



FJDTrion™

GNSS Receiver User Manual



■ October 25, 2025 | No.SM0001 Rev.1.0 en-US

© 2025 FJDynamics. All rights reserved.

**Copyright Notice:**

FJDynamics reserves the copyright for this manual and all content herein. No part of this manual may be reproduced, extracted, reused, and/or reprinted in any form or by any means without the prior written permission of FJDynamics.

This manual is subject to change without notice.

Revisions:

Version	Date	Description
1.0	2025.9.25	First release



Disclaimer

- The purchased products, services, and features are stipulated by the contract. All or part of the products, services, and features described in this manual may not be within the scope of your purchase or usage. Unless otherwise specified in the contract, all the content in this manual is provided "AS IS" without warranties of any kind, express or implied.
- The content of this manual is subject to change due to product upgrades and other reasons. FJDynamics reserves the right to modify the content of this manual without notice.
- This manual only provides guidance for use of this product. Every effort has been made in the preparation of this manual to ensure accuracy of the content, but no



information in this manual constitutes a warranty of any kind, express or implied.



Preface

Thank you for using this FJD Trion GNSS Receiver from FJDynamics. This manual provides detailed instructions for use of this product. Read this manual carefully and follow the instructions to operate this product. If you have any questions, contact the customer service of FJDynamics.

Purpose

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

Technical Support

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



Safety Instructions

Before using this product, make sure that you have read and understood the safety instructions and all the operation instructions and notes in the *FJD Trion GNSS Receiver User Manual*. Follow the 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. Damage caused by force majeure events, such as lightning strikes, high voltage, and collision, is 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.



Contents

1 Product Introduction	1
1.1 Overview	1
1.2 GNSS Receiver	1
1.3 Field Controller	8
2 Operation Instructions.....	10
2.1 Overview of Operation Procedure	10
2.2 Measurement Procedure.....	10
2.2.1 Setting Up the Instruments	10
2.2.2 Connecting the Devices.....	15
3 Appendix.....	17
3.1 Specifications.....	17



1 Product Introduction

1.1 Overview

V10L is a GNSS receiver designed, developed, and produced by FJDynamics. Powered by technologies such as RTK, AR, image measurement, voice recognition, and cloud interconnection, the product integrates the positioning, IMU, and wireless communication modules. It features a small size, light weight, and user-friendly design, and is easy to carry, operate, and manage, improving users' hardware and software experience.

1.2 GNSS Receiver

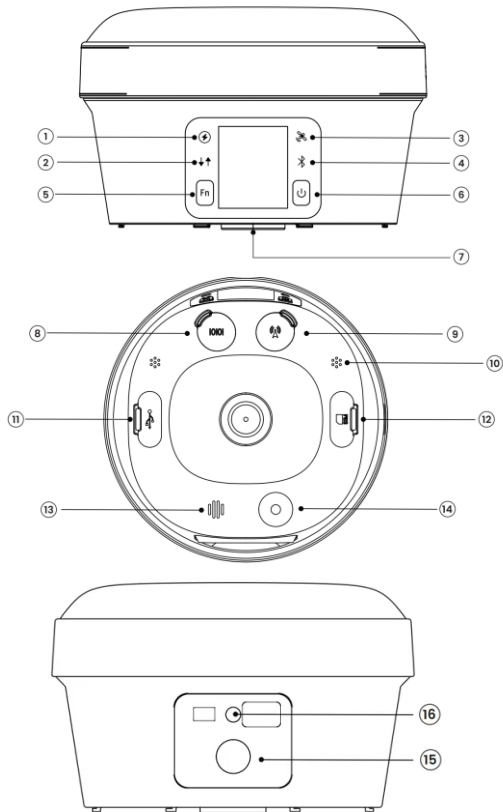


Figure 1.2 Interfaces and indicators



No.	Name	Description
1	Power indicator (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.
2	Data indicator (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. Flashing green: The differential data is transmitted, and the indicator flashes at the transmission frequency. Flashing blue: In the static mode, the indicator flashes at the collection interval when the interval is $\geq 1s$, and flashes at 1s when the interval is $< 1s$.
3	Satellite indicator (red and green)	Off: no satellite tracking; Solid green: fixed solution; Flashing green: positioning but not in the fixed



		solution status; Flashing red: satellite tracking but not positioning; Flashing green and red alternatively: GNSS board exception.
4	Bluetooth indicator (blue)	Off: no Bluetooth connection. Solid on: Bluetooth connection established.
5	Function button	Press this button to select a function.
6	Power button	Press and hold this button for 3 seconds until the screen lights up to turn on the receiver. Press and hold this button for 5 seconds to turn off the receiver. Press and hold this button for 8 seconds to force a shutdown.
7	OLED screen	Show the device information.
8	Aviation connector interface	For data transmission, and connection to an external power supply or an external radio.



9	Radio antenna interface	For connection to the radio antenna.
10	Microphone	For voice input.
11	Type-C interface	For data transmission and charging.
12	SIM card slot	Insert a SIM card into this slot.
13	Speaker	For voice output.
14	Bottom camera	For AR stakeout.
15	Front camera	For image measurement.
16	Laser	Laser emission port



Note:

- Do not plug or unplug the charger repeatedly during charging.
- Charge the receiver at an ambient temperature between 0°C and 35°C.
- Charge the receiver at a well-ventilated place, away from direct sunlight.
- Do not disassemble the receiver without authorization. In case of a fault, contact the maintenance staff or your dealer.
- Repair or replace the pole immediately if it is damaged.



- To ensure the accuracy of image measurement, keep the front camera clean.



CAUTION

Burn Hazard

Coverings on 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

Use of the antenna and the pole during thunderstorms.

- ➡ Do not use the antenna and the pole during thunderstorms.





LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 CONSUMER LASER PRODUCT
EN 50689:2021

a) This warning shall state that viewing the laser output with telescopic optical instruments (for example, telescopes and binoculars) may pose an eye hazard and thus the user should not direct the beam into an area where such instruments are likely to be used.

b) A description of any radiation pattern(s) emitted from the protective housing during the performance of operation and maintenance procedures. Where applicable, this shall include a statement in appropriate units of:

- Wavelength: $520 \text{ nm} \pm 20 \text{ nm}$
- Maximum power or energy output: 0.475 mW



1.3 Field Controller

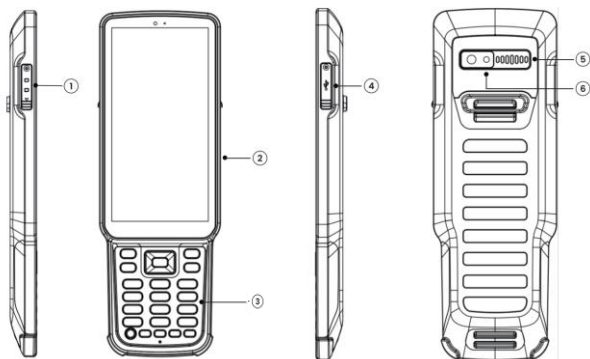


Figure 1.3 Components and interfaces

No.	Name	Description
1	SIM card slot	Insert the SIM card into this slot.
2	Screen	Show the software information.
3	Physical keypad	For information input.
4	Type-C interface	For charging and data transmission.



5	Speaker	For voice output.
6	Rear camera	Take pictures and record videos.



2 Operation Instructions

2.1 Overview of Operation Procedure

This manual describes the main workflow for the first time use of the product.

2.2 Measurement Procedure

2.2.1 Setting Up the Instruments

2.2.1.1 Setting Up the Rover

Fix the field controller bracket on the telescopic pole, install the field controller on the bracket, and mount the receiver on the pole.



Note: Connection to the radio antenna is required in the radio mode, but not in the network mode.

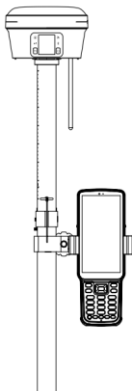


Figure 2.2.1.1-1 Rover

2.2.1.2 Setting Up the External Radio

Set up the tripod over a known point or an unknown point, and install the base station receiver on the extension pole of the tripod, or on the base of the tripod.



Note: When setting up a base station over a known point, use a base purchased separately for centering and levelling.

The external radio of the base station is set up as below.

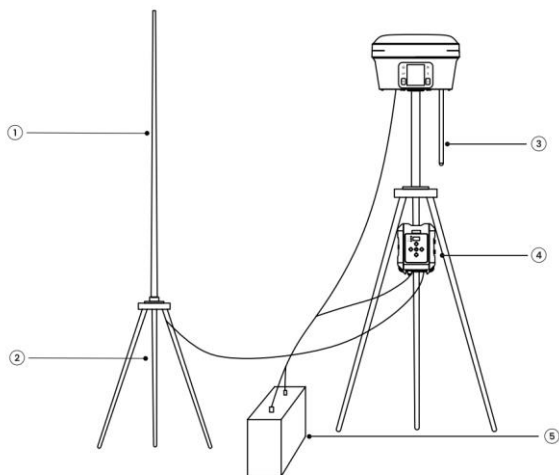


Figure 2.2.1.2-1 External radio

No.	Name	Purpose
1	Radio antenna	External radio antenna.
2	Tripod	Mount the radio antenna on it.
3	Receiver	Receive satellite signals.
4	Radio	External radio.

No.	Name	Purpose
5	Battery	Power the receiver and the external radio. You are recommended to purchase it separately due to transportation restrictions.

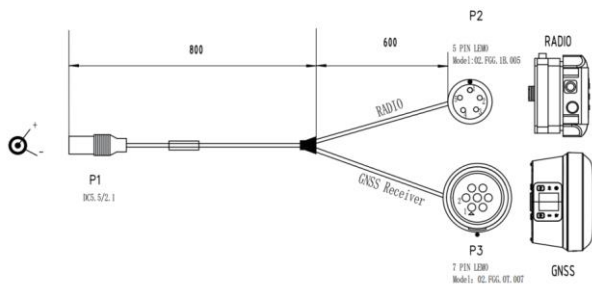


Figure 2.2.1.1-2 Connection of the external radio and receiver

2.2.1.3 Setting up the Internal Radio

Mount the receiver on the tripod and fix the tripod on the ground.



Note: The internal radio covers a range of 5–10 km in open areas without obstructions.

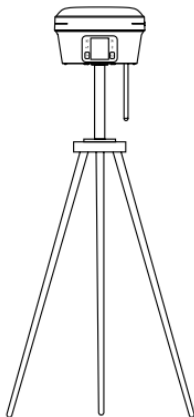


Figure 2.2.1.2 Internal radio



2.2.2 Connecting the Devices

Launch the field controller app, tap **Settings** >

Communication, set **Connection Mode** to **Bluetooth**, and then select the device name that starts with "GNSS" from **Bluetooth Devices**. The connection is successful if **Connected** is shown.

Select "WiFi", find the device name starting with "GNSS" in the WiFi device list and click on it (the initial password is 12345678). If it displays "Connected", it means the connection is successful.

Note: This device will not be sold to the general public, it will be sold to dealers only.

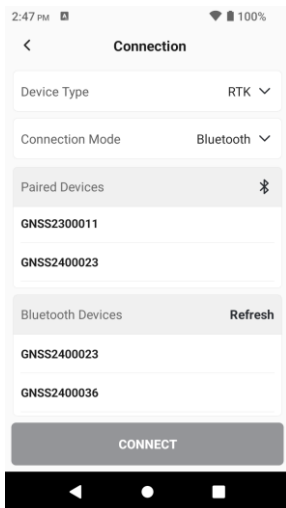


Figure 2.2.2-1 Communication settings



3 Appendix

3.1 Specifications

GNSS Receiver		
System	Operating system	LINUX
	RAM	3 G
	ROM	32 G
GNSS	Signal tracking	GPS L1 C/A, GPS L1C, BDS B1I, BDS B1C, Galileo E1, GLONASS G1, SBAS L1: 1559-1610MHz; GPS L2C, GLONASS G2, Galileo E6:1215-1300 MHz;GPS L5, Galileo E5a, Galileo E5b: 1164-1215MHz;
	Time to first fix	<20s (cold start)
		<5s (hot start)



GNSS Receiver		
	Signal reacquisition	<1s
	Pseudorange accuracy	≤ 10 cm
	Carrier phase accuracy	≤ 1 mm
	RTK initialization time	<5s (baseline <10 km)
	Initialization reliability	>99.9 %
	Channels	1408
	GNSS positioning accuracy	Single-point positioning (RMS): Horizontal: 1.5 m Vertical: 2.5 m
		Static accuracy (RMS): Horizontal: $\pm(2.5+0.5 \times 10^{-6} \times D)$ mm Vertical: $\pm(5.0+0.5 \times 10^{-6} \times D)$ mm D refers to the baseline length in mm.



GNSS Receiver		
		RTK accuracy (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 length in mm.
	AR accuracy	± 2.5 cm
	Image measurement accuracy	± 3 cm (2–15 m)
	Laser measurement accuracy	≤ 2 cm within 5m ≤ 3 cm within 10m ≤ 4 cm within 15m
	Timing accuracy	20 ns
	Update rate	Raw observation data: 1, 2, 5, 10, 20 Hz
		Real-time positioning data: 2Hz
	IMU update rate	200 Hz
	Data format	RTCM2.X (input), RTCM3.X, CMR (input), NMEA-0183, RINEX



GNSS Receiver		
Bluetooth	Protocol	2.1 EDR/3.0 HS/4.2 LE/5.0 LE
Wi-Fi	Protocol	2.4&5 GHz, 802.11a/b/g/n/ac
4G	Protocol	TDD-LTE, FDD-LTE, WCDMA, GSM, EDGE
INS	Tilt measurement	10 mm + 0.7 mm/° tilt (for a tilt of no larger than 30°, the accuracy is < 2.5 cm)
Screen	Size	1.41-inch
	Resolution	320×360 dots
	Brightness	350 cd/m ²
Internal radio	Transmit power	≤2 W
	Modulation type	4FSK
	Protocol	TRIMTALK, TRIMMARK3, TT450S, TRANSEOT, SATEL, LORA
Battery	Battery capacity	7,000 mAh
	Battery life	Base: 10 h Rover: 15 h
Laser	Laser	Class 2M



GNSS Receiver		
		Green 520nm±20nm
Power supply	Voltage	12V DC/2.5A
Indicator	Type	Power, data, satellite, and Bluetooth
Size, weight, and IP rating	Size	Ø130×83 mm
	Weight	970 g
	IP rating	IP68
Environmental requirements	Operating temperature	-35°C to 65°C
	Storage temperature	-40°C to 70°C
	Humidity	100%
	IP	IP68

Field Controller		
System	Operating system	Android 11
	CPU	Octa-core 2.0 GHz processor
	SIM card	Dual card single pass



Field Controller		
	RAM	4 GB
	ROM	64 GB (expandable to 256 GB)
GNSS performance	Signals received	GPS/BDS/GLONASS
	Update rate	1 Hz-10 Hz
Data communication	Bluetooth	BT/BLE
	Wi-Fi	2.4G :2412-2462MHz;2422-2452MHz 5G:5150-5250MHz,5250-5350MHz, 5470-5725MHz,5725-5850MHz
	Network	4G
Screen and keypad	Screen size	5.5-inch sunlight readable touchscreen
	Resolution	720 × 1440
	Keypad	Physical keypad
Battery	Battery capacity	7,700 mAh
	Charging voltage	9 V
	Battery life	≥ 10 h
	Maximum charging current	1.1 A
Size, weight,	Size	221×77.7×16 mm
	Weight	340 g



Field Controller		
and IP rating	IP rating	IP67

FCC Warning

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.

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

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

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

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.

For CE:
In all EU member states, operation of
5150-5350MHz is restricted to indoor use only.



				
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			