R10 Operation Guide

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China

GNSS Receiver

Version 1.0

Content

1. R10 Specifications



R10 portable high-precision locator is a lightweight, simple and practical high precision GNSS RTK receiver, which is a low-cost solution for both portable and high-precision positioning.

The R10 supports five stars and sixteen frequency positioning data, adopts high-performance aluminum alloy body, built-in Bluetooth module can be used with Android cell phones, can be widely used in engineering survey, geological survey, precision agriculture, land survey, unmanned, geographic information, water survey, aerial photogrammetry and other scenarios.

1.1 Technical features

- Small size and high integration, the system can integrate high-capacity battery, GNSS antenna, satellite positioning module, Bluetooth, etc..
- High accuracy and low power consumption, using BeiDou, GPS, GLONASS, Galileo, QZSS and other five stars and 16 frequencies, which can guarantee the positioning accuracy in a variety of complex environments.
- Adopting universal standard TYPE-C charging interface, supporting charging of rechargeable batteries and supporting TYPE-C upgrade.
- Standard IP54 waterproof and dustproof design.
- Built-in 4.0 Bluetooth module, which supports a wide range of cell phone connections for the AnTai.
- Ultra-long battery life, low power consumption, built-in 4800mAh high-capacity battery,

supporting more than 16 hours of continuous use.

- The total weight of the equipment is 0.55kg, small and light, easy to carry.
- Flexible in use, can be handheld or screwed directly onto the alignment bar for measurement.
- Software with standard version of measurement software or flagship version of measurement software with functions such as measurement, pointing and CAD placement.
- Software support for various CORS systems as well as Thousand Seekers and Six Points, with a free 1-year China Mobile national high-precision RTK positioning service.

1.2 Technical parametres

Signal Tracking

bds b1i/b2i/b3i/ b1c/b2a

GPS L1C/A/L2P(Y)/L2C

GLONASS L1/L2

Galileo E1/E5a/E5b

QZSS L1/L2/L5

Cold start time: <25s

Initialization time: <5s (typical)

RTK initialization reliability: >99.9%

Recapture: <1s

Accuracy index

Single point positioning.

Plane: 1.5m

Elevation: 2.5m

RTK accuracy.

Plane: ±（10+1.0×10^{-6} × D）mm

Elevation: ± (20 + 1.0 × 10^{-6} × D) mm, D is the baseline distance in mm

Data output

Differential data: RTCM 3.3/3.2/3.1/3.0

Positioning data: NMEA-0183

Electrical parameters

Endurance: ⩾16h

Input voltage: DC5V ⩽1A

Battery capacity: 4800mAh

Power consumption:1w

Physical Properties

Operating temperature: -45℃～+75℃

Storage temperature: -55℃～+85℃

Physical size: Φ165mm*70mm

Protection level: IP54

Impact and vibration: resistant to 2m drops

Button: 1 button

Indicator lights: 2 LED indicators

Weight: 0.55kg

Data interface.

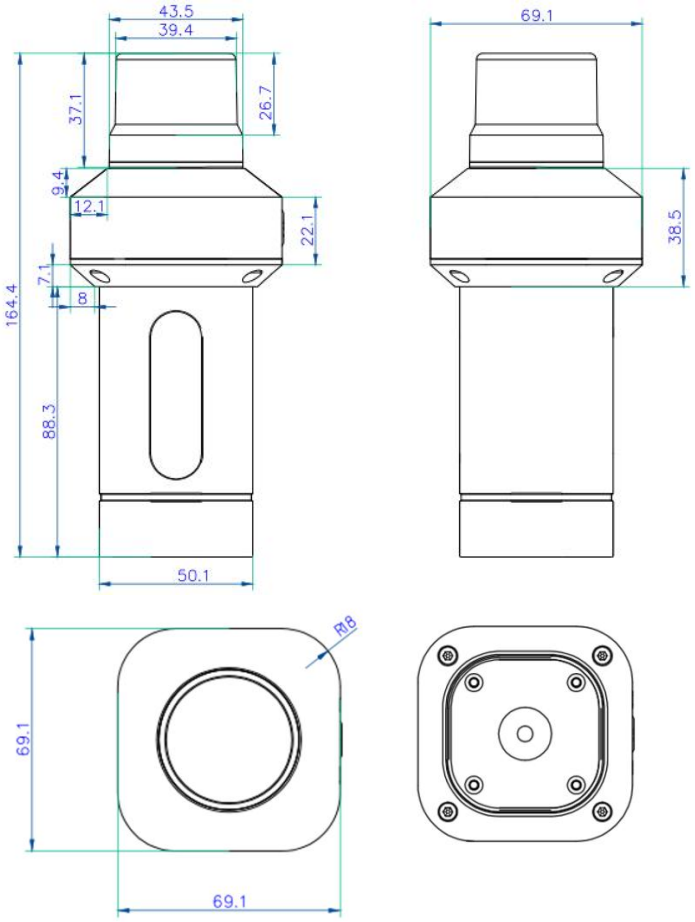
Data refresh rate: 1Hz

Baud rate: 115200

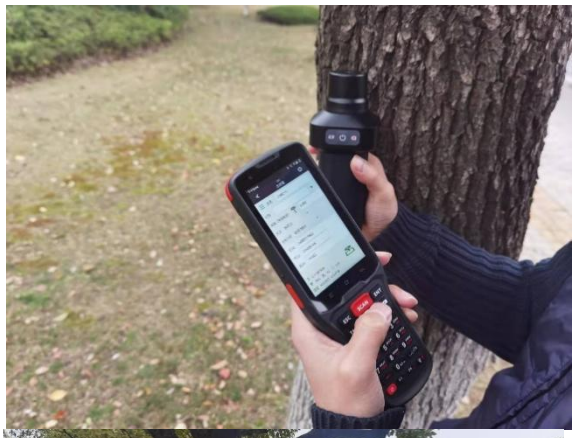
Interface mode: standard TYPE-C interface

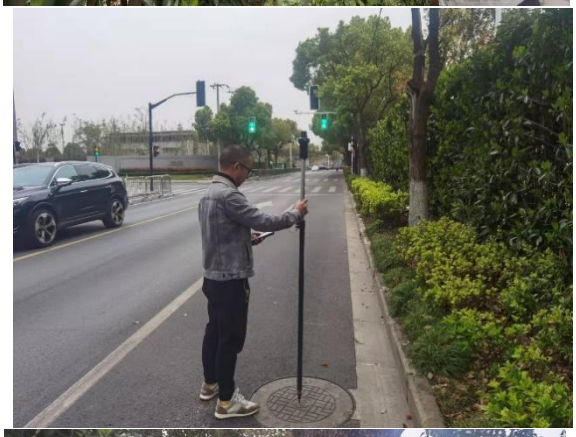
Bluetooth: BT4.0

1.3 Exterior dimensions



1.4 Pictures of actual use scenarios






2. R10 Instructions

 Connection indicator light : The red light flashes when the device is not connected to the mobile phone ; the red light is always on when the device is connected successfully

 Power button: Press and hold for two seconds to turn on or off

 Power indicator light : The red light is always on in normal working state ; the red light is flashing when the device is low in power; the green light is flashing in the charging state ; the green light is always on when the battery is full

 Charging interface: use TYPE-C charging interface, you can use the standard charging line or the conventional data line that can realize the communication function

Notice:

1. Please avoid placing the charging port in water or staying in a humid environment for a long time.
2. When not charging, please cover the dust-proof silica gel to avoid damage to the device caused by water and dust.

3. Software Description

3.1 Software profile

AllyPad software is an engineering survey application software developed by Shanghai AllyNav Technology Co., Ltd. based on GNSS high-precision location application. The developers integrate based on years of surveying and mapping development and market experience accumulation, combined with the use habits of a large number of industry users and Android operation style habits.The software has a humanized operation process of simple operation and easy to use, high-precision position survey and collection, point and line setting out, powerful road design and construction setting function and CAD Figure setting function, convenient functional menu display and convenient user customized design.

The following introduces the basic functions of the software: The software mainly includes four parts: Proiects, Device, survey, and tools.

3.2 Device connect

At the main software interface, click [Device] on the corresponding function menu, as shown in Figure 3-1.The instrument includes Communication, Rover, Base, Static, Inspection accuracy, Device Setting, Restart Positioning, Device information and other functions.

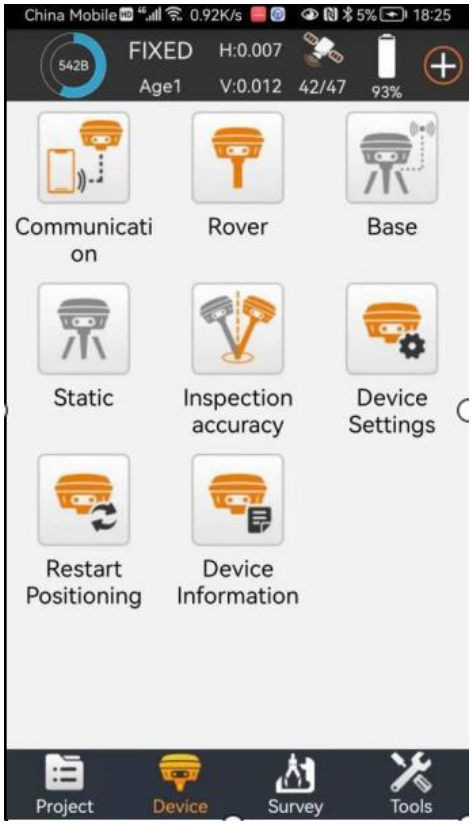


Figure 3-1

Click [Device] -> [Communication], as shown in Figure 3.1-1.Select the instrument manufacturer, instrument type and Communication mode, then select the R10, and click "Connect" to complete the equipment Communication.After the device is successfully connected, it will return directly to the main interface of the software, as shown in Figure 3-2.Enter the communication setting, as shown in Fig. 3.2-2, click Stop the section equipment Communication.

1. Selection of the instrument manufacturer: the software supports the joint navigation and the positioning equipment access of many other GNSS instrument and equipment manufacturers, as shown in Figure 3.2-3.

2. Instrument type: choose R10

3. Communication mode includes Bluetooth Communication, TCP client Communication, etc. The way supported by each instrument manufacturer may be different. The basic Bluetooth mode is basically supported by all manufacturers.

4. Click on the equipment parameters, enter the Bluetooth search and selection, as shown in Figure 3.1-4, and click on the equipment to choose the equipment needed to connect. The list of common equipment will display the 5 devices with the most Communication frequency, to facilitate users to quickly find the connected equipment.

5. After the equipment is successfully connected, click "debug" to view the communication data between the software and the equipment. As shown in Figure 3.1-4, the equipment debugging commands can be sent to the equipment to investigate the problems related to the equipment positioning through the communication data.

Figure 3.1-1 Figure 3.1-2 Figure 3.1-3

Figure 3.2-4 Figure 3.2-5

3.3 Point Survey

Click [Survey] -> [Point Survey], as shown in Figure 3.3-1.The positioning of GNSS device output is measured and collected into the coordinate point library under certain precision limits.In the point survey interface, the title bar displays the basic information of the positioning output of the current GNSS equipment, the current solution status, the difference delay, the positioning accuracy evaluation value of HRMS and VRMS, and the number of received satellites.Title bar is other Import dataant information status bar, display content can be set according to the user content, in the point survey default display high coordinates and base station distance information, the middle area is measuring data drawing information, can also set display network map, the upper right corner of the electronic compass for thin compass display, convenient users to judge the direction when needed.The bottom

left side of the drawing area is the display of the function collection, these function menu can also display the required functions here according to the needs of the user to quickly operate some functions, the bottom right corner of the area shows the drawing scale, the icon above the scale is the trigger survey acquisition function button, the button can be moved according to the user's use habits, in a more convenient place to operate.Click the key to start the survey function, as shown in Figure 3.3-2.Below the drawing area are the survey attribute naming and encoding input locations, as well as the antenna height setting and the entrance to the coordinate point library.

Figure 3.3-1 Figure 3.3-2

 Click the setting icon to enter the survey setting interface, as shown in Figure 3.3-3.Here, we set the collection restrictions for survey and collection, such as solution state, HRMS, VRMS, PDOP, difference delay, etc. Users set the restrictions according to the accuracy requirements of the job.Setting the number of smoothing points is to average multiple sites to indicate accuracy.In addition, you can also set the default roll call and the default encoding.The information display setting is to set the display content of the status information bar, and the user can display it according to his own key information setting, as shown in FIG. 3.3-4.Function menu setting is that the user displays the common function Settings to the left menu bar according to the needs of their own homework process, so that the user can quickly and easily call

some functions.These functions include: tilt survey switch, network map selection switch, drawing zoom in and reduce the whole map positioning center, screen point, CAD text annotation, length and area calculation, drawing background color setting, CAD layer setting, Coordinates Converter tools, Calculator tools and other functions, click the menu icon on the left to trigger the corresponding functions.

 survey collection points usually require name call and coding, and clicking the icon can select the preset coding in the coding library to quickly fill in the ground properties, as shown in Figure 3.3-6.

Click on the antenna high to display the content, and you can modify and edit the antenna high information, as shown in Figure 3.3-7.The antenna height is set to subtract the phase center coordinates of the GNSS from the antenna height to measure the actual target position on the ground.If the antenna information is incorrect, click the antenna information can select the correct antenna type in the antenna management (used when the GNSS equipment does not output the antenna information or uses the external antenna), as shown in Fig. 3.3-8.

Figure 3.3-3 Figure 3.3-5 Figure 3.3-6

Figure 3.3-7 Figure 3.3-8

3.4 Point Stakeout

Click [Survey] -> [Point Stakeout] to enter the interface of the setting out point library, as shown in Figure 3.4-1. Point Stakeout refers to the location of the point at the field site if the point coordinates are known.In the sample point will show the sample point and put point, click the sample point to remove, view the details and sample, to sample point is part of the coordinate point library, add Import data Export data operation consistent with the coordinate point library, did not actually delete points in the point library, also can be selected in the coordinate point (all points in the coordinate point library).After selecting the point for demout, enter the point demout interface as shown in Figure 3.4-2.

The layout of the point sample interface is similar to the point survey and is somewhat different. However, the southeast and northwest deviation value from the target is shown in the status information bar.The compass compass is not in the top right corner of the drawing area but is currently positioned together.Below the drawing area, in addition to the survey setting function, there are the nearest point, the top bit, and the next bit.

In addition to the survey setting, information display setting, and function menu

setting, as shown in Fig. 3.4-3.The target can be set according to the southeast, northwest or left and right prompts, the reference direction of the front and back can be the front direction of the host or press the known reference point direction, and can also set the prompt range, setting out limit difference, etc.

What if you get to the target point faster?

If the user has a good sense of direction, in the real-time field industry can distinguish the southeast and northwest, in the sample compass display, you can directly see the continuity of the current positioning point and the target point, which direction to the past.As shown in Figure 3.4-2, the target point Pt4 is found by walking southwest.

If the user sense of direction is not good, can not distinguish the southeast and northwest, you can see the current positioning of the small arrow, the small arrow is pointing to the thin hand when put flat, as shown in Figure 3.4-2, the current thin hand is pointing to the south.You can turn the Data controller pointing, when the Data controller point and the current point Communication overlap, that the Data controller pointing is the same with the target point orientation, at this time, press the Data controller pointing, can go forward.

Figure 3.4-1 Figure 3.4-2 Figure 3.4-3

In the sample point to be released, click the data item, click the detailed information of the entry point, including the information of each setting point and the Figureical distribution map of the demout target and collection points, as shown in Figure 3.4-4, 3.4-5.

Figure 3.4-4 Figure 3.4-5

FCC STATEMENT:

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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: 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.

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