

E100 GNSS Receiver

User Manual



V2.0_202011

Contents

1.	Introduction	3
1.1	Appearance	3
1.2	Indicator	3
1.3	Interface	4
1.4	Pin definition	4
1.5	Power button	5
2.	Web User Interface	5
2.1	Position	5
2.2	Satellites	6
2.3	Information	6
2.4	Working Mode	6
2.5	Satellite Setting	7
2.6	Device Configuration	7
2.7	NMEA Message	8
2.8	View Logs	8
2.9	Raw Data	9
2.10	Backup Data	9
2.11	Management	10
3.	Basic Operation	10
3.1	Insert SIM card	10
3.2	Charge the battery	10
3.3	Measure antenna height	11
3.4	Sensor	11
3.4.1	E-bubble Calibration	11
3.4.2	MEMS Tilt Survey	12
4.	Standard Accessories	14
5.	Technical Specifications	15
5.1	E100 (P20 Version)	15
5.2	E100 (UB4B0M Version)	16
6.	Warranty Policy	17

1. Introduction

This is the user manual for survey E100 GNSS receiver. It gives basic description and operation guide which may help user to operate device properly.

1.1 Appearance



The E100 main body is designed with magnesium alloy material to provide durable usage and better heat dispersion as well as light weight 900g. The internal battery ensures up to 9-hours continuous 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"> Off: no receiving satellites Flash red: receiving satellites but no solution status Flash green: have solution but not fixed Solid green: fixed solution Flash red and green alternately: mainboard abnormal
Data link 	Green and Blue	<ul style="list-style-type: none"> Solid green: datalink is ready to start Flash green: datalink is transmitting data normally Flash Blue: when raw data recording is enabled, the LED will flash according to the interval
Bluetooth	Blue	<ul style="list-style-type: none"> Off: no Bluetooth connection Solid blue: has Bluetooth connection

		
	Battery	Green and Red <ul style="list-style-type: none"> • Solid green: battery level between 30%~100% • Flash green: battery level between 10%~30%, speaker will beep • Flash red: battery level below 10%

1.3 Interface

E100 GNSS receive bottom interface is shown as below. The 5-pin port is used to connect external radio and external power, or output NMEA messages. Type-C port can be used for data download (internal storage access) or charging.



SIM Card



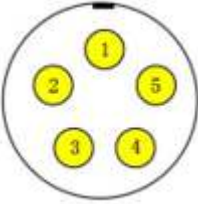
Type-C and 5-Pin

1.4 Pin definition

The 5-pin port is defined as below:



5 Pin	1	+12V	Power
	2	GND	Power ground

 <p>Front View</p>	3	TXD	Device out
	4	SGD	Signal ground
	5	RXD	Device in

1.5 Power button

There is a power button on E100 control panel, the main function as below:

Power On	Long press button for two seconds to power on receiver.
Power Off	Long press button for two seconds then release, will hear the voice “Power off?” Then press the button again to confirm.
Broadcast Current Working Mode	Receiver will broadcast current working mode when press the power button.
Self-check	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.

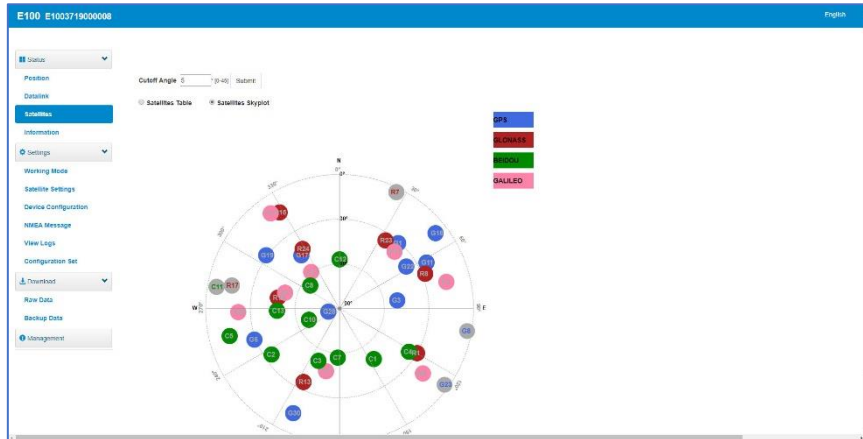
2.1 Position

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.



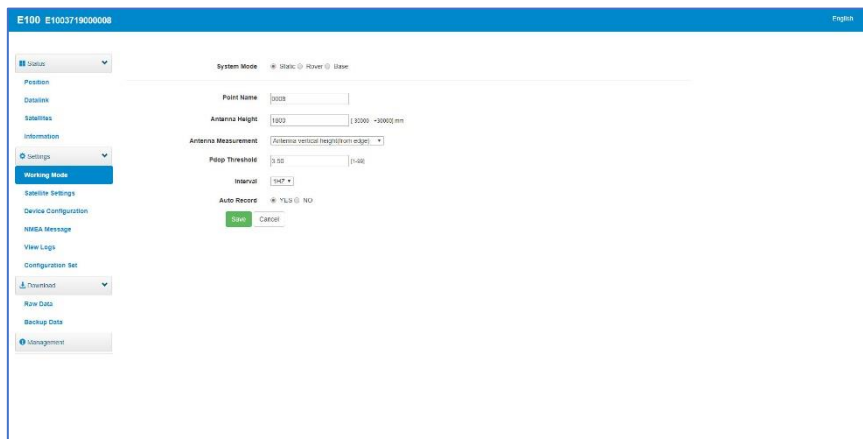
2.3 Information

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



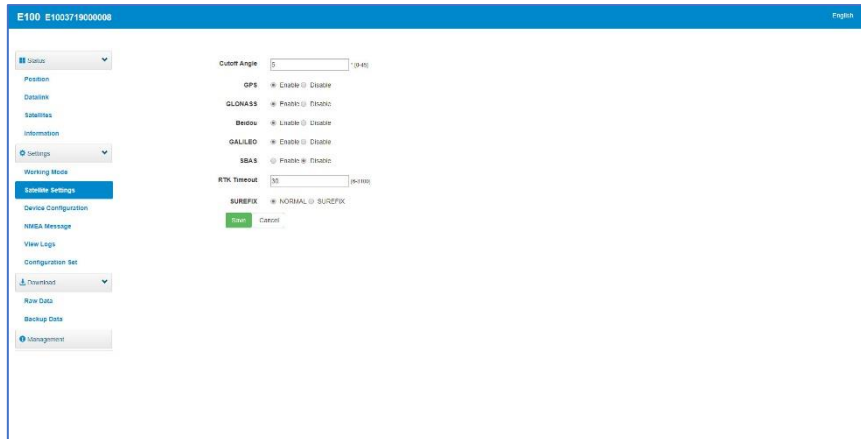
2.4 Working Mode

Configure working mode: base, rover or static.



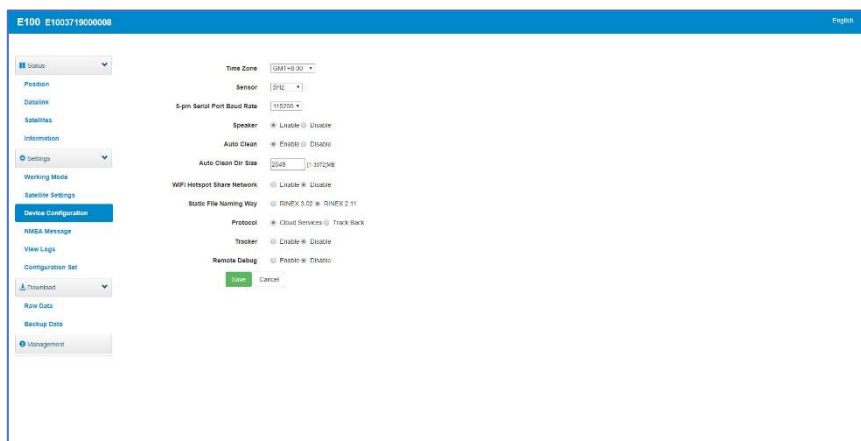
2.5 Satellite Setting

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.



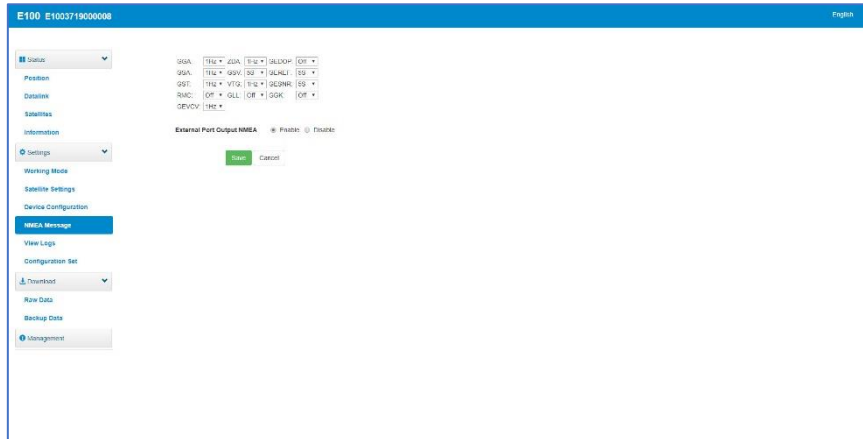
2.6 Device Configuration

Configure receiver settings: User can set time zone. Sensor means e-bubble data output. Also, the 5-pin port baud rate is changeable. Smart voice broadcast can be disabled. 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.



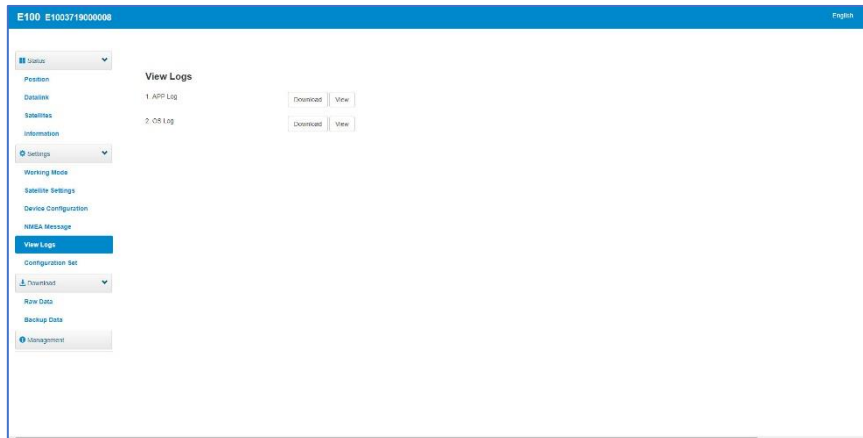
2.7 NMEA Message

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



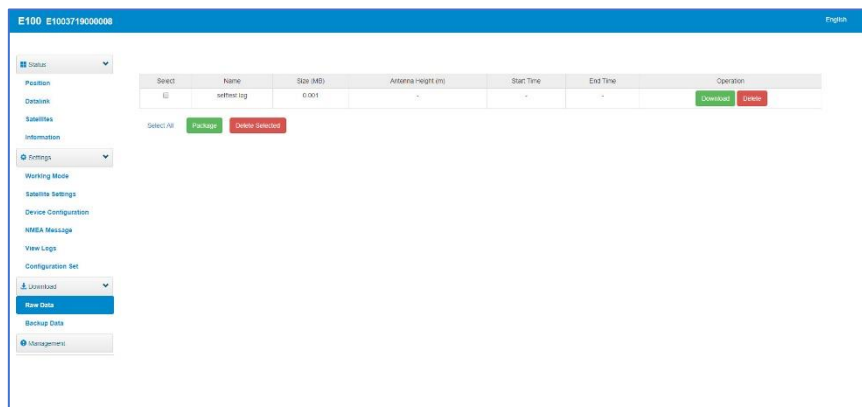
2.8 View Logs

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



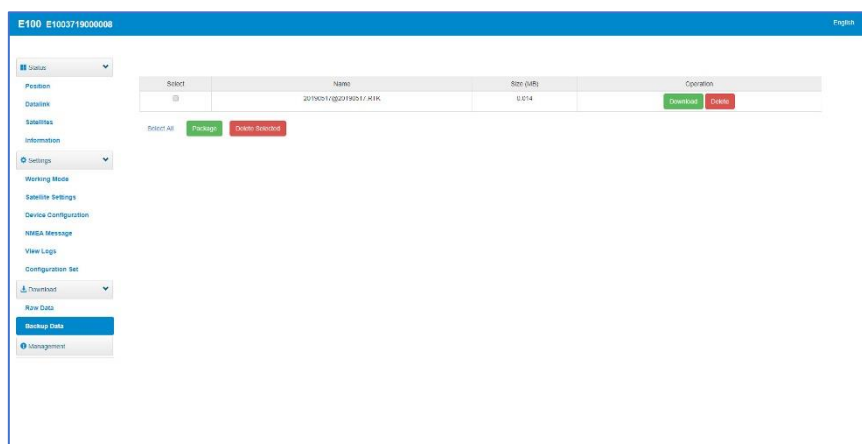
2.9 Raw Data

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



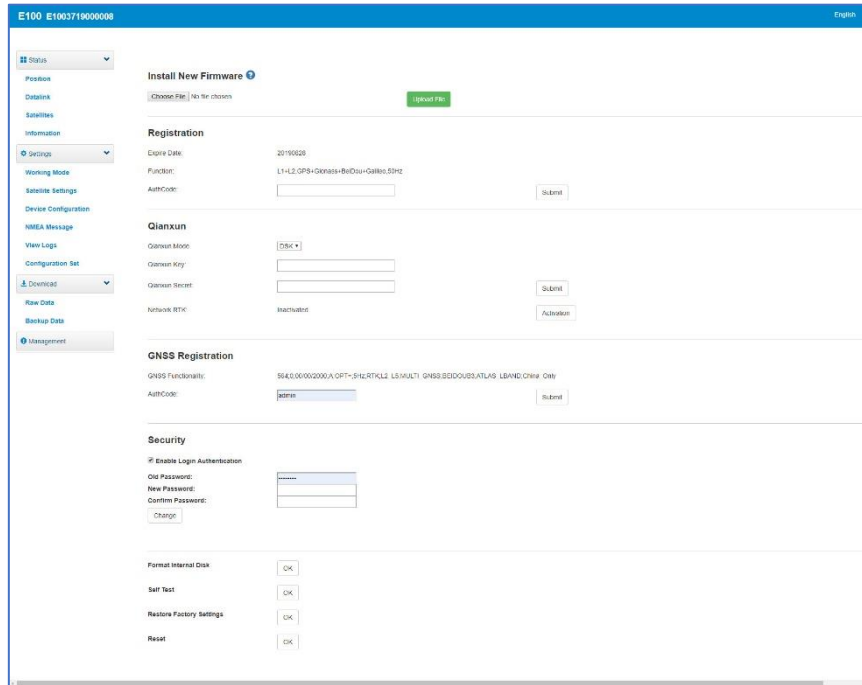
2.10 Backup Data

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.

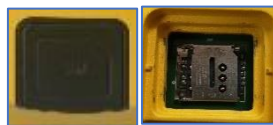


3. Basic Operation

This part shows user some basic operations to start working with E100.

3.1 Insert SIM card

E100 supports network working mode. Open the cover and insert SIM card.



3.2 Charge the battery

E100 is equipped with Type-C charger which support maximum 45w PD quick charge. Fully charge the battery will take 4 hours typically. The battery indicator is red when charging, will turn green when fully charged.



3.3 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

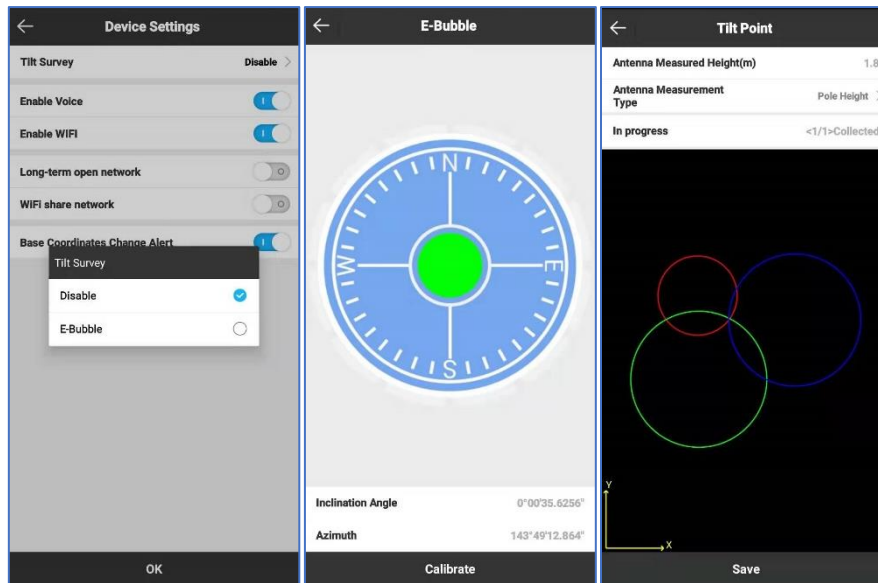
3.4 Sensor

The **new E100** supports E-bubble and MEMS. It is determined by the activation code for which sensor is activated. Please note only one of the sensors can be activated. If you purchase E-bubble code, you can update to MEMS later by contacting with salesman.

3.4.1 E-bubble Calibration

When e-bubble is activated on E100. 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.

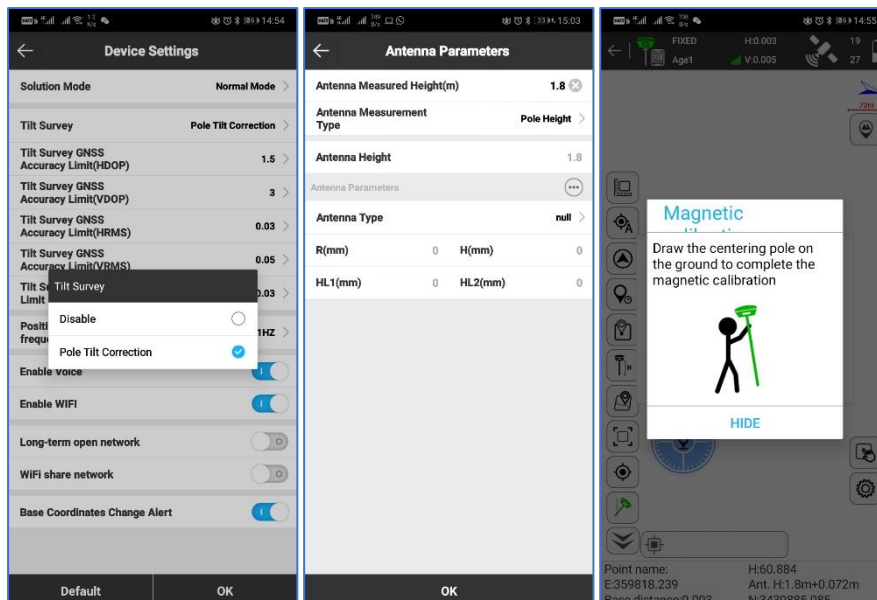
To use tilt survey function, go to "Survey" -> "Point Survey" page, select "Tilt Point". Then click survey button to start data collection. After collect three points on the same location, the software will calculate a final result.

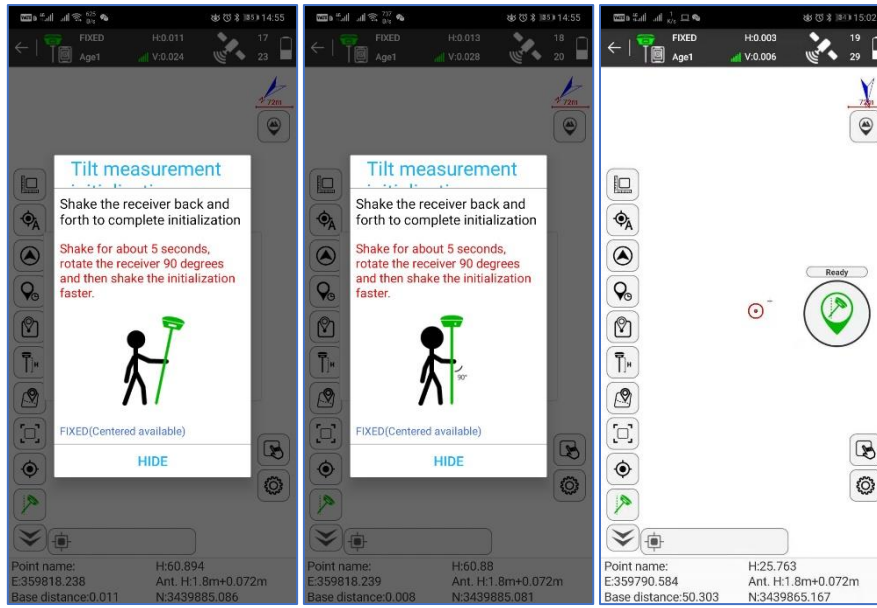


3.4.2 MEMS Tilt Survey

When MEMS sensor is activated on E100. To calibrate the MEMS sensor, receiver must be in Fixed solution. In SurPad4.0 software, connect device and click “Device” -> “Device Settings”, enable “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
- Follow the guide and shake the pole back and forth for around 5-10 seconds or walk in straight line around 10 meters until it shows “Ready”




















4. Standard Accessories

E100 base and rover are using the same accessories. We provide easy carrying soft bag or hard carrying case.

Soft Bag:

E100 Soft Bag					
NO.	Items	Quantity	Model	Description	Picture
1	E100 Soft Bag	1	---	---	
2	E100 GNSS Receiver	1	---	---	
3	Charger	1	KSA-45P-45W D5	Type-C port	
4	Charger Plug	4	---	---	
5	Power Cable	1	---	Type-C to Type-C	
6	Straps	1	---	---	
7	SIM Cover	1	---	Spare SIM Cover	
8	Warranty Card	1	---	---	

Carrying Case:

E100 Carrying Case					
NO.	Items	Quantity	Model	Description	Picture
1	E100 Carrying Case	1	---	Carry case for E100 Controller and bracket can be put inside	
2	E100 GNSS Receiver	1	---	---	
3	Charger	1	KSA-45P-45W D5	Type-C port	
4	Charger Plug	4	---	---	
5	Power Cable	1	---	Type-C to Type-C	
6	SIM Cover	1	---	Spare SIM Cover	
7	Warranty Card	1	---	---	

5. Technical Specifications

5.1 E100 (P20 Version)

GNSS		Voltage	9~28 VD, with over-voltage protection	
Satellites Tracking	GPS: L1CA/L1P/L1C/L2P/L2C/L5	Working Time	Up to 9 hours	
	BDS: B1/B2/B3/B1C/B2a/B2b/ACEBOC	Charging Time	Typically 4 hours	
	GLONASS: G1/G2/G3, P1/P2	Internet Modem		
	GALILEO: E1/E5a/E5b/E6/ALTB0C	Support Band	Global 4G	
	QZSS: L1CA/L1C/L2C/L5/LEX	Communication		
	IRNSS: L5	Bluetooth	BT 5.0, BLE	
	SBAS ¹ : L1, L5	WiFi	802.11 b/g/n(HT20)/ac	
	L-Band: Atlas H10/H30/Basic	SIM Card	Micro SIM card	
	Channels	800	5-pin Port	Connect to external radio and power NMEA data output
	Signal Reacquisition	< 1 sec	Type-C Port	Charge and data transmission
Cold Start	< 60 sec	Web UI	View status, update firmware, set up working mode, download data	
Warm Start	< 30 sec	Intelligent Voice	Broadcast working status	
Hot Start	< 10 sec	NMEA Output	GGA, ZDA, GSA, GSV, GST, VTG, RMC, GLL, Binary	
RTK Signal Initialization	< 8 sec	Correction Data	CMR, CMR+, RTCM2, RTCM3, RTCM32	
Initialization Reliability	> 99.9%	MEMS	Fast initialization, dynamic tilt survey up to 60°	
Update Rate	10 Hz standard, up to 50 Hz	Physical		
Operation System	Linux	Dimension	Φ148 mm x H60 mm	
Internal Memory	8 GB	Weight	900±5 g	
Performance		Operating Temperature	-40°C ~ +65°C	
High Precision Static	H: 2 mm + 0.1 ppm V: 3 mm + 0.4 ppm	Storage Temperature	-45°C ~ +80°C	
Static/Fast Static	H: 2.5 mm + 0.1 ppm V: 3.5 mm + 0.4 ppm	Water/Dust Proof	IP67	
RTK	H: 8 mm + 1 ppm V: 15 mm + 1 ppm	Shock	Survive a 2 m drop on concrete floor	
Code Differential	H: 0.25 m V: 0.45 m	Vibration	Vibration resistant	
SBAS	H: 0.3 m V: 0.6 m	Humidity	Up to 100%	
L-Band	Atlas H10: 4 cm RMS Atlas H30: 15 cm RMS Atlas Basic: 30 cm RMS	Indicators	Satellites, datalink, battery, Bluetooth	
Power Supply		Button	Power button, short press to voice broadcast status	
Battery	Rechargeable and built-in Lithium-ion battery, 7.2 V ~ 6800 mAh	Certificate	CE, NGS Calibration	
1. SBAS supports WAAS, EGNOS, GAGAN, SDCM, MSAS.				

5.2 E100 (UB4B0M Version)

GNSS		Voltage	9~28 VD, with over-voltage protection
Satellites Tracking	GPS: L1CA/L1P/L1C/L2P/L2C/L5 BDS: B1/B2/B3I/B1C/B2a/B2b/ ACEBOC GLONASS: G1/G2/G3, P1/P2 GALILEO: E1/E5a/E5b/E6/ALTB0C QZSS: L1CA/L1C/L2C/L5/LEX IRNSS: L5 SBAS ¹ : L1, L5 L-Band: Atlas H10/H30/Basic	Working Time	Up to 9 hours
		Charging Time	Typically 4 hours
		Internet Modem	
		Support Band	Global 4G
		Communication	
		Bluetooth	BT 5.0, BLE
		WIFI	802.11 b/g/n(HT20)/ac
		SIM Card	Micro SIM card
		5-pin Port	Connect to external radio and power NMEA data output
		Type-C Port	Charge and data transmission
Channels	800	Web UI	View status, update firmware, set up working mode, download data
Signal Reacquisition	< 1 sec	Intelligent Voice	Broadcast working status
Cold Start	< 60 sec	NMEA Output	GGA, ZDA, GSA, GSV, GST, VTG, RMC, GLL, Binary
Warm Start	< 30 sec	Correction Data	CMR, CMR+, RTCM2, RTCM3, RTCM32
Hot Start	< 10 sec	MEMS	Fast initialization, dynamic tilt survey up to 60°
RTK Signal Initialization	< 8 sec	Physical	
Initialization Reliability	> 99.9%	Dimension	Φ148 mm x H60 mm
Update Rate	10 Hz standard, up to 50 Hz	Weight	900±5 g
Operation System	Linux	Operating Temperature	-40°C ~ +65°C
Internal Memory	8 GB	Storage Temperature	-45°C ~ +80°C
Performance		Water/Dust Proof	IP67
High Precision Static	H: 2 mm + 0.1 ppm V: 3 mm + 0.4 ppm	Shock	Survive a 2 m drop on concrete floor
Static/Fast Static	H: 2.5 mm + 0.1 ppm V: 3.5 mm + 0.4 ppm	Vibration	Vibration resistant
RTK	H: 8 mm + 1 ppm V: 15 mm + 1 ppm	Humidity	Up to 100%
Code Differential	H: 0.25 m V: 0.45 m	Indicators	Satellites, datalink, battery, Bluetooth
SBAS	H: 0.3 m V: 0.6 m	Button	Power button, short press to voice broadcast status
L-Band	Atlas H10: 4 cm RMS Atlas H30: 15 cm RMS Atlas Basic: 30 cm RMS	Certificate	CE, NGS Calibration
Power Supply			
Battery	Rechargeable and built-in Lithium-ion battery, 7.2 V ~ 6800 mAh		
1. SBAS supports WAAS, EGNOS, GAGAN, SDCM, MSAS.			

6 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 earth- quakes, floods, wars, etc.
- Other conditions that cannot comply with the relevant provisions of the Guarantees Rights.