

BO NAV RTK

Instructions for use



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Preface

330 NAV RTK is a handheld RTK positioning terminal with built-in bluetooth and CORS services. It uses a high-precision RTK module and supports GPS, Beidou, Galileo, QZSS, and other satellite navigation systems^缺 for L1 or L1+L5 signal reception. The RTK fixed solution positioning accuracy can reach 1-2 cm, suitable for precise measurement occasions. 330RTK also has sensors such as barometric temperature sensor, three-axis electronic compass, and three-axis accelerometer.

330 NAV RTK is optimized for industry applications and has functions^缺 such as point collection and stakeout, sharing AB points, terrain surveying, grid tree planting, area measurement, surrounding area, straight and curved length measurement, etc. It has built-in hundreds of coordinate systems such as WGS84, Beijing 54, Xi'an 80, UTM, MGRS, and supports setting three sets of custom coordinate systems at the same time.

Chapter 1、Introduction to 660RTK Keys



Chapter 2、Viewing RTK Differential Status

1. Explanation of Differential Status and Accuracy:

- ① No Fix: The device has not received satellite signals.
- ② Single: The number of observed satellites is greater than or equal to four, but the device has not obtained base station information.
(Positioning accuracy is in the meter level.)
- ③ Code Differential: The device has connected to the base station and performed data communication, and the coordinates are obtained through ranging codes. (Positioning accuracy is in the meter level.)
- ④ Float: The device has connected to the base station and performed data communication, and the coordinates are obtained through carrier phase, but a fixed coordinate value has not been calculated. (Positioning accuracy is in the meter level or decimeter level.)
- ⑤ Fixed: A fixed coordinate value has been calculated. (Positioning accuracy is in the centimeter level.)

2. Viewing Differential Status on the Main Screen

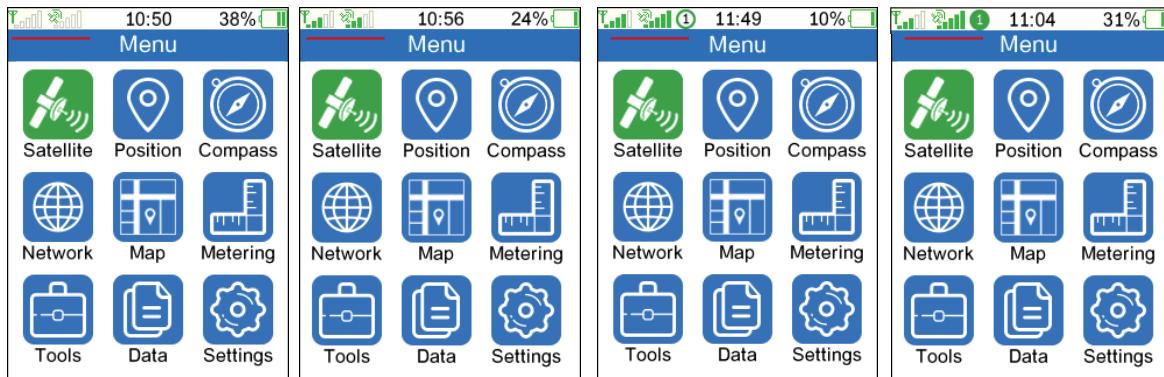


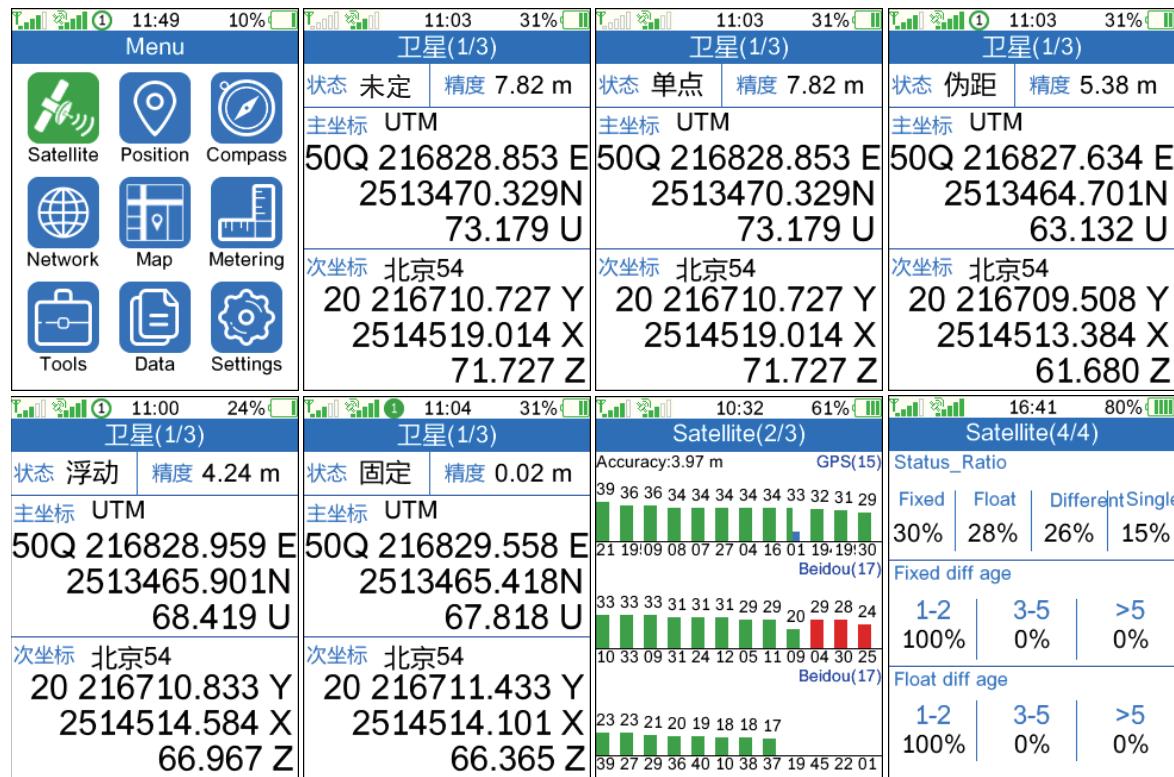
Figure 1: No satellite signal received.

Figure 2: Satellite signal received, but differential correction has not started.

Figure 3: Differential correction has started, but the device has not achieved a fixed solution.

Figure 4: The device has achieved a fixed solution

3. Viewing Differential and Satellite Status in the Satellite Function



To access the 'Satellite' function in the main menu, click the 'Enter' button on the device.

On the first page of the satellite function, the current differential status and positioning accuracy of the device are displayed.

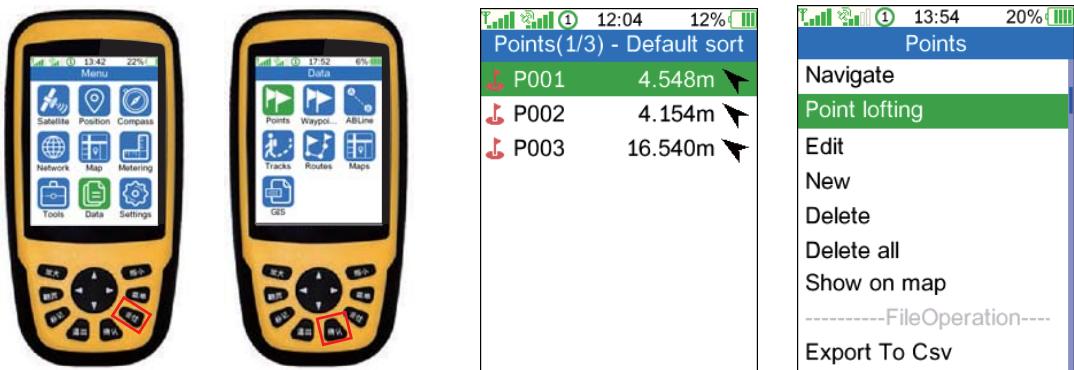
On the second page of the satellite function, the satellite system, satellite number, and signal strength received by the device are displayed.

On the third page of the satellite function, data analysis of the positioning status is shown.

Chapter 3、Measurement Function

1. Point Collection and Stakeout

To access the 'Mark' function, press the 'Mark' button on the device to enter the marking interface. Use the directional keys to select the options in the interface to replace or add remarks. After confirming the waypoint information, select the 'Save' button and press the 'Enter' button on the device to save the waypoint. It is recommended to perform the marking operation when the device is in a fixed state to ensure a smaller error.



To access the 'Go To' function, press the 'Go To' button on the device to enter the data management interface. Select the information to be navigated, for example, waypoints, and press the 'Enter' button on the device to select the desired point. Then select 'Navigate' from the pop-up menu to start navigation. The navigation interface shows the direction to the target with a black pointer by default in compass navigation mode. Users can also switch to map navigation mode by pressing the 'Page' button on the device. In the map navigation mode, users can zoom in or out the map by pressing the 'Zoom In' or 'Zoom Out' button on the device.

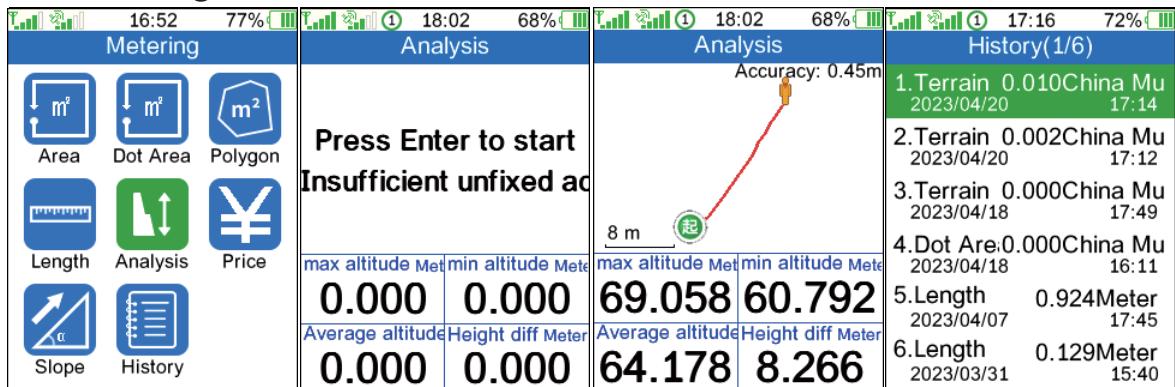


2. Sharing AB Points



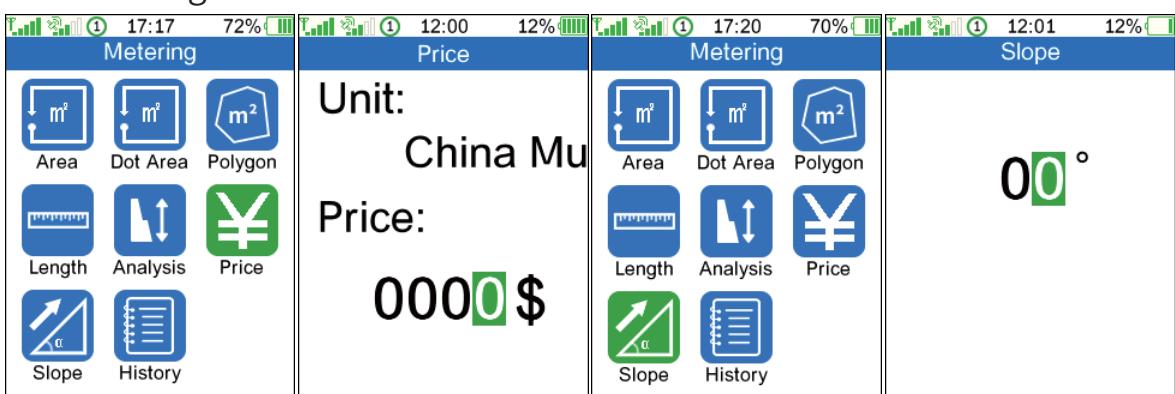
To access the AB Line function, users can enter the data management interface and select the AB Line option. Alternatively, users can directly press the 'Go To' button on the device and select the AB Line option to enter the AB Line list. In the AB Line list, users can press the 'Menu' or 'Enter' button on the device to enter the function interface and select 'New'. Users can then use the 'Zoom In' or 'Zoom Out' button on the device to perform AB point marking. After marking the points, the information will be saved automatically. Users can use the directional keys to switch between screens to view the detailed information of the AB points.

3. Measuring Terrain

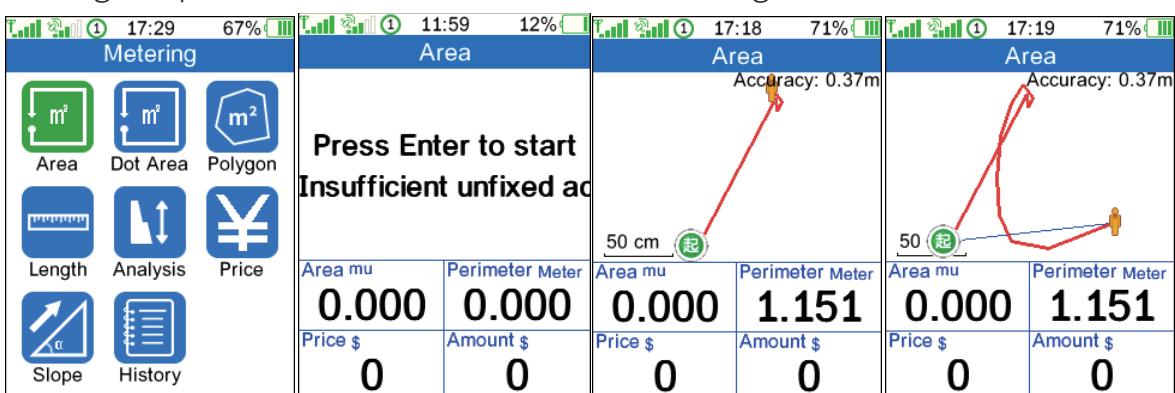


To measure terrain using the 330 NAV device, select the 'Measurement' function from the main menu and press the 'Enter' button to enter. Then select the 'Terrain Analysis' function and start the measurement. The device will automatically collect the current height data at 1-meter intervals and calculate the results. Users can view the measurement results in the 'Result View' function.

4. Measuring Area



Select the 'Measurement' function from the main menu and press the 'Enter' button to enter. Then select either the 'Unit Price Setting' or 'Slope Setting' function, and set the unit price or slope values accordingly. After setting the parameters, users can start measuring the area.



Metering			Dot Area			Dot Area			Dot Area		
			Enter: Start measurement	Exit: End of measurement		Numbers: 1	Accuracy: 0.46m		Accuracy: 0.46m		
			Zoomin: Add a Point	Zoomout: Delete a point		12 cm			30 cm		
			Start distance M	Previous distance		0.096	0.096		0.000	0.000	
			Area mu	Perimeter Meter		0.000	0.000		0.000	0.000	
			0.000	0.000		0.000	0.000		0.000	0.000	
			0.000	0.000		0.000	0.000		0.000	0.000	

There are two ways to measure an area using the 330RTK device.

1. The first method is to use the 'Surrounding Area' function. Users can mark the starting point by pressing the 'Enter' button on the device, and then start surrounding the area. After completing the surrounding, users can press the 'Enter' button again to end the measurement.
2. The second method is to use the 'Point-to-Point' function. Users can press the 'Enter' button on the device to add or delete point coordinates using the 'Zoom In' or 'Zoom Out' button.

Both methods will provide the final measurement results, which can be viewed in the 'Result View' function.

5. Measuring Length

Metering			Length			Length			Length		
			Press Enter to start	Insufficient unfixed ac		Accuracy: 0.36m			Accuracy: 0.36m		
			Distance Meter	Length Meter		0.713	0.713		0.959	0.959	
			0.000	0.000		0.888	-0.531		1.310	-0.893	
			3D Distance Met	Height Meter							
			0.000	0.000							

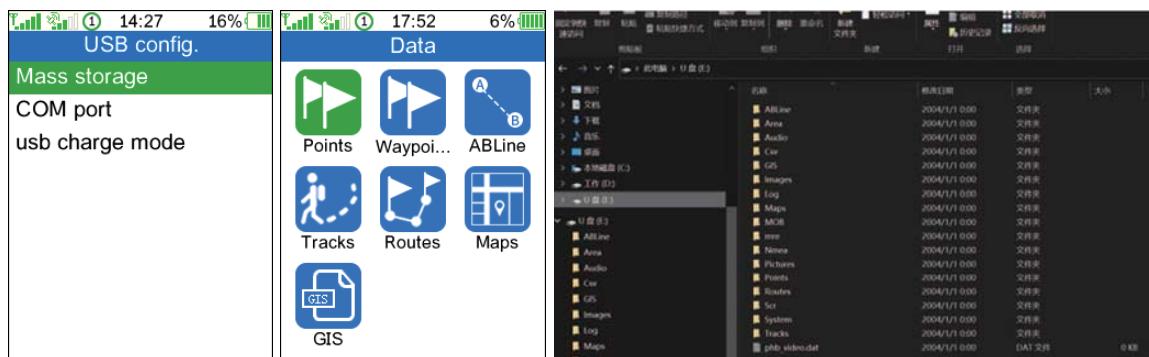
Used for measuring the straight line distance and curve length between two points, it is recommended to perform the measurement when the accuracy reaches the centimeter level. Length measurement is carried out based on the sampling points determined by speed. Data is collected when the speed is greater than 0.5 knots (nautical speed). Press the 'Confirm' button to set the starting point, then move from the starting point to the endpoint according to your custom method. At the endpoint, press the 'Confirm' button again to complete the measurement.

Chapter 4、Data Import and Export

(1) The device supports exporting waypoint, track, and route files in CSV and CAD formats, and CSV files can be imported as GPX files. All data, including waypoints, tracks, routes, and maps, are saved on the TF card of the device. To avoid data loss, it is recommended to use a high-quality TF card and backup data regularly.

(2) Waypoint data is saved in GPX format in the 'Points' folder on the TF card of the device. Exported CSV files are saved in the 'Csv' folder, and CAD files are saved in the 'Scr' folder. Users can customize the icon for waypoints, but the icon file needs to be placed in the 'system' directory and named 'userPointIcon.png'.

- Track data is saved in GPX format in the 'Tracks' folder on the TF card of the device.
- Route data is saved in GPX format in the 'Routes' folder on the TF card of the device.
- Raster maps are saved in ratlas and MBtiles file formats in the 'Maps' folder on the TF card of the device.

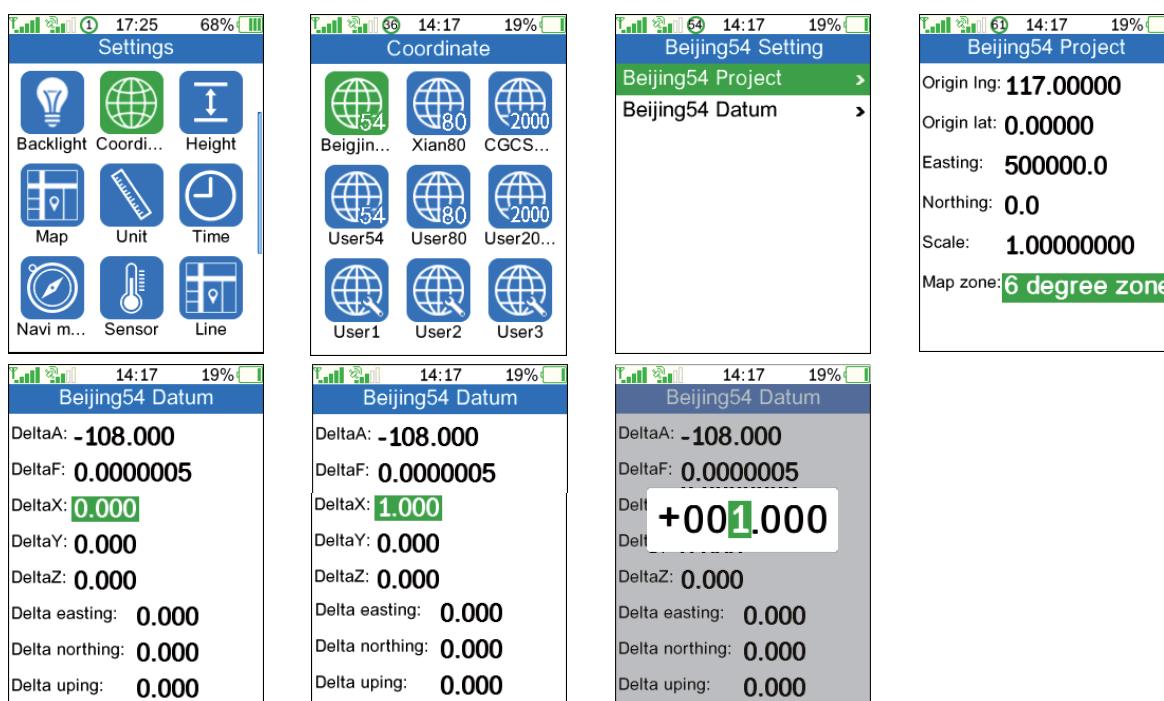


Chapter 5、Coordinate System Setup

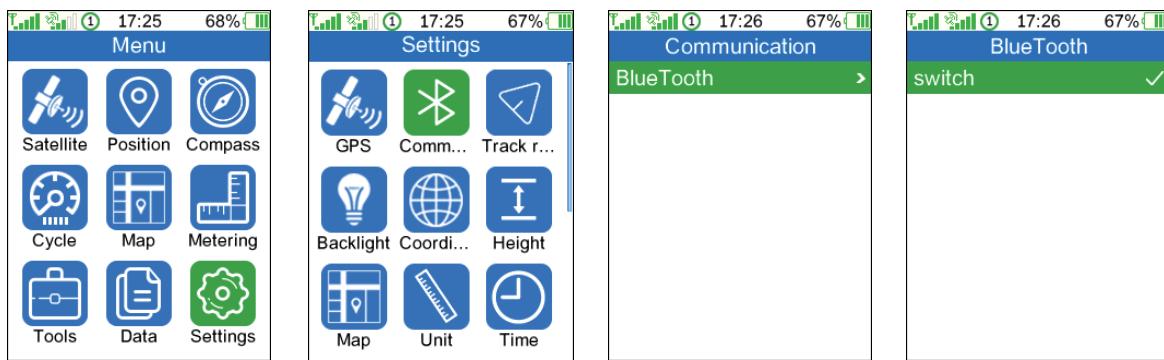
This function is located in the 'Settings' function under 'Coordinate System'.

(1) It is used to set the conversion parameters for the Beijing 54 and Xi'an 80 coordinate systems or to customize a coordinate system. In the Beijing 54 and Xi'an 80 coordinate systems, users can set the projection parameters, ellipsoid parameters, and translation parameters. For the projection parameters, only the map zone method needs to be set. For the ellipsoid parameters, users need to set DX, DY, and DZ, and can also set the offset of the XY axis. Incorrect parameter settings may result in the device displaying incorrect projection coordinates or even unable to display valid projection coordinates!

(2) The setting of the central meridian mode allows users to manually input or automatically calculate the central longitude and central latitude of the local coordinate zone, as well as the east-west deviation (usually set to 500000 in China), north-south deviation (usually set to 0 in China), scale ratio (usually set to 1), and map zone (3-degree or 6-degree zone) for custom projection parameters. Users can also set DA, DF, DX, DY, and DZ for custom ellipsoid parameters, and choose a pre-stored map datum to use.



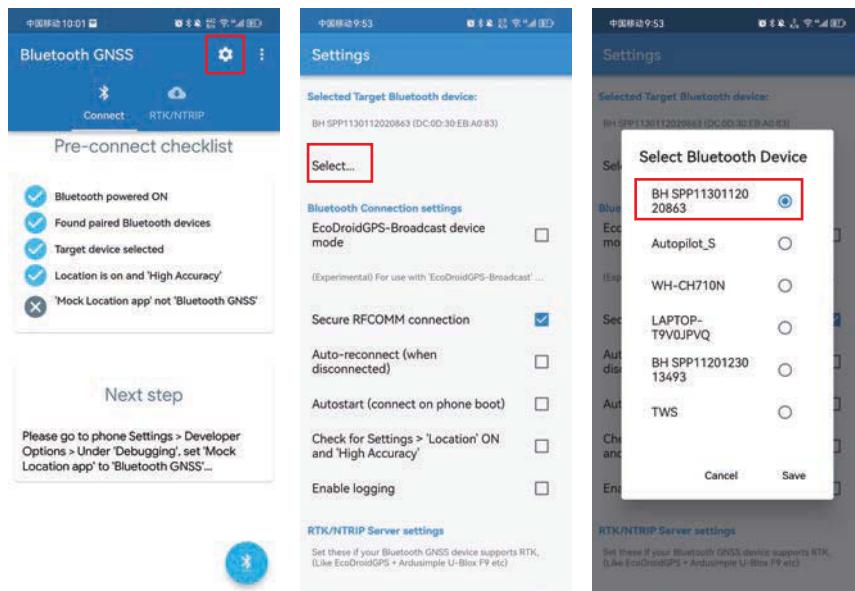
Chapter 6、Bluetooth & USB



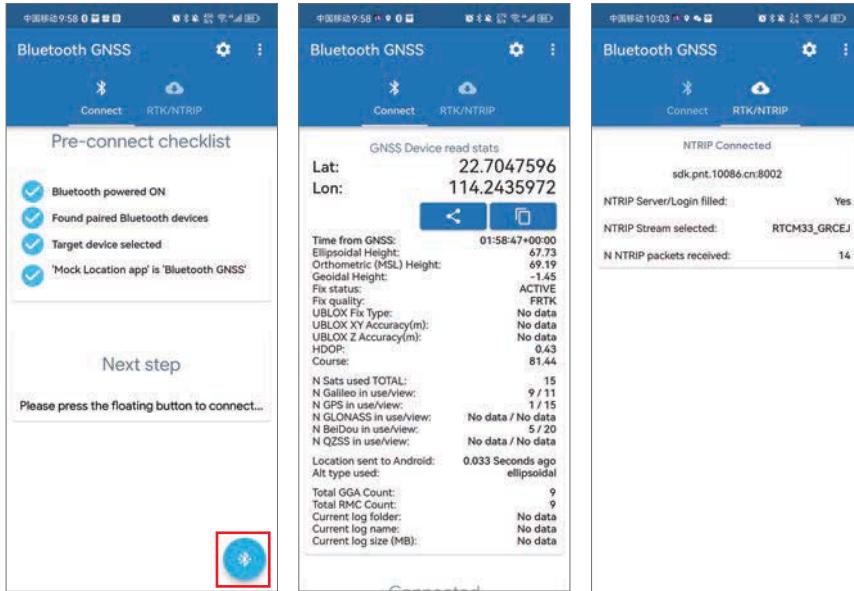
Select 'Communication Settings', the switch for the Bluetooth function is located under 'Bluetooth' in 'Communication'. After enabling this function, user can use the Bluetooth function to view and analyze Bluetooth differential and positioning data with a mobile phone and the 'Bluetooth GNSS' or 'Surveyor' app. The specific steps are as follows:

(1) Bluetooth GNSS:

- ① Turn on Bluetooth on the mobile phone, search for the device, and connect it;
- ② Turn on Bluetooth GNSS 2, click on 'Settings', then click 'Select...' on the Settings screen, select the device being used, and click 'Save'.



③ Return to the homepage and click on the Bluetooth connection button in the lower right corner of the screen. After a successful connection, the 'Connect' page will display the latitude, longitude, and connection status, while the 'RTK/NTRIP' page will display the server connection status and the number of received NTRIP data packets.



(3) How to use the Surveyor app:

① Turn on Bluetooth on the mobile phone.

② Open the Surveyor app and select the 'Instrument' interface. Choose 'Binghuo RTK' to enter the 'Connect RTK' interface. Click 'Scan' to search for available devices. Select the device to be connected and click 'Connect'. Enter '0000' for pairing.



FCC warning statements:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement.

The device interface is Type-C, which supports not only charging and importing/exporting data in USB mode, but also viewing NMEA data in serial port mode. This feature is a hidden setting and can be enabled by clicking the confirm button four times in a row in the device function 'About this device'.

