



Eyr GNSS RTK System User Manual

Manual Revision

SATLAB GEOSOLUTIONS AB

Revision Date	Revision Level	Description
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Eyr

GNSS RTK System

User Manual



Preface

Introduction

Welcome to the Satlab Eyr receiver. This introduction describes how to use this product.

Experience requirement

To help you use the Satlab series products better, Satlab suggests that you read the instructions carefully. If you are unfamiliar with the products, please refer to www.Satlab.com.cn

Tips for safe use



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, as they will help you to use it better. GeoSolution i Göteborg AB assumes no responsibility if you fail to operate the product according to the instructions, or operate it wrongly because you have misunderstood them.

Satlab is committed to constantly perfecting the product's functions and performance, improving its service quality, and reserves the right 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 the case of non-conformity with products, the products shall prevail.

Technology and service

If you have any technical issues, please call the Satlab technology department for help, and we will answer your question.

Relevant information

You can obtain this introduction by:

Purchasing Satlab products: this manual is found in the instrument container and will help you to operate the instrument.

Logging on to the Satlab official website and downloading the electronic version of this introduction from Partner Center: <http://members.Satlab.com.cn/>

Advice

If you have any suggestions for this product, please email them to: sales@Satlab.com.cn. Your feedback information will help us to improve the product and service.

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Chapter 1

Overview

This chapter contains:

- Foreword
- Features
- Use and precautions

1.1 Foreword

The Eyr receiver brings superior performance and high efficiency and will support your field work with a reliable solution. The new generation of image RTK incorporates two cameras, a main camera that greatly increases the usable range of the receiver through non-contact image

measurement. The other lower camera provides great convenience for AR Stakeout and increases the speed of Stakeout. It deploys an advanced RTK engine and ultra IMU module, which makes tilt measurement much easier, while the new generation GNSS chip guarantees fixing speed and accuracy. So you can count on Eyr to provide you with better productivity.

1.2 Features

1. Its more durable and portable with plastic box.
2. A main camera provides non-contact image survey with an accuracy of 2-4 cm. a lower camera is used for AR Stakeout with an accuracy of better than 2 cm.
3. It delivers accurate and reliable results and increases the efficiency of field work with an in-house developed ultra IMU module and a new generation of GNSS chips.
4. Equipped with the High-performance Patch Antenna, it both enhances the low elevation angle tracking capabilities and maintains a high gain for higher elevation satellites.
5. Hi-Fix technology enables both continuous connectivity and quality results, a certain level of accuracy continues to be guaranteed even in the absence of differentials.

1.3 Use and precautions

The Eyr receiver is designed to have chemical and impact resistance, but precision instruments require careful use and maintenance.

Notice: This equipment complies with radiation exposure limits set forth for a controlled environment. This equipment should be installed and operated with minimum distance 1m between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Notice: Recommend a separation distance of 0.31m or more should be maintained between this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.



Notice: The product shall not be permanently installed outdoor because protection against water and dust is not guaranteed. Please bring back to indoors in rainy weather.

Notice: This device needs a license from the national regulatory authority before can be put into service.

The receiver must be within the specified temperature range when it is used and stored. For detailed requirements, please refer to Chapter 3: Technical specification.

Notice: 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.

(2) this device must accept any interference received, including interference that may cause undesired operation.

In order to ensure the continuous tracking observation of the satellite and quality of the satellite signal, the space above the station should be as wide as possible, with no obstacles above the 15° elevation angle. To reduce the interference of various electromagnetic waves on the GNSS satellite signal, there should be no strong electromagnetic interference within a range of about

200m around the station, such as TV towers, microwave stations, and high-voltage transmission lines. To avoid or reduce the occurrence of multipath effects, the station should be away from terrain and features with strong reflectors, such as high-rise buildings, water, etc.

Chapter 2

Product introduction

This chapter contains:

- Overall appearance
- Button & LED
- WEB management system
- Static survey
- Tilt survey
- Firmware upgrade

2.1 Overall appearance

The product's appearance is divided into three parts, including the upper cover, bottom cover and control panel.



Figure 2-1-1

2.1.1 Upper cover



Figure 2-1-2

2.1.2 Bottom cover

The bottom cover includes the SMA antenna interface, Type-C USB interface.



Figure 2-1-3

1. Type-C USB interface 2. Connection screw 3. Speaker 4. SMA antenna interface

- ◇ Type-C USB interface: To upgrade the firmware and download static data.
- ◇ SMA antenna interface: Connect the radio antenna while using the Internal UHF mode.
- ◇ Protective plug: Used for dustproof and waterproof sockets.



Notice:

- 1.If you don' t use the SMA antenna interface and USB interface, please cover the rubber plug to protect them from dust and water.
- 2.When the speaker is flooded, the sound may be silent or hoarse, but it will return to normal after it has dried.

2.1.3 Control cover

The control panel includes a satellite light, power button and data light.

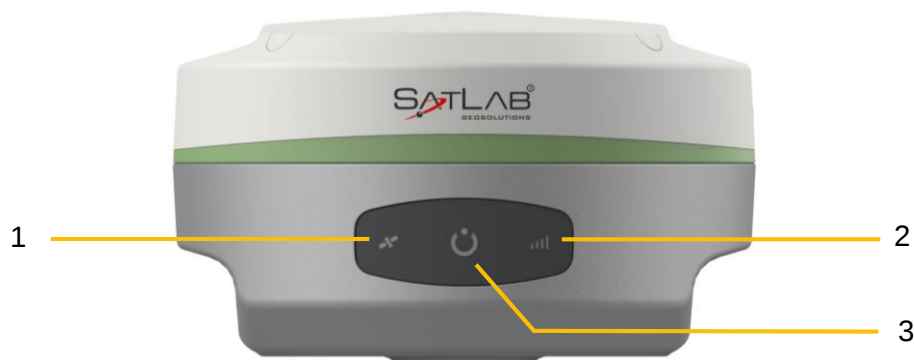


Figure 2-1-4

1. Satellite LED 2. Data LED 3. Power button

2.2 Button & LED

2.2.1 Button function

Table 2-2-1 Button function description

Function	Description
Power-on	Long press the power button for 1 second.
Power-off	In the power-on state, long press the power button for more than 3 seconds but less than 6 seconds.
Forced shutdown (use when the device crashes)	Press the power button for at least 12 seconds.
Query current status	Press the power button once to voice the product's current working status.
Reset motherboard	When the device is powered on, long press the power button for 6 seconds and release it after hearing the second "dingdong" sound.
Switch working mode	Double-click the power button to enter the mode switch. After each double-click, switch to a working mode, and click the power button to confirm it.

2.2.2 LED

Table 2-2-2 LED function description

Function	Status	Description
 Power LED(red)	Long-term light out	In the non-charging state or after the power is full, the power red light is always off.
	Long-term lighting	In the charging state, and the power is not fully charged, the power red light is always on.

 Power LED(green)	Flash	The power $\leq 10\%$.
	Long-term lighting	1. RTK mode: No correction data. 2. Static mode: Sampling has not started.
 Data LED	Flash	1. RTK mode: Flashes at the frequency of the correction transmit and receives. 2. Static mode: Sampling interval $> 1s$: Flashes at the sampling interval. Sampling interval $\leq 1s$: Flashes once per second.
	Off	1. RTK mode: No correction data. 2. Static mode: Sampling has not started.
 Satellite LED	Long-term lighting	Satellite is tracked.
	Flash	Satellite is not tracked.

2.3 WEB management system

Eyr has a built-in web management system that can be used to set the receiver's working mode, data output, as well as view receiver information and satellite information. The receiver's Wi-Fi name is its S/N. You can connect it to a controller or phone (the default password is: 12345678) and then input the IP address 192.168.20.1 into the browser to log onto the web management system.

Note: The web management system can only be visited when the receiver's Bluetooth isn't connected.

2.3.1 Main menu

After logging into the web management system, you can click Start to enter the main menu interface. Each option of the main menu contains drop-down menus.



Figure 2-3-1 Home

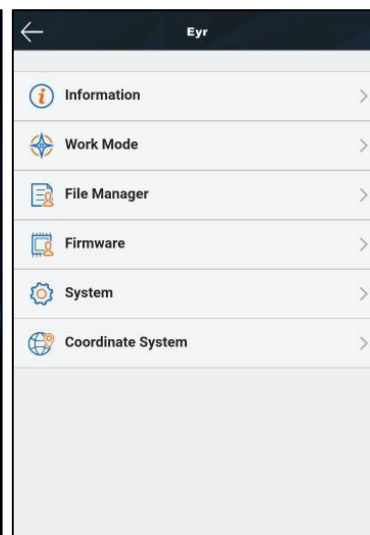


Figure 2-3-2 Main menu

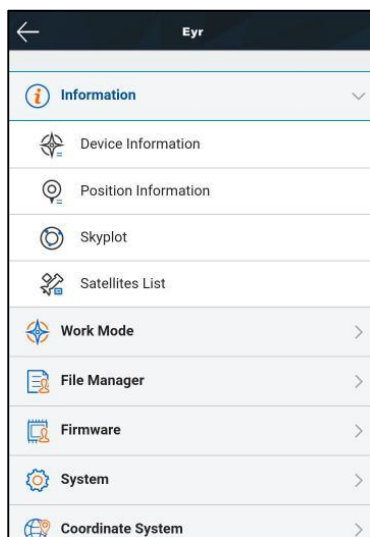


Figure 2-3-3 Information

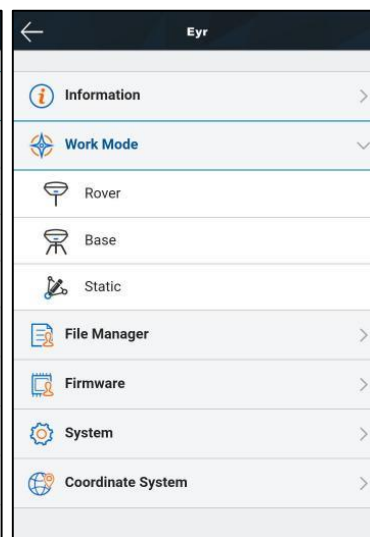


Figure 2-3-4 Work mode

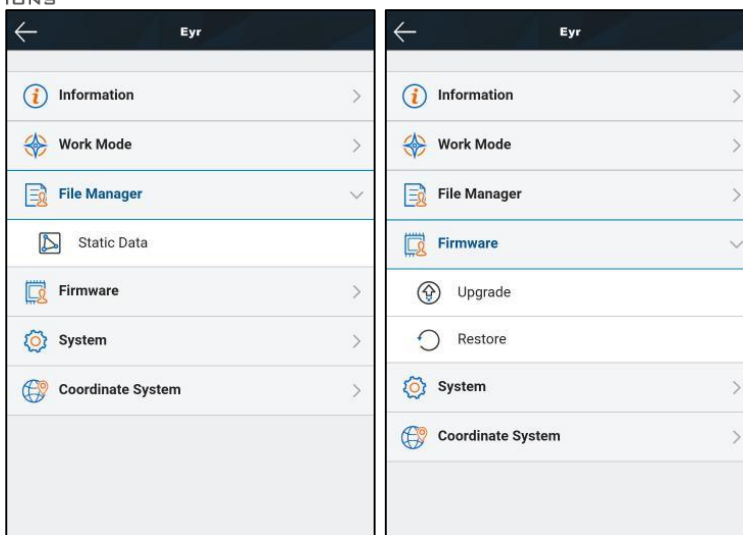


Figure 2-3-5 File manager

Figure 2-3-6 Firmware

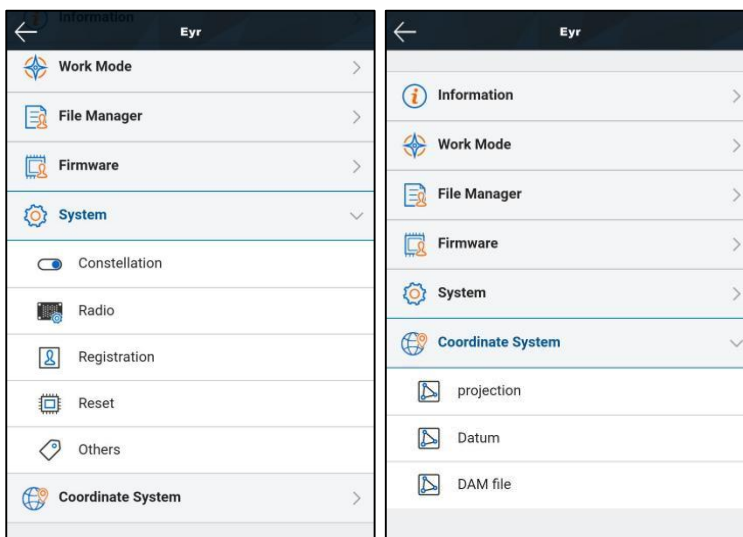


Figure 2-3-7 System

Figure 2-3-8 Coordinate System

Table 2-3-1 Menu description

Main menu	Sub-menu	Description
Information	Device info	Device model, version, registration info, etc.
	Position info	Coordinates, satellite tracking, solution state, etc.
	Sky plot	Check the sky plot
	Satellites list	Satellite tracking information
Work mode	Rover	Data link and parameter settings of the rover

	Base	Data link and parameter settings of the base
	Static	Static measurement parameter settings
File manager	Static data	Download, delete and format static data
Firmware	Upgrade	Select and upgrade the firmware
	Restore	Restore the system
System	Constellation	The satellite tracking switches
	Radio	Radio frequency list
	Registration	Device registration and information
	Reset	Reset the motherboard
	Others	Switch of the static RINEX and volume control, etc
Coordinate System	Projection	Modify projection model, central meridian, scale factor, etc.
	Datum	Modify source ellipsoid, target ellipsoid and transformation model
	DAM File	Export/import of coordinate system parameters in dam format

2.3.2 Information

1. Device information

Includes the main information about the device: device model, S/N, firmware version, OEM info, battery power, work mode, configuration parameters, etc.

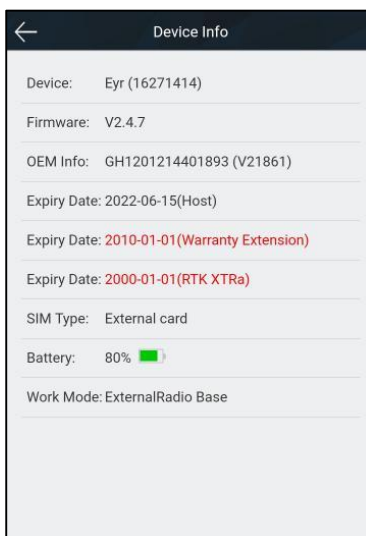


Figure 2-3-9 Device information

2. Position information

Includes the device's position, satellites, solution state, latency, PDOP and time, etc.

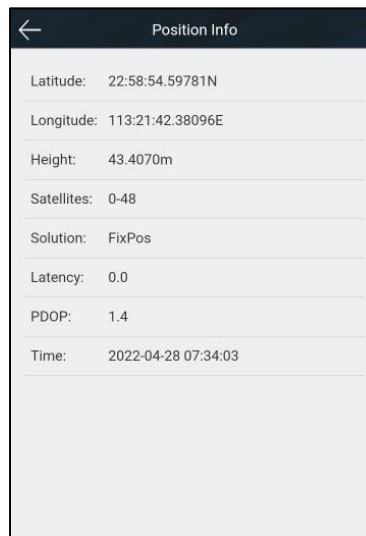


Figure 2-3-10 Position information

3. Sky plot

Displays the visual satellites of the device and the switches of each constellation.

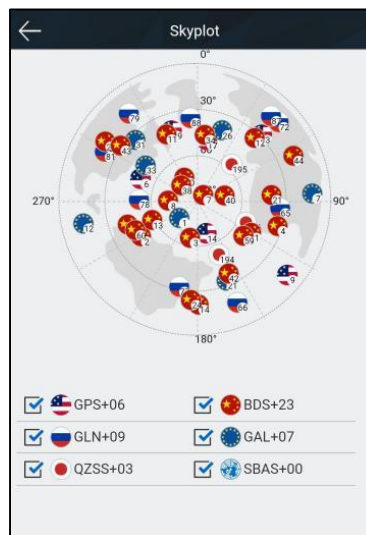
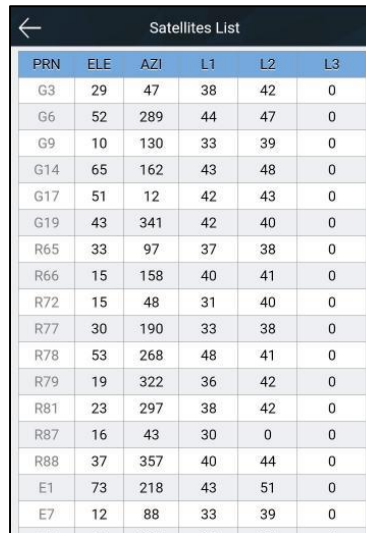


Figure 2-3-11 Sky plot

4. Satellites list

Shows the satellite's tracked information.



PRN	ELE	AZI	L1	L2	L3
G3	29	47	38	42	0
G6	52	289	44	47	0
G9	10	130	33	39	0
G14	65	162	43	48	0
G17	51	12	42	43	0
G19	43	341	42	40	0
R65	33	97	37	38	0
R66	15	158	40	41	0
R72	15	48	31	40	0
R77	30	190	33	38	0
R78	53	268	48	41	0
R79	19	322	36	42	0
R81	23	297	38	42	0
R87	16	43	30	0	0
R88	37	357	40	44	0
E1	73	218	43	51	0
E7	12	88	33	39	0

Figure 2-3-12 Satellites list

2.3.3 Work mode

1. Rover

Set up the rover's data link and parameters. The rover station data link includes: Internal UHF, Internal GSM, External Radio.

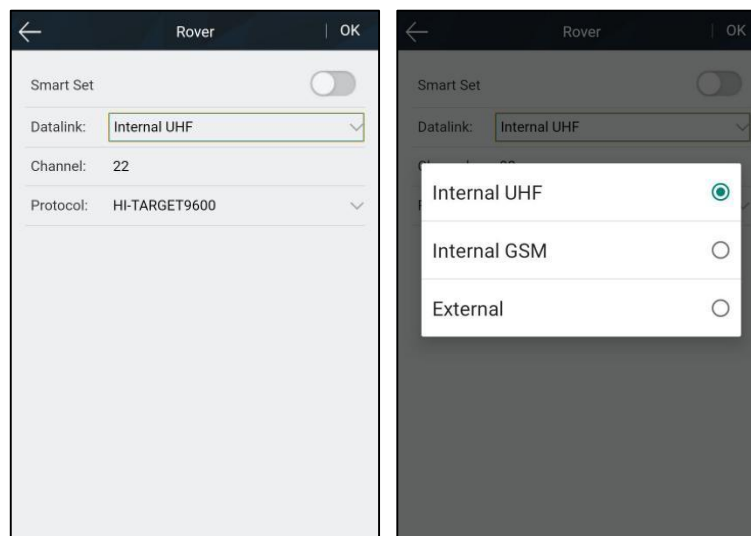


Figure 2-3-13 Rover

2. Base

Set up the data link and parameters of the base and get the point coordinates by averaging. The base station data link mode includes: Internal UHF, Internal GSM, External Radio.

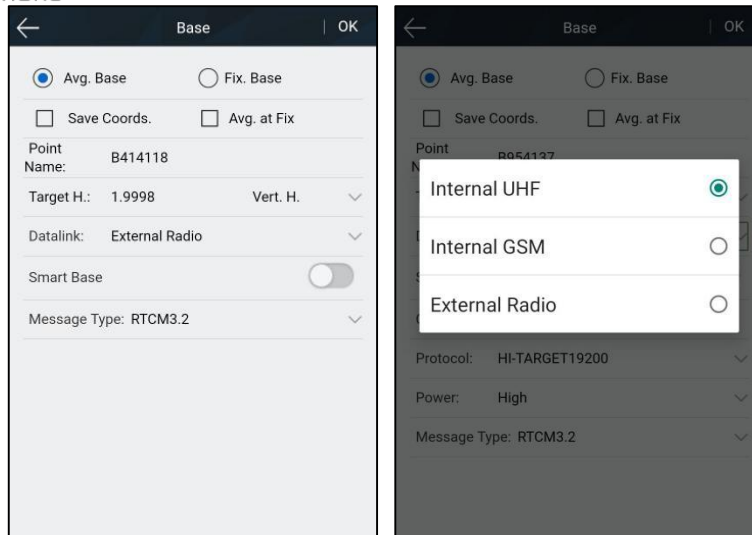


Figure 2-3-14 Base

3. Static

Set up the file name and parameters of the static collection.

Note: After ticking Static Mode, you can only cancel it in the base rover setting interface.

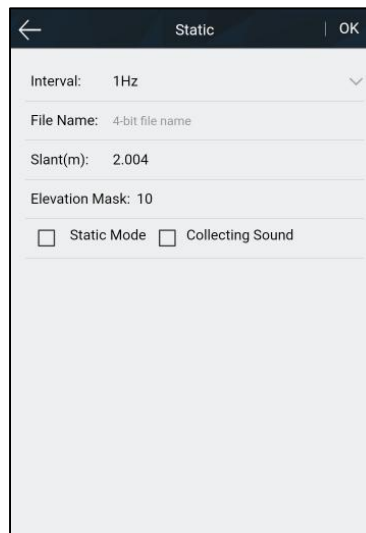


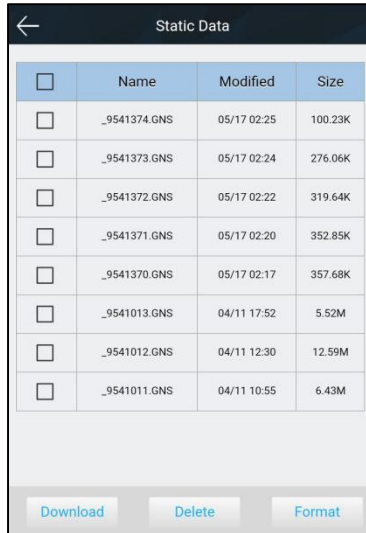
Figure 2-3-15 Static

2.3.4 File manager

1. Static data

Display the static data files, which supports the Download, Delete and Format options.

Note: After checking the "Static Mode", you can only uncheck the "Static Mode" in the base station mode or rover mode.



☐	Name	Modified	Size
☐	_9541374.GNS	05/17 02:25	100.23K
☐	_9541373.GNS	05/17 02:24	276.06K
☐	_9541372.GNS	05/17 02:22	319.64K
☐	_9541371.GNS	05/17 02:20	352.85K
☐	_9541370.GNS	05/17 02:17	357.68K
☐	_9541013.GNS	04/11 17:52	5.52M
☐	_9541012.GNS	04/11 12:30	12.59M
☐	_9541011.GNS	04/11 10:55	6.43M

Download Delete Format

Figure 2-3-16 Static data

2.3.5 Firmware

1. Upgrade

Display specific device version information. Click Select, choose the upgrade package and then click Start. The receiver will automatically detect it and upgrade the firmware.



Upgrade

Host Version: V2.4.7

System Version: V1.7.1

Radio Type: M10_TR4602_B

Radio Version: v1.2.0

Net Version: SC20R09_Beta1212

INS Version: 4.3.0.0

File Name:

Type:

Select Start

Figure 2-3-17 Upgrade

2. Restore

You can restore the system to its state after the last firmware upgrade.

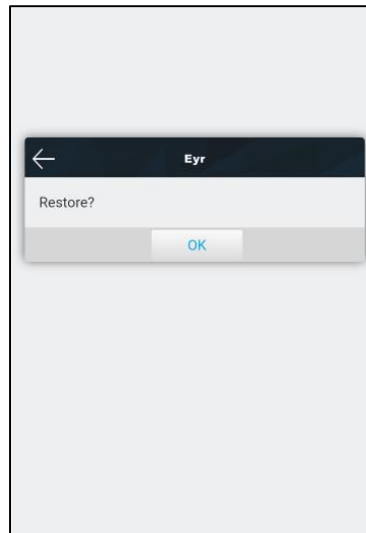


Figure 2-3-18 Restore

2.3.6 System

1. Constellation

Switches of the satellite tracking.

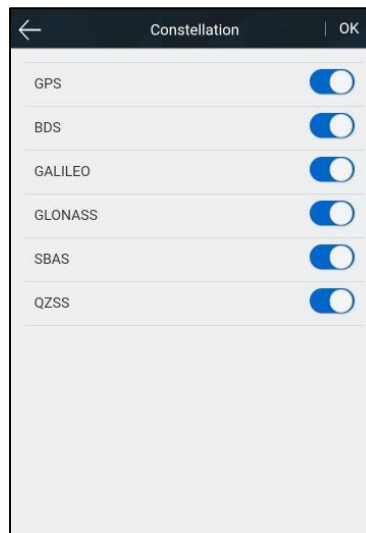
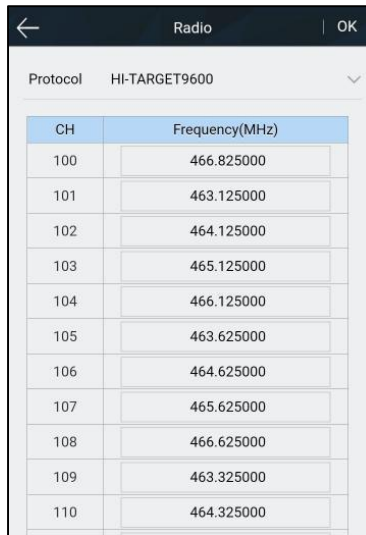


Figure 2-3-19 Constellation

2. Radio

You can select the radio modulation protocol (HI-TARGET19200, HI-TARGET9600, TRIMTALK450S, TRIMTALK III, SATEL-3AS, SOUTH19200, SOUTH9600, CHC19200, CHC9600, TRANSEOT).

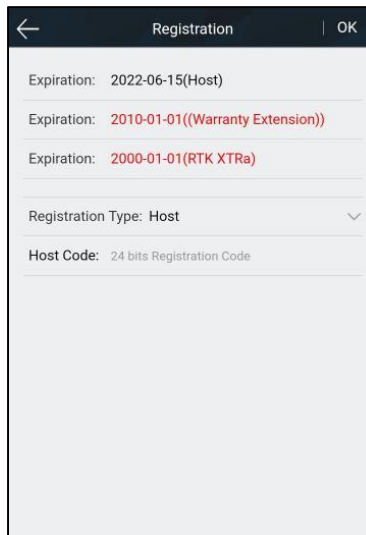


CH	Frequency(MHz)
100	466.825000
101	463.125000
102	464.125000
103	465.125000
104	466.125000
105	463.625000
106	464.625000
107	465.625000
108	466.625000
109	463.325000
110	464.325000

Figure 2-3-20 Radio

3. Registration

Display the registration information of the receiver. You can select the registration type, and then enter the corresponding code to register online.



Expiration: 2022-06-15(Host)

Expiration: 2010-01-01((Warranty Extension))

Expiration: 2000-01-01(RTK XTRa)

Registration Type: Host

Host Code: 24 bits Registration Code

Figure 2-3-21 Registration

4. Reset

Reset the motherboard.

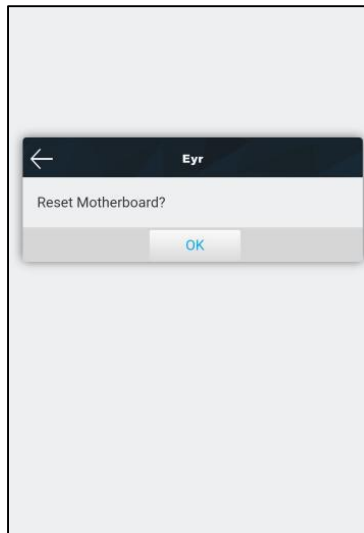


Figure 2-3-22 Reset

5. Others

You can set the switches of the Store RINEX Data and Check Base Position, select the RINEX version, and adjust the voice volume of the receiver.

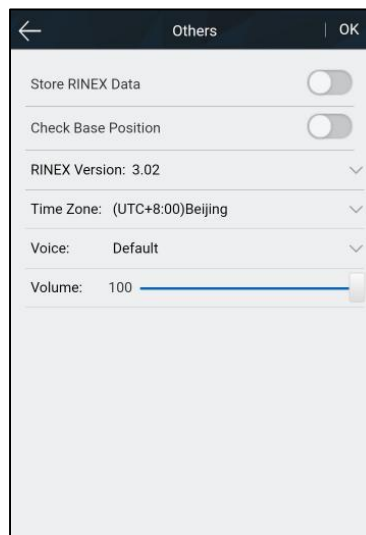
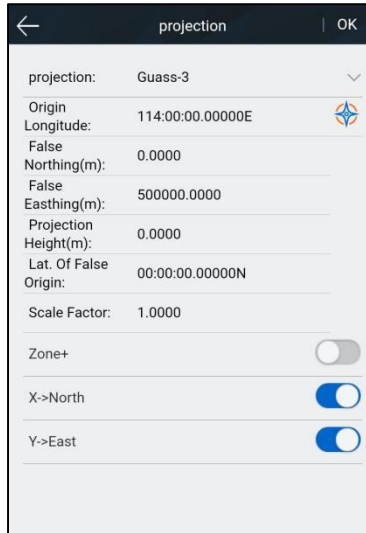


Figure 2-3-23 Others

2.3.7 Coordinate System

1. Projection

Configure planar projection parameters, such as projection model, central meridian, and scale factor.

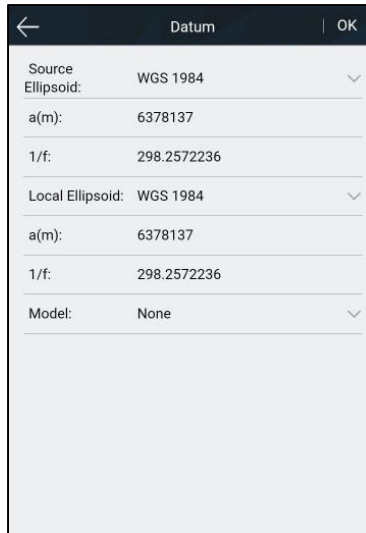


Parameter	Value
projection:	Guass-3
Origin Longitude:	114:00:00.00000E
False Northing(m):	0.0000
False Easting(m):	500000.0000
Projection Height(m):	0.0000
Lat. Of False Origin:	00:00:00.00000N
Scale Factor:	1.0000
Zone+	☐
X->North	☒
Y->East	☒

Figure 2-3-24 Projection

2. Datum

Configure the geodetic coordinate system of the source and target ellipsoids, and optionally the transformation model of both.



Parameter	Value
Source Ellipsoid:	WGS 1984
a(m):	6378137
1/f:	298.2572236
Local Ellipsoid:	WGS 1984
a(m):	6378137
1/f:	298.2572236
Model:	None

Figure 2-3-25 Datum

3. DAM File

Import and export of coordinate system configuration parameters in dam format that can be linked to the controller Satsurv coordinate system.

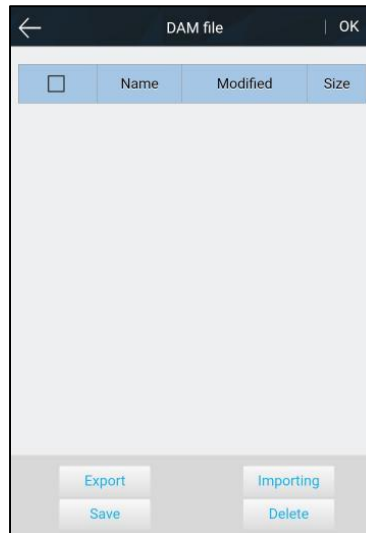


Figure 2-3-26 DAM File

2.4 Static survey

Static survey is a kind of positioning survey, which is mainly used to establish various control networks.

2.4.1 Static settings

There are two ways to set up the device to work in the static mode:

1. Satsurv software – static interface – to set up the static or temporary static mode.
2. Web interface – work mode – to set up the static or temporary static mode.

Users can download the static data file to the computer, if necessary, and then use the static post-processing software (HBC data processing software package) to process the data.

2.4.2 Static data collection steps

1. Set up the receiver on a control point with a tripod, making sure the tripod is strictly centered and leveled. The benchmark must be installed.
2. Measure the slant height of the receiver three times in three directions, ensuring that the difference of each measurement is less than 3mm, and then take the average value as the final height. The slant height of the receiver is measured from the center of the measuring point to the upper part of the top of the benchmark.
3. Record the point name, S/N, receiver height and beginning time.
4. Press the power button to power-on and set up the static collecting mode.
5. Turn off the receiver after the static data is collected and record the turn-off time.

6. Download and post-process the static collection data.



Figure 2-4-1 Height



Notice: Don't move the tripod or change the collecting set while the receiver is collecting data.

2.4.3 Static Data Download

1. Download by USB cable

Connect the receiver to a computer with the Type-C USB cable and copy the static data to the computer. The static data is in the GNSS folder of the static drive.

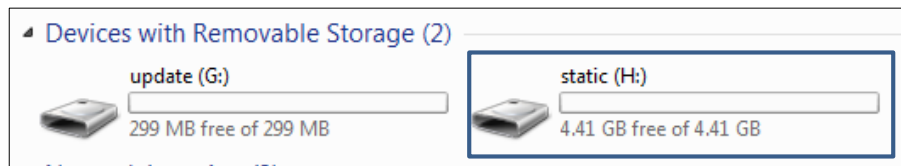


Figure 2-4-2 Static Drive

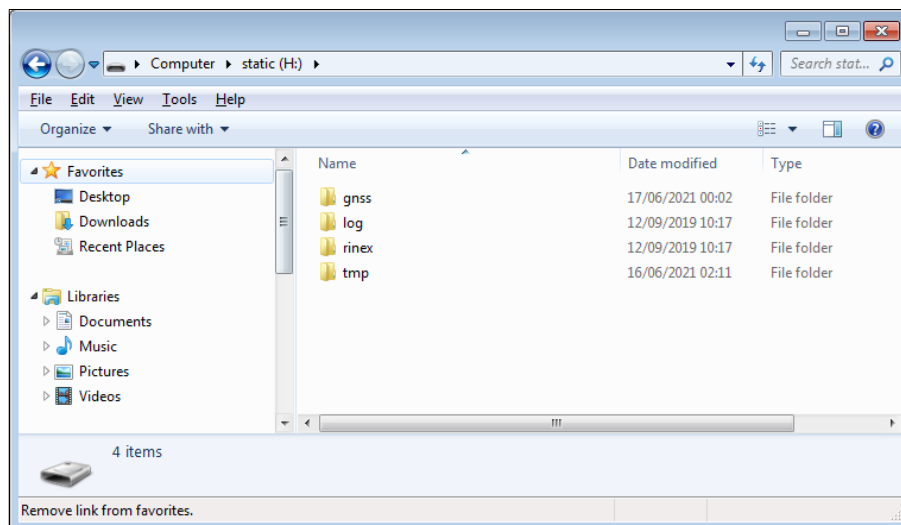


Figure 2-4-3 Static Drive

2. Download in the web management system

The Wi-Fi name of the receiver is its S/N. You can connect it to a controller or phone (the default password is: 12345678) and then input the IP address 192.168.20.1 into the browser to log into the WEB management system. Now, open the file manager interface and select the static file that needs to be exported. Click Download and the file can be downloaded to the controller or phone.

The default save path of the static data to be downloaded from the website is: device internal storage > MyFavorite. You can customize the save path according to your needs.

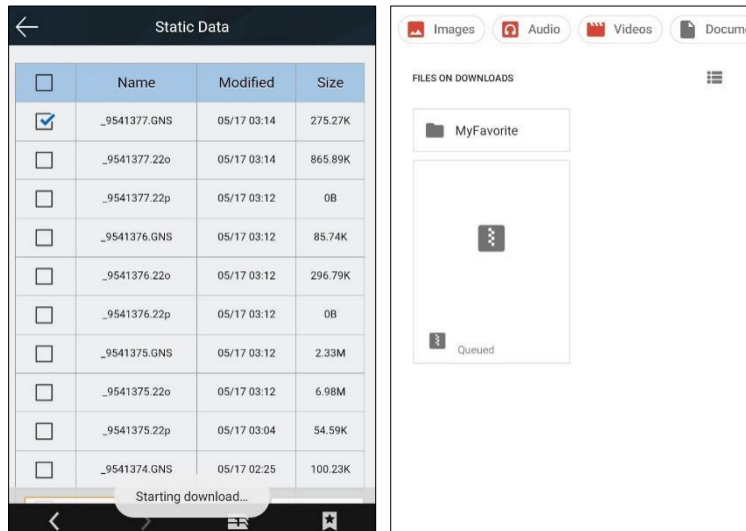


Figure 2-4-4

2.5 Tilt Survey

2.5.1 Calibration-free Tilt Survey

Connect the receiver in the Satsurv software to open the Tilt Survey in the Survey → Surveying Configure → Data interface. Click the Tilt Survey icon and follow the prompt on the Satsurv Road interface to finish the initialization.

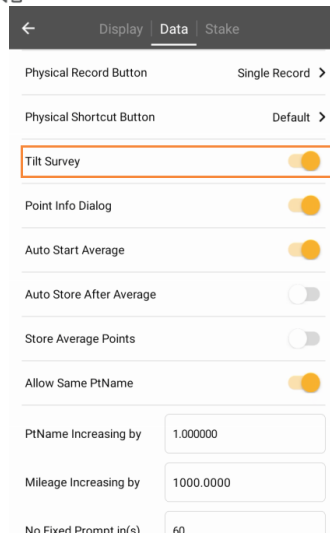


Figure 2-5-1 Tilt Survey

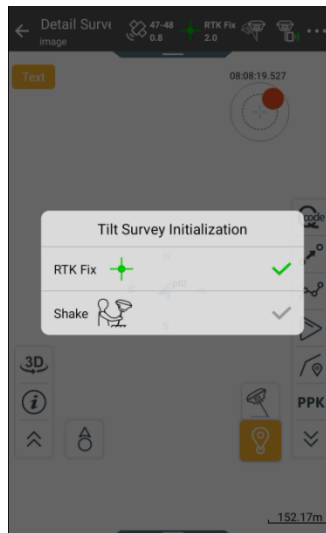


Figure 2-5-2 Shake

When the receiver gets the fixed solution, shake the receiver back and forth (once every second) for initialization until Shake is marked with 

When all of the initialization items are ticked, the receiver prompts "Tilt compensation started" and the tilt survey icon becomes illuminated. This means that the tilt survey initialization is now complete and you can perform the tilt survey on the receiver.

2.6 Firmware Upgrade

You can upgrade the firmware of the receiver, motherboard and module by using a USB cable, the web management system and remote online.

2.6.1 Upgrade by USB Cable

Steps to using a USB cable in order to upgrade the firmware:

1. Turn on the receiver and connect the receiver and the computer with the cable attached. This will show the update drive.
2. Copy the firmware (which can be downloaded from our official website or the technical team) to the update drive. Disconnect the computer and receiver and restart the receiver, which automatically recognizes the firmware and starts upgrading the firmware.
3. There will be different prompt voices for the success or failure of the upgrade. If it fails, please contact our technical team.



Notice: Don't move the tripod or change the collecting set while the receiver is collecting data.

1. Make sure the actual pole height is consistent with the set pole height before the tilt survey.
2. When turning on the Tilt Survey switch, you will need the initialization operation before normal use.
3. To meet most the users' operational needs, the maximum measurement angle of the tilt survey is 70°.
4. To ensure the measurement accuracy, do not turn the device quickly during the measurement process.
5. The data quality is not good in the occluded environment. If the accuracy requirements are high, please try to use this function in an open environment.
6. When you enter the tilt survey for the first time every 7 days, you need to complete the static calibration according to the prompts. Just let the device stand for about 10s to complete this.

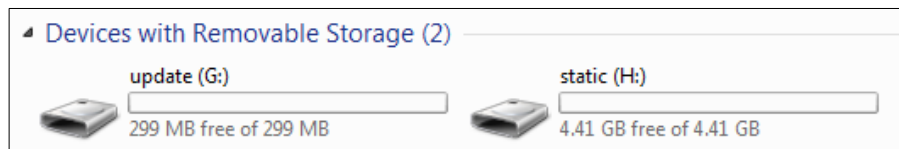


Figure 2-6-1 Update Drive.

2.6.2 Upgrade by Using the Web Management System

Copy the firmware to the controller or phone and use Wi-Fi to connect it to the receiver. The name of the Wi-Fi is the device's S/N. Now, input 192.168.20.1 to log in, click Firmware upgrade - Select - File to choose the firmware, and then click start to upgrade it.



Notice:

1. When the download fails, it will resume downloading if the network recovers within two minutes; otherwise, it will exit the firmware upgrade detection.
2. It will not forcibly power-off during the upgrade. If the power is forcibly cut off, the instrument may be damaged and become abnormal..

2.7 Image measurement

The Eyr receivers have newly added dual cameras, which can support the image measurement function. The SHC55 and the software Satsurv V2.3.0 and later versions are required.

The image measurement scene is defined as shooting the unreachable position. After the solution is successfully solved by the control's software, the points can be marked on the photo and their coordinates can be calculated.

2.7.1 Video Shooting

1. Equipment Preparation

To perform image measurement, it is necessary to:

- (1) Connect to a receiver that supports image measurement via wifi;
- (2) The receiver has entered the tilt measurement mode;
- (3) The solution state is fixed solution.

2. Shooting Process

After reaching the shooting conditions, enter the image measurement interface:

- (1) Fixed-point shooting;
- (2) Click to end;
- (3) Upload optimization;
- (4) Save;
- (5) Point calculation.

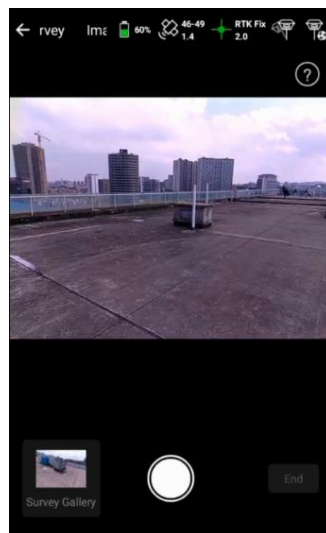


Figure 2-7-1 Fix-Point Shooting



Figure 2-7-2 Point Calculation

2.7.2 Schematic Diagram Of Video RTK Shooting

1. Error Demonstration

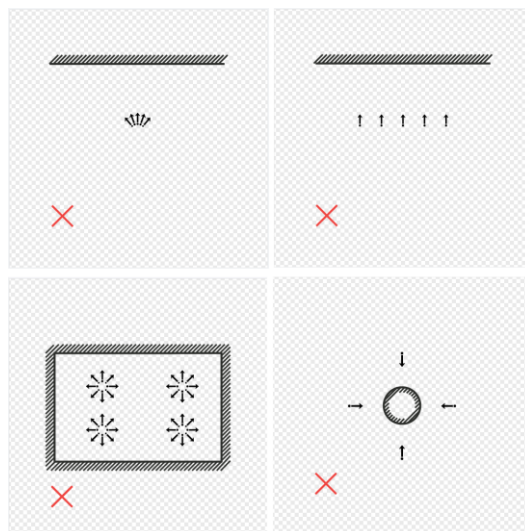


Figure 2-7-3 Error Demonstration

2. Correct Demonstration

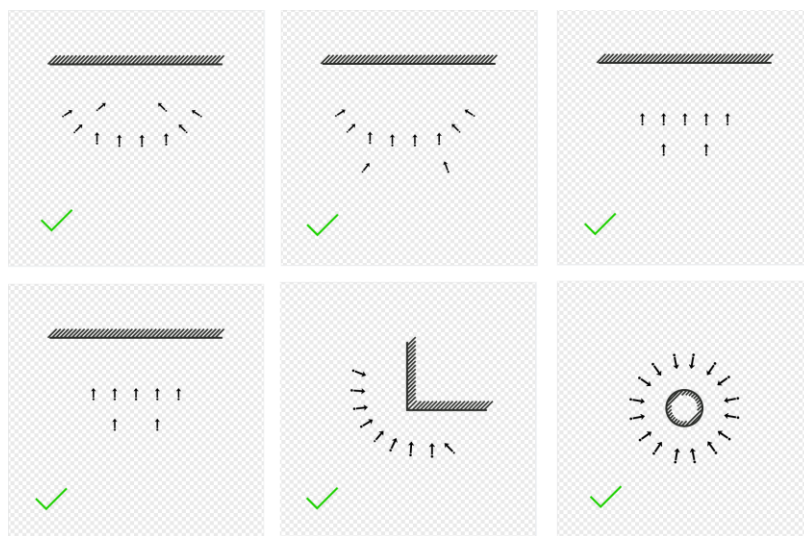


Figure 2-7-4 Correct Demonstration

For detailed setting steps, please refer to 'Satsurv Software User's Manual' - Image Measurement.

2.8 AR Stake

2.8.1 AR Stake Instructions

The Eyr receivers have newly added dual cameras, which can support the AR stakeout function. The iHand55 control and the software Satsurv V2.3.0 and later versions are required. The AR stakeout scene is defined as when the stakeout point is about 3m away from the receiver, the camera of receiver is called, and the precise position of the stakeout point is displayed in real time through the control, which can be reached with one shot.

After entering the point stakeout interface:

- (1) Enter the stakeout point;
- (2) Click the AR stakeout button  ;
- (3) According to the prompts to stake out;
- (4) The stakeout is successful.

Click the AR stakeout button, when the distance from the stakeout point is $> 3\text{m}$, use the control AR stakeout (control navigation); if the distance from the stakeout point is less than or equal to 3m , switch to the receiver AR stakeout (receiver navigation).

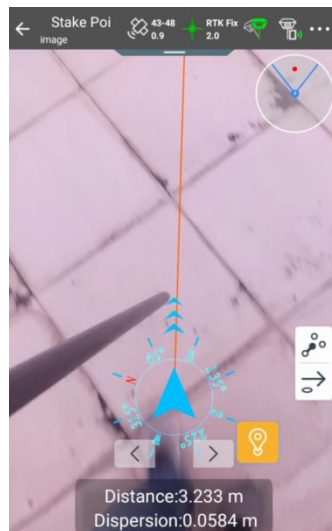


Figure 2-8-1 Control Navigation

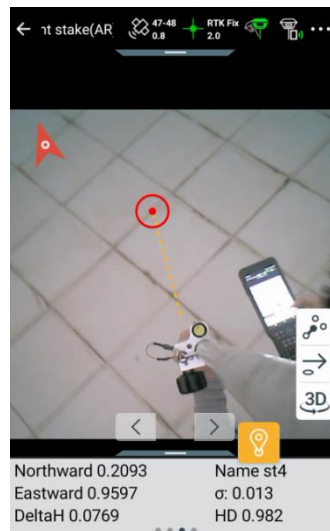


Figure 2-8-2 Receiver Navigation

For detailed setting steps, please refer to 'Satsurv Software User Manual' - Point Stakeout (AR Stakeout).

Chapter 3

Technical Specification

This chapter contains:

- Technical Specification

3.1 Technical Parameters

Table 3-1-1 Technical Parameters

Configuration		Detailed Indicators
GNSS configuration	Channels	1408
	Satellite signals tracked simultaneously[1]	BDS: B1I,B2I,B3I,B1C,B2a,B2b*
		GPS: L1C/A,L1C,L2P(Y),L2C,L5
		GLONASS: L1, L2
		GALILEO: E1,E5a,E5b,E6*
		QZSS: L1,L2,L5,L6*
		IRNSS:L5*
		SBAS:L1C/A,L5
	Output format	ASCII: NMEA-0183, Binary data
	Positioning output	1~20Hz
	Static data format	GNS and RINEX
	Message type	RTCM2.X,RTCM3.X
	Network Mode	VRS,FKP,MAC,support NTRIP protocol
System configuration	Operating system	Linux system
	Data storage	8G internal storage,supports automatic cyclic storage of static data
Accuracy and reliability[2]	RTK position precision	Horizontal: $\pm (8+1 \times 10^{-6}D)$ mm (D is the distance between measurement points)
		Vertical: $\pm (15+1 \times 10^{-6}D)$ mm (D is the distance between measurement points)
		Horizontal: $\pm (2.5+0.5 \times 10^{-6}D)$ mm

	Static measurement precision	(D is the distance between measurement points)
		Vertical: $\pm (5+0.5 \times 10^{-6}D)$ mm (D is the distance between measurement points)
	DGPS position precision	Horizontal: $\pm 0.25\text{m} + 1\text{ppm}$
		Vertical: $\pm 0.50\text{m} + 1\text{ppm}$
	SBAS position precision	0.5m
	Tilt survey precision[3]	less than $8\text{mm} + 0.7\text{mm}/^\circ\text{tilt}$ (2.5cm accuracy in the inclination of 60°)
	AR stake precision	Typical accuracy: 2cm
	AR measure precision	2cm ~ 4cm
	Initialization time	2-10s
	Initialization reliability	>99.99%
	Breakpoint continuity test	Provides RTK measurements even during differential signal interruptions
Camera	Pixel	Professional Dual HD Camera, 2MP & 5MP
	Function	Support live view stakeout, image measurement, working distance 2~15m
Data communication	I/O ports	USB type C interface; SMA interface.
	Cellular Mobile	Full band support for cellular mobile network LTE FDD: B1/B3/B5/B7/B8/B20 LTE TDD: B38/B40/B41 WCDMA: B1/B5/B8 GSM: 850/900/1800/1900MHz
	Wi-Fi	802.11 b/g access point and client mode for WiFi hotspot service
	Bluetooth	Bluetooth® 4.0/2.1 + EDR , 2.4GHz
	Internal UHF	Power: 0.5W/1W/2W adjustable
		Frequency: 410MHz~470MHz

		Protocol: HI-TARGET, TRIMTALK450S, TRIMMARK III, TRANSEOT, SATEL, CHC, SOUTH
		Channels: 116 totally, 16 configurable
Sensors	Tilt survey	Built-in high-precision inertial guidance, automatic attitude compensation
User interface	Button	Power button*1
	LED prompt light	3 LED lights, Satellite light, Data light, Power button
Functional applications	Advanced features	NFC flash connection, WebUI interaction, U disk firmware upgrade
	Intelligent application	Intelligent voice
	Remote service	Message push, online upgrade
Physical	Host battery	High-capacity lithium battery 6900mAh, working time better than 15 hours ^[4]
	External power supply	USB 15W charging
	Size	Φ130mm×79mm
	Weight	≤0.97kg
	Power consumption	2.6 W
	Material	The housing is made of magnesium alloy
Environment	Water/dustproof	IP68
	Drop test	Resist natural fall of 2m high measuring rod
	Relative humidity	100% non-condensing
	Operation temperature	-45°C ~ +75°C
	Storage temperature	-55°C ~ +85°C

**Notice:**

1. BDS B2b ,GALILEO E6,QZSS L6, IRNSS L5 are available through firmware upgrade.
 2. The measurement accuracy, precision, reliability and initialization time depend on various factors, including tilt angle, number of satellites, geometric distribution, observation time, atmospheric conditions and multi-path validation, etc. The data are derived under normal conditions.
 3. Irregular operations such as rapid rotation and high-intensity vibration may affect the inertial guidance accuracy.
 4. The battery operating time is related to the operating environment, operating temperature and battery life.
-

Chapter 4

Accessories and Interface

This chapter contains:

- Data cable
- Antenna

- Battery & charger

4.1 Data cable

Type-C cable: To connect the receiver to the PC for upgrading the firmware and downloading static data.



Figure 4-1-1 Type-C cable

4.2 Antenna

The UHF radio antenna is used in the Internal UHF mode.



Figure 4-2-1 Radio Antenna

4.3 Battery & charger

1. Battery: The receiver has a built-in 6900mAh/7.2V battery.

Notice: If the battery needs to be stored for a long time, it should be charged to about 70% and then placed in a dry, low temperature environment. It is recommended that you charge and discharge the battery every 3 months. If you do not have the conditions that are needed for charging and discharging, take out the battery after 3 months and charge it to about 70% before storing it once more.

2. Charger: To charge the receiver, use the standard charger. When it is in charge, the power button light will turn red.



Figure 4-3-1 Cable and Charge



Notice: Please use this product's standard charger to charge the receiver. We will not be responsible for any accidents that occur during the charging process or any damage to the instrument if you use other chargers instead.



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