displayed. Find the WIFI name sent by the corresponding receiver (the default is the receiver number), choose WIFI NAME connect your rover device to WIFI. Click【connect】, complete the WIFI communication connection, as shown in the figure 4.1-4.【Quick Connection】 searches for WIFI signals of receivers around you and automatically connects to the one with the strongest signal strength.

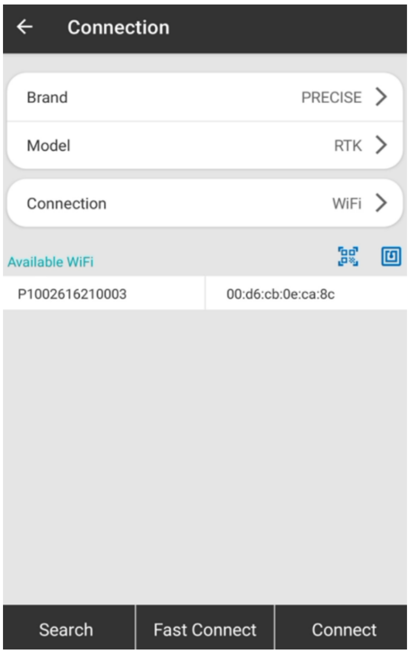


Figure 4.1-4

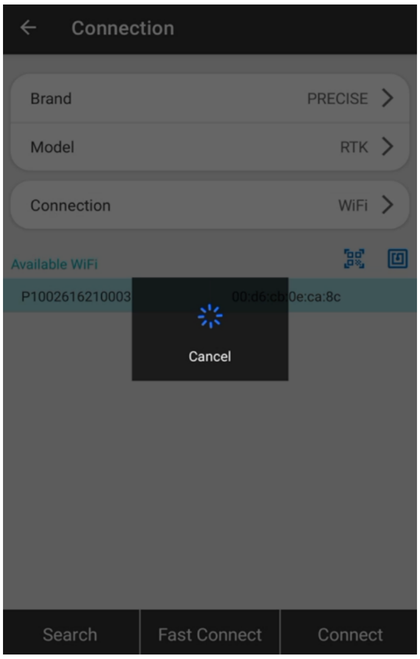


Figure 4.1-5

4.2 Rover Station Mode

Click【device】->【Rover Station Mode】, as shown in Figure 4.2-1. The rover station settings include cut-off angle, whether to enable PPK, data link, connection mode, etc. Setting contents. The following describes various parameter settings in detail.

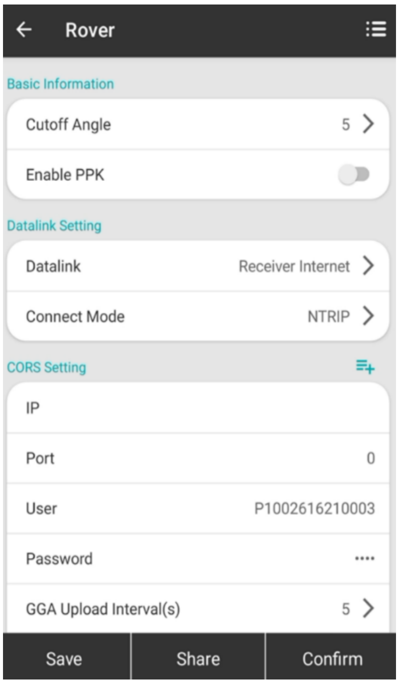


Figure 4.2-1

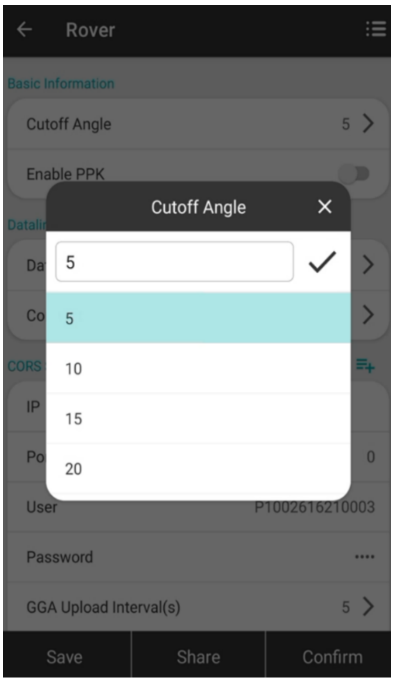


Figure 4.2-2

Cut-off angle: the angle between the line between the satellite and the receiver and the horizon. The receiver will not receive satellite signals that are smaller than the cut-off angle. Value range:0-45 degrees.

Enable PPK: when select enable PPK, can enter the name, Set the collection interval. Post-difference points can be collected in the point measurement interface.

PPK (postprocessed kinematic) measurement technology is a GNSS positioning technology that uses carrier phase for post-differentiation. It is a dynamic post-processing measurement technology. This technology uses dynamic initialization OTF (On the Flying) to quickly resolve integer ambiguities. During field measurement, centimeter-level spatial three-dimensional coordinates can be resolved after observing for 10s to 30s. Unlike RTK real-time carrier phase differential measurement technology, PPK measurement does not require a real-time communication link to be established between the rover station and the base station. Instead, after the field observation is completed, the original observation data is collected by the rover station and the base station. GNSS receivers are post-processed to calculate the three-dimensional coordinates of the rover station.

The working principle of PPK measurement technology is to set up one or more base station receivers at appropriate locations in the measurement work area within a certain effective distance range, and then use at least one GNSS receiver as a rover station to survey and map the operation area. Since the satellite clock errors and other errors of the synchronously observed rover station and the base station have strong spatial correlation, after the field observation is completed, the GNSS processing software is used in the computer to perform differential processing, linear combination, and form a virtual carrier phase observation value to calculate the spatial relative position between the rover station and the base station receiver; then the known coordinates of the base station are fixed in the software to solve the coordinates of the rover station's test point. During the operation, the base station GNSS receiver maintains continuous observation, the rover station GNSS receiver is initialized first, and then observes each test point for a certain period in turn. To transfer the integer ambiguity to the test point, the rover station receiver needs to keep tracking the satellite during the relocation process. The base station can also be a CORS system, that is, the rover station can perform PPK operations and solve if it is within the effective coverage of the CORS system.

Data Link: according to the connected device, the basic no data link, Receiver network, internal radio, external radio, controller network etc.

1. No data link: No differential signal is sent.
2. Receiver Network: internal device. The network transmits differential signals. This mode requires a SIM card to transmit data.
3. Internal radio: refers to the working mode of using the internal radio of the device to transmit differential signals. Both the RTK base station and the rover station have internal transceiver radios. The base station transmits differential signals through the internal radio, and the rover station receives the radio differential signals sent by the base station through the internal radio.
4. External radio: refers to the working mode in which the Receiver is connected to an external large radio to transmit differential signals.
5. Controller network: refers to Controller The working mode of network transmission differential signal, this mode requires Controller Insert a SIM card to transfer data.

Choose suitable data of link mode, after successful setting, the rover station can receive the differential signal from the base station. internal Radio mode, the frequency and protocol settings of the rover and base stations must be consistent.

4.2.1 Rover Station- Receiver Network

Select 【Receiver Network】 for the data link. As shown in Figure 4.2.1-1. Required settings connection options, WIFI settings or SIM set two items content.

"Connection Options" requires setting the connection mode, Internet access method (WIFI or SIM, select WIFI and the WIFI settings will appear. Select SIM and the APN settings will appear), the connection mode options are detailed as follows:

TCP: Transmission Control Protocol, it is a connection-oriented, reliable, byte-stream based transport layer communication protocol.

NTRIP: standard network transmission differential mode, generally used in CORS networks.

Custom: User-defined

ZHD: Hi-Target network transmission differential mode, you need to set the group number and subgroup number.

CHCNAV: CHCNAV network transmission differential mode.

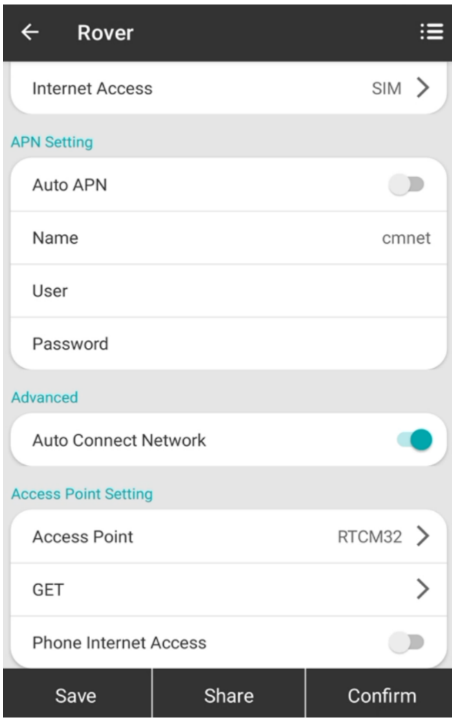


Figure 4.2.1-1

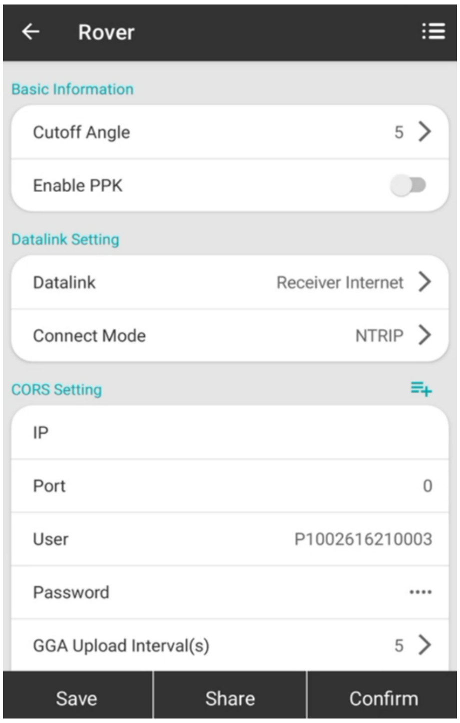


Figure 4.2.1-2

“CORS set up” need set IP, port, Username and password. Enter username and password. If you set up your own base station, you can set the account and password as you wish. If you use someone else's CORS account, you need to enter the account and password of the corresponding CORS account. Besides you can click on the right  ,Custom CORS server related information.

In "Access Point Settings", you need to click 【Get Access Point】 first and turn on automatic network connection before you can select the rover station access point in the 【Access Point】 list.(Generally, the default access point is the base station SN number).

When all settings of the rover station are completed, click 【Apply】 to complete the network data link settings of the rover station Receiver.

4.2.2 Rover Station - Internal Radio

Select 【Internal Network】 for data link. As shown in Figure 4.2.2-1. You need to set the channel, frequency and protocol channel is 1-7 are fixed channels, and the frequencies corresponding to the channels cannot be modified; channel 8 is a custom channel, and the frequency of the channel can be set according to actual needs. Radio Protocol As shown in Figure 4.2.2-2Shown, there are SATEL, PCC-EOT (4FSK), PCC-EOT (GMSK), TrimTalk 450S(T) and so on are available.

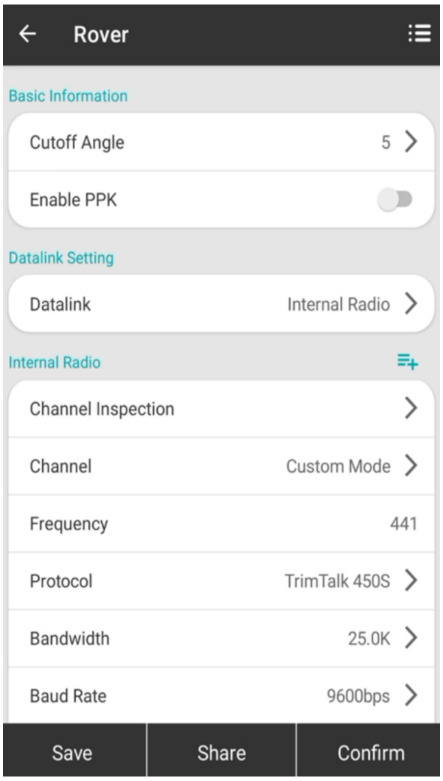


Figure 4.2.2-1

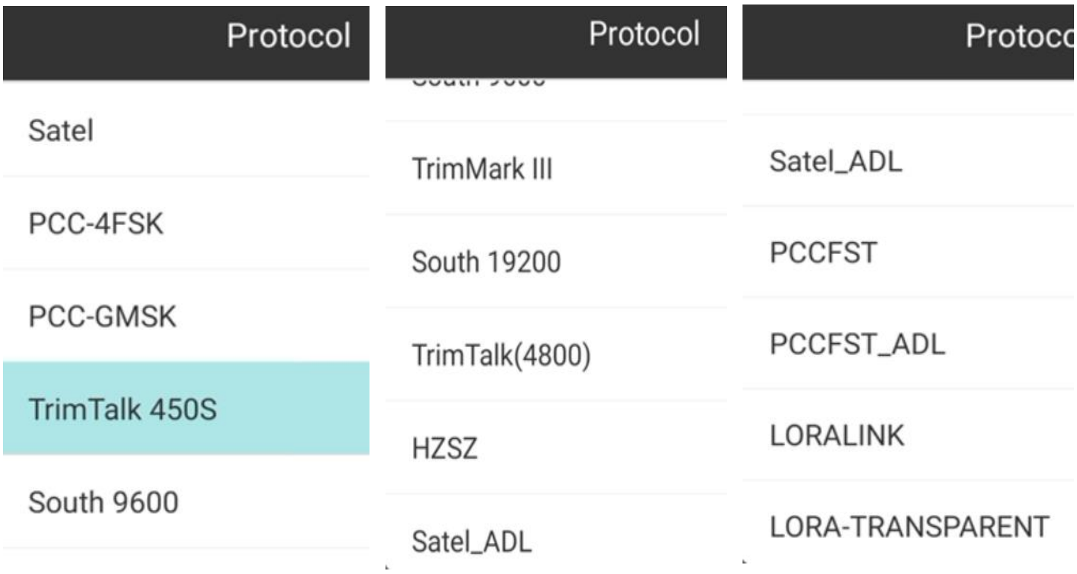


Figure 4.2.2-2

4.2.3 Rover Station-External Radio

Select 【External Radio】 in the data link. You only need to set the port baud rate, the default baud rate is 38400.

4.2.4 Rover Station-Controller Network

Select 【Controller Network】 for data link. As shown in Figure 4.2.4-1.

Required settings connect model, CORS settings and Access Point. Setting three content. The setting method is the same as the receiver network. The only difference is that the network used comes from a rover device, and this method requires the rover device to be able to access the Internet.

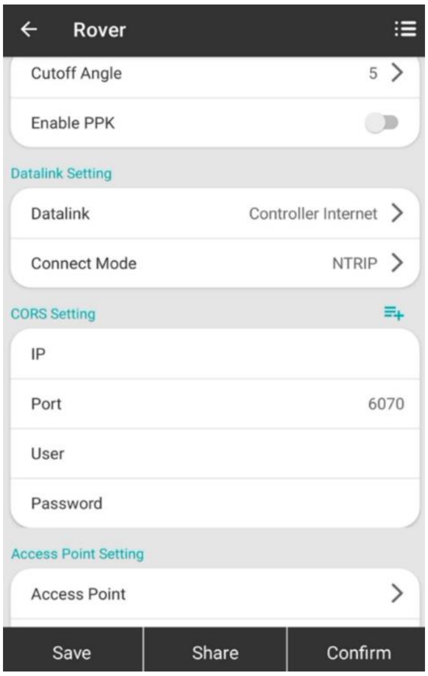


Figure 4.2.4-1

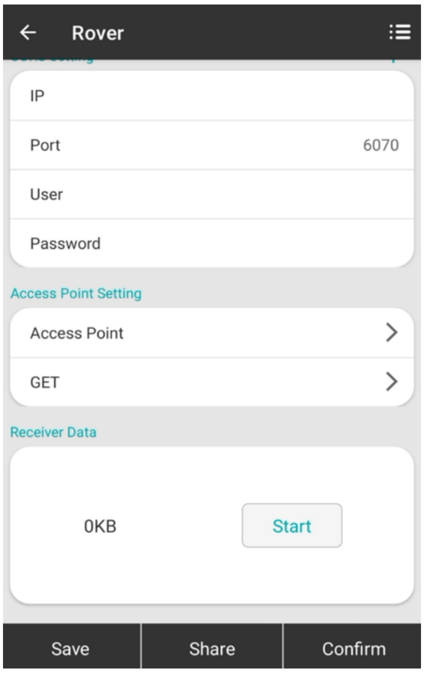


Figure 4.2.4-2

4.3 Base Station Mode

Click【device】->【Base】, as shown in the figure4.3-1. After setting various parameters, click 【Start】 to set the receiver to base station working mode. If you start when entering, it is determined that the device has not turned on at the base station. You can modify the receiver base station parameter data and start the base station; if it is determined that the base station is already started, you can stop the base station first, and then set the base station parameters.

The base station settings include configuration sets, startup parameters, startup Mode, differential data broadcast parameter radio/CORS Settings, APN Settings, etc. The various parameter settings are described in detail below.

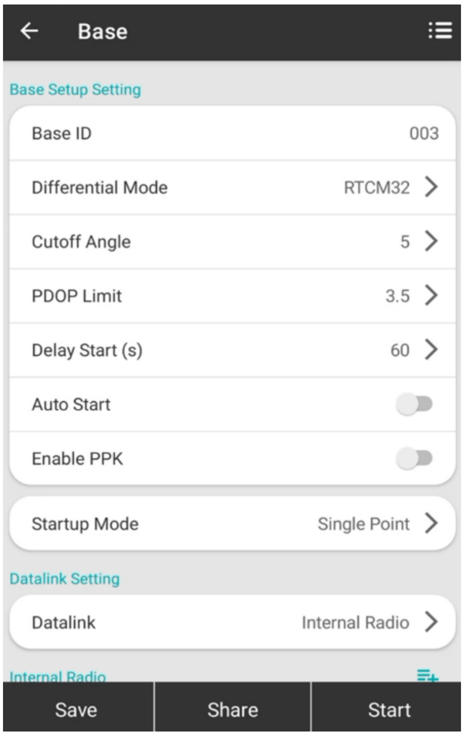


Figure 4.3-1

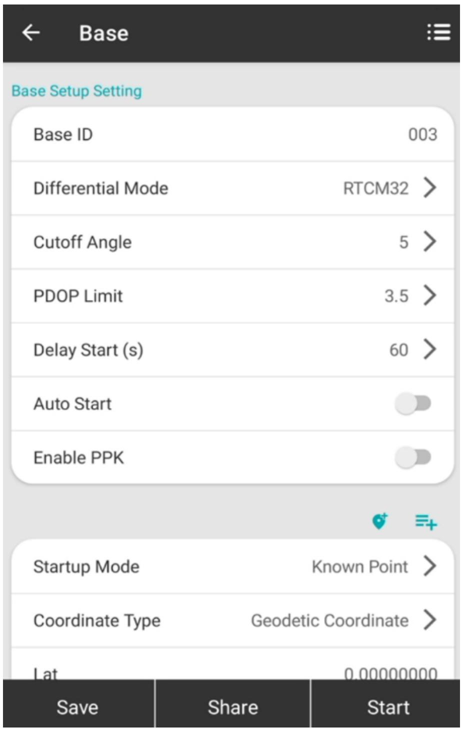


Figure 4.3-2

Startup mode: There are two startup modes for the base station: Single point positioning start and specify the base station coordinates.

a) Single point positioning start: the base station takes the WGS-84 coordinates of the current point through single-point positioning as the base station coordinates.

b) Specify the base station coordinates: that is, the user specifies the base station coordinates. The specified base station coordinates cannot differ too much from the accurate WGS-84 coordinates of the current point, otherwise the base station cannot work properly.

When using the specified base station coordinates, click "Set Base Station Coordinates", as shown in the figure4.3-2, the base station coordinates can be selected from the coordinate library, or the current GPS coordinates can be obtained, or they can be entered manually. Antenna height: select the measuring method and enter the correct measuring height. The antenna height can be obtained.

Differential mode: including RTCM2, RTCM3, CMR, CMRPLUS, DGPS and RTCM32.

Data Link: Set the working mode of the current receiver. You can select the receiver network, internal radio, external radio, dual-transmit.

1. Receiver Network: refers to internal device. The network transmits differential signals. This mode requires a SIM card to transmit data.
2. Internal radio: refers to the working mode of using the internal radio of the device to transmit differential signals. Both the RTK base station and the rover station have internal transceiver radios. The base station transmits differential signals through the internal radio, and the rover station receives the radio differential signals sent by the base station through the internal radio.
3. External radio: refers to the working mode in which the Receiver is connected to an external large radio to transmit differential signals.
4. Dual-transmit link: The base station transmits differential signals through the network and an external large radio at the same time, and the rover station can choose to receive any differential signal as needed.

Choose a suitable data of link mode, after successful setting, the base station can send a signal that the rover station can receive differential signal. If using internal radio mode, the frequency and protocol settings of the rover and base stations must be consistent.
Cut-off angle: the angle between the line between the satellite and the receiver and the horizon. The receiver will not receive satellite signals that are smaller than the cut-off angle. Value range:0-45 degrees.
PDOP limit: The spatial geometric intensity factor of satellite distribution. Generally, the better the satellite distribution, the smaller the PDOP value. A value less than 3 is an ideal state.

4.3.1 Base Station-Receiver Network

Select 【Receiver Network】 for the data link. As shown in Figure 4.3.1-1. Required settings connectivity options, internet access and CORS Set three items content.

"Connection Mode" needs to set the connection mode. The connection mode options are described in detail as follows:

NTRIP: standard network transmission differential mode, generally used in CORS networks.

Custom: User-defined

ZHD: Hi-Target network transmit differential mode; you need to set the group number and subgroup number.

CHCNAV: CHCNAV network transmit differential mode.

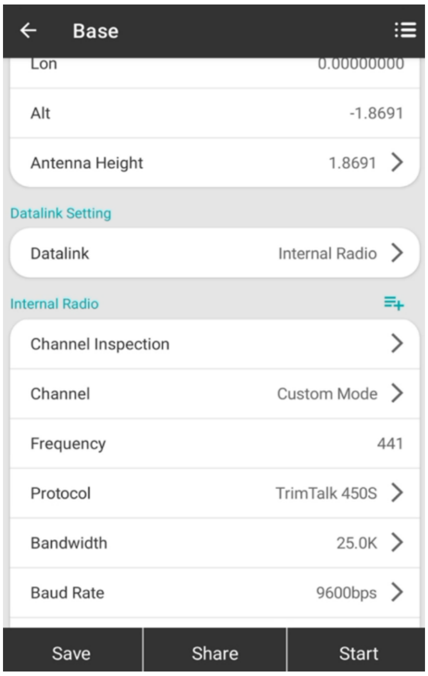


Figure 4.3.1-1

"CORS set up" need to set IP, port, base station access point (generally the base station access point is the code of the base station receiver) and password. Besides, you can click on the right , custom CORS server related information.

When all the base station settings are complete, click 【Start】 to complete the base station Receiver network data link settings.

4.3.2 Base Station - Internal Radio

Select 【Internal Network】 for data link. As shown in Figure 4.3.2-1. You need to set the channel, frequency, protocol and power. Channels 1-7 are fixed channels, and the frequencies corresponding to the channels cannot be modified; channel 8 is a custom channel, and the frequency of the channel can be set according to actual needs. The radio protocols include SATEL, South 9600, South 19200, TrimTalk 450S, PCC-GMSK, TrimMark III (19200) and 900M Hopping are available. The power of the base station will affect the operating distance of the radio. Low power means low power consumption and a short operating distance; high power means high power consumption and a long operating distance.

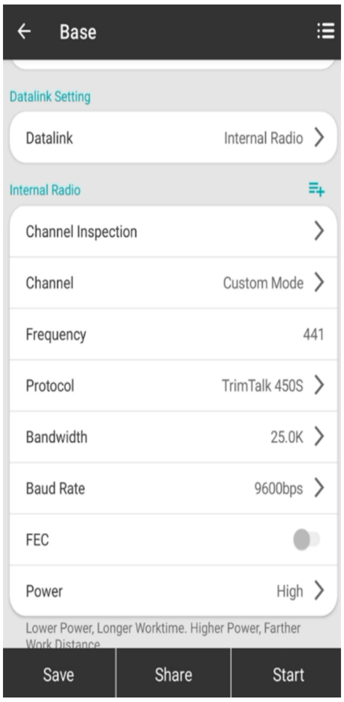


Figure 4.3.2-1

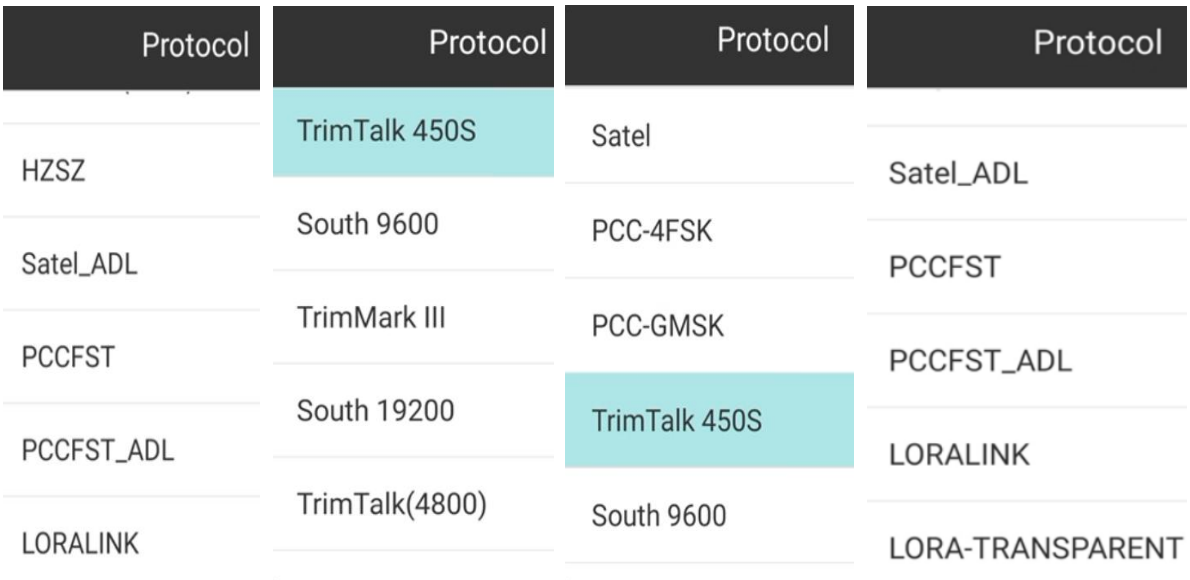


Figure 4.3.2-2

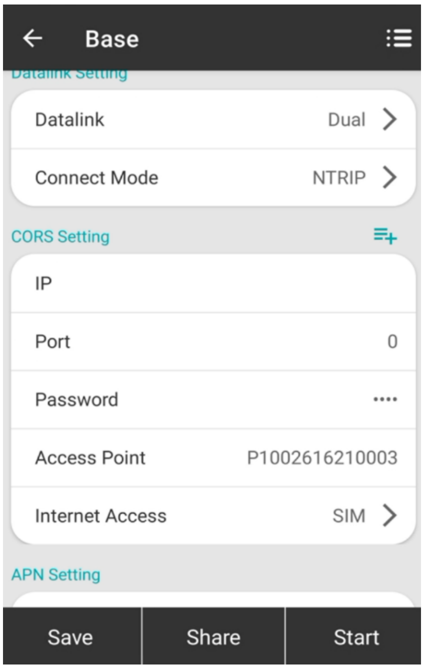


Figure 4.3.4-1

4.3.3 Base Station - External Radio

Select 【External Radio】 in the data link. You only need to set the port baud rate, the default baud rate is 38400.

4.3.4 Base Station – Dual

Select 【Dual】 for data link. As shown in Figure 4.3.4-1. The dual-transmit data link mode is that the base station transmitter Receiver network and the external large radio transmit differential signals. The setting method is the same as base station-Receiver network and base station-external radio. But this method requires using the device's internal network function (with a phone card inserted in the device).

4.4 Static station mode

Click【device】 -> 【Static Mode】 , as shown in Figure 4.1-1. Static station settings include options set up and antenna parameters. Two the following is a detailed introduction to various parameter settings.

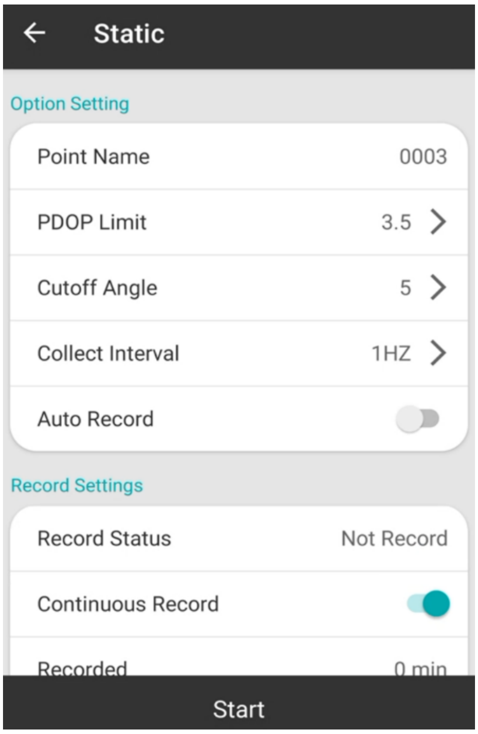
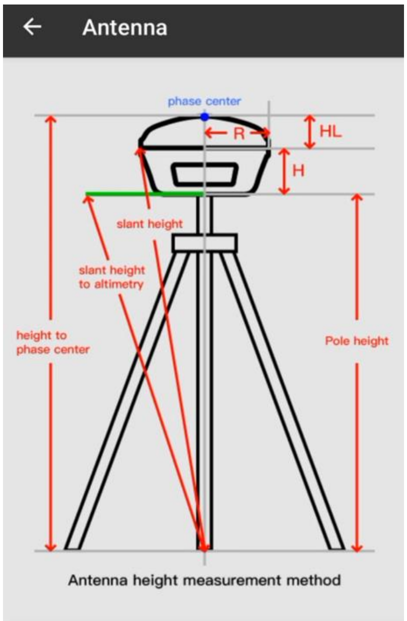
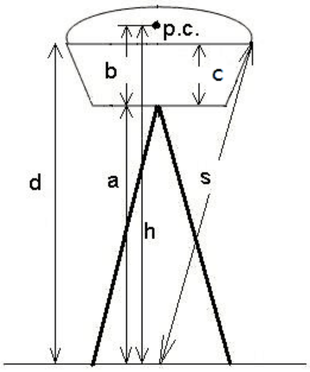


Figure 4.4-1

Option Settings
Point name: Point name of static data.
PDOP limit: The spatial geometric intensity factor of satellite distribution. Generally, the better the satellite distribution, the smaller the PDOP value. A value less than 3 is an ideal state.
Altitude cut-off angle: The angle between the line between the satellite and the receiver and the horizon. The receiver does not receive satellite signals smaller than the cut-off angle. Value range:0-45 degrees.
Collection interval: 1HZ means collecting one data per second, 5HZ means collecting five data per second, 5 seconds means collecting one data every five seconds, and so on.
Whether to automatically record static data: If "Yes" is selected, the receiver will automatically start recording after receiving satellite signals after it is turned on; if "No" is selected, you need to manually set it to start recording static data after turning it on.
Antenna parameters
Measuring height: General refers to measuring position distance ground point.
Antenna height: Generally, refers to the vertical height of the antenna phase center from the ground point.
The device provides the following known values:





b: The height from the bottom of the device to the phase center pc.

c: The height from the bottom of the device to the rubber ring;

R: The radius of the rubber ring of the machine.

When the measured value is vertical height a from the ground point to the bottom of the receiver, it is measured in the "pole height" way. Antenna height h = a + b.

The equivalent value is from the ground point to phase center when, it is the "straight height" measurement method. Antenna height h=h.

When the measured value is the slant height from the ground point to the sealing rubber ring, it is the "slant height" measurement method. Antenna height $h = \mathrm{sqrt}(s^2 - R^2) - c + b$ (sqrt means square root).

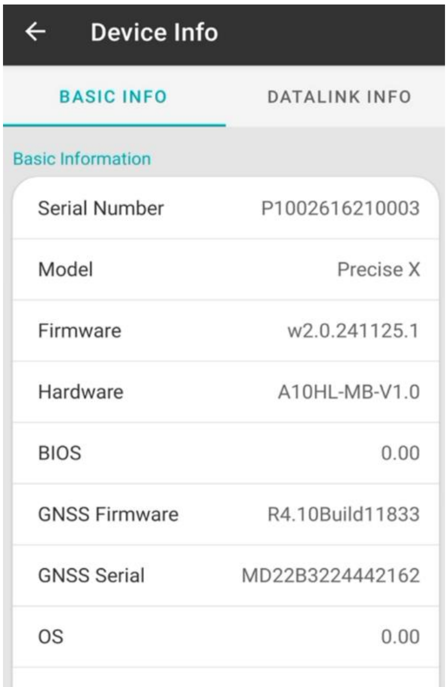
The altimeter is a device fixed at the bottom of the device. It measures the length from the ground point to the edge of the altimeter (i.e. the slant height S of the altimeter). If the radius of the altimeter is Rc, then the antenna height $h = \mathrm{sqrt}\ (S^2 - Rc^2) + b$.

Antenna height is usually defined as the vertical distance from the phase center of the antenna to the measurement point. Since it cannot be measured directly, it is usually estimated through other measurement methods. Enter the measured height and select the measurement method to get the antenna height value.

After completing the setting of various parameters in the static station setting, clic 【confirm】,The working mode of the receiver can be changed to static mode.

4.5 Device Information

Click【device】->【Device information】, as shown in the figure 4.7-1.When the controller is connected to the receiver, the receiver's information can be read. Devices included hardware information, network module Information, radio station information, satellite systems, etc.



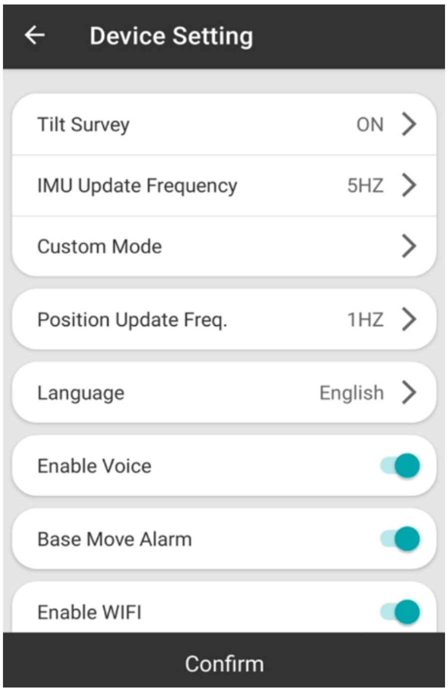


Figure 4.7-1 Figure 4.8-1

4.6 Device Setup

Click 【Device】->【Device settings】, as shown in Figure 4.8-1.

Tilt measurement: used for tilt correct or disable Tilt.

Inertial navigation parameters: normal mode, strict mode, custom mode. The mainboard solves the fixed solution with the required accuracy. Under the same conditions, the stricter the solution, the harder it is to fix, and the more reliable the accuracy.

Positioning data output frequency: Set the frequency of the Receiver outputting GGA and other positioning data. After the setting is completed, it can be seen in the debugging. When collecting data, RTK outputs one coordinate per second to the software for refresh.
Enable voice: Set whether to give voice prompts for stakeout.
Enable WIFI: Set whether to open the connection to the device WIFI.

Base move alarm: Whether to prompt the surveyor when the base station changes.
Satellite system: Satellite system switch.
Frequency: Setting 5G Signal frequency

4.7 Tilt Calibration

Click【device】->【tilt calibration】Enter the main operation interface, which includes two function keys, namely start and clear.

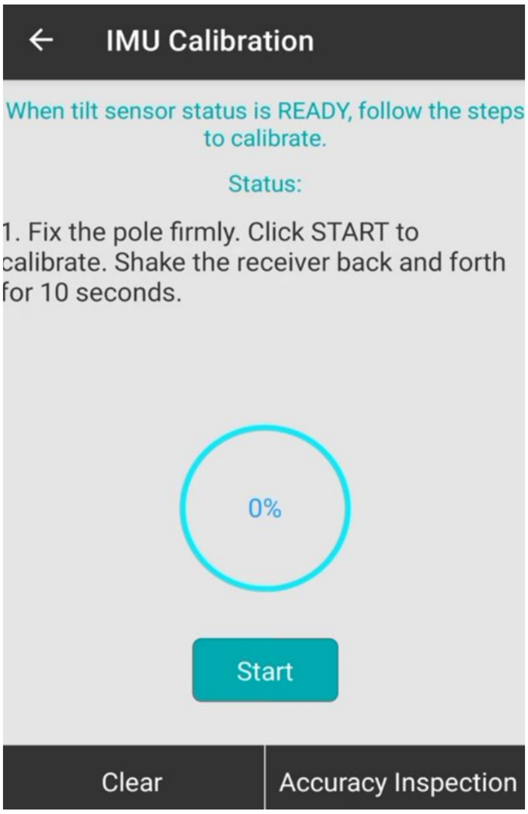


Figure 4.9-1

4.7.1 Start tilt calibration

Click【Device】->【Tilt Calibration】,Tilt measurement choose【start】Options, click【Sure】Turn on the tilt measurement function. Start tilt calibration and operate the device according to the prompts.

4.7.2 Clear

Click【Clear】,The tilt calibration result will be cleared.

4.8 Repositioning

Click 【Device】-> 【Repositioning】, as shown in Figure 4.10-1, click 【Confirm】 to reposition. The receiver can search and lock satellites again, which can initialize the mainboard and re-receive satellite signals for positioning.

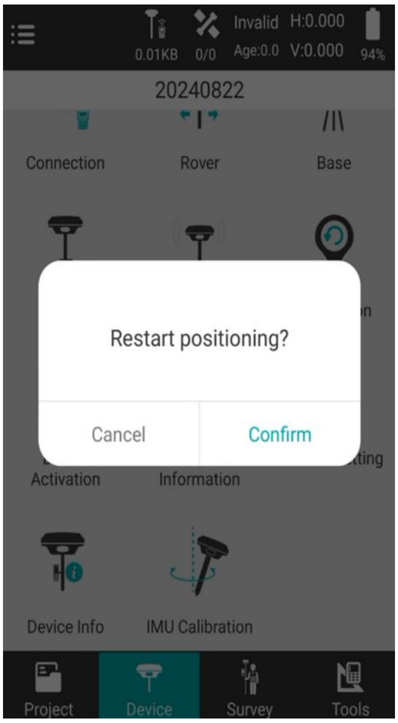


Figure 4.10-1

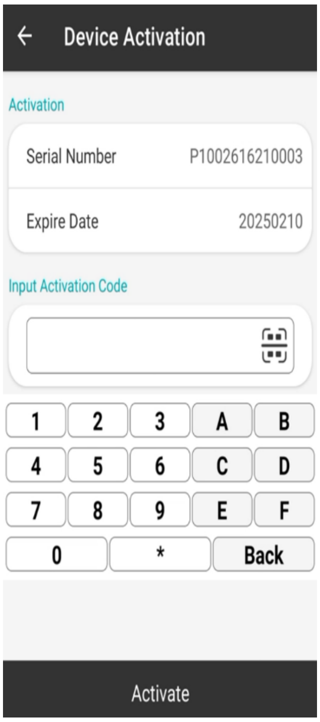


Figure 4.11-1

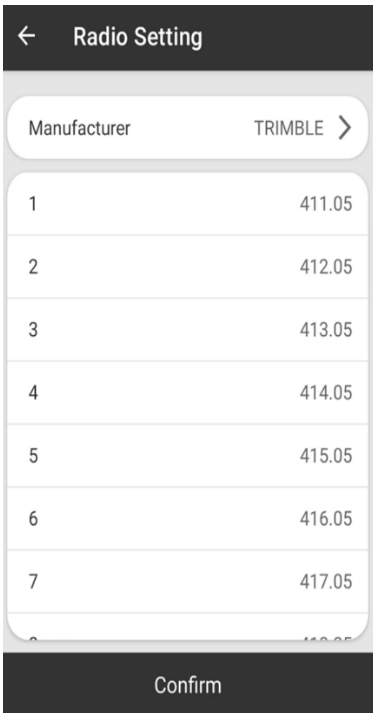


Figure 4.12-1

4.9 Device Registration

When the handheld is connected to the receiver, you can view the device serial number and device registration deadline, as shown in the figure4.11-1. When you need to register the RTK Receiver, one is to manually enter the registration code, the other is to click Scan the QR code to get the registration code. After entering the registration code, Click 【Device Registration】 Can register devices. You need to contact our company or agent to obtain the registration code for the device.

4.10 Default Radio Station Settings

Click 【Device】-> 【default Radio Settings】, as shown in Figure 4.12-1. Select the radio manufacturer, and the radio channels will correspond to the default frequencies one by one. You can modify them as needed.

Think PRECISE!

Chapter 5

Measurement

This chapter contains:

Point measurement
Point Stakeout
Line Stakeout
CAD Stake Out
Layer Settings

5.1 Point measurement

Click 【Survey】->【Point measurement】, as shown in Figure 5.1-1 point measurement provides point geographic information measurement functions in various ways, including point coordinate measurement in multiple modes, measurement mode switching, and simple mapping of measurement data.

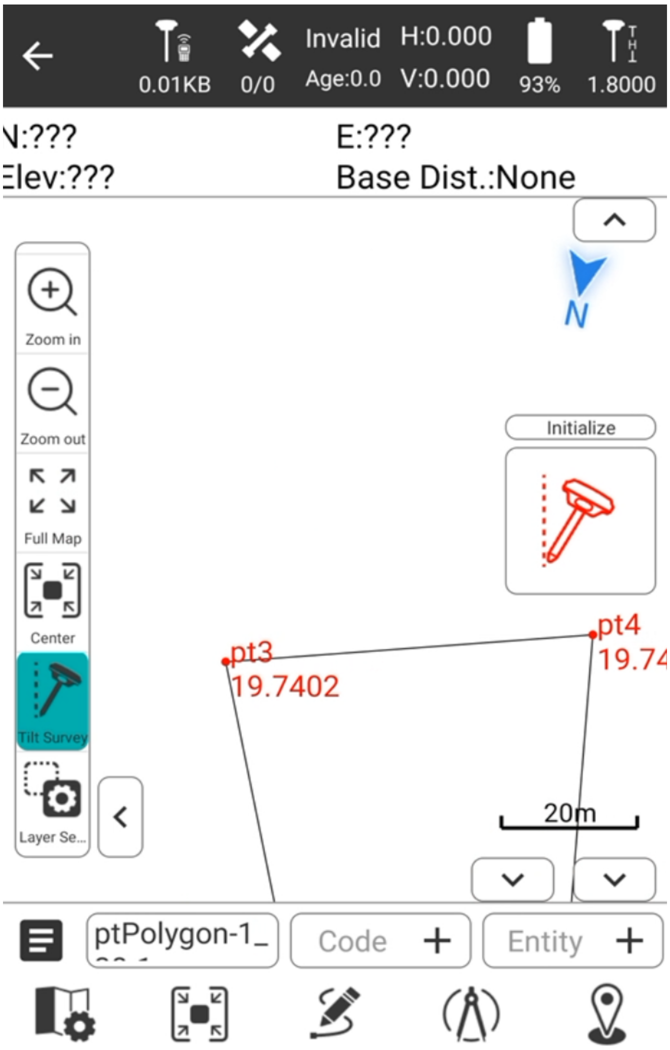
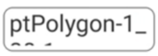


Figure 5.1-1

The upper status bar is parsed as follows:

 Click to enter point management.



Click to edit the point number.

Click to enter the encoding list.

Click to set antenna parameters.

 Click to switch to continuous point collection mode. As shown in Figure 5.1-3shown.

Click to turn off the tilt measurement mode. It is on by default.

Solution status: includes single-point solution, floating-point solution, differential solution and fixed solution.

“Delay: 2” —Indicates that the current differential delay is 2.

“Fixed solution” —Indicates that the current solution is fixed.

“H” – HRMS, horizontal root means square, the value indicates the plane accuracy of the current point.

“V” ——VRMS, vertical root means square, the value represents the elevation accuracy of the current point.

"36/39” ——The number of satellites currently involved in the receiver's solution and the total number of satellites receiving satellite signals.

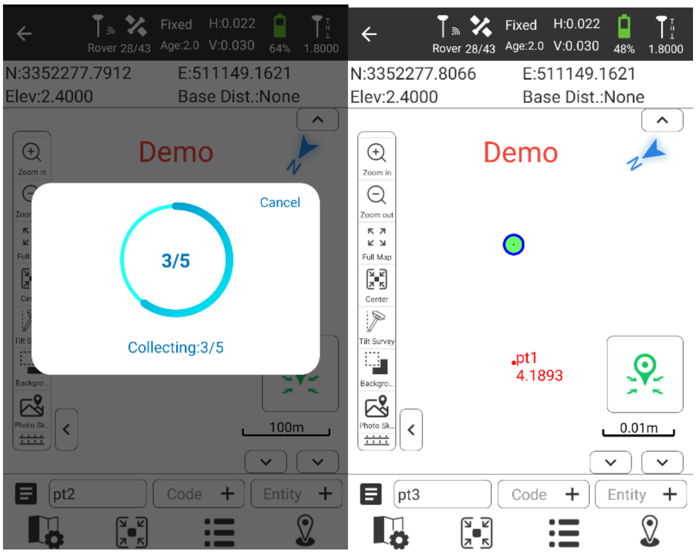


Figure 5.1-2 Figure 5.1-3

 Measurement key, as shown in Figure 5.1-2shown.

N:3352277.8066	E:511149.1621
Elev:2.4000	Base Dist.:None

Current location information.

5.2 Point Stakeout

Point stakeout is the process of inputting the target coordinates into the software and then staked them out on site.

Click 【Survey】 -> 【Point Stakeout】 -> 【Point Management】, select a point to stake out and enter the point stakeout interface, as shown in Figure 5.2-1.

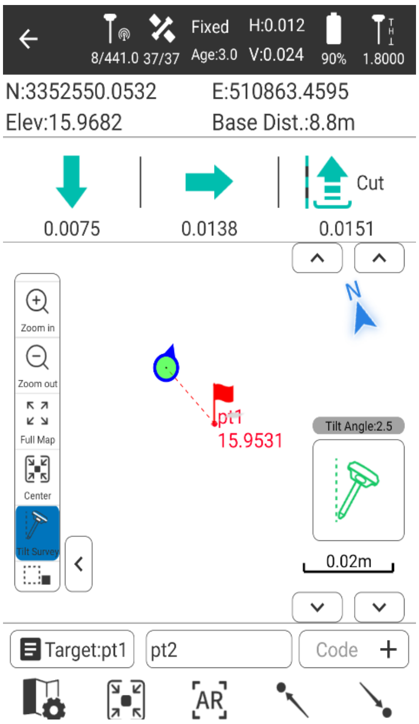


Figure 5.2-1

Figure 5.2-2

Status description on the left:

Forward/Backward: refers to the distance that needs to be moved forward/backward from the current receiver position to the stakeout point position.

Left/Right: refers to the distance to the left/right that needs to be moved from the current receiver position to the stakeout point position.

Fill/Cut: Dig at the location of the staked point. If the value is positive, dig; otherwise, fill..

: Open/Close AR Stake out.

: Turn on/off tilt measurement.

 : Enter the stakeout settings, Figure 5.2-4shown.

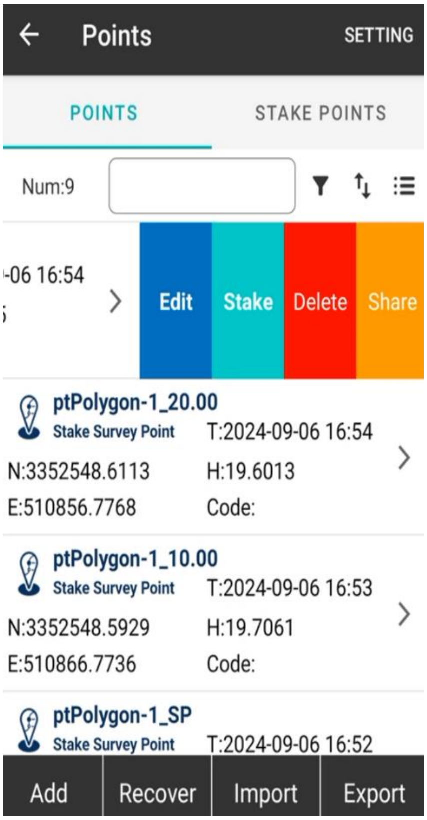


Figure 5.2-3

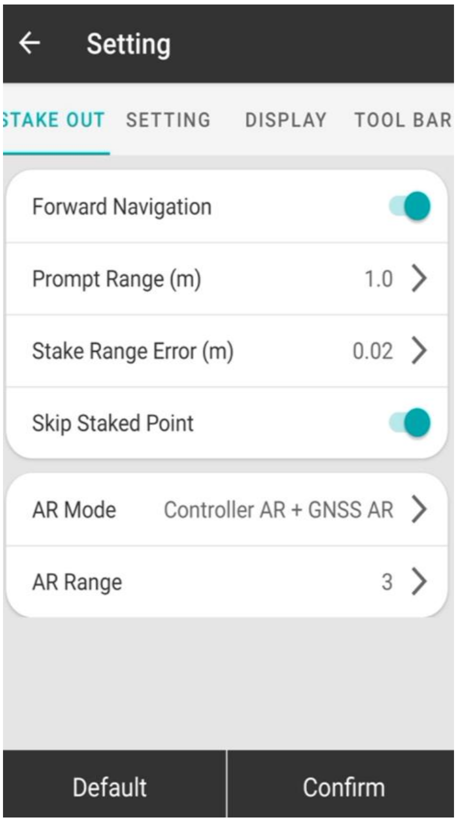


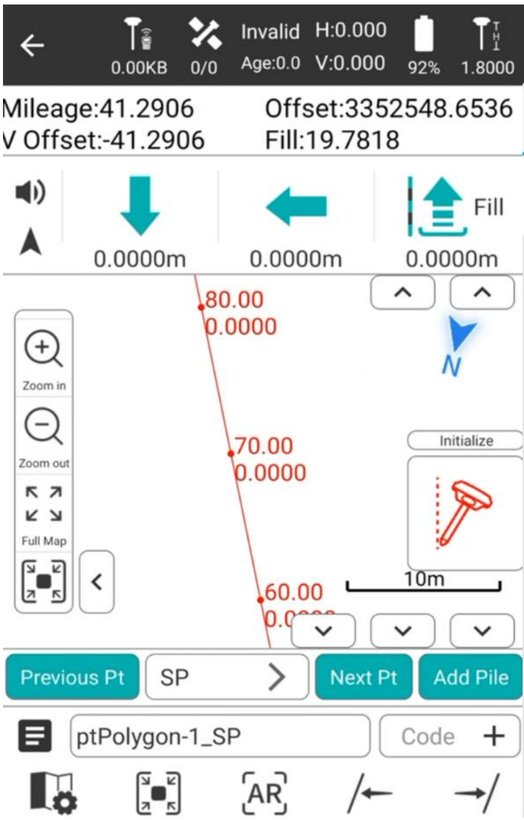
Figure 5.2-4

 : Click Management, as shown in Figure 5.2-3, you can select a point to stake out, and pull left to display options to edit, stake out, remove, and share the point.

5.3 Line Stakeout

Straight line stakeout is to stakeout the designed straight line, which includes the mileage of the straight line, left and right offsets and elevation control within the designed straight-line range.

Click 【Survey】 -> 【Line Stakeout】 -> 【Add】, add a line to stake out, make stakeout settings, and click 【OK】 to enter the line stakeout interface, as shown in Figure 5.1-1.



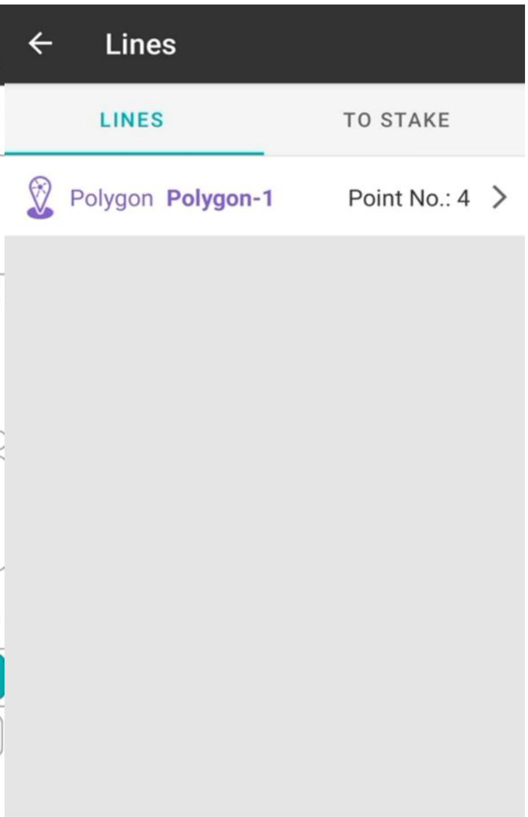


Figure 5.5-1 Figure 5.5-2

The toolbar on the right side of the straight-line stakeout is analyzed as follows:

 : Straight line library, as shown in Figure 5.5-2. The stakeout line library includes the contents of adding, editing, stakeout and removing.

Click 【Add】, as shown in Figure 5.5-3, enter the line name, starting mileage, select the input method, enter the parameters and click 【OK】 to complete the parameter setting of the newly added straight line. There are two ways to enter the straight-line parameters: one is to set the starting point coordinates and end point coordinates of the straight line, and automatically calculate the azimuth and line length (the starting point mileage defaults to 0); the other is to set the starting point coordinates, azimuth and length of the straight line.

Select any line in the line library and click 【Edit】 to modify the setting parameters of the line. Click 【OK】 to save the modified line parameters. Click 【Delete】 and select OK in the pop-up prompt box to delete the line from the line library.

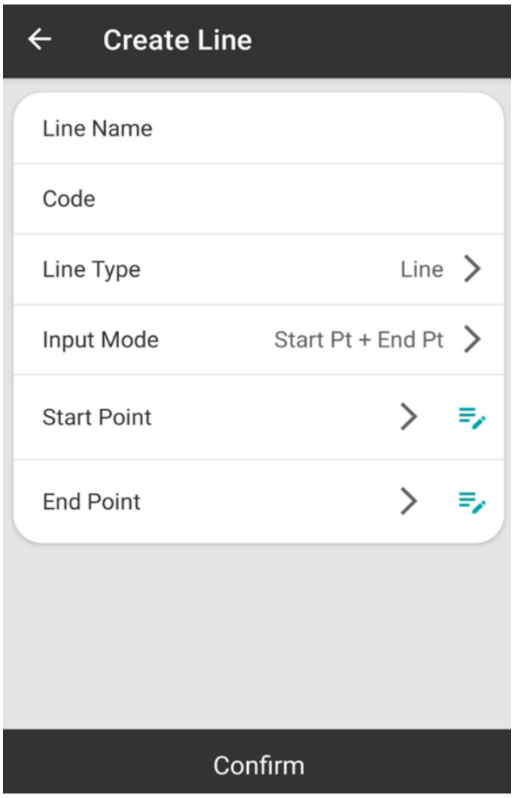

Create Line
Line Name
Code
Line Type
Line
Input Mode
Start Pt + End Pt
Start Point
End Point
Confirm

Figure 5.3-3

5.4 CAD Stake Out

The CAD function is mainly used for graphic editing.

Click 【Survey】-> 【CAD Stake out】, enter CAD function as shown in Figure 5.4-1.

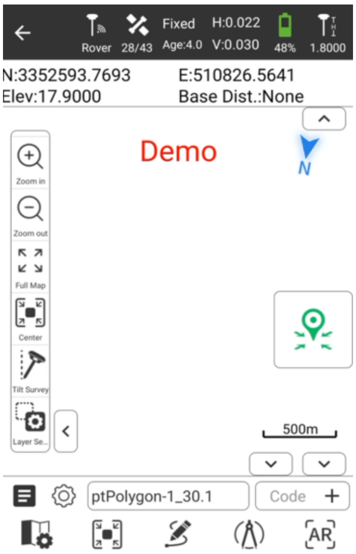
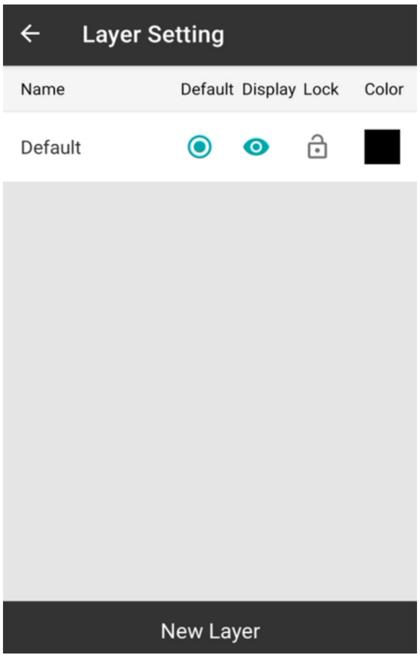


Figure 5.4-1

5.5 Layer Settings

Click 【Survey】-> 【Layer Settings】, create a new layer, as shown in Figure 5.5-1.



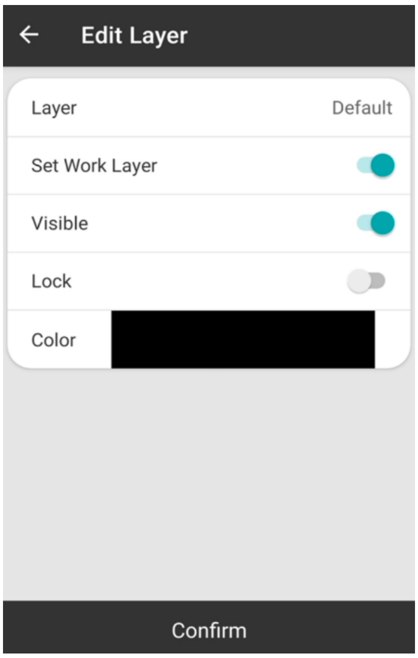


Figure 5.5-1 Figure 5.5-2

PRECISE

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Chapter 6

Tools

This chapter contains:

Calculator
Coordinate Converter

6.1 calculator

Click 【Tools】 > 【calculator】, as shown in Figure 6.1-1.

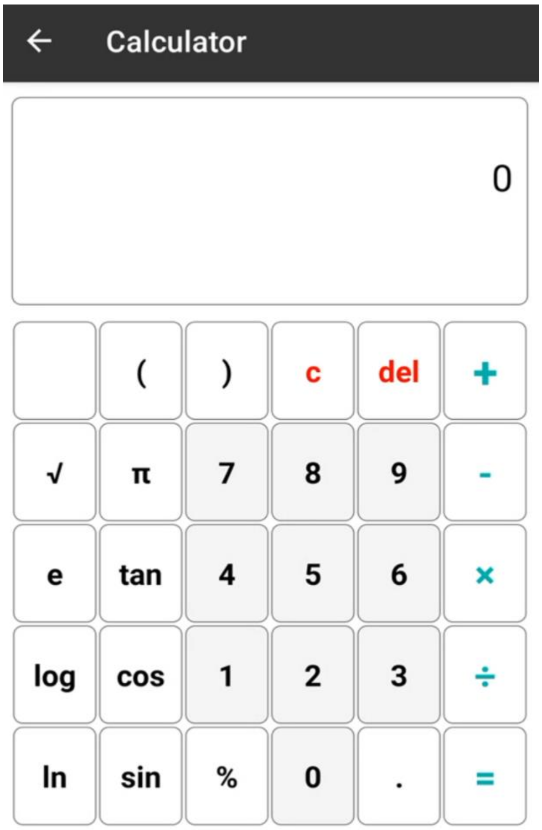


Figure 6.1-1

6.2 Coordinate Converter

Click【Tools】->【Coordinate converter】, as shown in Figure 6.2-1.Set the source coordinates, Coordinate input methods are two ways, First, click From the coordinate library. Pick two direct input point name of North coordinate, East Coordinates and Elevation. Complete the source coordinate input, set the conversion type (BLH and xyh) -> enter the conversion coordinate point, Click【Conversion】You can complete the coordinate transformation and view the calculation results.

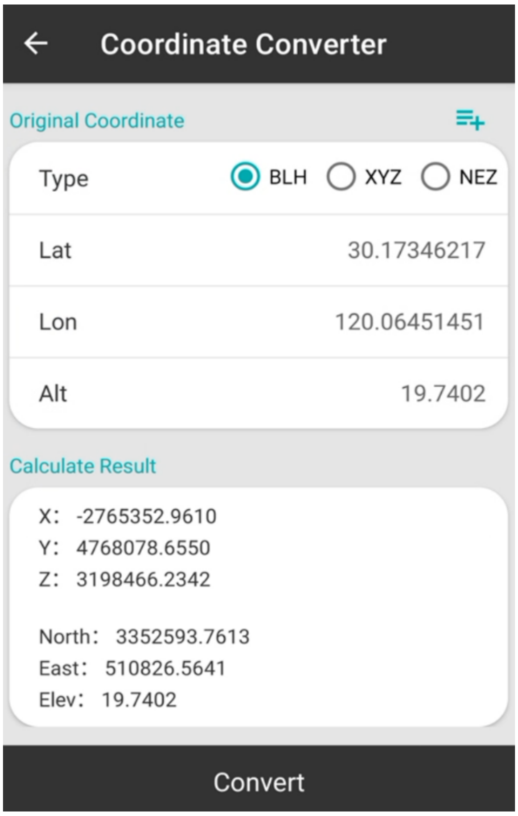


Figure 6.2-1

6.3 Angle Converter

Click【tools】->【Angle converter】, as shown in the figure 6.3-1. There are a total of angle formats in angle transformation. Five Species, respectively Spend, Degrees, minutes and seconds, Degrees:Minutes:Seconds, Spend point' Second, radian.

Converter process:

1.Select the format for input angles.

2.Input angle.

3. View calculation results.

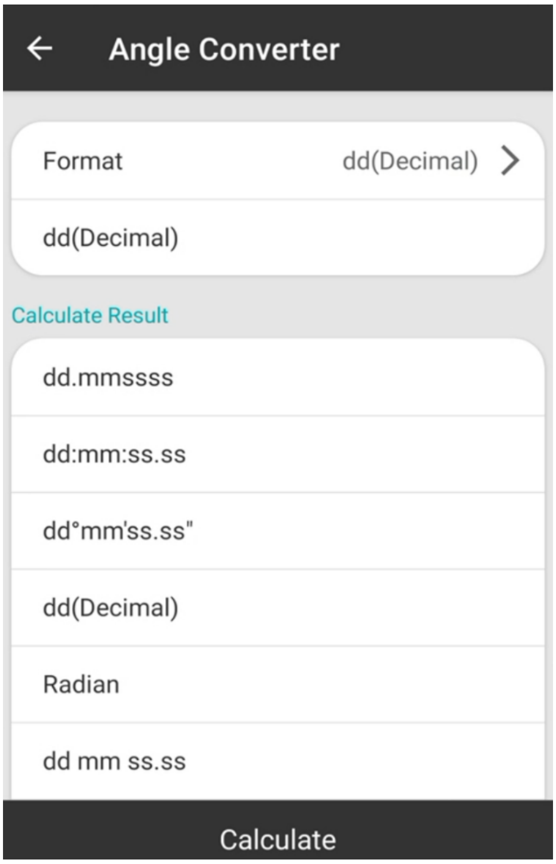


Figure 6.3-1

6.4 Grid to Ground

Click【tools】->【Grid to Ground】, as shown in the figure 6.4-1. After entering the coordinates, click Calculate to see the calculation results. Click Apply to apply the calculation results to the current project.

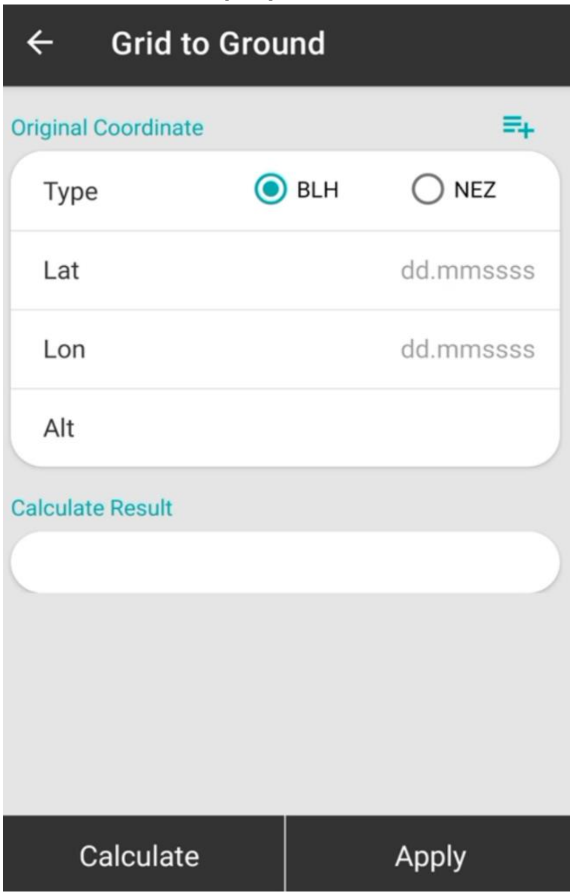
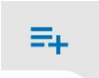


Figure 6.4-1

6.5 Geometric computation

Click 【tools】 -> 【COGO】 ,Enter the geometry calculation options interface. Based on the coordinates of known points, the positional relationship between points and points, and between points and lines can be calculated. Including: Coordinate inversion, Point and line calculation, spatial distance, angle Calculation, etc. It will be introduced one by one below. The following icons have the same meaning in geometric calculations.

: Coordinate point library

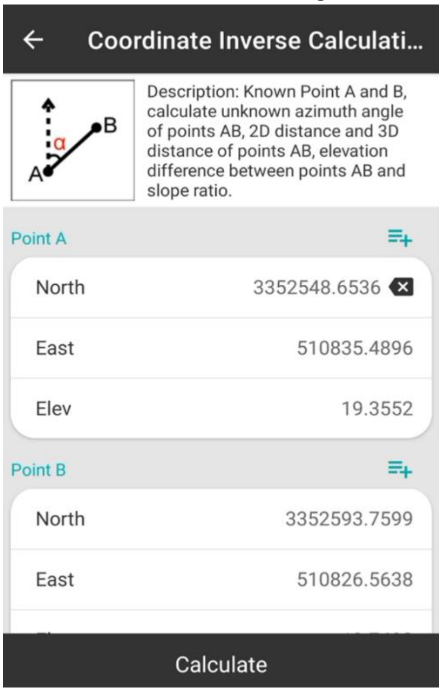
The coordinates can be set in two kinds:

First, extract the point coordinates from the coordinate point library.

Second, directly Input North coordinate, East coordinate, Elevation value.

6.5.1 Coordinate inversion

As shown in Figure 6.5-1, set the coordinates of the starting point A and the endpoint B, and click **[Calculate]** to obtain the "plane distance," "azimuth angle," "elevation difference," "slope ratio," and "spatial distance" between the two points. The calculation results can be viewed as shown in Figure 6.5-2.



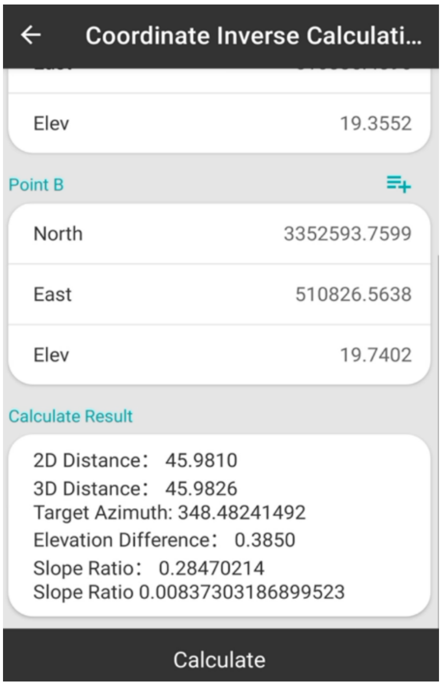


Figure 6.5-1 Figure 6.5-2

6.5.2 Point and line calculation

As shown6.5-3. Set the starting point, Coordinates of the end point and the offset point, Click【calculate】, you can calculate the starting distance, end distance, starting perpendicular distance, end perpendicular distance, offset distance, offset angle and view the calculation results.

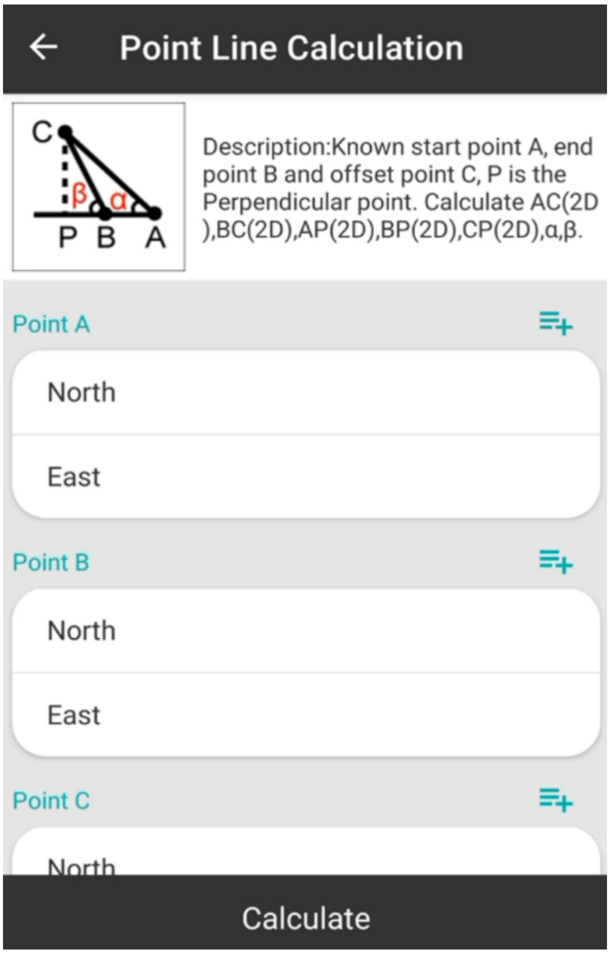


Figure 6.5-3

6.5.3 Vector

As shown6.5-4.Set up starting point A and ending point B coordinates, click【calculate】, you can calculate the spatial distance between two points.

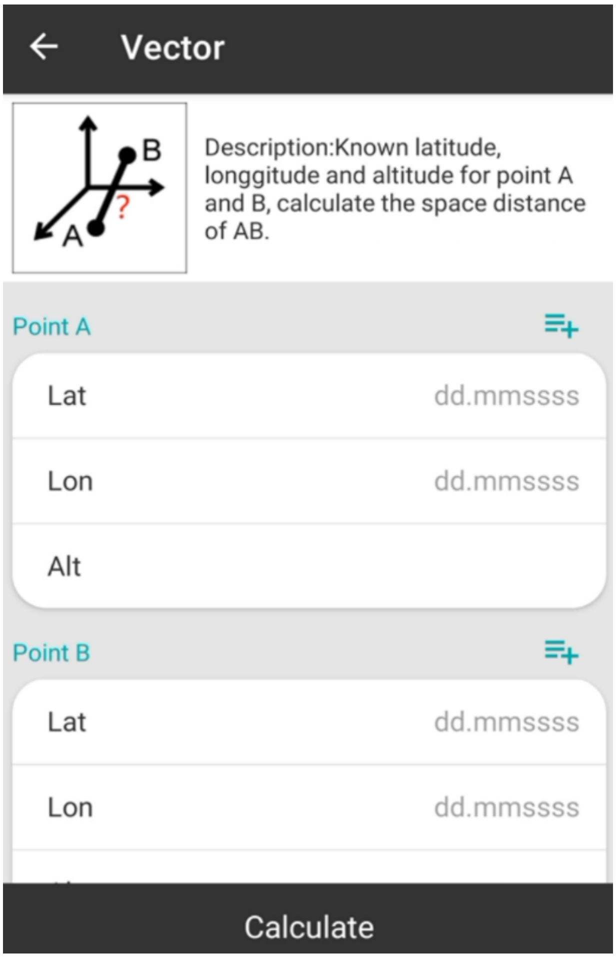


Figure 6.5-4

6.5.4 Lines angle

As shown 6.5-5.Set up coordinate point A,B,O coordinates, click【calculate】, you can according to three coordinates of known points the two straight lines formed calculate The angle to be found, And you can view the calculation results.

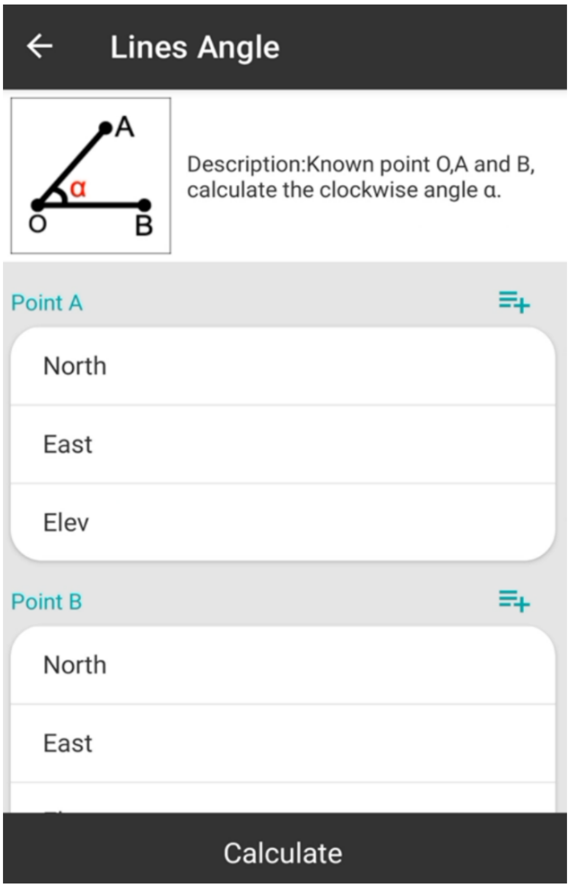


Figure 6.5-5

6.5.5 Intersection Calculation

As shown 6.5-6.Set up coordinate Point A,B,C,D coordinates, click【calculate】, you can according to the coordinates of four known points are calculated waiting for point, and you can view the calculation results.

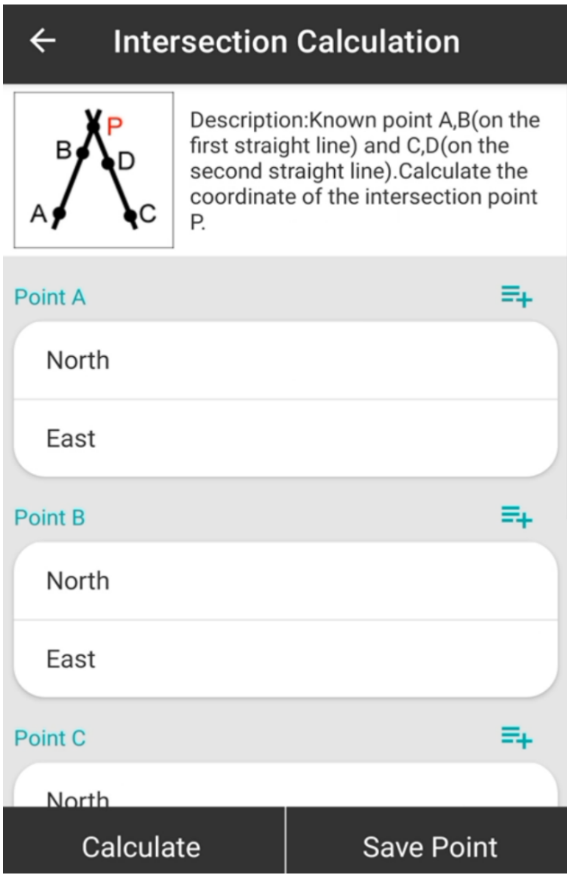


Figure 6.5-6

6.5.6 Resection

As shown 6.5-7. Set up coordinate Point A, the coordinates of Band the values of line segments L1 and L2, click【calculate】, that is, calculate the coordinates of point P.

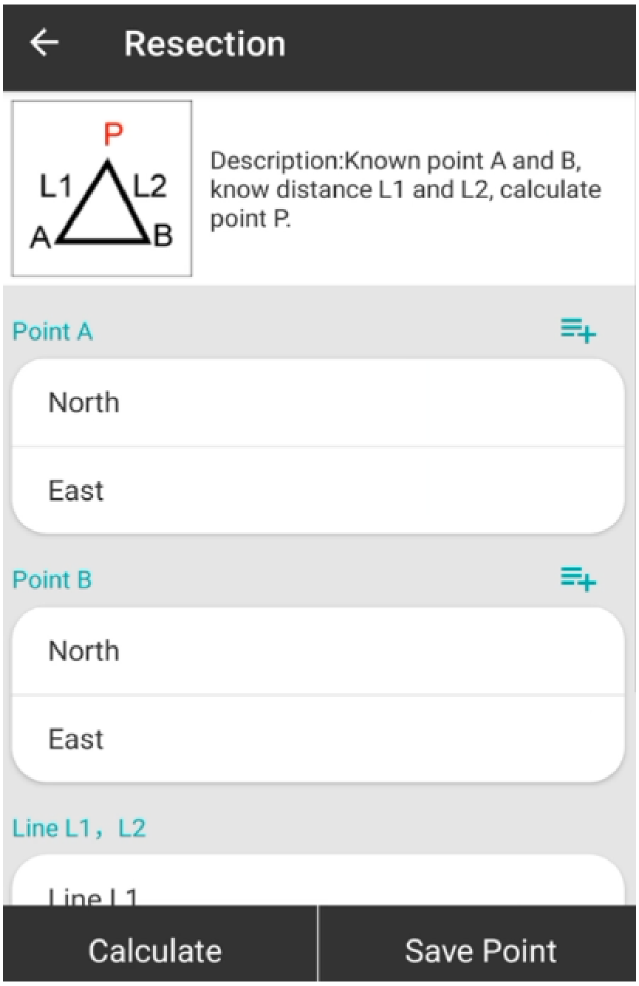


Figure 6.5-7

6.5.7 Front intersection

As shown 6.5-8.Set up coordinate Point A, The coordinates of Band angle α, β value, click 【calculate】, that is, calculate coordinates of point P.

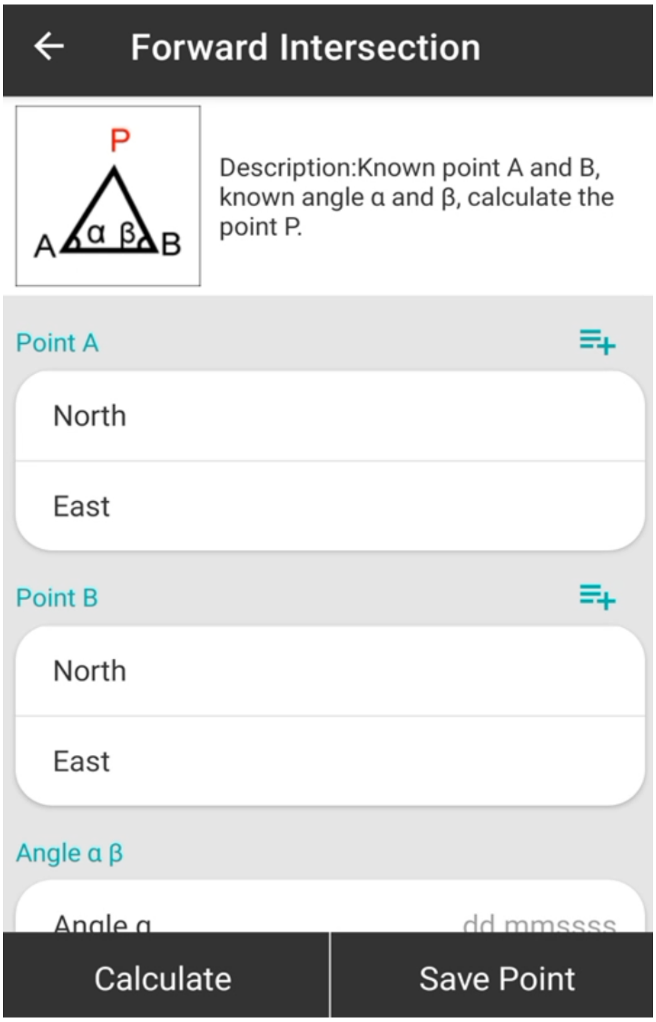


Figure 6.5-8

6.5.8 Coordinate positive calculation

As shown 6.5-9.Set up coordinate point A and B, Line segment L1,angle α value, click 【calculate】, that is, calculate the coordinates of point P.

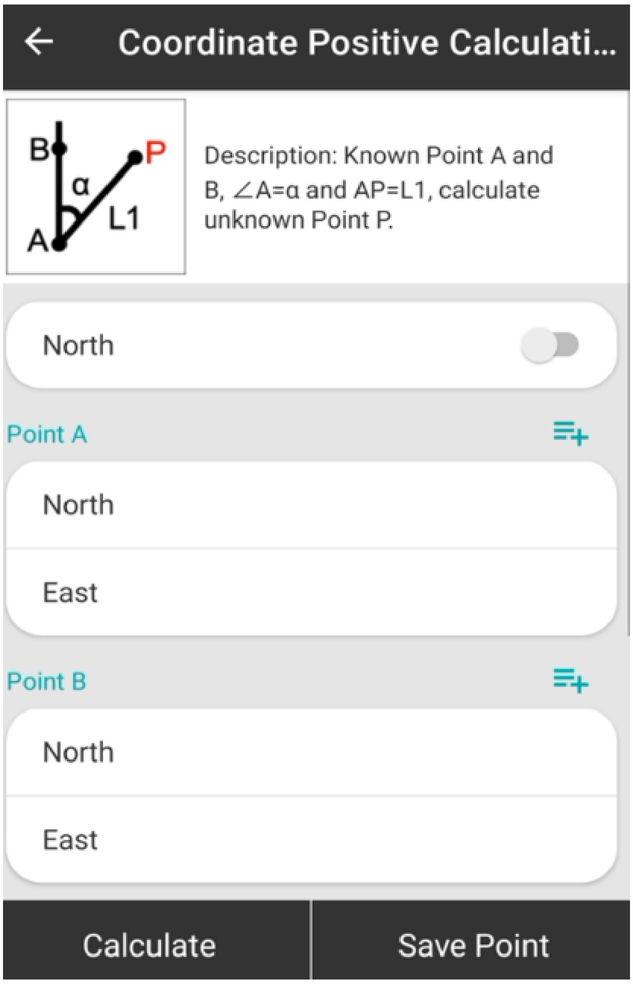


Figure 6.5-9

6.5.9 Offset point

As shown 6.5-10.Set up coordinate point A, Line segment L1, angle αvalue, click 【calculate】, that is, calculate the coordinates of point C.

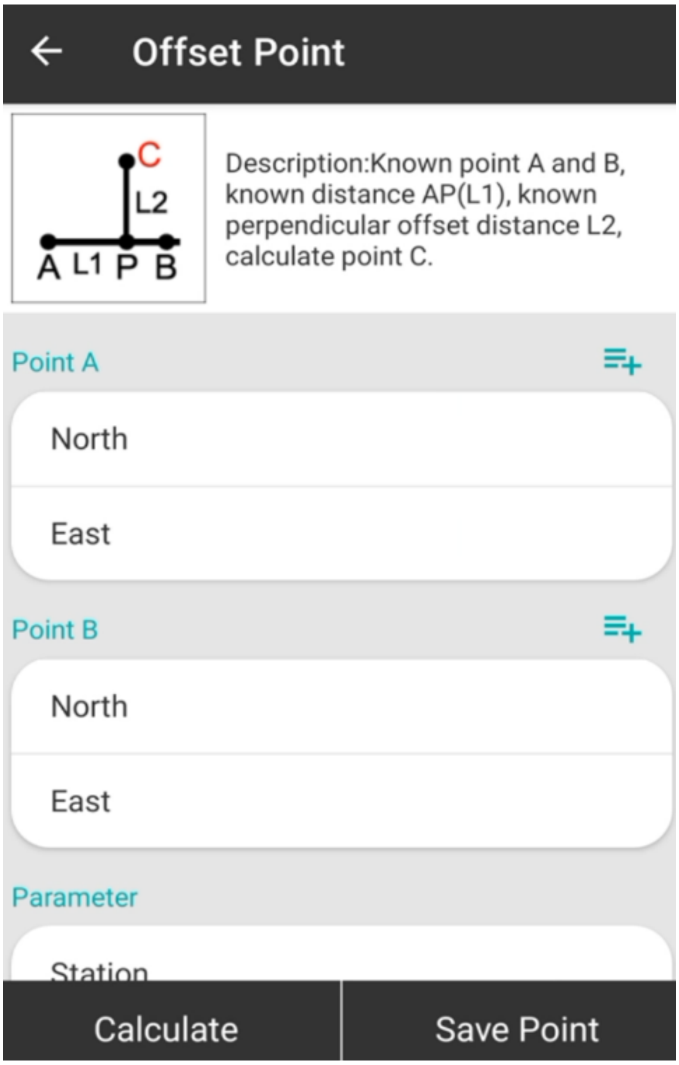


Figure 6.5-10

6.5.10 Equal points calculation

As shown 6.5-11. Set up the starting point coordinate A and the end point coordinate B, the number of segments n. Click【calculate】.

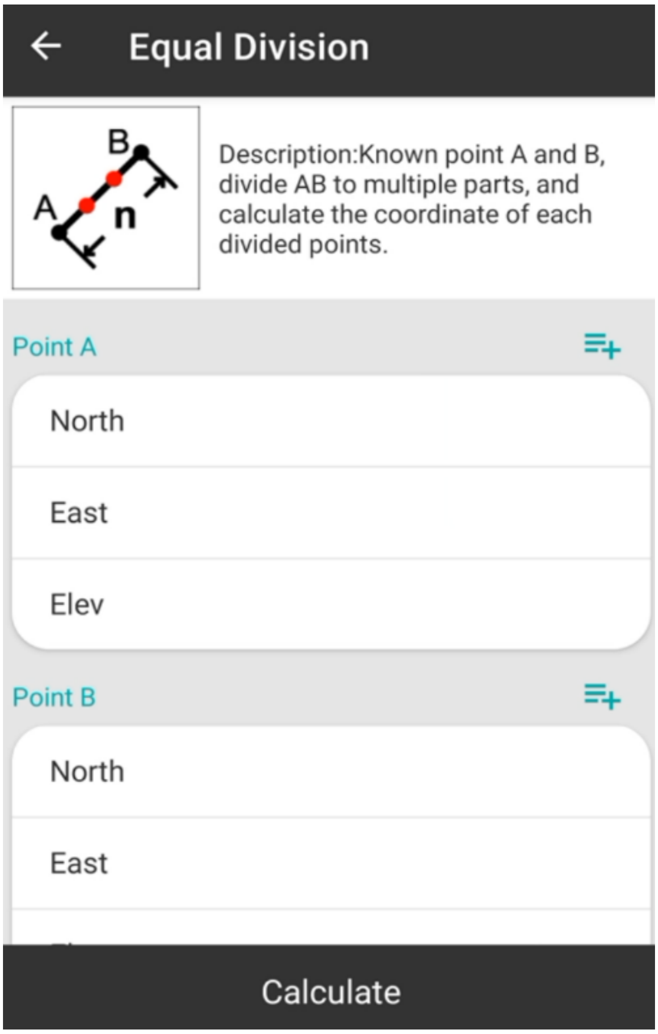


Figure 6.5-11

6.6 Base offsets match

The base offsets match function is generally used when the station calibration is not done during data collection. After the data collection is completed, the time of a certain period is corrected. Click 【Tools】 -> 【Base offsets match】, as shown in Figure 6.6-1. Click 【Known Point Calibration】 and enter the known point coordinates and current WGS84 Coordinates, click 【Calculate】, and get the plane calibration x in the bottom interface, y, h Click 【Refresh】 to enter the value as shown in Figure 6.9-2 In the interface shown, select the refresh date and start and end time, click 【Confirm】, and it will prompt that several points have been updated, indicating that the data for this period of time has been successfully corrected.

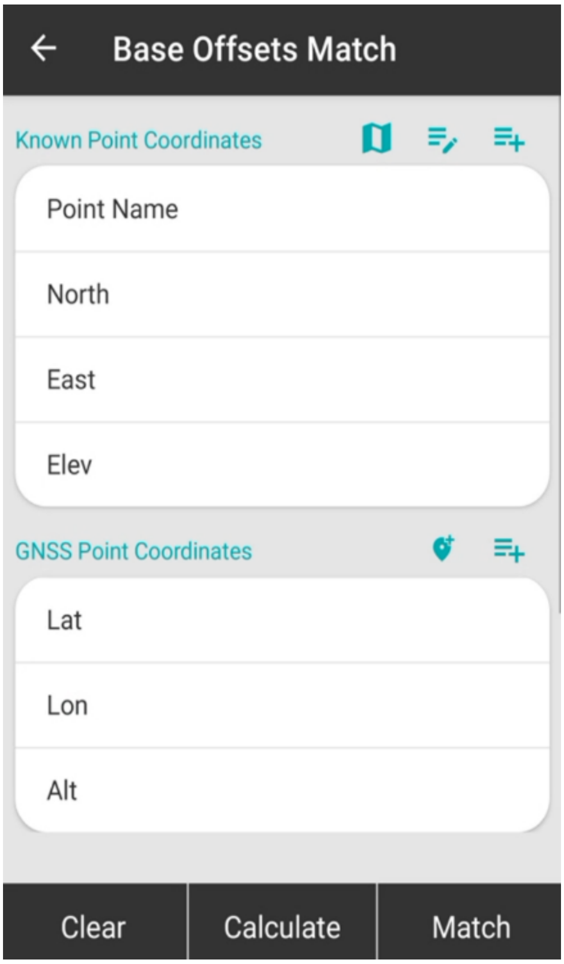


Figure 6.6-1

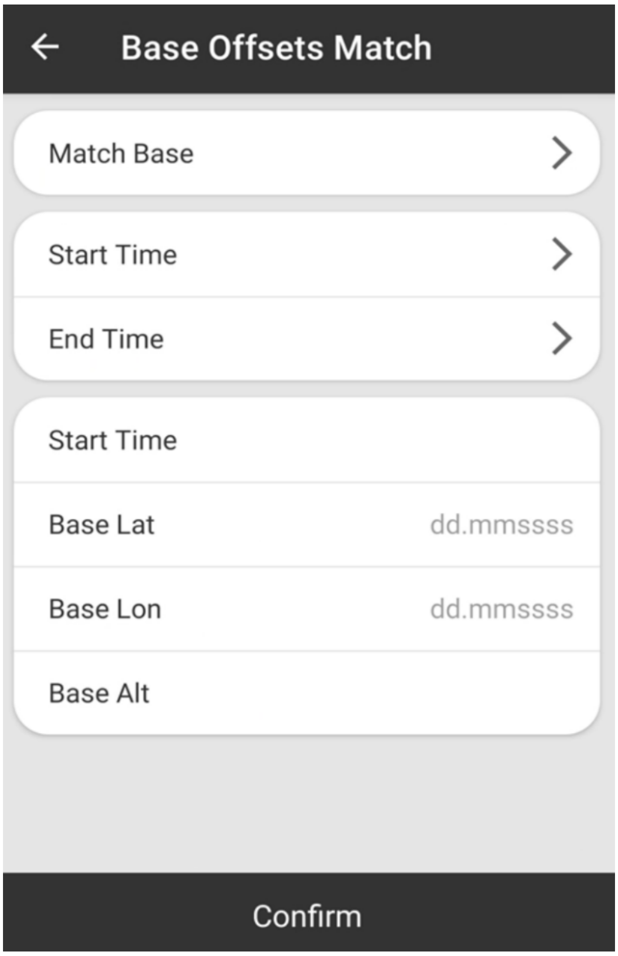


Figure 6.6-2

PRECISE

Think PRECISE!

Chapter 7

Trouble shooting

This chapter contains:

Common problems

Common failures

7.1 Common problems

7.1.1 How to set the beep for the completion of inertial guidance initialization near the release point?

A: In Project—Software Setting—Voice. Turn on Voice Broadcast. Then you could see the “IMU Status”. if it has been turned on, you could hear beep or tone.

7.1.2 How is the local central meridian determined?

A: The user can enter the value of the local central meridian in the projection parameters of the xField. The xField also automatically obtains the center meridian based on the current position.

7.1.3 The project file was accidentally deleted from the software, where can I find it?

A: It can be found in the Project folder under the installation path of the xField

7.1.4 How to Smoothly Capture Coordinate Points?

A： The software presets different smoothing times according to different acquisition point types, and users can also modify them according to actual needs. When collecting points, set the point type, and then set the collection restriction conditions, you can set the "smoothing points".

7.1.5 How virtual intersections are entered in highway design?

A: Virtual intersections, as well as turnback curves, are edited in the software using the line element method.

7.1.6 What parameters are to be entered before the road is laid out?

A: The entire route, including flat curves, broken chains, vertical curves, etc., needs to be entered before the road is laid out.

7.1.7 How does the software use CORS?

A: Use "Phone internet" in the rover station mode of the software "Device", and enter the IP, port, username, and password in the CORS settings to use CORS data.

7.1.8 What is the minimum number of GNSS receivers required to make a static measurement and what is the impact on accuracy?

A: Generally static measurements require three or more devices for measurement, the more devices the more efficiency will be improved, for different control network levels there are details of the requirements, it is recommended to refer to the relevant industry specifications for GNSS measurements in your country.

7.1.9 What are the requirements for the ground and buildings in radio mode?

A: Currently, the digital radio of measurement RTK adopts 400M frequency band for propagation, which is generally recommended to be used in open environments because of the general bypassing ability of this frequency band. Currently, the 4G network coverage is very good, and users can use the 4G network to carry out differential operations without being affected by the obstruction of buildings on the ground.

7.1.10 What is the L-band satellite signal?

A: L-band signals, which in the GNSS industry refers to the use of this band for broadcasting satellite-based augmentation signals, allowing users to operate with high precision on a stand-alone basis even in the absence of conventional signals, such as radio and internet.

7.1.11 What's a radio relay?

A: Radio relay is a mobile station in the network differential operation at the same time, the received differential signal through the radio for forwarding, the nearby receiver can be received through the radio mode, differential operation. It can be applied to CORS to radio and other scenarios, to achieve the effect of a CORS account a number of mobile stations to use together.

7.1.12 Why convert WGS84 coordinates?

A: Different coordinate systems are mainly the difference in the definition of the earth's reference parameters, each coordinate system can have latitude and longitude, spatial right-angle coordinates and plane right-angle coordinates of three different forms of expression, the use of plane right-angle coordinates will be converted to the projection, the conversion of different coordinate systems will be used in the conversion of ellipsoids.

7.1.13 Why are the geodetic coordinates different under different CORS networks?

A： Because the coordinate systems of different CORS networks are different, and some CORS service providers are divided into several ports to output differential data of different coordinate systems, it is recommended that users understand the coordinate reference provided by the local CORS service provider when they use it for the first time.

7.1.14 Can handheld controller connect to the hotspot of mobile phone? How to set it?

A: Yes, just like a normal Android phone connecting to Wi-Fi, pull down and long press the Wi-Fi icon, select the Wi-Fi you need to connect to and enter the password.

7.2common failures

7.2.1 GNSS receiver can't lock the satellite

A: Please troubleshoot and deal with the following aspects:

(1) Reset the station in an unobstructed area far away from the source of electromagnetic wave interference (e.g. substation, radar station);

(2) Set the host into static mode to collect static data for 3-5 minutes, and then set it back to the previous mode.

(3) Long press the function key to reset the motherboard, shut down and restart.

7.2.2. In external radio mode, close to rover station but not receiving signal

A:

(1) Base station indicator light blinks abnormally. (Refer to fault 2.2).

(2) Transmitting radio RX/TX signal lamp is not normal (one second blinking is normal).

a. Check whether the cable is plugged in properly.

b. The connecting cable is damaged, replace the connecting cable to test.

c. The battery power is too low, replace the battery.

(3) Both the base station and external radio transmit normally, and the signal light of the rover station does not flash.

a. The channel and air baud rate of the rover station are not the same as those of the base station, set them to be the same again.

b. The radio module of the rover station is not normal, replace the radio module.

(4) The signal light of the rover station is blinking but it shows that there is no public satellite.

a. Differential message format of rover and base station is not consistent, set them to be consistent again.

b. The rover station is too heavily covered, resulting in less than 4 public satellites and cannot be displayed, go to an open place and reset the station.

7.2.3 Why does the radio work at such short range?

A:

(1) The battery power of the base station is too low, replace the battery.

(2) Base station not set to transmit in external mode, reset to external mode ;)

(3) The external radio is not normal.

a. Power not set to maximum.

b. Transmitting antenna is not mounted vertically on the tripod or centering pole.

c. The cable connector is not tightened for poor contact.

d. Receiving antenna is not installed correctly or there is a break, etc.

(4) There are sources of interference (same frequency interference or high-power equipment) in the vicinity of the base station and the surrounding environment, try to change the channel and the location of the base station.

7.2.4 Base station cannot connect to the network in built-in network mode

A:

1． Incorrect network settings. (IP address, port, operator, communication mode, source node, VRS username, password, etc.;)

2．SIM card problems.

a. Not properly installed SIM card (or loose).

b. SIM card arrears or damage.

c. The SIM card network is not compatible, try to replace the SIM card.

3．Poor network signal in the operation area, try changing location.

4． CORS server is not normal. Can use other devices to log in to determine whether the device is the problem.

5． Press the function key to reset the motherboard of GNSS receiver.

7.2.5 In the built-in network mode of the base station of the CORS server, the network connection between the base station and the mobile station is normal and the base station transmits signals normally, but the mobile station is unable to get fixed.

A: Processing steps:

1．Check whether the IP and port of the mobile station are consistent with the base station.

2． Check whether the differential message format used by the rover station is consistent with that of the base station.

3． Account conflict. Click on the resolution status to check whether there is a difference between the distance of the base station and the actual one

4． The server is not working properly. You can call the CORS service provider to confirm whether the server is normal.

7.2.6 The rover station is connected to the CORS server but is not receiving differential signals.

A: Processing steps: Judge the status of the GNSS receiver according to the signal light:

(1) The green light is blinking, but it cannot connect to the server:

a. SIM card problem (SIM card arrears, poor contact with loose card slot, incompatibility).

b. CORS parameter setting problems (IP, port, source node, username, password error, etc.).

c. If all the above checks are OK, you can call the CORS service provider to confirm whether the server is normal.

d. GNSS receiver network module problems

(2) Only the green light is always on, connecting to the server but not receiving the differential signal:

a. Check whether the IP and port settings are correct.

b. When the rover station is connected to VRS, whether the GGA data of the rover station is uploaded to the server (check whether the mobile station is locked to the satellite and whether GGA is checked).

c. If there is no problem in the above checks, consult the CORS administrator whether the server is normal or not.

(3) The indicator light is normal (green light is always on, yellow light blinks once a second), but there is no public satellite. Under normal circumstances, the solution will be completed in half a minute after connecting to the server, if the public satellite is still zero:

a. Check whether the differential message format is correct.

b. If the blockage is too serious, resulting in less than 4 public satellites cannot be displayed, you need to go to an open place to reset the station.

7.2.7 The handheld controller Bluetooth does not connect to the GNSS receiver.

A: Processing steps

(1) Check whether the GNSS receiver is static.

(2) Search for Bluetooth again in the connection interface and then connect.

(3) Reboot the Bluetooth of the handheld controller (turn it off and on again) or reboot the GNSS receiver and the handheld controller (sometimes you only need one of these three

steps to connect, and you do not need to reboot the GNSS receiver and the handheld controller)

(4) Update the software of the handheld controller and upgrade the firmware of the GNSS receiver.

7.2.8 The handheld controller cannot be synchronized and connected to the computer

(1) Check that the handheld controller connection program and driver are installed on the computer.

(2) Check whether no antivirus software on the computer prevents the connection program from running.

(3) Check if the "USB Debugging" function under the Developer Options menu is checked.

(4) Check whether the USB cable and interface are normal (replace the cable to test).

7.2.9 After calculating the coordinate transformation parameters, the control point calibration was performed with a significant difference from the true value.

A: Possible causes:

① Poor accuracy of the collected control points;

② Uneven distribution of control points;

③ Abnormal control points.

Processing steps:

(1) Check the calculated parameters (e.g., four parameters, if the rotation is too big and the scaling is not close to 1, check whether the control points are wrongly input).

(2) Check the distribution of control points, whether the points involved in the calculation are too close or unevenly distributed.

(3) If more than three points are involved in the calculation, if there is any point with abnormal center error, it is necessary to eliminate it before calculation or add other points for calculation.

PRECISE

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RELIABLE,
and **EASY**
experience!

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