

PRECISE



# PRECISE X

## GNSS Receiver

*Think PRECISE!*

# USER MANUAL

Release Month 2025/03



# 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.

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# Chapter 1

## Common problems

### **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.

### **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.

### **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

### **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".

### **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.

### **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.

### **1.7 How the software uses 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.

### **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.

### **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.

### **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.

### **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.

### **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.

### **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.

**1.14 Can handheld controller connect 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.

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# Chapter 2

## common failures

## 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.

## 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.

## 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.

## **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. 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.

## **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.

## **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.

## **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.

## **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).

## **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.



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