



ROHS, TS16949, ISO9001

S2

Product Specification Manual

July, 2023

www.xbteek.com

Revision History

Version NO.	Version	Date
V.1	New	July, 2023

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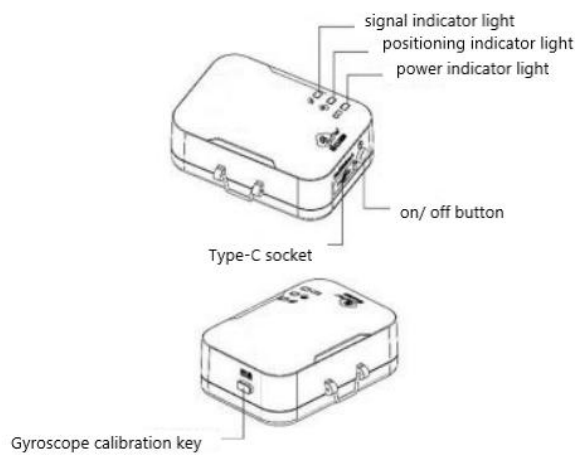
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1. Product introduction

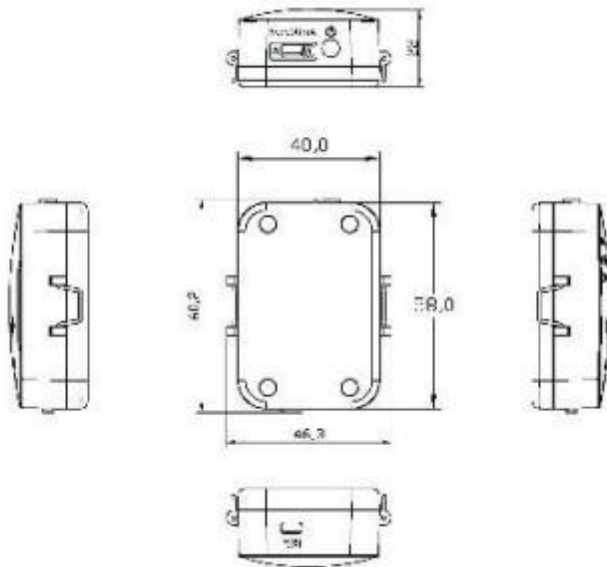
S2 is a 4G mobile positioning terminal designed for UAVS, which integrates 4G wireless communication technology and GPS/BDS satellite navigation and positioning technology, adopts industrial high integration full built-in antenna design, built-in 9-axis sensor, with intelligent, power-saving, abnormal-wake-up working characters. It supports GPS/ Beidou positioning, low power alarm, AGPS quick positioning, UAV posture detection, flight trajectory breakpoint transmission, UAV heading Angle acquisition, remote FOTA firmware upgrade, remote configuration and real-time monitoring. It is equipped with the global positioning service platform to realize the real-time acquisition, tracking and positioning of UAV data.

2. Product schematic diagram



3. Appearance parameters

Weight	About 41g
Dimensions	60.2mm (L) *40mm (W) *22mm (H)



4. Power Supply

Charging voltage :USB TYPE-C 5V/500mA

Charging time: 1-2 hours

Low power off voltage: 3.3V

Battery overcharge protection voltage: 4.25V

5. Network

4G LFE -FDD:B1,B3,B5,B8

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6. Max flight Altitude

Related to the flight area and mobile base station.

7. Positioning Method

GPS/BDS satellite positioning

8. Indicator Description

Red light -> Network Indicator light

Network indicator status	Implication
Flash once within 5 seconds	The network connection to the user platform is normal
Quick flash twice within 1 second	The network connection to the user server is abnormal

Yellow light ->GPS indicator light

GPS Indicator Status	Implication
Flash once whthin 5 seconds	GPS has located
Flash twice in 1 second	GPS has not located

Green light -> Battery indicator light

Battery Indicator Status	Meaning
Flash once within 5 seconds	The battery continues to work normally
Quick flash twice within 1 second	Low battery

9. Working Logic

After the device is installed, press the on button of the device for 5 seconds, wait for all the red, yellow and green lights to be steadily on for 2-3 seconds, and the device will enter the normal working state.

Working logic: The device reports the position and gyroscope attitude data to the user server platform every 1 second according to the default configuration parameters.

Gyroscope calibration: When the device is installed and run for the first time, it is recommended that the user perform gyroscope posture/attitude calibration. Press and hold the "gyroscope" calibration button of the device to calibrate the UAV attitude. If the position and direction of the device remain unchanged each time it is installed, calibrate once is enough.

AGPS: After the device is turned on, the device detects the GPS positioning status when it enters the power-on initialization. If the GPS has not located, the device obtains AGPS data from the cloud server for AGPS quick auxiliary positioning. If it has been located, no AGPS is required to open the ephemeris data download, ephemeris data package, whose size of about 4K bytes;

Breakpoint continued transmission function: if the device GPS has been located, no 4G LTE network or signal difference (signal value CSQ<10), the device automatically stores GPS position data and attitude data in RAM and FLASH memory.

When the 4G network is not restored or the signal value is low, the working logic of the device is as follows:

1, If the 4G network has never been restored, the device will automatically record RAM data in FLASH every 3 minutes time out , and when the user is shut down and the device is low power, the data will be recorded in FLASH. The total number is currently set at 700, 1/s, which is

about 12 minutes, such as about an hour, reported in 5 seconds. When the device is turned on again, the device first determines whether there is a breakpoint continued data recording in the FLASH, if so, it will first execute the breakpoint continued data reporting platform, in the execution process, all the LED lights will blink quickly at the same time, after completion, automatically enter the normal working state.

2, If the device is not shut down when the 4G fast network is restored, all data records are only stored in RA. After the 4G network is restored, will executed the breakpoint resume function to fill the points.

10. Function Description

(1) Breakpoint Resumable Function

① If the device GPS has been positioned, no 4G LTE network or signal difference (signal value CSQ<10), the device GPS positioning data, and attitude data will automatically store in RAM and FLASH memory, at this time LED red light fast flashing.

② After the 4G LTE network is restored, the breakpoint resumable function will be started, and the three LED indicators will blink rapidly at the same time (about 200ms fast blinking) and return to the normal function state after completion.

(2) The terminal uses an industrial-grade high-stability LTE module, built-in GSM high-sensitivity antenna, support TCP/IP data transmission, support domain name /IP address connection server;

(3) Built-in large-capacity memory chip, support offline data storage and retransmission; When the drone is in a place where the wireless signal is weak or the interference is serious, the device will temporarily store the data of the drone operation in FLASH, and when the wireless signal returns to normal, the data can be retransmitted to realize no data omission.

(4) Built-in 6-axis acceleration sensor, integration of accurate acceleration algorithm, real-time acquisition of the UAV's current attitude;

(5) High-sensitivity GPS/BDS dual-star positioning module, anti-interference ceramic antenna, more stable star search signal, support A-GNSS fast positioning and tracking, synchronous timing.

11. Hardware Function Description

Items	Function	with	without	Function Description		
Electrical characteristics	Mode of power supply	•		Battery powered		
	Operating voltage range	•		DC 5V/500mA		
	Operating current	•		3.7V/ 90mA average		
	Dormant current	•		3.7V/ Less than 100uA		
	Built-in battery capacity	•		500 mAh (3.7V polymer battery)		
Environmental features	Operating temperature range	•		-20°C -75 °C		
	Storage temperature range	•		-30°C -80 °C		
	Operating humidity range	•		10%-85% RH does not coagulate		
	Communication frequency band	•		LTE/4G	LTE -FDD:B1/B3/B5/B8	
		•			LTE - TDD:B34/B38/B39/B40/B41	
		•		GSM/2G	900/1800 MHz	
	SIM card	•		Standard SIM card		
	Communication antenna	•		Built-in antenna		
	LTE antenna Specifications	•		FPC antenna		
	Positioning mode	•		Beidou +GPS		
	Cold start time	•		32 seconds on average		
	Hot start time	•		2 seconds on average		
	Tracking sensitivity	•		-162 dBm		
	Positioning antenna	•		Built-in antenna		
	Antenna specifications	•		25mm * 25mm * 4mm		
	GPS band	•		L1: 1575.42± 1.023MHz		
	Beidou Band	•		B1: 1561.098±2.046MHz		
	Number of satellite channels	•		64		
	Positioning accuracy	•		<10m (1σ)		
	Timing accuracy	•		<30ns (1σ)		
Accuracy of speed measurement	•		<0.1m/s (1σ)			
External interface	TYPE -C	•		Device LOG output and software download port or GPS output		



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Form factor	Host dimensions (length, width and height)	•		60.2mm (L) *40mm (W) *22mm (H)
	Shell material	•		ABS plastic
	IP protection rating	•		IP65
	Host weight	•		About 41g

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