



CHCNAV i76 GNSS

User Guide



Make your work more efficient

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Preface

Copyright

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Trademarks

All product and brand names mentioned in this publication are trademarks of their respective holders.

Safety Warnings

GNSS (Global Navigation Satellite System) receivers are electronic devices that use signals from satellites to determine location, speed, and time. While GNSS receivers are generally safe to use, there are some safety considerations that users should keep in mind:

Do not rely solely on GNSS for navigation: GNSS signals can be disrupted by various factors such as tall buildings, trees, and bad weather. It is important to use other navigation aids such as maps, compasses, and visual landmarks.

Keep GNSS receivers away from other electronic devices: Electronic devices such as mobile phones, radios, and computers can emit electromagnetic interference (EMI) that can disrupt GNSS signals. Keep GNSS receivers away from such devices to avoid EMI.

Do not tamper with GNSS receivers: Tampering with GNSS receivers or modifying their software can cause them to malfunction or produce inaccurate readings. Only use GNSS receivers that are certified and authorized for use.

Follow manufacturer instructions: Follow the manufacturer's instructions regarding the safe use and handling of GNSS receivers. This includes instructions for charging, cleaning, and storing the device.

Dispose of GNSS receivers properly: When disposing of GNSS receivers, follow local regulations for electronic waste disposal to avoid harming the environment.

It is important to use GNSS receivers safely to avoid accidents or injury. If you experience any issues or concerns with your GNSS receiver, contact the manufacturer or a qualified technician for assistance.

FCC Interference Statement

This equipment has been designed to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules in the Portable Mode. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

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.

CE Interference Statement

Declaration of Conformity: Hereby, Shanghai Huace Navigation Technology Ltd. declares that this i76 is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

Conformity to Japanese regulations

Japanese Radio Law and Japanese Telecommunications Business Law Compliance.

- This device is granted pursuant to the Japanese Radio Law and the Japanese Telecommunications Business Law.
- This device should not be modified (otherwise the granted designation number will become invalid).

1 Introduction

The i76 GNSS Receiver User Guide describes how to set up and use the CHCNAV® i76 GNSS receiver. In this manual, “the receiver” refers to the i76 GNSS receiver unless otherwise stated. Even if you have used other Global Navigation Satellite Systems (GNSS) products before, CHCNAV recommends that you spend some time reading this manual to learn about the special features of this product. If you are not familiar with GNSS, go to www.chcnav.com for an interactive look at CHCNAV and GNSS.

1.1 Safety Information

1.1.1 Warnings and Cautions

An absence of specific alerts does not mean that there are no safety risks involved.

A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.



WARNING - A Warning alerts you to a potential misused or wrong setting of the equipment.



CAUTION - A Caution alerts you to a possible risk of serious injury to your person and/or damage to the equipment.

1.2 Regulations and Safety

The receivers contain a built-in wireless modem for signal communication through Bluetooth® wireless technology or through external communication data link. Regulations regarding the use of the wireless modem vary greatly from country to country. In some countries, the unit can be used without obtaining an end-user license. However, in some countries, the administrative permissions are required. For license information, consult your local dealer. Bluetooth® operates in license-free bands.

Before operating a i76 GNSS receiver, determine if authorization or a license to operate the unit is required in your country. It is the responsibility of the end-user to obtain an operator's permit or license for the receiver for the location or country of use.

1.2.1 Use and Care

This receiver is designed to withstand the rough environment that typically occurs in the field. However, the receiver is high-precision electronic equipment and should be treated with reasonable care.



CAUTION - Operating or storing the receiver outside the specified temperature range will cause irreversible damage.

1.3 Technical Support

If you have a problem and cannot find the information you need in this manual or CHCNAV website (www.chcnav.com), contact your local CHCNAV dealer from which you purchased the receiver(s).

If you need to contact CHCNAV technical support, please contact us by email(support@chcnav.com) or Skype (chc_support).

1.4 Disclaimer

Before using the receiver, please make sure that you have read and understood this User Guide, as well as the safety information. CHCNAV holds no responsibility for the wrong operation by users and for the losses incurred by the wrong understanding about this User Guide. However, CHCNAV reserves the rights to update and optimize the contents in this guide regularly. Please contact your local CHCNAV dealer for new information.

1.5 Your Comments

Your feedback about this user guide will help us to improve it in future revision. Please email your comments to support@chcnav.com.

2 Getting Started with I76

2.1 About the Receiver

The new CHCNAV i76 GNSS receiver offers integrated IMU-RTK technology to provide a robust and accurate GNSS positioning in any circumstances. Unlike the standard MEMS based GNSS receivers, the i76 GNSS IMU-RTK combines state-of-the-art GNSS RTK engine, calibration-free professional IMU sensor and advanced GNSS tracking capabilities. Survey projects are achieved with high productivity and reliability pushing the boundaries of conventional GNSS RTK survey.

The LCD panel enables user to check satellite-tracking status, internal battery status, Wi-Fi status, working mode, data logging status and basic receiver information. Bluetooth and Wi-Fi technology provides cable-free communication between the receiver and controller.

The receiver can be used as the part of an RTK GNSS system with CHCNAV LansStar7 software. Moreover, user can download the GNSS data that recorded in the internal memory of receiver to a computer.

The receiver can be used as the part of an RTK GNSS system with CHCNAV LandStar 8 software. And you can download the GNSS data that recorded in the internal memory of receiver to a computer.

To configure the receiver for performing a wide variety of functions, you can use the web interface by connecting the receiver with PC or smartphone through Wi-Fi.

2.2 Parts of the Receiver

The operating controls are all located on the front panel. SIM card slot is on the backside. Serial ports and connectors are located on the bottom of the unit.

2.2.1 Front Panel

The following figure shows a front view of the receiver.



The front panel contains two indicator LEDs and two buttons.





Name	Description
Correction LED (Red/Yellow/Green)	<ul style="list-style-type: none">Indicates whether the receiver is transmitting/receiving differential data.As a Base station: successfully transmitting differential data, flash yellow light.As a Rover station: tracking satellites will flash red light, successfully receiving differential data from Base station will flash yellow light when it is single or float, flash green light when it is fixed.
Satellite LED (Red/Yellow/Green)	<ul style="list-style-type: none">Shows the number of satellites that the receiver has tracked.When the receiver is searching satellites, the red LED flashes once every 5 seconds.When the receiver has tracked N satellites, the red LED will flash N times every 5 seconds.
Power Button (Yellow/Green)	<ul style="list-style-type: none">Under normal conditions red power lightThe power light shows yellow when chargingThe power light shows green when fully charged

2.2.2 Lower Housing

The lower housing contains one SIM card slot, one TNC radio antenna connector, one communication and power port and one USB type C communication and power port.



2.2.3 Receiver Ports

Port	Name	Description
	USB port	<ul style="list-style-type: none">• This port is a type-C USB connector that supports USB communications.• Users can use USB Cable supplied with the system to download the logged data to a computer but can't upload the data.• USB port can used to charge the i76 GNSS receiver
	Radio antenna connector	<ul style="list-style-type: none">• Connect a radio antenna to internal radio of the receiver. And this connector is not used if you are using an external radio.

2.3 Batteries and Power

2.3.1 Batteries

The receiver has an built-in non-removable Lithium-ion battery.

2.3.2 The Internal Battery

The rechargeable Lithium-ion battery is supplied partially charged.



WARNING – Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment can cause an explosion or fire and can result in personal injury and/or equipment damage.

To prevent injury or damage:

- Do not charge or use the battery if it appears to be damaged or leaking.
- Charge the Lithium-ion battery only in a CHCNAV product that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
- Discontinue charging a battery that gives off extreme heat or a burning odor.
- Use the battery only in CHCNAV equipment that is specified to use it.
- Use the battery only for its intended use and according to the instructions in the product documentation.

2.3.3 Battery Safe



WARNING – Do not damage the rechargeable Lithium-ion battery. A damaged battery can cause an explosion or fire and can result in personal injury and/or property damage.

To prevent injury or damage:

- Do not use or charge the battery if it appears to be damaged. Signs of damage include, but are not limited to discoloration, warping, and leaking battery fluid.
- Do not expose the battery to fire, high temperature, or direct sunlight.
- Do not immerse the battery in water.
- Do not use or store the battery inside a vehicle under hot weather condition.
- Do not drop or puncture the battery.
- Do not open the battery or short-circuit its contacts.



WARNING – Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive and contact with it can result in personal injury and/or property damage.

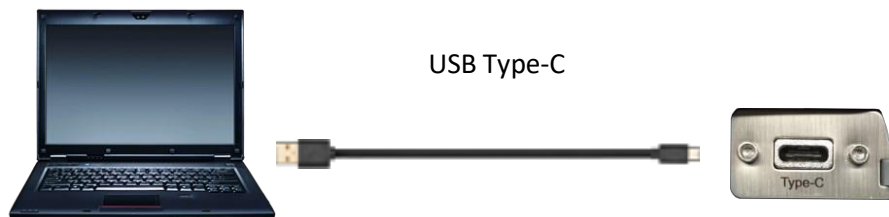
To prevent injury or damage:

- If the battery leaks, avoid with the battery fluid.
- If battery fluid gets into your eyes, immediately rinses your eyes with clean water and seek medical attention. Please do not rub your eyes!
- If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

2.4 Connecting to an Office Computer

The receiver can be connected to an office computer for serial data transfer or settings via a HCE600 USB Type-C. Before you connect to the office computer, ensure that the receiver is powered on by internal battery or external power.

The following figure shows how to connect to the computer for serial data transfer or settings:



2.5 Connecting to a Controller

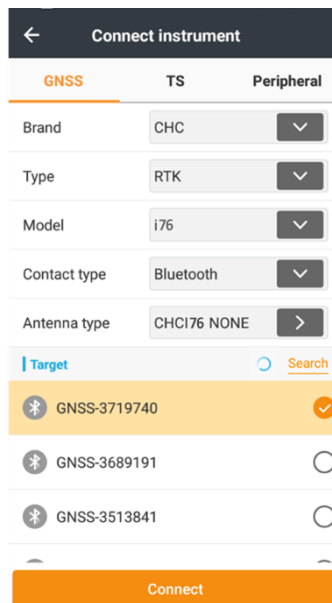
2.5.1 Connecting via Bluetooth with LandStar 8 Software

Turn on the controller → run LandStar 8 → go to **Config** main menu → tap **Connect**.

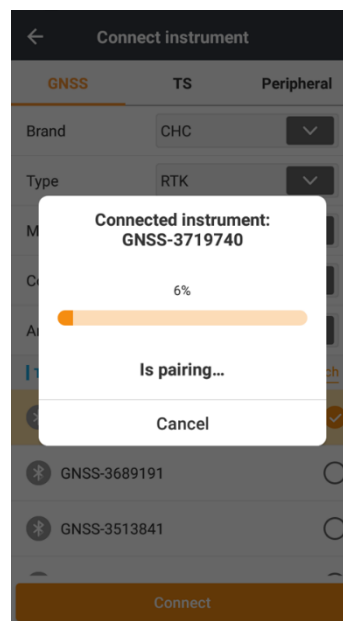
In the *Connect* screen, select **CHC** for the *Manufacture* field, **i76** for *Device Type* field, **Bluetooth** for *Connection Type* field.

Connect instrument		
GNSS	TS	Peripheral
Brand	CHC	▼
Type	RTK	▼
Model	i76	▼
Contact type	Bluetooth	▼
Antenna type	CHC/i76 NONE	>
Target Search		
GNSS-3719740		✓
GNSS-3689191		○
GNSS-3513841		○
Connect		

Tap the **Bluetooth Manager** and turn on the **Bluetooth** function to search Bluetooth device around → select the target device in the list → Tap back button → select the target device in the Bluetooth manager list.



Tap the **Connect** button to build the connection.



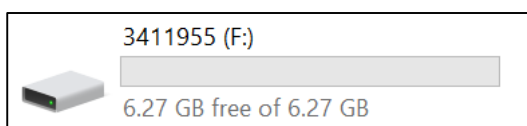
2.6 Downloading Logged Data

Data logging involves the collection of GNSS measurement data over a period at a static point or points, and subsequent post-processing of the information to accurately compute baseline information. Data logging using receivers requires access to suitable GNSS post-processing software such as the CHC Geomatics Office (CGO) Software.

2.6.1 USB Download

The procedures of downloading logged data in the receiver are as follows:

- (1) Switch on the receiver and connect it with a computer by HCE600 Type-C. After the successful connection, a removable disk named as the Serial Number (SN) of the receiver will appear on the computer.



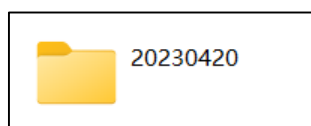
- (2) Double click the removable disk and you will see the folder named as “repo”.



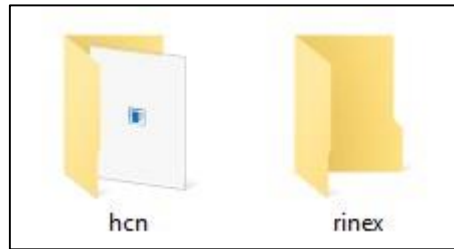
- (3) Double click this folder, you will see 9 folders. The “push_log” folder is used to save the log files, and the other 8 folders represent different logging session and are used for store static data.



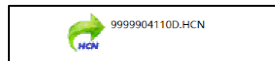
- (4) Double click the folder that you have configured to store the static data, you will see the folder(s) created by the i76 system automatically and named by the date which is decide by GPS time when you start to log data.



(5) Select the destination folder and double click it, and then two folders named as different data format (hcn and rinex) will be displayed.



(6) Select the data format that you have configured to save the static data, you will find the static raw data.



Tip – For hcn files, the name of the file is represented as XXXXXDDDNN, where XXXXXX is the SN of the receiver, DDD is day of year, and NN is the recording session.



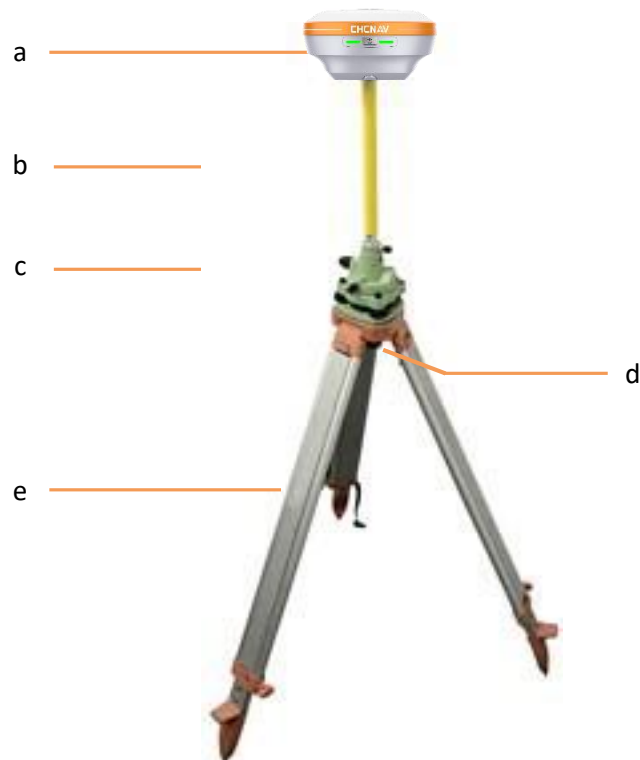
WARNING – The static data will be saved in the first logging session, the “record_1” folder, by default. Old files will be deleted if the storage space is full. If you configure not to auto delete old files when the memory is low, the receiver will stop data logging.

3 Equipment Setup and Operation

3.1 Post-processing Base Station Setup

For good performance, the following base station setup guidelines are recommended:

Components:



No.	Name
a	I76 GNSS receiver
b	Extension pole (30 cm)
c	Tribrach adaptor
d	Tribrach w/ Opti
e	Aluminum tripod

Steps:

- (1) Put tripod in the target position, center and level it roughly.
- (2) Place and lock the tribrach in the tripod.

-
- (3) Screw the receiver onto the tribrach.
 - (4) Center and level the receiver more precisely.
 - (5) Connect the receiver to external battery by using external power cable if necessary.
 - (6) Connect the receiver to external storage disk by using USB cable if necessary.
 - (7) Turn on the receiver by pressing the power button for 3 s.
 - (8) Measure the antenna height by using H.I. tape and auxiliary H.I. tool.
 - (9) Press the function button to select Data to start recording static raw.

If work with a data controller:

- (10) Switch on the data controller and connect it to the receiver.
- (11) Use software to configure the receiver as static mode.

3.2 Real-Time Base Station Setup

3.2.1 Internal UHF

For good rover operation, the following base station setup guidelines are recommended:

Components:



No.	Name
a	i76 GNSS receiver
b	UHF whip antenna
c	Extension pole (30 cm)
d	Tribrach adaptor
e	Tribrach w/ Opti
f	Aluminum tripod

Steps:

- (1) Put tripod in the target position, center and level it roughly.
- (2) Place and lock the tribrach in the tripod.

If work as a UHF base station, the UHF whip antenna need to be connected to the receiver.

- (3) Connect the receiver to external battery by using external power cable if necessary.
- (4) Connect the receiver to external storage disk by using USB cable if necessary.
- (5) Turn on the receiver by pressing the power button for 3 s.
- (6) Measure the antenna height by using H.I. tape and auxiliary H.I. tool.
- (7) Switch on the data controller and connect it to the receiver.
- (8) Use software to configure the receiver as cellular base or UHF base mode.

3.2.2 External UHF

For good performance, the following base station setup guidelines are recommended:

No.	Name
a	i76 GNSS receiver
b	Extension pole (30 cm)
c	Tribrach adaptor
d	Tribrach w/ Opti
e	Datalink Power Cable (5-pin)
f	Aluminum tripod
h	Whip antenna
i	3 m cable for datalink antenna 3m
j	Pole mounting
k	External 410-470 datalink

Steps:

- (1) Put tripod in the target position, center and level it roughly.
- (2) Place and lock the tribrach in the tripod.
- (3) Screw the receiver onto the tribrach.
- (4) Center and level the receiver more precisely.
- (5) Connect the receiver to external datalink by using GPS to datalink cable.
- (6) Hang the external datalink on the tripod leg.
- (7) Connect the receiver to external battery by using external power cable if necessary.
- (8) Connect the receiver to external storage disk by using USB cable if necessary.
- (9) Turn on the receiver by pressing the power button for 3 s.
- (10) Measure the antenna height by using H.I. tape and auxiliary H.I. tool. Turn on the external datalink and configure it as need.

If work with a data controller:

- (11) Switch on the data controller and connect it to the receiver.
- (12) Use software to configure the receiver as cellular base or UHF base mode.

3.3 Real-Time Rover Station Setup

For good performance, the following rover station setup guidelines are recommended:

Components:



No.	Name
a	i76 GNSS receiver
c	2M range pole w/bag

Steps:

- (1) Keep the receiver fully charged.

If work as a UHF rover station, the UHF whip antenna need to be connected to the receiver.

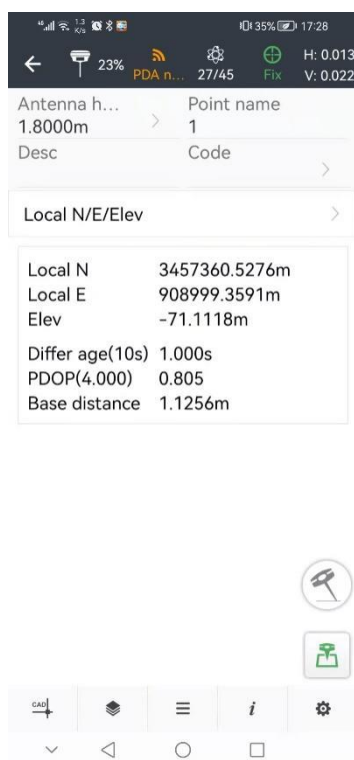
- (2) Turn on the receiver by pressing the power button for 3 s.
- (3) Switch on the data controller and connect it to the receiver.
- (4) Use software to configure the receiver as cellular rover or UHF rover mode.
- (5) Center and level the receiver more precisely.
- (6) Use software to start survey.

3.4 Working with the Tilt Compensation

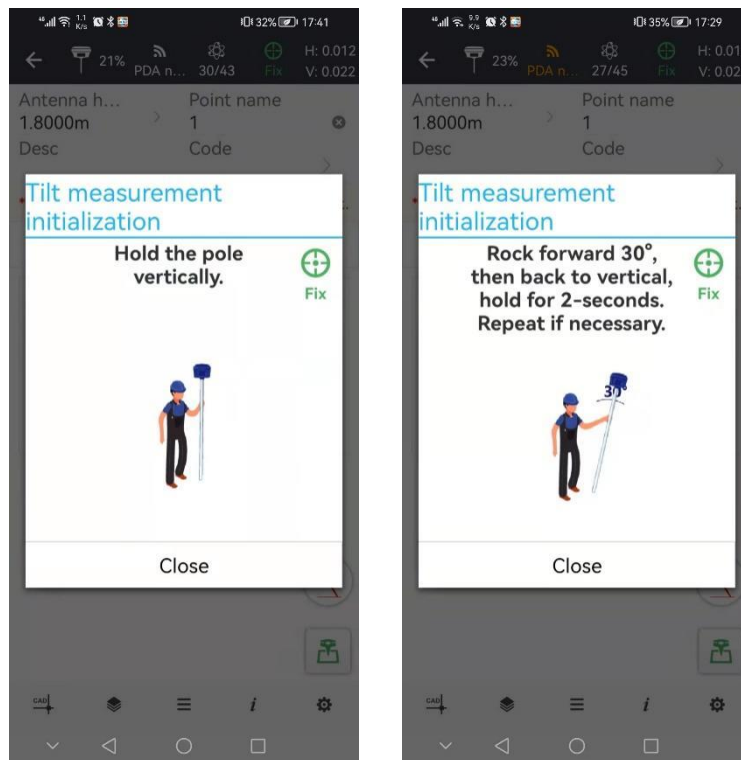
The auto-IMU need to be calibrated at the first time when users get a new i76 GNSS receiver. After initializing the sensor successfully, the i76 GNSS receiver will record the calibration parameters, and the user do not need to calibrate it manually any more. After enable the tilt survey, the i76 IMU can be ready after a few steps walk or a bit movement automatically.


3.4.1 Operation Steps for first IMU initialization

- (1) Open Landstar8-> Tap PT Survey-> Tap  to activate tilt measurement.



- (2) Hold the pole vertical for a while and shake according to the procedures in the interface to do initialization.




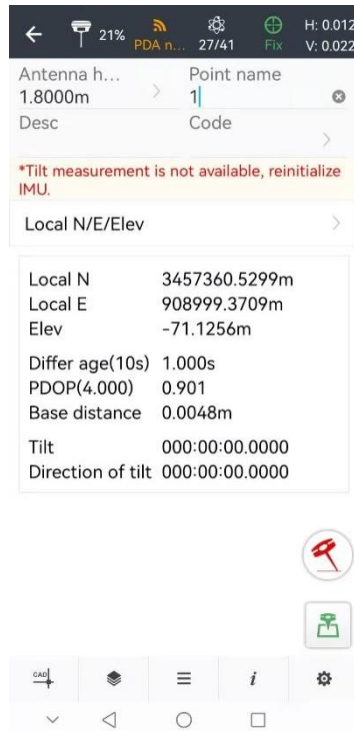
- (3) This icon  will appear when the initialization is successful.




- (4) Enter the Name and Antenna, then tap , point will be collected and store to Points

automatically.

- (5) When this icon  appears, the text will show “Tilt is not available, please measure in alignment” at the bottom of interface.



- (6) Tap  to close tilt compensation.

3.4.2 Notes of using tilt measurement

1. At the beginning of initialization, the pole height of the instrument should be the same as that antenna height in the software.
2. In the process of tilt measurement, if the controller shows that “Tilt is not available, please measure in alignment” (red), please shake RTK slightly from left to right or back to front until the reminder disappears.
3. The controller will prompt “Tilt is not available, please measure in alignment” when the receiver is stationary over 30 seconds or the pole hit the ground toughly.
4. The pole cannot be shaken when point is collected.
5. Initialization is required:
 - when the RTK is turned on every time;

- when IMU module is turned on every time;
- when receiver drops at working;
- when the pole is tilted more than 65 degree;
- when the receiver is stationary more than 10 minutes;
- when the RTK rotates too fast on the matching pole (2 rounds per second);
- when the pole hit the ground toughly.



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This document is intended for general information purposes only. It does not consider the reader's specific circumstances and environmental constraints of use of GNSS.

Make your work more efficient

FCC Warning:

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.