Contents

Disclaimer

Thank you for purchasing the satellite navigation base station (hereinafter the "base station") of FJ Dynamics (hereinafter the "Company").

Please carefully read all contents of the Satellite Navigation Base Station Manual and understand the specifications and notes of this product before use. Once the base station is used, it shall automatically be deemed that all contents of this disclaimer have been recognized and accepted. This Company assumes no liability for any damage caused by installation, modification or improper use by the user or force majeure (such as lightening stroke, high voltage and collision), or damage of device and parts(including but not limited to parts not specified by this Company) caused by reasons other than product quality.

Notes

Operator requirements

1. The minimum operator age required is 18.
2. The operator must not operate under the influence.
3. The operator must not operate when tired.

Working environment

1. Please use this base station in an open field away from crowds, and ensure that all antennas of the base station are uncovered.
2. Please keep away from crowds, livestock, barriers, electric wires, tall buildings, airports and signal towers, to prevent signal interference during operation.
3. Please operate in good weather conditions (no extreme weather such as heavy rain, heavy fog, snow, thunder and lightning, and strong wind).

Operation specification

1. Do not overbend or fold wires during installation.
2. Please make sure the base station is in a horizontal position when installed.
3. To prevent the base station from moving due to accidental external force during installation and placement, please insert a tripod into the ground to enhance

stability.

4. Please use the battery that comes with the base station for power supply. If the battery needs to be purchased separately, please refer to the specified models.
5. Please comply with the local radio laws and regulations when using the base station.
6. Please turn off other wireless devices of the same frequency band when using the base station.
7. Please use the accessories specified by the Company, otherwise the system may be damaged.
8. Please ensure there is no foreign matter (water, sand, etc.) within each part.
9. Do not dismantle any component of the base station by oneself.
10. The bottom of the tripod is sharp. Please handle with care.
11. To maximize battery life, please remove rechargeable batteries from the base station when not in use.
12. If any connection cable in different parts of the base station is damaged, please stop using and replace it with new cable in time to avoid accidents.

I. Foreword

1.1 Manual purpose

This manual provides guidance for using the base station, with its operational process described simply and clearly, so that users can learn the different operation steps easily, quickly and accurately.

1.2 Technical support

Users enjoy long-term technical support and upgrade services provided for free by FJ Dynamics Technology Co., Ltd. from the date of purchase of this product.

Official website of FJ Dynamics: https://www.fjdynamics.com/en/

II. Product Overview

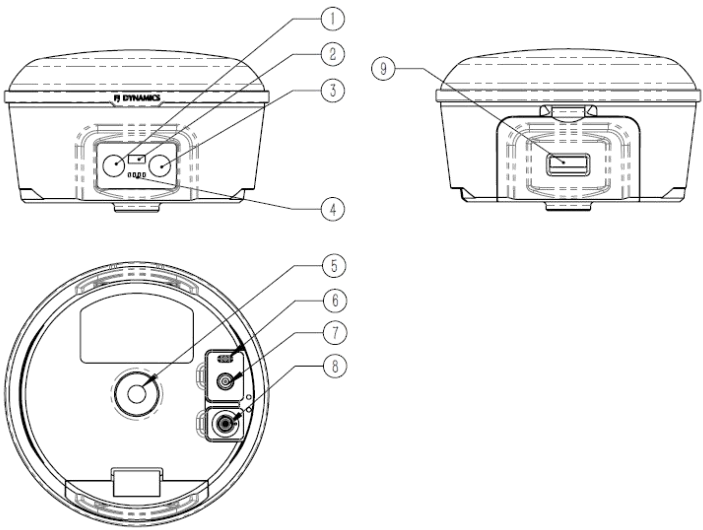
2.1 Introduction

The satellite navigation base station of FJ Dynamics adopts real-time kinematic (RTK) technology and data transmission links to provide precision positioning services.

- Analysis of accurate positioning information with intelligent data algorithm.
- Full coverage of target work area with stable data transmission capacity.

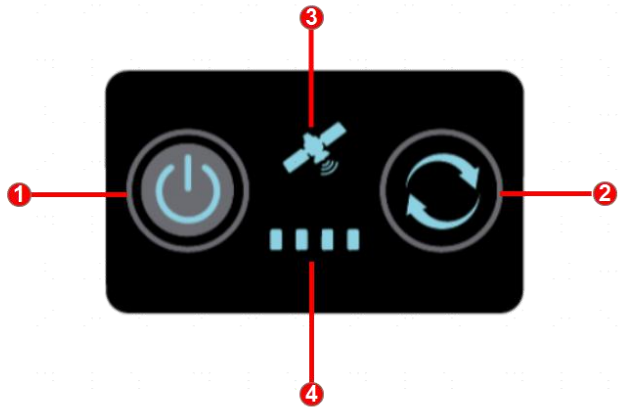
2.2 Main parts

2.2.1 Satellite navigation base station body



1. Switch button
2. GPS indicator light
3. Standby button
4. Power indicator light
5. Threaded hole of fixed rod
6. Type-C interface
7. External antenna interface
8. External power interface
9. Battery cover switch

2.2.1.1 Panel indicator light

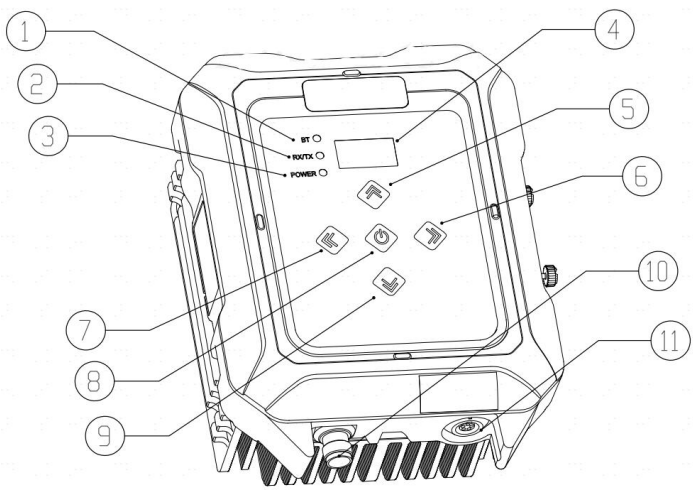


Indicator light	Meaning
① Power light	Blue light on: base station working normally
	Blue light flashes slowly: internal radio channel checking in progress (please wait for 30s)
	Blue light flashes quickly: high-power radio channel checking in progress (please wait for 30s)
	Red light on: base station out of battery or low voltage of external power
	Red light flashing: please check whether the installation site of the base station meets the requirements
② Mode light	Blue light on: mobile base station function enabled
③ Satellite indicator light	Blue light on: positioning
	Blue light flashing: positioning completed
④ Battery level indicator light	When only one of the 4 side-by-side indicator lights remains on, please replace the battery or connect to external power soon.

2.2.1.2 Operating instructions

Operation	How to
Turn on the base station	With the base station off, press the power button until the power light is on, and the base station is turned on.
Turn off the base station	When the base station is turned on, long press the power button until the power light, satellite light and mode light are all off.
Channel Redetection	Press the power button under working status, and the base station will redetect communication channels. After successful detection, the power indicator light will remain blue.
Base station upgrade	When the power light and the satellite light are on, press the power button and the standby button at the same time, base station will start upgrading. Under upgrade mode, the red power light and the green mode light will flash simultaneously. * Please maintain a full battery charge of the base station during upgrade.

2.2.2 High-power Radio



1. GPRS and Bluetooth Signal Light (dual color LED)
2. Wireless Signal Light (dual color LED)
3. Power Light (dual color LED)
4. OLED Display Screen
5. Function Button (Up)
6. Function Button (Right)
7. Function Button (left)
8. Power Button
9. Function Button (down)
10. Radio antenna port
11. Interface of serial port data cable

2.2.2.1 Device Menu

◆ **Device information:**

In the information column, the current channel number, current transmitting frequency, current receiving frequency, current protocol, current transmitting power, battery condition, device model, firmware version, hardware version and serial number are displayed.

◆ **Transmitting/Receiving Channel and Frequency :**

In this menu column, you can set up the current transmitting/receiving frequency, select required communication frequency through up and down buttons, and press the OK key to select this frequency as the current communication frequency point, the character of "*" will appear after selection.

◆ **Data Protocol :**

In this menu column, you can set up the current communication protocols such as TRANSEOT, TRIMTALK and TRIMMK3. Select required communication protocol through up and down buttons, and press the OK key to select this protocol as the current communication protocol, the character of "*" will appear after selection.

Note: After changing the protocol, you need reselect the RF baud rate supported by the current protocol in the menu of "wireless link rate";

◆ **RF Baud Rate:**

In this menu column, you can set up the current communication RF baud rate. Different protocols support different types of RF baud rates. For example, TRANSEOT supports 4800,9600, while TRIMMK3 supports 19200. Select required RF baud rate through up and down buttons, and press the OK key to select this RF baud rate as the current communication RF baud rate, the character of "*" will appear after selection.

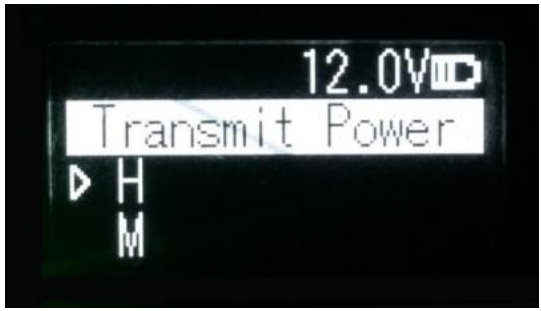
◆ **Transmitting/Receiving Mode :**

In this menu column, you can set up the current radio transmitting/receiving mode. Now, four types of transmitting/receiving modes are supported: transmitting-receiving, single transmitting, single receiving and relaying mode. Select required transmitting/receiving mode through up and down buttons, and press the OK key to select this transmitting/receiving mode as the current communication transmitting/receiving mode, the character of "*" will appear after selection.

◆ **Transmitting Power :**

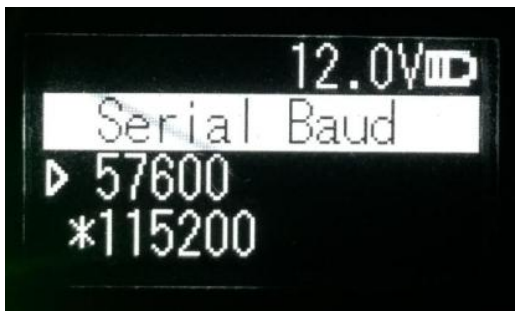
In this menu column, you can set up the current wireless transmitting power level. Now, three levels of power, high, medium and low, are supported, these three levels of power values can be customized according to the demands of users. Select required transmitting power through up and down buttons, and press the OK key to select this transmitting power as the current communication transmitting power, the character of "*" will appear after

selection.



◆ **Serial Port Baud Rate :**

In this menu column, you can set up the current serial port communication baud rate. Now, there are the following baud rates: 9600, 19200, 38400, 57600, 115200. Select required serial port communication baud rate through up and down buttons, and press the OK key to select this serial port communication baud rate as the serial port communication baud rate of the current communication, the character of "*" will appear after selection.



◆ **Serial Port Baud Rate Self-adaption :**

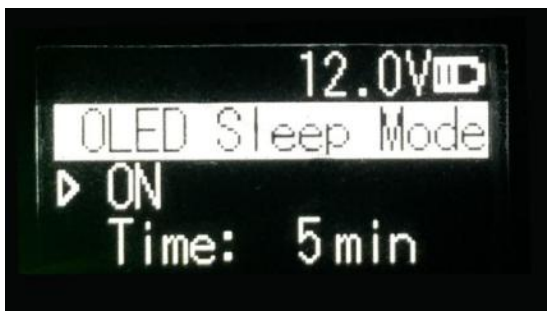
In this menu column, there are two options: self-adaptive master switch and triggering enabling. The former has memory function, if turning on the switch, ON is displayed on the menu; if off, then OFF is displayed; self-adaptive triggering enabling does not have memory function, the system remains in the startup condition after power-on; only if the self-adaptive master switch has been turned on can the adaptive function of serial port baud rate work

normally.

If the serial port baud rate is successfully self-adaptive, a message box pops up indicating successful self-adaptive matching, meanwhile, self-adaptive triggering enabling stops automatically. If the serial port baud rate is not successfully self-adaptive, this function is always operating.

◆ **OLED Sleep Mode :**

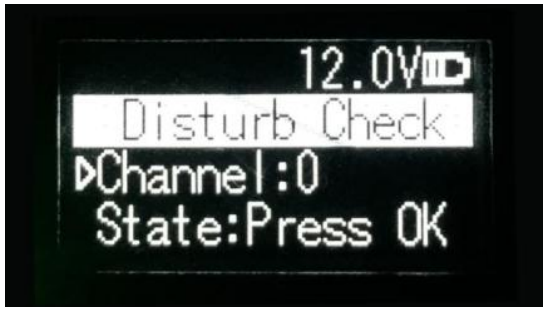
Set up whether the OLED display enters sleep, only if the "Function" switch is in the "On" mode can the OLED display enter the sleep mode, sleep time has the following levels: 1min, 5min, 10min, 15min, 20min, 25min, 30min.



NOTE: After the OLED display enters sleep, you can awaken it through button and pop-up window message.

◆ **Interference Detection :**

Detect whether there is any interference in the current channel. You can modify the detection channel number manually and press the OK key for detection, there are three levels of detection result: superior, moderate, poor.



◆ **Language :**

Set up the display language of device fonts, Chinese and English are supported for this terminal.

2.2.2.2 Notice on Indicator Lights

Indicator Light	Meaning
①BT (GPRS and Bluetooth signal light)	Green light constantly on: Bluetooth connected
	GPRS red light constantly on: GPRS connected
	No light: Bluetooth and GPRS not connected
②RX/TX (wireless signal light)	Red light flashes: Signal sending
	Green light flashes: Signal receiving
③Power (power light)	Green light constantly on: Normal powering
	Red light constantly on: Low voltage

2.2.2.3 Operation Notice

Operation	Operation Method
Turn on the radio	1. Power off the device and then supply power if the radio was previously switched off abnormally, and the radio will be on automatically 2. Press the power button for 1s if the radio was switched off normally
Turn off the radio	Long press the power button for 3s and the radio is off. The indicator light and display screen will be off.
Press on each button	1. Power button: turn on/off the high-power radio; confirm parameters of the menu; 2. Function buttons (left and right): switch between different menus; 3. Function buttons (up and down): select corresponding items in current menu.
Set radio parameters	Please set the parameters of radio as follows for operation: 1. Data Protocol: TRIMTALK; 2. RF Baud Rate:9600; 3. Transmitting/Receiving Mode: Single transmitting; 4. Transmitting Power: High; 5. Baud Rate of Serial Port: 115200.

III. Preparation before use

3.1 Charging

*Please fully charge the battery before first use.

Step 1: Connect one end of the Type-C cable to the power plug of the charger, and the other end to the Type-C interface at the bottom of the battery charger.

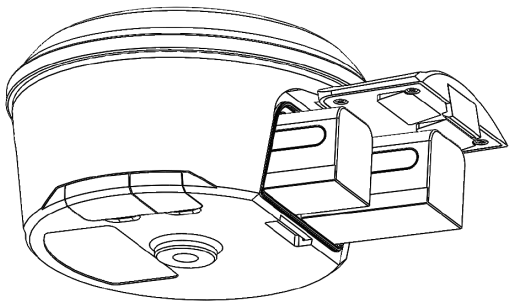
Step 2: Install the battery to the charging base.

Step 3: Connect the other end of the power plug of the charger to an AC power supply (100-240V, 50/60Hz).

After successful power connection, charging will begin as the LCD screen of the charging base lights up, and the current battery level will be displayed on the screen.

3.2 Battery installation and replacement

1. Battery installation: open the battery cover, and insert battery with the cell facing the inside, and the battery will be locked by the metal clips.
2. Battery replacement: this device supports battery replacement with uninterruptible power supply. This device is powered by 2 batteries. Please replace the batteries one by one, and ensure that at least one battery remains inside to power the device. Unless the device is connected to external power supply, do not take out 2 batteries at the same time, otherwise the device will stop working due to interruption of power supply.



Notes:

1. The base station can be fitted with 2 batteries. The estimated service time is 6 hours with one battery and 12 hours with two batteries.
2. Do not charge batteries which are not intended for use by this device, to prevent personal injury and property loss caused by battery damage, liquid leakage and even explosion.
3. Improper use of the charger may result in damage and personal risks.
4. Do not use the charger under wet conditions.
5. Do not dismantle or repair the charger by oneself, to avoid damage to the charger.
6. Stop using the charger if it is stricken heavily.
7. Minors are prohibited from using the charger.
8. Please use the charger within a temperature range of 0℃～40℃.
9. Do not use or store the charger in direct sunlight, near heating devices or in areas subject to high temperature.

10. The charger and its batteries will get slightly hot while charging, which is normal.

11. Please take out rechargeable batteries when the charger is not in use.

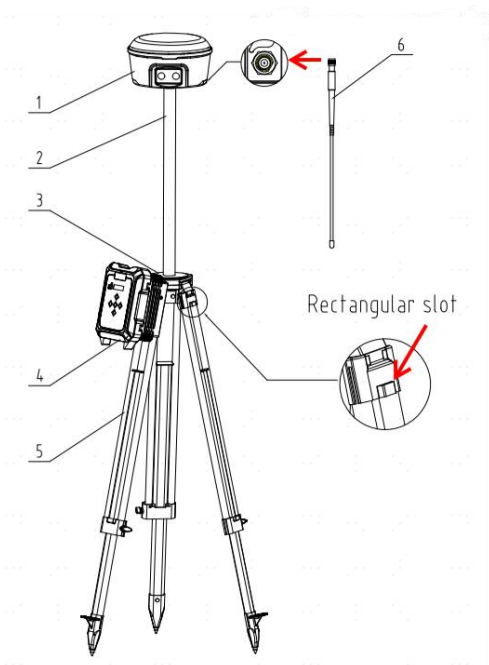
3.3 Base station installation

1. Unfold the tripod, adjust the telescopic rods to a proper length, and then tighten the knob to keep the base level. To ensure stability of the tripod, stick the tip of the tripod into the ground when necessary.

2. Install the radio antenna to the external antenna interface of the base station body, and rotate the base station to fix it on the fixed rod with screw thread.

3. Place the circular plate on the center of tripod surface, tighten the other end of the fixed rod with the bolt on the tripod, and adjust the tripod to ensure the levelness of the base station.

4. High-power Radio can be fixed on the tripod by using the clip-on on radio's back (the upper part of each tripod foot has a rectangular slot for clipping).



1--Base station; 2--Fixed rod;

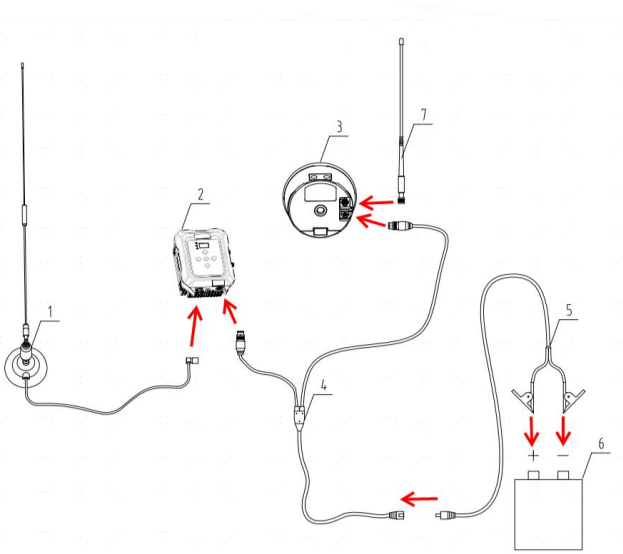
3--Circular plate; 4--High-power Radio;

5--Base station tripod; 6--Radio antenna.

Notice:

1. Whip antenna should be always connected to the base station in internal radio and high-power radio modes.
2. If the position or angle of the tripod or the base station has to be changed, please adjust again to ensure the levelness.
3. The base station should be installed in an open field free of obstacles (such as trees, buildings, etc.) in the surroundings to prevent GNSS signals from being absorbed or blocked.
4. The base station should maintain at least 200m away from high-power radio emission sources (such as high-voltage cable, radio tower and cell tower) to prevent GNSS signals from being interfered by electromagnetic fields.
5. Keep the base station away from large bodies of water and objects which may seriously interfere with the reception of satellite signals to reduce the influence of the multi-path effect.
6. It is forbidden to move the base station during use.

3.4 Connection of High-power Radio



1--5DBi sucker antenna; 2--High-power radio;

3--Base station; 4--Main wiring harness;

5--Power cord with alligator clip; 6--Battery.

7--Radio antenna.

Notice:

1. The base station should connect to external power in high-power radio mode for normal operation;
2. Keep batteries away from raindrops in rainy days;
3. Keep the sucker antenna vertically upward and away from disruption and covering after fastening it;
4. Power adapter is only for external power in internal radio mode.

IV. Use

4.1 Use

4.1.1 Use of Internal Radio

1. Install batteries in the base station and press the power button on the base station control board;
2. The base station is in operation normally when the satellite icon on the control board flashes.

4.1.2 Use of High-power Radio

1. Install Tripod and Connect Cords: please refer to Chapter 3.3 and Chapter 3.4 for installation and connection (high-power radio must be powered by external power);
2. Turn on the Radio and Base Station: For the base station, press the power button until the power light is on; for the radio, press the power button for 1s;
3. Operation Mode: The base station is in operation when the satellite icon on the control board flashes; the radio is in operation when the RX/TX indicator light flashes red light;
4. Check if radio parameters are set according to the reference in Chapter 2.2 and Chapter 2.3. Then check current transmission frequency and record it for frequency matching of vehicle-mounted kit.

4.1.3 Switching between Internal and High-power Radio Modes

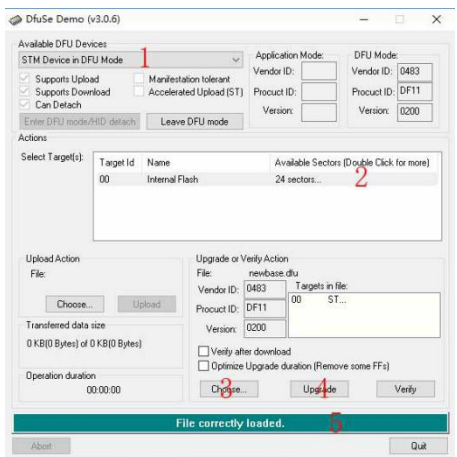
1. Switch High-power Radio to Internal Radio: Unplug the main wiring harness off the base station, and then long press the power button of base station for 3s (the power light turns blue and flashes slowly, meaning that the system is checking channels); then the blue light will be constantly on, meaning that the mode shifting is successful.

2. Switch Internal Radio to High-power Radio: Connect the high-power radio with the base station, and then long press the base station power button for 3s (the power light turns blue and flashes quickly, meaning that the system is checking channels); then the blue light will be constantly on, meaning that the mode shifting is successful.

4.2 Firmware upgrade

Firmware upgrade can be performed through the base station software. The following are the detailed procedures for using the base station software to upgrade the mobile station:

1. Please download the latest version of base station firmware at the official website of FJ Dynamics.
2. Turn on the base station, and use a USB Type-C cable to connect the USB Type-C interface of the mobile base station to the computer.
3. Open the base station upgrade software (provided by technical service personnel).
4. When the power indicator light and the satellite indicator light both remain blue, press the power button and the standby bottom, then the base station will start upgrading. The upgrade mode is indicated by red power light and green mode light.
5. Please follow the steps 1-5 below.



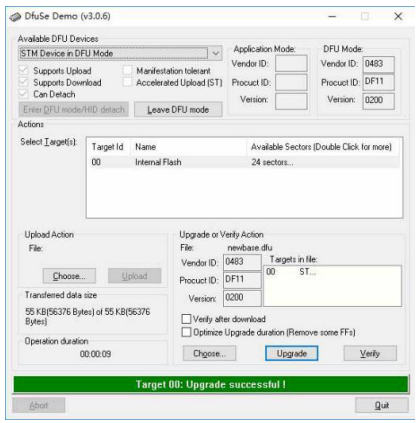
*Step 1: Confirm successful device connection.

*Step 2: Choose the chip for upgrading.

*Step 3: Choose the firmware for upgrading.

*Step 4: Press the upgrade button to begin upgrading, and wait for the status shown in the picture.

*Step 5: As shown in the picture below, when “Upgrade successful!” is displayed, restart the base station.



V. Common faults and solutions

5.1 Common faults and solutions of base station

No.	Fault	Solutions
1	Base station cannot be turned on	If it is powered by battery, please check the battery level.
		If it is powered by battery, please check battery installation.
		If it is powered by external power source, please check the connection between the charging cable and the battery terminal.
2	Base station cannot be charged	Please check whether the charging cable of external power source is properly connected.
		Please check whether the anode and cathode of the battery terminal are connected correctly.

3	No reception of RTK signals	Please confirm that the base station is installed in the working area within a reasonable range.
		Please confirm that there are no obstructions or signal interference within the signal coverage area of the base station.
4	Interruption of RTK signals	If it is powered by battery, please check the battery level.
		Please check for signal interference (such as high-voltage cable, water body, heavy truck and power plant) within the working area.
5	Base station cannot be upgraded	Please check whether the base station is powered on.
		Please check whether the Type-C upgrade cable is connected properly.
		Please confirm whether the base station enters upgrade mode.

5.2 Common faults and solutions of High-power Radio

No.	Fault	Solutions
1	Cannot turn on the radio	Check if the external power cord is well connected
		Check if the electrode is connected correctly
2	Cannot send data out	Check if the parameter settings (frequency, air Baud rate, etc.) of the receiver and sender are the same.
		Check if external antenna is well connected.
		Check if the battery voltage in the threshold value of forbidden voltage.
3	Power light is red and flashes twice every 1s	Current power voltage less than the threshold value of low-voltage alarm and please increase voltage.
4	Power light is red and flashes once every 1s	Current power voltage less than the forbidden threshold value and please increase voltage.

5	GPRS light is red and flashes twice every 1s	GPRS abnormal. Please maintain this function.

Appendix-Specifications

Satellite Navigation Base Station

Satellite Navigation Base Station	Tracking Features		GPS：L1/L2 GLONASS：L1/L2 BDS：B1/B2/B1I/B2I GALILEO：E1/E5b QZSS：L1/L2
	Positioning Accuracy	Single Point Positioning (RMS)	Plane：1.5m Elevation：3.0m
		DGPS(RMS)	Plane：0.4m Elevation：0.8m
		RTK(RMS)	Plane：1cm+1ppm Elevation：1.5cm+1ppm
	Positioning Update Rat		1Hz, 2Hz, 5Hz, 10Hz and 20Hz
	Cold Boot		＜30s
	Warm Boot		＜10s
	Recapture		＜1s
	Initialization Reliability		＞99.9%
	Differential Data Transport Format		RTCM v3.0/3.2
Electrical Characteristics	Power Consumption		≤24W
	Battery		Double battery compartments, 10400mAh 7.4V（single battery 5200 mAh） Mobile station lasts up to 12 hours, support hot plugging
	Power Supply		Input：AC 100-240V 50/60Hz Output：12V 5A
	Battery Charger		1000mA*1 700mA*2(±50mA) 5V input; 1500mA*1 1000mA*2(±100mA) QC9V input;

Wireless Data Radio	Frequency Range	410∽470MHz
	Power	1W
Physical Properties	Dimensions	Φ178*110
	Waterproof and Dustproof	IP65
Working Temperature	-40℃-65℃	

High-power Radio (external)

High-power Radio (external)	Frequency Range	410∽470MHz
	Power	35W
	Channel	25KHz、12.5KHz
Electrical Features	Power Consumption	≤85W
	Working Voltage	9~16V
Physical Features	Dimensions	175(L) X 130（W） X 86.5（H）
	Weight	≈2.0KG
	Water-and-dust-proof	IP67
Working Environment Temperature	-40℃~65℃	

Warranty services of repair, replacement and refund

As China’s leading intelligent agricultural machinery manufacturer with a strong sense of responsibility, FJ Dynamics Technology Co., Ltd. (hereinafter “FJ Dynamics”) provides users of its satellite base station with warranty services of repair, replacement and refund.

Ⅰ. Warranty period of the satellite navigation base station: The warranty period shall be counted from the date of purchase (invoice issuance) until the expiration date of the warranty services of repair, replacement and refund provided herein.

Ⅱ. Within the warranty period of the body and parts of the satellite navigation base station, any damaged part shall be repaired and replaced by the dealer free of charge; if

the warranty period of the damaged part has expired, the user shall purchase the part with repair made by the dealer.

Ⅲ. In case of damage to the satellite navigation base station within the warranty period due to improper use, maintenance and adjustment by the user or other non-quality issues, the user shall purchase the part, and the dealer or FJ Dynamics shall provide free repair service.

Ⅳ. Details of the warranty period of FJ Dynamics satellite navigation base station:

No.	Part	Warranty	No.	Part	Warranty
1	Base station body	2 years	11	Type-C cable	1 year
2	Base station tripod	1 year	12	Charging plug	1 year
3	Fixed rod	1 year	13	AC power cord	1 year
4	Radio antenna	2 years	14	Rechargeable battery	N/A
5	External power cord	2 years	15	Antenna tripod (optional)	1 year
6	Battery charger	1 year	16	Telescopic rod (optional)	1 year
7	Power adapter	1 year	17	High-power Radio	1 year
8	Circular plate	1 year	18	5DBi sucker antenna	2 years
9	Antenna extension cord	2 years	19	Main wiring harness	1 year
10	Antenna adapter	1 year	20	Power cord (with alligator clip)	1 year

Ⅴ. FJ Dynamics reserves all rights for the explanation of this warranty.

AT	BE	CY	CZ	DK	EE	FI
FR	DE	EL	HU	IE	IT	LV
LT	LU	MT	NL	PL	PT	SK
SI	ES	SE	BG	RO	HR	