



RTK Base Station User Manual



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Revisions

Version	Date	Description
1.0	2025.03.11	First release



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Preface

Thank you for using this RTK Base Station. This manual provides detailed hardware installation guide. Please carefully read and follow this manual. If you have any questions, contact FJD customer service at service@fjdynamics.com or the local dealer.

Purpose and Intended Users

This manual introduces the physical characteristics, specifications, operation and use of the product.

Technical Support

- FJD official website: <https://www.fjdynamics.com/>
- FJD customer service: service@fjdynamics.com



Safety Instructions

Before using this product, make sure that you have read and understood this Safety Instructions and all the operation instructions and notes in the *RTK Base Station User Manual*. Follow this Safety Instructions and all applicable local regulations.

Operation Environment:

1. Keep away from people, animals, electrical wires, tall buildings, airports, signal towers, and other obstacles, to avoid interference to GNSS signals and ensure the positioning accuracy.
2. Avoid working in extreme weather such as heavy rain, strong wind, thick fog, snow, and lightning.

Others:

1. Do not disassemble the product without authorization, which may invalidate the warranty.
2. Damages caused by force majeure events, such as lightning strikes, high voltage, and collision, are not covered by the warranty.
3. Use the device in strict accordance with the manual. When connecting cables such as data cables, hold the end of the plug and gently plug or unplug it. Do not pull the plug by force or twist the plug, which may break the pins.
4. Use the regulated power supplies accepted by FJDynamics, and strictly follow the rated voltages, to prevent damaging the radio, the field controller, and the receiver.
5. During charging, keep away from fire sources such as flammables and explosives, to avoid fire and other serious consequences.
6. During operation, do not power the receiver via the Type-C interface and the aviation connector at the same time.
7. Do not plug or unplug cables when the receiver is powered on, and replace the damaged cables in time to avoid personal injury.



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1 About This Document

1.1 Introduction

The RS1-900 RTK Base Station developed by FJDynamics . With the integration of GNSS .It supports standard radio communication within a range of 500 meters and GNSS positioning services.



1.2 RTK Base Station

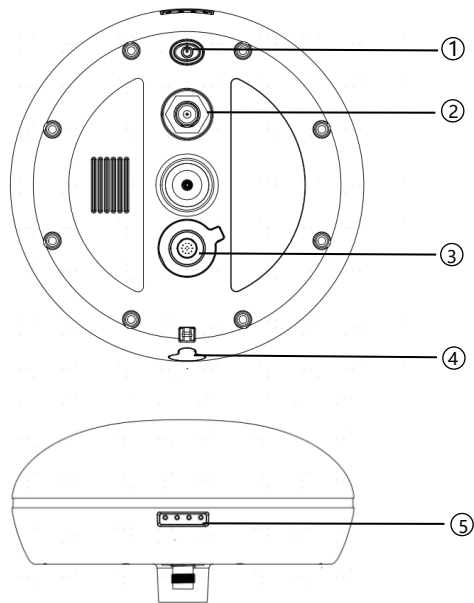


Figure 1.2 Interfaces and indicators

No.	Name	Description
1	Radio antenna interface	For connection to the radio antenna.
2	Aviation connector interface	For data transmission, and connection to an external power supply or an external radio.
3	Type-C interface	For data transmission and charging.



No.	Name		Description
4	Indicators	Power (red, blue, and green)	Green: battery level of 60%-100%; Blue: battery level of 30%-60%; Red: low battery (<30%); Charging: flashes red during charging, and turns solid green after charging is complete.
		Data (blue and green)	Off: The base station does not transmit differential data, or does not start static collection. Solid green: The data link is established after settings. Flashes green: The differential data is transmitted, and the indicator flashes at the transmission frequency. Flashes blue: In the static mode, the indicator flashes at the collection interval when the interval ≥ 1 s, and flashes at 1 s when the interval < 1 s.
		Satellite (red and green)	Off: no satellite tracking; Solid green: fixed solution; Flashes green: positioning but not in the fixed solution status; Flashes red: satellite tracking but not positioning; Flashes green and red alternatively: GNSS board exception.
		Wi-Fi (blue)	Off: no Wi-Fi connection. On solidly: Wi-Fi connection established.
		The indicators are in the following colors during upgrade: Power: green Data: blue Satellite: green Wi-Fi: blue	

**Note:**

- Do not plug or unplug the charger repeatedly during charging.
- Do not disassemble the receiver without authorization. In case of a fault, contact the maintenance staff or your dealer.
- Stop using the damaged pole. Repair or replace it in time.

**Caution****Burn Hazard**

Coverings on the surface of the receiver or the external radio may affect heat dissipation.



Reduce or remove such coverings.



Maintain good ventilation.

**Warning****Sharp Tips**

Sharp tips of the pole may cause personal injury.



Use the pole with caution.

**Danger****Lightning Strikes**

Usage of the antenna and the pole in thunderstorms.



Do not use the antenna and the pole in thunderstorms.



2 Operation Instructions

2.1 Overview

The RTK Base Station is used in conjunction with the RTK machine as accessory. The RTK Base Station needs to be arranged according to the requirements of the RTK machine, or arranged on a tripod as shown in the picture below. Before using RTK machine, please provide power to the base station in advance.

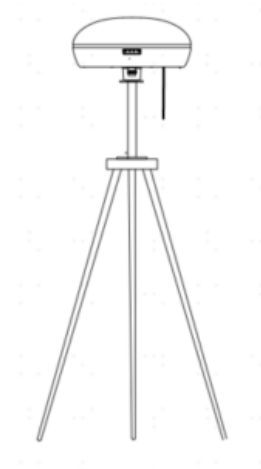


Figure 2.1.1 Inner radio

3 Appendix

3.1 Specifications

RTK



GNSS	Signal tracking	GPS: L1, L1C/A, L2C, L2P, L5
		BDS-2: B1I, B2I, B3I
		BDS-3: B1I, B3I, B1C, B2a, B2b
		GLONASS: G1, G2, G3*
		Galileo: E1, E5a, E5b, E6C*, AltBOC*
		QZSS: L1, L2C, L5, L1C*, L1-SALF
		SBAS: L1C/A, L5*
		IRNSS: L5*
		L-band*
	Items marked with * will be updated with the firmware.	
	Time to first fix	< 20s (cold start)
		< 10s (hot start)
	Signal reacquisition	< 1s
	Pseudorange accuracy	≤ 10 cm
	Carrier phase accuracy	≤ 1 mm
	RTK initialization time	< 5s (baseline < 10 km)
	Initialization reliability	> 99.9%
	Channels	965
	GNSS positioning accuracy	Single-point positioning (RMS): horizontal 1.5 m, vertical 3 m;
		Static differential (RMS): horizontal $\pm (2.5 + 1 \times 10^{-6} \times D)$ mm, vertical $\pm (5.0 + 1 \times 10^{-6} \times D)$ mm D refers to the baseline length, in km.
		RTK (RMS): horizontal $\pm (8 + 1 \times 10^{-6} \times D)$ mm, vertical $\pm (15 + 1 \times 10^{-6} \times D)$ mm D refers to the baseline distance, in km.
	Timing accuracy	20 ns
	Update rate	Raw observation data: 1, 2, 5, 10 Hz



		Real-time positioning data: 1, 2, 5, 10 Hz
	Data format	RTCM2.X, RTCM3.X, CMR, NMEA-0183, RINEX
Wi-Fi	Protocol	IEEE 802.11b/g/n standards
INS	Tilt measurement	10 mm + 0.7 mm/tilt (for a tilt of no larger than 30°, the accuracy is < 2.5 cm)
Built-in Radio	Power consumption	0.5 W/1 W
	Modulation type	GMSK
	Frequency	902 MHz–928 MHz
	Protocol	TRIMTALK, TRIMMARK3, TT450S, TRANSEOT
Power Supply	Voltage	30 W USB PD fast charging Aviation connector: (9–32) V DC
Indicator	Type	Power, data, satellite and Bluetooth
Overall	Size	∅ 162 mm × 86 mm
	Weight	0.85kg
	IP rating	IP67
Ambient Environment	Operating temperature	-30°C to 60°C
	Storage temperature	-40°C to 70°C
	Humidity	95%

Field Controller		
GNSS Performance	Signals received	GPS/BDS/GLONASS
	Update rate	1 Hz–10 Hz
Data Communication	Wi-Fi	IEEE 802.11 b/g/n 2.4G dual-band
Screen and Keyboard	Screen size	5-inch sunlight readable touchscreen
	Resolution	720 × 1280
	Keyboard	30-key keyboard + 2 volume keys + 1 power key



3.2 Warranty

Upholding the user-centered principle, FJ Dynamics Co., Ltd. (FJD), as a leading machinery and smart driving system manufacturer, provides the following warranty for each RTK Base Station:

1. Warranty period: A warranty period of 1 year is granted to each user (including lifetime free software upgrade). The period starts from the invoice date and expires on the date stipulated in this warranty.
2. If the receiver or any of its parts fails during the warranty period, the dealer shall repair or replace the damaged part free of charge. If warranty for the damaged part has expired, the user shall pay for the new part and the repair service provided by the dealer.
3. Within the warranty period, if the receiver is damaged due to improper use, maintenance, or adjustment by the user or for reasons other than product quality issues, the user shall pay for the new part, while the dealer shall provide the repair service free of charge.
4. The dealer shall also provide free training and services for the software system within the warranty period.
5. Warranty period: 1 year for the receiver and 6 months for the accessories.
6. FJD reserves all rights to interpret this warranty.

FJ Dynamics Co., Ltd.



FCC Compliance:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

● 15.105 Information to the user.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a

residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ✧ Reorient or relocate the receiving antenna.
- ✧ Increase the separation between the equipment and receiver.
- ✧ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ✧ Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC RF Exposure Warning Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment shall be installed and operated with minimum distance 20cm between the radiator & body.



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