

# E600 GNSS Receiver

## User Manual



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## 1. Introduction

This is the user manual for survey E600H/E600N/E600T GNSS receiver. It gives basic description and operation guide which may help user to operate device properly.

### 1.1 Appearance



The E600 main body is designed with magnesium alloy material to provide durable usage and better heat dispersion as well as light weight 1.3Kg (dual batteries inside). The dual battery slot design makes it possible to replace battery without interrupting the working.





### 1.2 Indicator

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

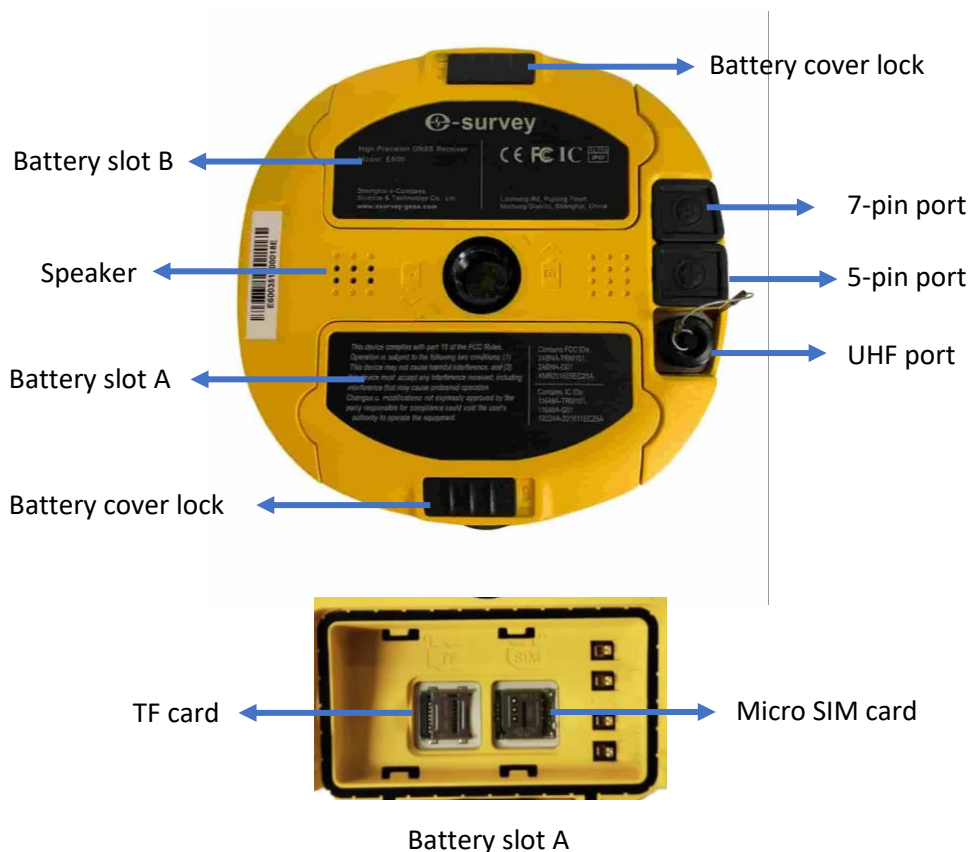


Indicator	Color	Meaning
Satellite 	Red and Green	<ul style="list-style-type: none"> <li>Off: no receiving satellites</li> <li>Flash red: receiving satellites but no solution status</li> <li>Flash green: have solution but not fixed</li> <li>Solid green: fixed solution</li> <li>Flash red and green alternately: mainboard abnormal</li> </ul>
Data link 	Green and Blue	<ul style="list-style-type: none"> <li>Solid green: datalink is ready to start</li> <li>Flash green: datalink is transmitting data normally</li> </ul>

		<ul style="list-style-type: none"> <li>Flash Blue: when raw data recording is enabled, the LED will flash according to the interval</li> </ul>
<p>Battery</p> 	Green and Red	<ul style="list-style-type: none"> <li>Solid green: battery level between 30%~100%</li> <li>Flash green: battery level between 10%~30%</li> <li>Flash red: battery level below 10%</li> </ul>
<p>Bluetooth</p> 	Blue	<ul style="list-style-type: none"> <li>Off: no Bluetooth connection</li> <li>Solid blue: has Bluetooth connection</li> </ul>

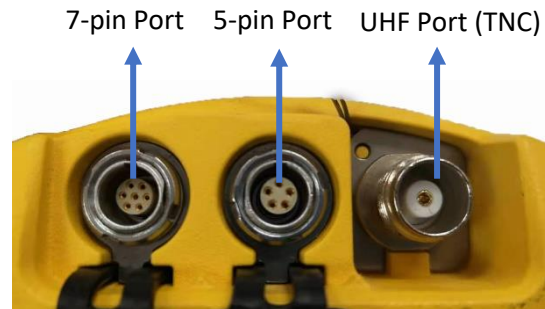
### 1.3 Interface

E600 GNSS receive bottom interface is shown as below. There are two battery slots. Micro SIM card and TF card can be installed from slot A. The 7-pin port can be connected to 7-pin cable for data downloading and NMEA output. 5-pin port is used to connect external radio and external power. The TNC port is for internal radio.

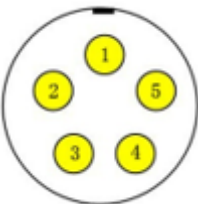
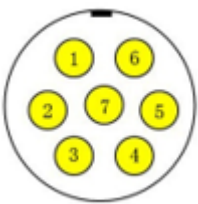


### 1.4 Pin definition

The 5-pin and 7-pin ports are defined as below:



Port front view

5 Pin	 <p>Front View</p>	1	+12V	Power
		2	GND	Power ground
		3	TXD	Device out
		4	SGD	Signal ground
		5	RXD	Device in
7 Pin	 <p>Front View</p>	1	--	Reserved
		2	USB_DN (-)	
		3	USB_VBUS	
		4	USB_DP (+)	
		5	TXD	Device out
		6	RXD	Device in
		7	SGD	Signal ground

### 1.5 Power button

There is a power button on E600 control panel, the main function as below:

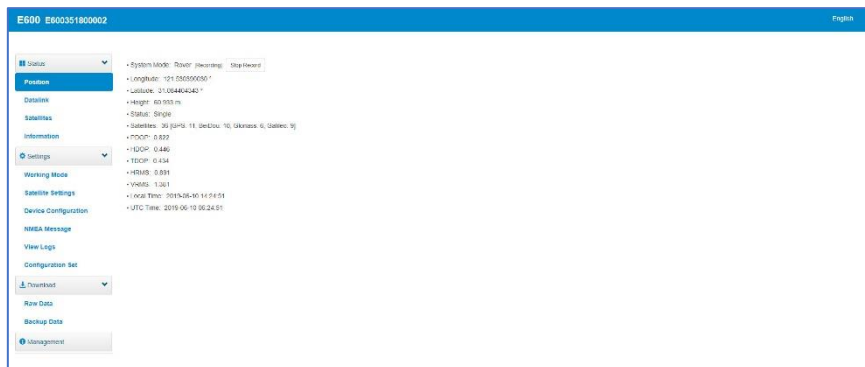
<b>Power On</b>	Long press button for two seconds to power on receiver.
<b>Power Off</b>	Long press button for two seconds then release, will hear the voice "Power off?" Then press the button again to confirm.
<b>Broadcast Current Working Mode</b>	Receiver will broadcast current working mode when press the power button.
<b>Self-check</b>	Long press button for two seconds then release, will hear the voice "Power off?" Then long press button for three seconds, will hear the voice "self-check".

## 2. Web User Interface

User can connect to receiver WIFI hotspot with PC, smart phone or tablet. The hotspot name is the device serial number, can be found under the bottom of the device label. 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, configurate basic settings, download raw data, update firmware and register device.

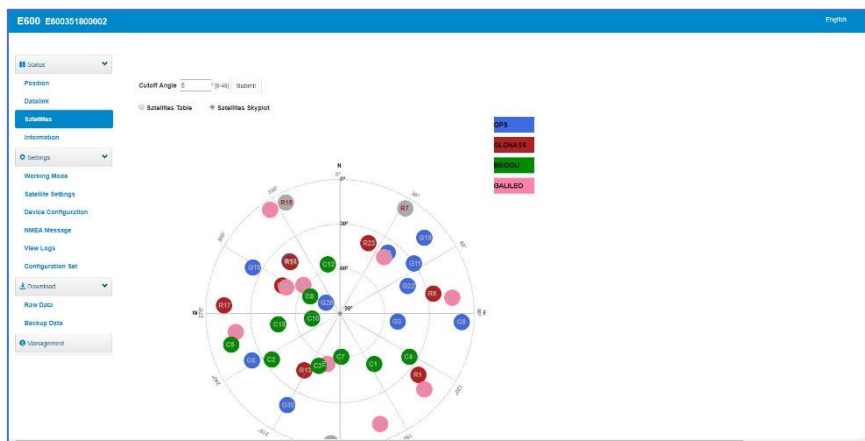
### 2.1 Position

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.



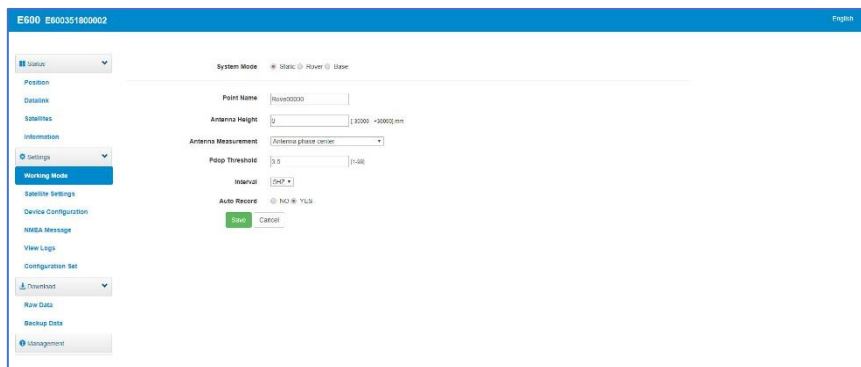
### 2.3 Information

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



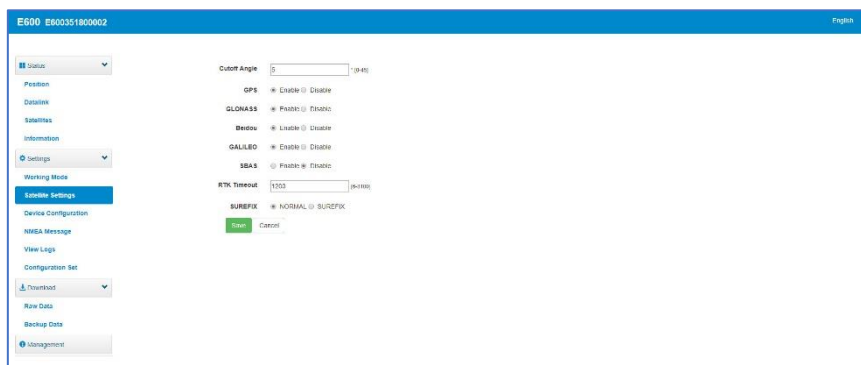
### 2.4 Working Mode

Configure working mode: base, rover or static.



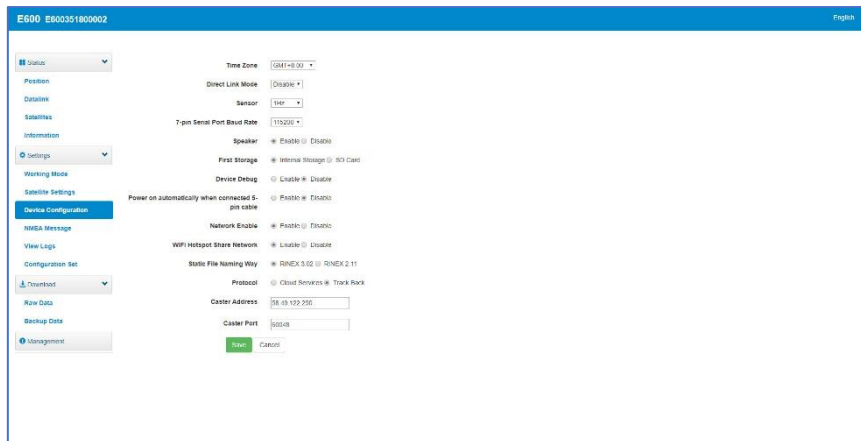
### 2.5 Satellite Setting

Configure the satellites to be used. “RTK Timeout” setting is for aRTK service (With Hemisphere L-Band service, user can still keep high accuracy for a period when correction data loses). “Surefix” is hemisphere technology to increase the reliability of the fixed solution. Which means it will be much more difficult to get fixed solution in tough environment.



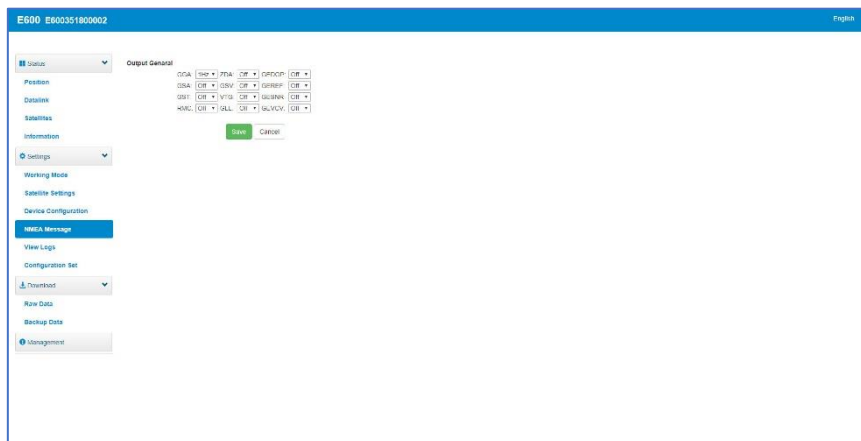
## 2.6 Device Configuration

Configure receiver settings: User can set time zone. Direct link mode is used for debug. Sensor means e-bubble data output. Also, the 7-pin port baud rate is changeable. Smart voice broadcast can be disabled. When TF card is insert, can select static data prior storage. When external power is connected, can also choose to power on receiver automatically. When network is enabled, the network module will be activated even in radio working mode. This is helpful for fast initializing the network module, but also increase the power consumption. When SIM card is insert and “WIFI share network” is enabled, PC can surf the internet when connected to device hotspot by using SIM data. “Cloud service” and “Track back” is used for uploading position information to cloud/TCP server.



## 2.7 NMEA Message

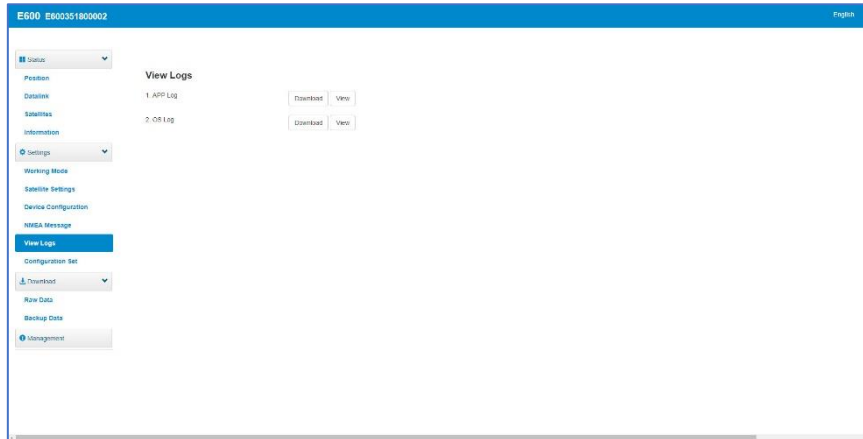
Configure NMEA data output through Bluetooth or 7-pin port.





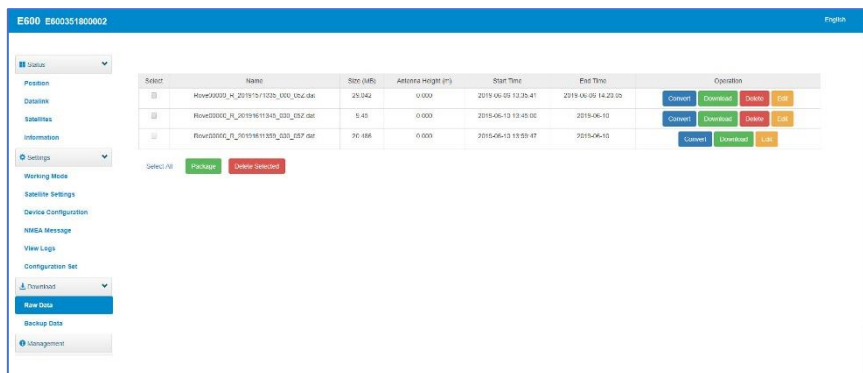
## 2.8 View Logs

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



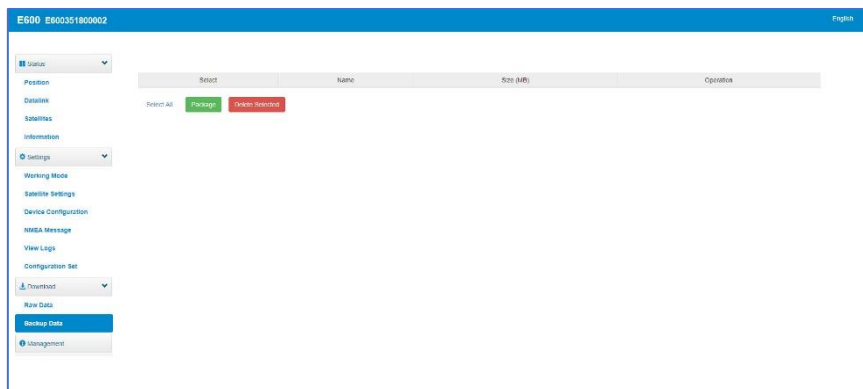
## 2.9 Raw Data

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



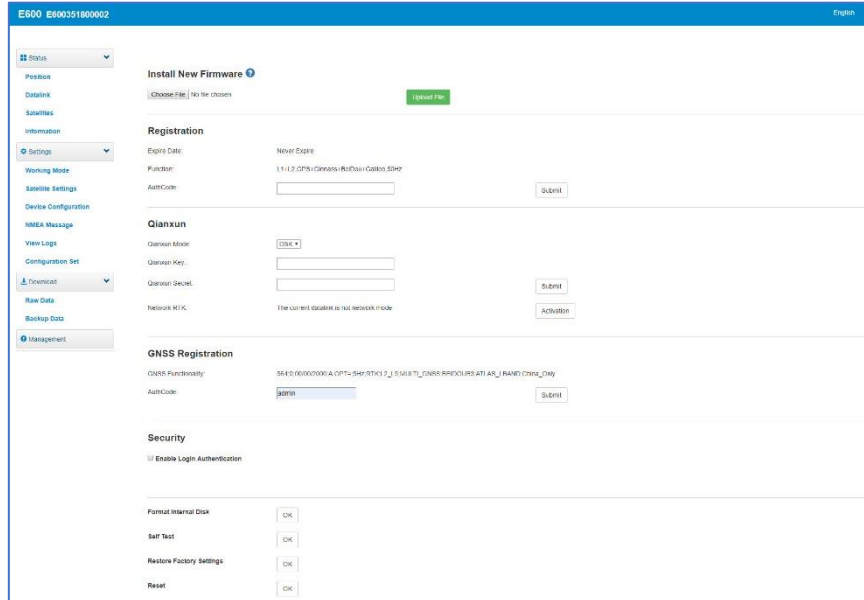
## 2.10 Backup Data

The points collected in SurPad4.0 will be backup in receiver storage automatically to avoid data loss. Can restore the data to SurPad software.



### 2.11 Management

User can update receiver and GNSS firmware as well as register device, format internal disk, restore factory setting, restart device. To update the firmware, click “Chose 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 E600.

### 3.1 Insert SIM and TF card

E600 supports external TF card expansion up to 32 GB for static data storage. Micro SIM card can be used for network working mode. Open battery cover “A” and insert TF card or SIM card.



### 3.2 Insert and remove battery

Insert battery and slide as the arrow in below picture to lock it. Then, lock the battery cover. It is suggested to remove battery if the receiver is not in use for a long time.



### 3.3 Charge the battery

E600 charger can charge two batteries at the same time. Fully charge the battery will take 4 hours typically. Press the button on the battery to view current battery level (each indicator means 25% battery power). The charging indicator is red when charging, will turn green when fully charged.



### 3.4 Insert radio antenna

The antenna is required in radio working mode.



### 3.5 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 not possible 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

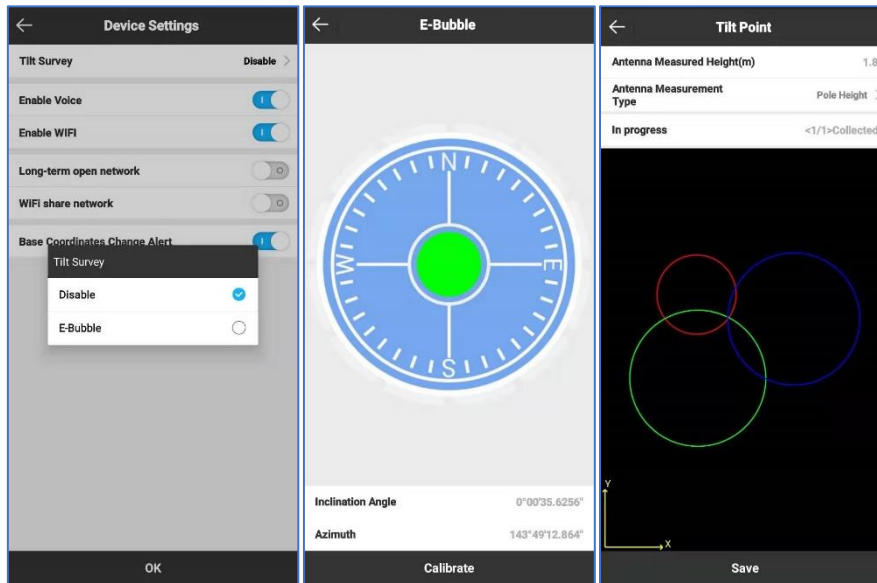
Measurement Line

B: Pole height

### 3.6 E-bubble Calibration

E600 is equipped with e-bubble sensor which supports tilt survey in SurPad4.0 software. To calibrate the e-bubble, put the device on flat table or pole (ensure the bubble on the pole is normal before calibration, then centering the pole bubble). In SurPad4.0 software, connect device and click “Device” -> “Device Settings”, open “E-Bubble” function. Then, go to “Device” -> “Calibrate Sensor”, click “Calibrate” to calibrate the e-bubble.

To use tilt survey function, go to “Survey” -> “Point Survey” page, select “Tilt Point”. Then click survey button to start data collection. After collect three points on the same location, the software will calculate a final result.



## 4. Internal Radio

E600 is equipped with 1-watt internal radio. User can select the transmission power 0.5 watt or 1 watt. There are 8 default channel frequency and the frequency of channel “8” is changeable. With new firmware update, lots of mainly used protocols in survey industrial are supported.

### 4.1 Default channel frequency

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











### 4.2 Supported radio protocol

Some of the protocols may require firmware update.











Protocol	
SATEL	<input type="radio"/>
PCC-GMSK	<input type="radio"/>
TrimTalk 450S	<input checked="" type="radio"/>
South 9600	<input type="radio"/>
HiTarget 9600	<input type="radio"/>
HiTarget 19200	<input type="radio"/>
TrimMask III(19200)	<input type="radio"/>
South 19200	<input type="radio"/>
TrimTalk(4800)	<input type="radio"/>
GEOTALK	<input type="radio"/>
GEOMARK	<input type="radio"/>

## 5. Standard Accessories

Base station:

NO.	Items	Quantity	Model	Description	Picture
1	Base Carrying Case	1	---	Carry case for base station External radio and cable can be put inside	
2	E600 GNSS Receiver	1	---	---	
3	Battery	2	BP-5S	Li-ion Battery, 7.2V-3400mAh	
4	Charger	1	CH-04	Dual Slots	
5	Switching Adapter	1	DSA-40CA-12	Adapter for CH-04	
6	Charger Plug	3	---	---	
7	Measure Tape	1	---	3m/10ft-16mm	
8	UHF Antenna	1	QT440A	Internal UHF Antenna, 430-450MHz, 4dBi, TNCJ	
9	Extension Pole	1	---	25cm	
10	Screw Connector	1	---	---	
11	Tray	1	---	---	
12	Warranty Card	1	---	---	

Rover Station:

NO.	Items	Quantity	Model	Description	Picture
1	Rover Carrying Case	1	---	Carry case for rover station Controller and bracket can be put inside	
2	E600 GNSS Receiver	1	---	---	
3	Battery	2	BP-5S	Li-ion Battery, 7.2V-3400mAh	
4	Charger	1	CH-04	Dual Slots	
5	Switching Adapter	1	DSA-40CA-12	Adapter for CH-04	
6	Charger Plug	3	---	---	
7	Measure Tape	1	---	3m/10ft-16mm	
8	UHF Antenna	1	QT440A	Internal UHF Antenna, 430-450MHz, 4dBi, TNCJ	
9	Screw Connector	1	---	---	
10	Warranty Card	1	---	---	

## 6. Technical Specifications

GNSS Receiver			
Model	E600-N	E600-H	E600-T
Channel	555	600	336
Satellite Tracking	GPS: L1CA/L1C/L2C/L2P/L5	GPS: L1CA/L1P/L1C/L2P/L2C/L5	GPS: L1 CA/L2E/L2C/L5
	GLONASS: L1CA/L2C/L2P/L3/L5	GLONASS: G1/G2, P1/P2	GLONASS: L1CA/L2CA/L3 CDMA
	BeiDou: B1/B2/B3	BeiDou: B1/B2/B3	BeiDou: B1/B2/B3
	Galileo: E1/E5A/E5B/E5A1/BOC/E5a/E5b/E6	GALILEO: E1BC/E5a/E5b	Galileo: E1/E5A/E5B/E5A1/BOC/E6
	SBAS: L1/L5	SBAS: L1 CA/L5	SBAS: L1 CA/L5
	QZSS: L1CA/L1C/L2C/L5/L6	QZSS: L1CA/L2C/L5/L1C	QZSS: L1CA/L1SAIF/ L1C/ L2C/ L5
	NAVIC: L5	L-BAND: ATLAS H10/H30/H50	NAVIC: L5
Update rate	5 Hz, up to 100 Hz	5 Hz, up to 20 Hz	100 Hz
Performance (RMS) <sup>1</sup>		Power Supply	
Signal Reacquisition	< 1 sec	Battery	Dual rechargeable and replaceable
Hot Start	< 10 sec		Lithium-ion batteries, 7.2 V - 3400 mAh * 2
Initialization Reliability	> 99.9%	Voltage	9-28 V DC, with over-voltage protection
Static Accuracy	Horizontal : 2.5 mm + 0.1 ppm	Working Time	Up to 10 hours
	Vertical : 3.5 mm + 0.4 ppm	Charge Time	Typically 4 hours
RTK Accuracy	Horizontal : 8 mm + 1 ppm	Internal Radio	
	Vertical : 15 mm + 1 ppm	Frequency Range	410 - 470 MHz
Code Differential	Horizontal : 0.25 m	Channel Spacing	12.5 KHz / 25 KHz
SBAS Accuracy	Horizontal : 0.3 m	Emitting Power	0.5 W / 1 W
Communication		Operating Range	3 - 5 km typically
Memory	Internal 8 GB, expansion up to 32 GB	Physical Specifications	
5-pin	Connect to external power and radio	Dimension	φ156 mm x 76 mm
7-pin	NMEA output and data download	Weight	1.3 Kg with 2 batteries inside
SIM Card	Micro SIM card		1.1 Kg without battery
Cellular	GSM/GPRS/EDGE/LTE/	Operating Temperature	-30°C ~ +65°C
	UMTS/WCDMA	Storage Temperature	-40°C ~ +80°C
Bluetooth	V2.1+EDR / V4.1 Dual Mode, Class 2	Water/ Dust Proof	IP67
WIFI	802.11 b/g/n	Shock	Survive a 2 m pole drop on concrete floor
WebUI	Update firmware, manage settings and		1.2 m free drop
	status, download data	Vibration	Vibration resistant
Voice	Support TTS voice broadcast	Humidity	Up to 100%
Electronic Bubble	Support	Indicator	Satellites , Datalink , Battery level, Bluetooth
NMEA Output	GGA, ZDA, GSA, GSV, GST, VTG,	Certificate	CE, FCC, IP67
	RMC, GLL		

Illustrations and technical specifications are subject to change without notice.

1. The accuracy claimed is based on the optimal environment.

## 7. Warranty Policy

### The Guarantees Rights

- e-survey supports free exchange or refund within 7 days from the day when you have received the products, where the device appears "performance failure", which confirmed by e-survey repaircenter.
- e-survey supports free maintenance or exchange within 15 days from the day when you have received the products, where the device appears "performance failure", which confirmed by e-survey repair center.
- e-survey supports free maintenance or exchange the same type of device within one year from the day when you have received the products, where the device appears "performance failure", which is still not in working conditions after two repairs.
- e-survey supports a 24-month warranty service for the device host and a 3-month free warranty service for the accessory from the day when you have received the products.

### 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 of the extra-fee.
- After the device is repaired, the same fault is confirmed by the repair center and 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 repair or inspection equipment returned to the user shall be borne by e-survey.
- Equipment that needs to be repaired or sent for inspection, please back up the data in the machine in time.
- During the warranty period, the parts normally used for maintenance are free.
- The parts that have been replaced during the repair are owned by e-survey.
- e-survey is not responsible for non-product standard 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 of abnormal conditions, unauthorized disassembly or alteration, accidents, damage caused by improper installation.

- Damage caused by improper use of user, such as liquid injection, damage due to external force, etc.
- Failure to use, repair or transport caused by the equipment's instruction manual.



- Damage to the product is caused by external, including but not limited to, abnormal and unpredictable factors such as satellite systems, geomagnetism, static electricity, physical pressure, etc.
- Damage caused by force majeure such as earthquakes, floods, wars, etc.
- Other conditions that cannot comply with the relevant provisions of the Guarantees Rights.