E800 GNSS Receiver

User Manual

V1.0_201912

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1. Introduction

This is the user manual for eSurveys' E800 GNSS receivers. It gives a basic description and operational guide which may help users to operate the device in a proper manner.

1.1 Appearance

The E800 main body is designed with magnesium alloy material to provide durable usage and better heat dispersion. The receiver is also equipped with 1.45" touch screen and 5W internal radio to meet the different challenges of each working environment.

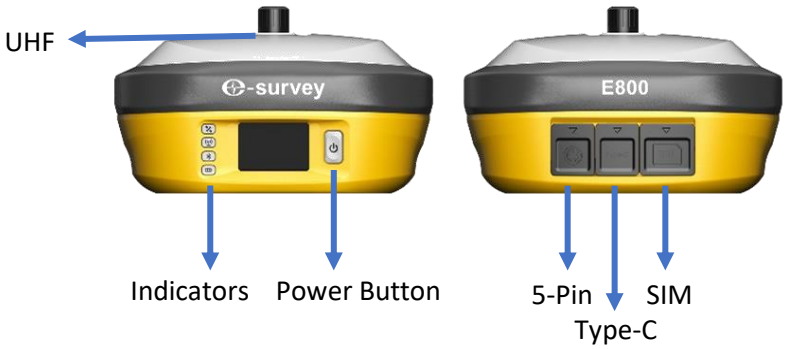
1.2 Indicators

Working status is viewable through the indicators. The meaning of each indicator:

Indicator	Color	Meaning
Satellite 	Red/Green	• Off: not receiving satellites signals • Flashing red: receiving satellites signals, but no solution status • Flashing green: have solution, but not fixed • Solid green: fixed solution • Flashing red and green alternately: mainboard abnormality
Data link 	Green/Blue	• Solid green: datalink is ready to start • Flashing green: datalink is transmitting data normally • Flashing blue: when raw data recording is enabled, the LED will flash according to the interval
Bluetooth 	Blue	• Off: no Bluetooth connection • Solid blue: has Bluetooth connection
Battery 	Green/Red	• Solid green: battery level between 100%~30% • Flashing green: battery level between 30%~10%, the speaker will beep • Flashing red: battery level below 10%

1.3 Interface

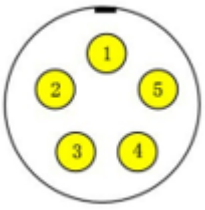
E800 GNSS receiver's bottom interface is shown below. The 5-pin port is used to connect to the external radio, external power or output NMEA messages. Type-C port can be used for data download (internal storage access) or charging.



5-Pin Type-C SIM Card

1.4 Pin definition

The 5-pin port is defined as below:

5 Pin	 Front View	1	+12V	Power
		2	GND	Power ground
		3	TXD	Device out
		4	SGD	Signal ground
		5	RXD	Device in

1.5 Power button

There is a power button on E800 control panel, the main function as below:

Power On	Long press button for three seconds to power on receiver, all the indicators will go on.
Power Off	Long press button for two seconds then release, will hear a phrase "Power off?" Then press the power button again to confirm.
Broadcast Current Working Mode	Receiver will broadcast current working mode when the power button is pressed .

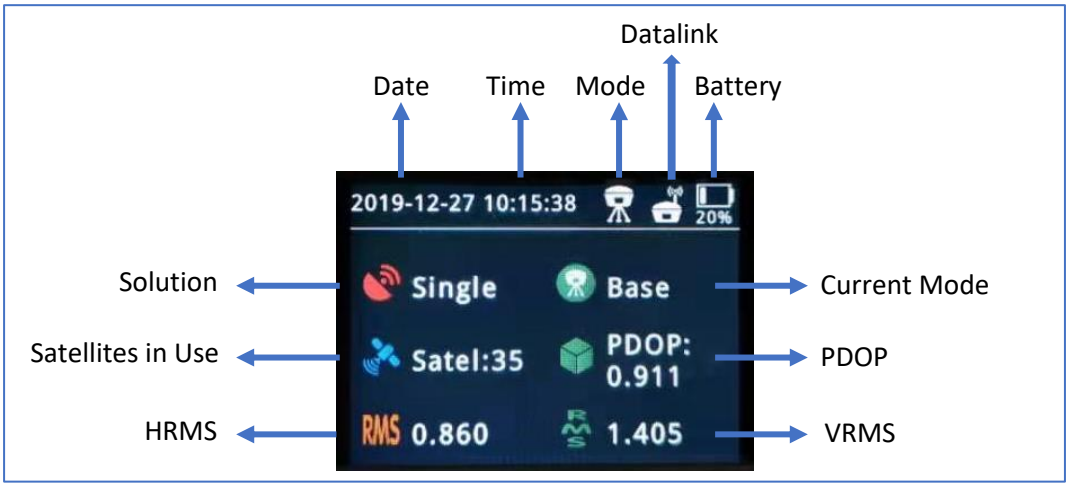
Self-check	Long press button for two seconds then release, will hear “Power off device?” Then long press button for three seconds, you will hear “self-check”.

1.6 Touch Screen

E800’s 1.45” colorful screen is touch enabled. Users can view device status or operate the device via touch screen. The screen includes three parts: the main page, device information and work mode setting.

1.6.1 Main Screen

Press the power button to wake the screen, user will see the main page.



1.6.2 Device Information

Slide the screen to the right, the device information can be found. There are four pages as below. The user can view basic position information, firmware version and device expiration date.

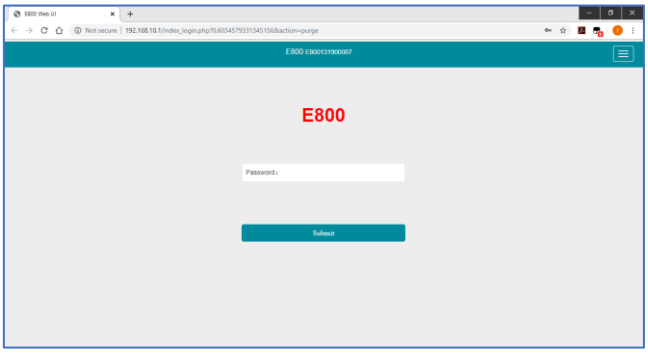
1.6.3 Work Mode Setting

Start	Start/Stop	Start/Stop current working mode
Mode	Static	Sample Interval Cut-off Angle Auto Record: Yes/No
	Base	Auto Record: Yes/No

		PDOP Limit Base ID: Change from software
	Rover	Change to rover setting
Datalink	Radio	Channel: Channel frequency Power: Low(2W)/High(5W) Protocol: Radio Protocol
	GPRS	Auto APN: Yes/No
	External Radio	Baud Rate
Diff	Diff Mode	Available in base mode
Setting	Setting	Backlight Time Language: wait for 3 seconds to apply setting

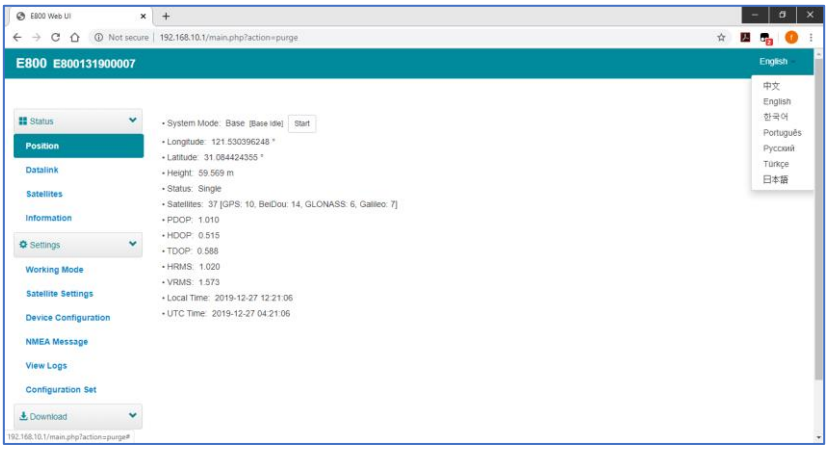
2. Web User Interface

User can connect to the receiver by WIFI connection using a PC, smartphone or tablet. The hotspot name is the device's serial number, it can be found under the bottom of the device. Open web browser and input the IP address "192.168.10.1". The default user name is "admin", password is "password". From the website, user can manage working status, change working mode, configure basic settings, download raw data, update firmware and register device.



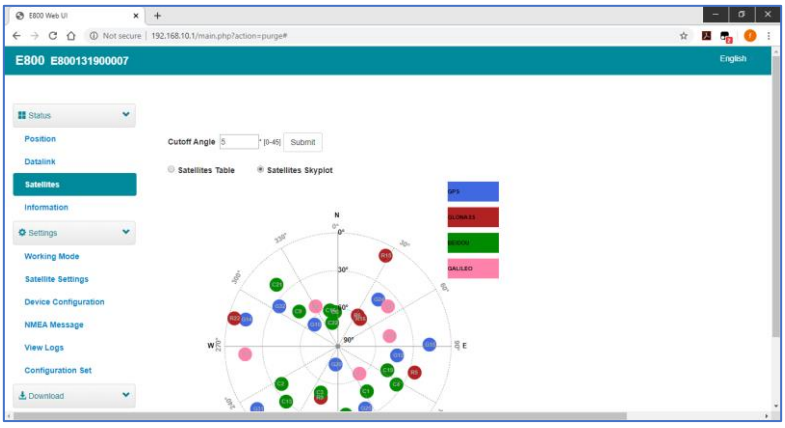
2.1 Position

View basic position information, satellite number, PDOP and time. In static mode, can start and stop recording here.



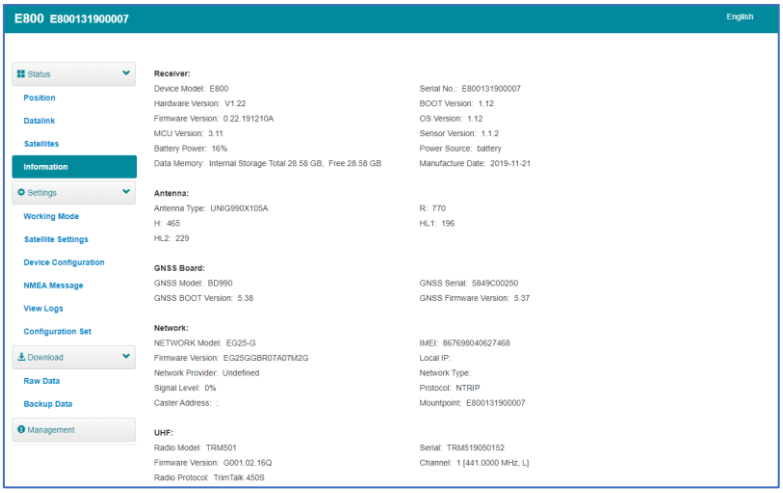
2.2 Satellites

View satellite list and satellite map, set cut-off angle.



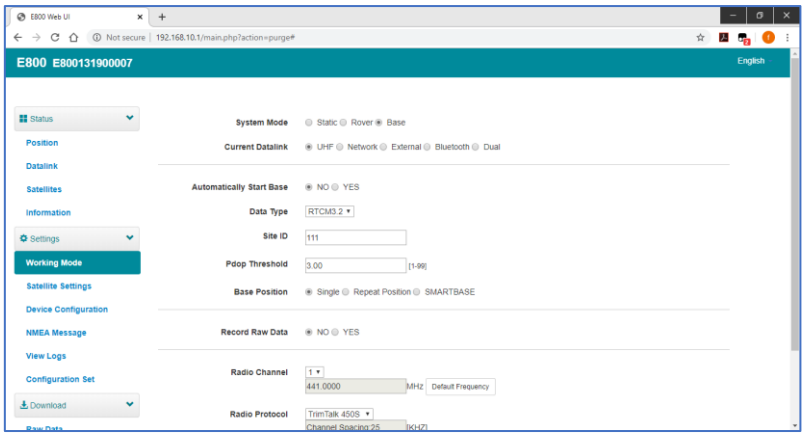
2.3 Information

View receiver information: firmware version, GNSS board, and network module.



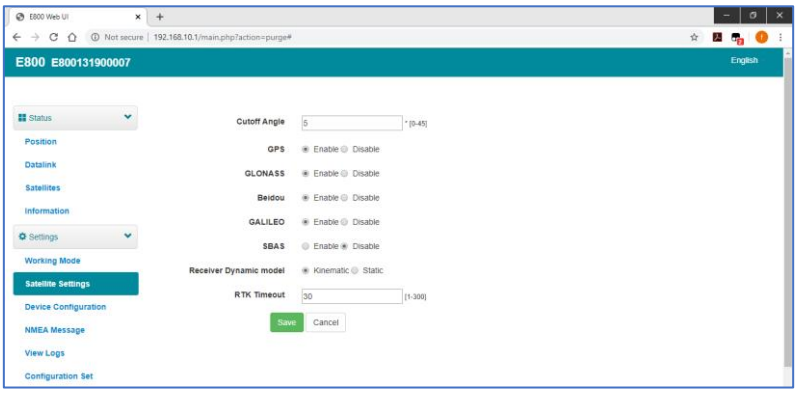
2.4 Working Mode

Configure working mode: base, rover or static.



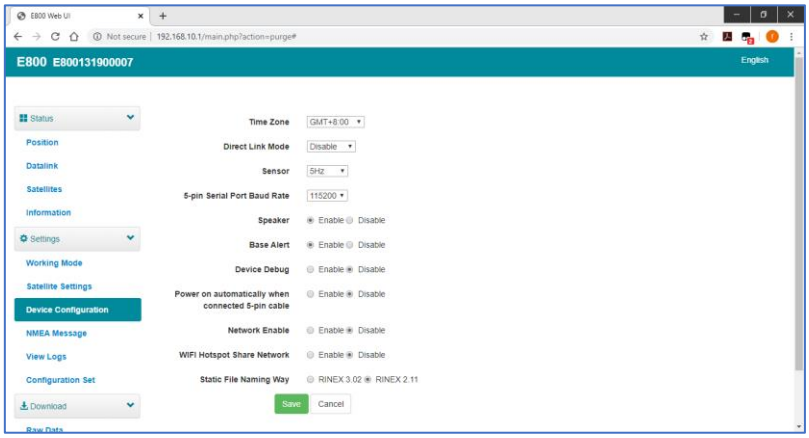
2.5 Satellite Setting

Configure the satellites to be used.



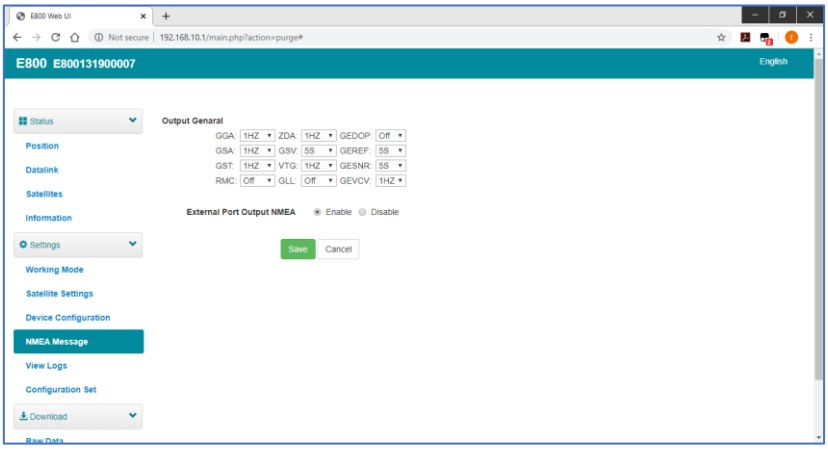
2.6 Device Configuration

Configure receiver settings: User can set the time zone. Sensor means MEMS sensor data output. Also, the 5-pin port baud rate is changeable. Speaker “Smart voice broadcast” can be disabled. Base Alert is enabled, the rover will receive message when base is moved. When a SIM card is inserted and “WiFi share network” is enabled, a device such as a laptop or tablet can browse the internet when connected to device’s hotspot by using the SIM card’s data.



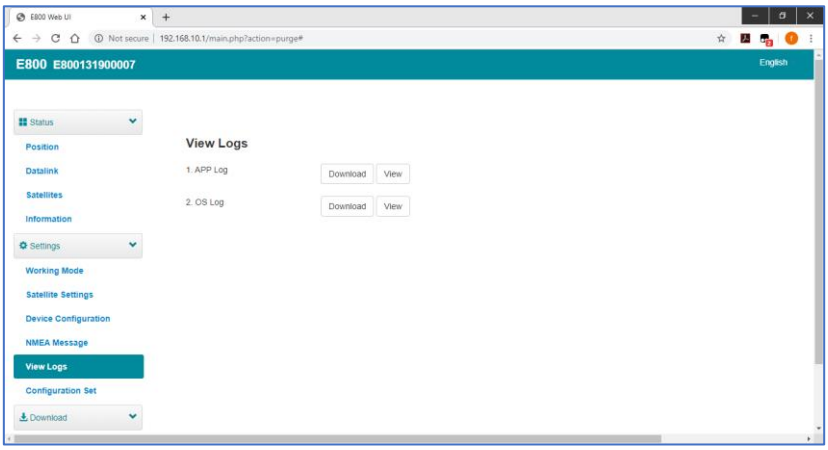
2.7 NMEA Message

Configure NMEA data output through Bluetooth or 5-pin port.



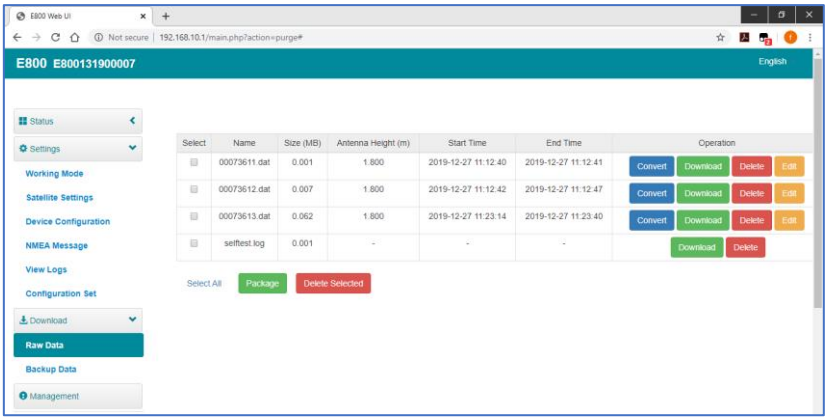
2.8 View Logs

The log files can be used to diagnose issues. Click “download” to download the files.



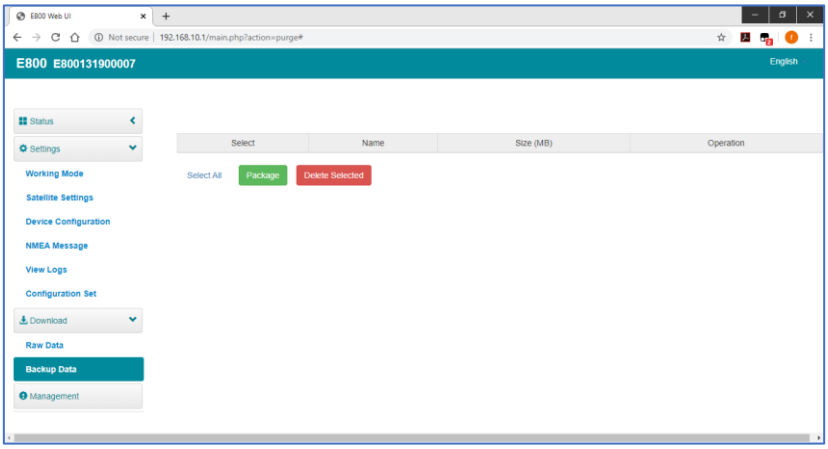
2.9 Raw Data

Download raw data or convert data to RINEX format. Users can use the check box, then click “Package” to download multiple files.



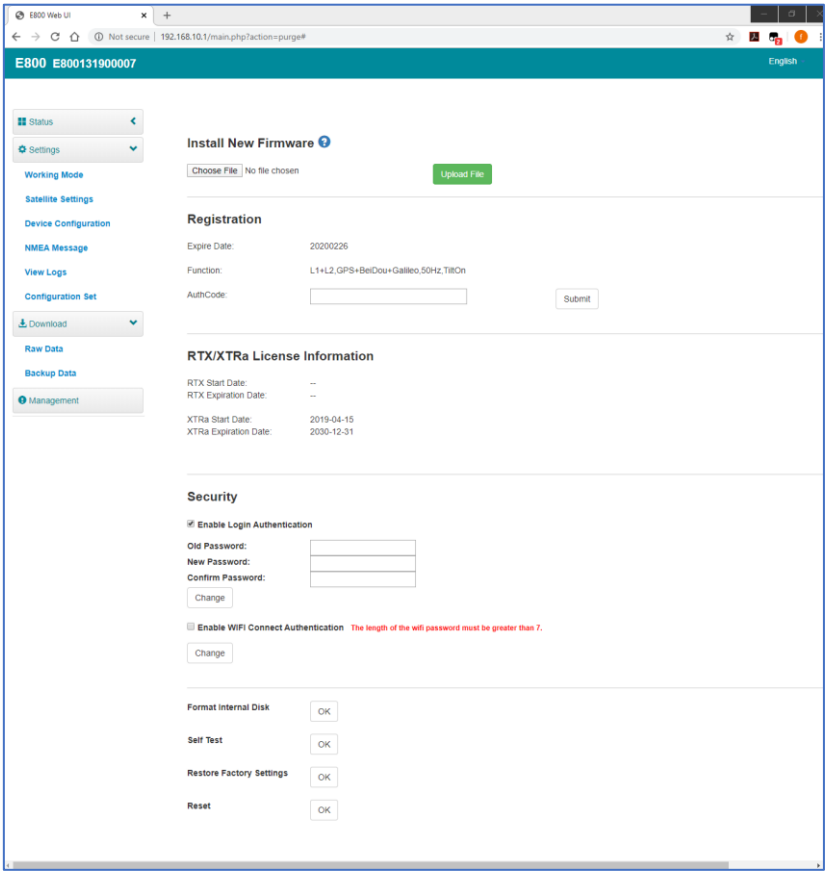
2.10 Backup Data

The points collected in SurPad4.0 software can be backed up in receiver storage automatically to avoid data loss. Can restore the data to the SurPad4.0 software.



2.11 Management

User can update the receiver and GNSS firmware as well as register the device, format internal disk, factory reset, restart device. To update the firmware, click “Choose File” to import the firmware, then click “Upload File” to start updating.



3. Basic Operation

This part shows user some basic operations to start working with the E800.

3.1 Insert SIM card

E800 supports network working mode. Open the cover and insert Micro SIM card.

3.2 Charge the battery

E800 is equipped with a Type-C charger which supports a maximum of 45W PD quick charge. The capacity is 13600mAh, Fully charging the battery takes 8 hours typically. The battery indicator is red when charging, will turn green when fully charged.

3.3 Attach radio antenna

A antenna is required in radio working mode.

3.4 Measure antenna height

In order to get correct elevation value, we need to know the correct phase center height of the receiver. However, it is almost impossible to measure the phase center directly. Normally, the software will read the receiver antenna offset parameters. Once user input the measurement height, software will calculate the phase center height automatically. Typically, there are two ways to measure the height:

A: Slant height (to measurement line)

- Centering and leveling the tripod on known point, then measure slant height from the ground point to the arrow at the side of the receiver.

B: Pole height (straight height to device bottom)

- Read the straight pole height

A: Slant height

Measurement Line

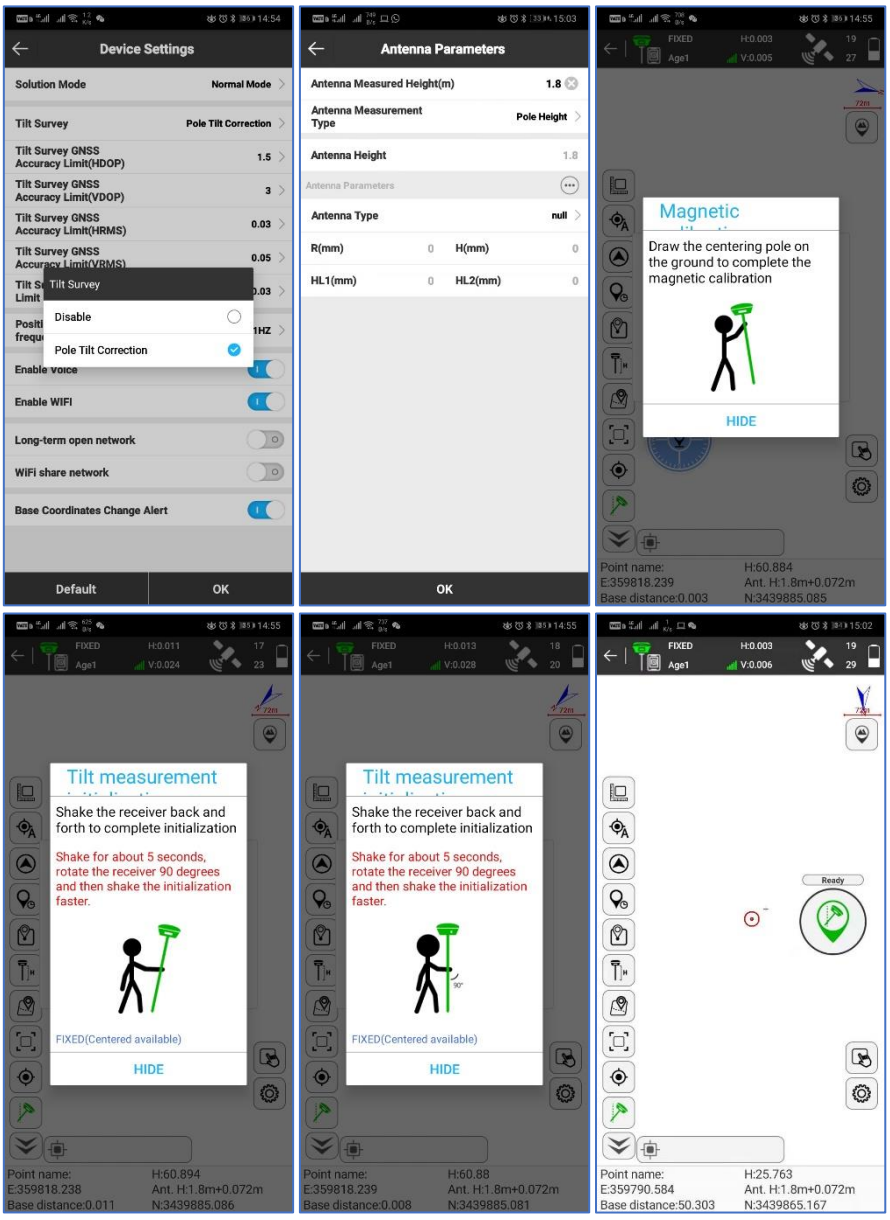
B: Pole height

3.5 Tilt Survey

E800 is equipped with MEMS sensor which supports tilt survey in SurPad4.0 software. The calibration is very simple.

To calibrate the MEMS sensor, receiver must be in Fixed solution. In SurPad4.0 software, connect device and click “Device” -> “Device Settings”, open “Pole Tilt Correction” function. Then, go to “Survey” -> “Point Survey” page. The software will guide user to calibrate the sensor.

- Input the correct pole height
- Draw circle on the ground using the pole
- Shake the pole back and forth for around 5-10 seconds
- Rotate the pole 90° and repeat the lase step until it shows “Ready”



4. Internal Radio

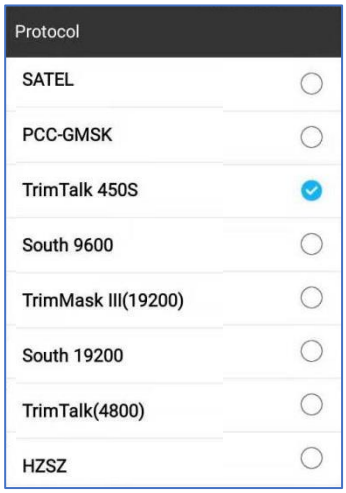
E800 is equipped with 5-watt internal radio. Users can select the transmission power of 2W (Low) or 5W (High). There are 8 default channel frequencies and the frequency of the channel “8” is adjustable. With new firmware update, many of the main survey industry protocols are supported.

4.1 Default channel frequencies

Channel	Frequency/MHz
1	431
2	432
3	433
4	434
5	435
6	436
7	437
8	438, Changeable

4.2 Supported radio protocols

Some of the protocols may require a firmware update.



5. Standard Accessories

E800 base and rover are using the same hard carrying case.

Base:

E800 Base					
NO.	Items	Quantity	Model	Description	Picture
1	Base Carrying Case	1	---	Carry case for E800	
2	E800 GNSS Receiver	1	---	---	
3	Charger	1	KSA-45P-45W D5	Type-C port	
4	Power Cable	1	---	Type-C to Type-C	
5	Charger Plug	4	---	---	
6	Measure Tape	1	---	3m/10ft-16mm	
7	UHF Antenna	1	QT440A	Internal UHF Antenna, 430-450MHz, 4dBi, TNCJ	
8	Screw Connector	1	---	---	
9	Tray	1	---	---	
10	Warranty Card	1	---	---	

Rover:

E800 Rover					
NO.	Items	Quantity	Model	Description	Picture
1	Rover Carrying Case	1	---	Carry case for E800	
2	E800 GNSS Receiver	1	---	---	
3	Charger	1	KSA-45P-45W D5	Type-C port	
4	Power Cable	1	---	Type-C to Type-C	
5	Charger Plug	4	---	---	
6	Measure Tape	1	---	3m/10ft-16mm	
7	UHF Antenna	1	QT440A	Internal UHF Antenna, 430-450MHz, 4dBi, TNCJ	
8	Screw Connector	1	---	---	
9	Warranty Card	1	---	---	

6. Technical Specifications

GNSS Performance	
Channel	336
Satellite Tracking	GPS: L1 CA/L2E/L2C/L5
	GLONASS:L1CA/L2CA/L3 CDMA
	BeiDou:B1/B2/B3
	GALILEO:E1/E5A/E5B/E5AltBOC/E6
	SBAS: L1 CA/L5
	QZSS: L1CA/L1SAIF/ L1C/ L2C/ L5
	NAVIC: L5
Update rate	5Hz
Performance (RMS)[1]	
Signal Reacquisition	< 1 sec
Hot Start	< 10 sec
Initialization Reliability	> 99.9%
Static Accuracy	Horizontal: 2.5 mm + 0.5 ppm
	Vertical: 5 mm + 0.5 ppm
RTK Accuracy	Horizontal: 8 mm + 1 ppm
	Vertical: 15 mm + 1 ppm
Code Differential	Horizontal: 0.25 m
SBAS Accuracy	Horizontal: 0.3 m
Power Supply	
Battery	Built-in rechargeble battery 7.2V/13.6Ah
Voltage	9~28 V DC,with over-voltage protection
Working Time	Up to 12 hours
Charge Time	Typically 8 hours
Internal Radio	
Frequency Range	410 - 470 MHz
Channel Spacing	12.5 KHz / 25 KHz
Emitting Power	2 W / 5 W
Operating Range	5-10km typically

Communication	
Memory	Internal 32G
5-pin	External radio and external power，RS232
Type-C	Charge and access internal storage
SIM Card	Micro SIM card
Cellular	Global Version
	GSM/UMTS/LTE
Bluetooth	BT 5.0, BLE
WIFI	802.11ac/n(HT20)/a/b/g
WebUI	To manage the status and settings,
	upgrade firmware,data download
Voice	Support smart voice broadcast
MEMS	Support, up to 60°
NMEA Output	GGA, ZDA, GSA, GSV, GST, VTG,
	RMC, GLL
Physical Specifications	
Dimension	154 * 154 * 76mm (L * W * H)
Weight	1.5KG
Screenn	1.45" colorful touchable
Operating Temperature	-30℃ ~ +65℃
Storage Temperature	-40℃ ~ +80℃
Water/ Dust Proof	IP67
Shock	Survive a 2 m (6.6 ft) pole drop,
	1.2 m (3.9 ft) free fall
Vibration	Vibration resistant
Humidity	Up to 100%
Indicator	4 indicators，GNSS/BT/UHF/PWR
Certificate	CE, FCC, IP67

Illustrations and technical specifications are subject to change without notice.
1. The accuracy claimed is based on the optimal environment.

7. Warranty Policy

The Guaranteed Rights

- e-survey supports free exchange or refund within 7 days of the product being received, where the device appears to have a "performance failure", which is confirmed by e-survey repair center.

- e-survey supports free maintenance or exchange within 15 days from the day when the product is received, where the device appears to have a "performance failure", which is confirmed by a e-survey repair center.

- e-survey supports free maintenance or exchange of the same type of device within one year from the day when the product is received, where the device appears to have a "performance failure", which still isn't in working condition after two repairs.

- e-survey supports a 24 months of warranty service for a device host and a 3 months of free warranty service for an accessory from the day when the products are received.

Warranty service

If the device host meets the warranty conditions, the warranty service can be obtained according to the warranty card and the purchasing invoice. If the proof of purchase and the warranty card cannot be provided, and e-survey will use the delivery time as the standard for the warranty period.

- If it is a non-warranty product, and the repair center will handle the maintenance for a fee.

- After the device is repaired, e-survey will provide a 3 month free warranty service.

- The transportation, delivery and disposal costs incurred during the delivery or inspection of the product to e-survey shall be borne by the user. The freight generated by the repaired or inspected equipment returned to the user shall be borne by e-survey.

- Please back up data in a timely manner for equipment that needs to be repaired or sent for inspection.

- During the warranty period, parts that are commonly used for maintenance are free.

- Parts that have been replaced during the repair process are owned by e-survey.

- e-survey is not responsible for non-standard products and software or applications that are not certified by the company.

Following conditions are not within the scope of the warranty and service

The device host and accessories have been subjected to: abnormal or improper use, improper storage in abnormal conditions, unauthorized dis-assembly or alteration, accidents, damage caused by improper installation.

- Damage caused by improper use by the user, such as liquid injection, damage due to external forces and etc.

- Failure to properly follow the equipment's instructional manual in repairing or in the transportation of the equipment.

- Damage to the product that is caused by external, including but not limited to, abnormal and unpredictable factors such as satellite systems, geomagnetism, static electricity, physical pressure and etc.

- Damage caused by natural and man-made forces such as earthquakes, floods, wars and etc.

- Other conditions that cannot comply with the relevant provisions of the Guaranteed Rights.