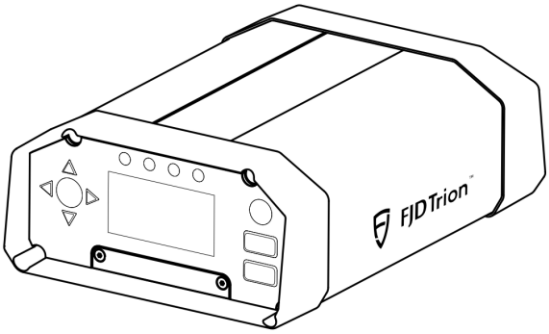
FJDTrion™



N10 GNSS Reference Receiver

Quick Start Guide

June 21, 2024 | Rev. 1.4

Copyright Notice:

Revisions:

Version	Date	Description	Revised By
1.4	2024.06.21	First release	Terry.Qin

Read Before Use:

Operate in strict accordance with this guide.

Failure to follow the instructions may result in device damage and performance degradation.

If you have any questions during use, contact the service personnel.

Disclaimer:

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

Preface

Thank you for using this N10 GNSS Reference Receiver from FJDynamics. This guide provides detailed instructions for quick use of this product. Read this guide carefully and follow the instructions to operate this product. If you have any questions, contact the customer service of FJDynamics.

Purpose

This guide 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, ensure that you have read and understand all the safety instructions and precautions in this guide. You must abide by the safety instructions in this guide and all applicable local laws and regulations.

Operation Environment:

- Keep away from tall trees, high-voltage power lines, tall buildings, airports, signal towers, and other obstacles, to avoid interference to GNSS signals and ensure the positioning accuracy and stability.

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 this guide. When connecting cables such as data cables, hold the end of the connector and gently plug or unplug it to avoid damaging the connector.
4. Use chargers designated by FJDynamics and pay attention to the rated voltage of the receiver to avoid device damage.
5. During charging, keep away from fire sources, flammables, and explosives to avoid fire and other serious consequences.
6. Do not plug or unplug cables when the receiver is powered on. Replace damaged cables in time to avoid device damage and personal injury.

Contents

1 Product Introduction

1.1 Overview

N10 GNSS Reference Receiver is the second-generation receiver developed by FJDynamics. It is a high-precision receiver that supports multiple frequencies from multiple constellations such as BDS, GPS, GLONASS, Galileo, and QZSS. Supporting chip-level multipath mitigation, it can offer millimeter-level carrier phase measurements and centimeter-level RTK positioning.

Being highly reliable and available, it is widely applied to GBAS, precision agriculture, surveying and mapping, deformation monitoring, and machine control.

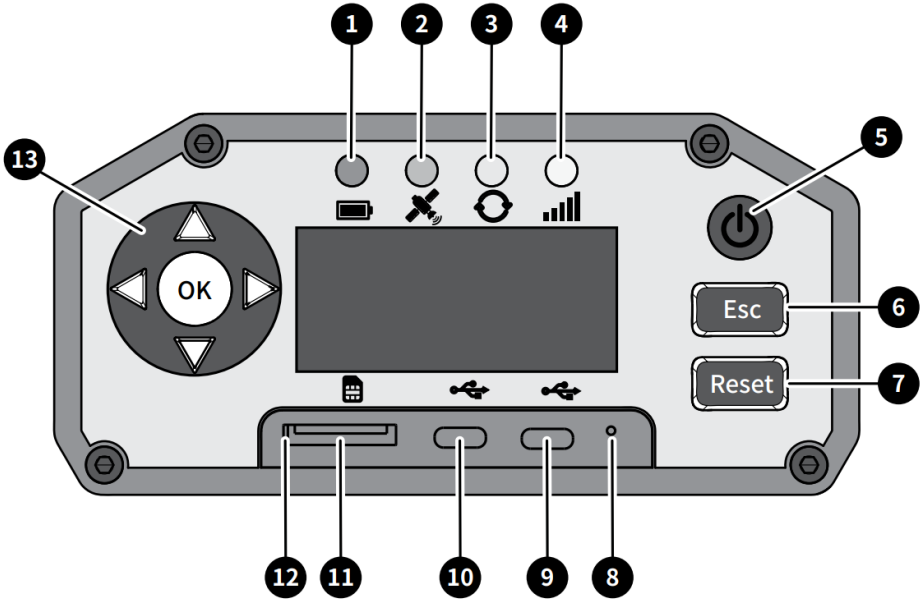
It supports 4G, Wi-Fi, and Ethernet communications. With an aluminum alloy housing and IP67 rating, it is suitable for outdoor applications. The voltage stabilizing and lightning protection features ensure a higher stability.

Highlights:

1. Easy and convenient to use. It adopts an embedded Linux system and allows users to access the web interface via Wi-Fi to configure the receiver, making the operations easy and convenient.
2. Various ports. It comes with a GNSS antenna port, an RJ45 Ethernet port, a USB HOST port, a USB DEVICE port, a COM2 port, a COM1 port, an SMA external clock port, an SMA PPS output port, an SMA EVENT input port, and a 2-pin LEMO external power supply, and charging port, meeting all the input and output requirements of the reference station and peripherals.
3. Huge storage space. It has a storage space of 8 GB, and stores data in files that can be exported via the USB port or the web interface remotely. Stored data will be overwritten after a month.
4. Remote management. The 10/100 Mbps Ethernet port can meet GNSS data transfer requirements. Users can configure the receiver parameters through the LAN, front panel, and remote management. OTA firmware updates are also supported, reducing maintenance costs.
5. Rugged and durable. With an industrial-grade design, rugged aluminum alloy housing, and IP67 rating, it is highly reliable and available.

1.2 Panels

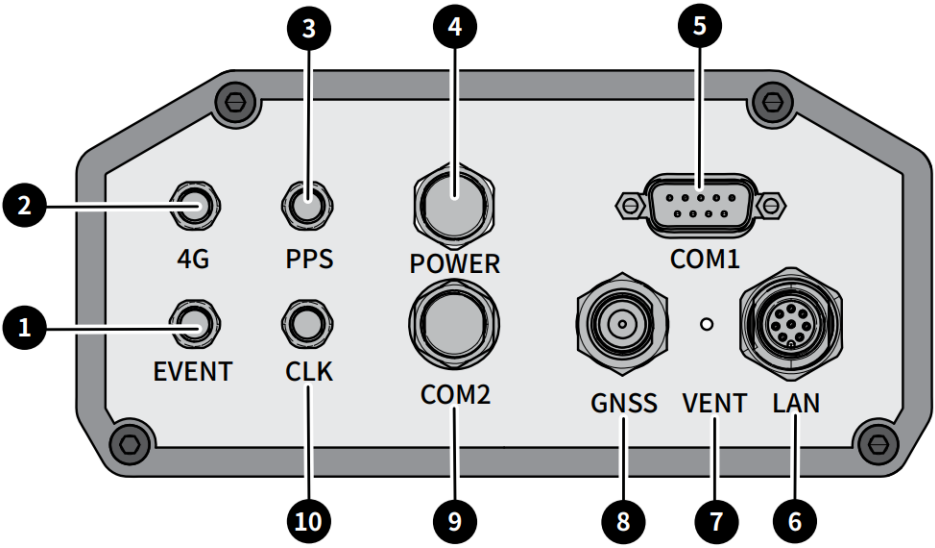
1.2.1 Front Panel



No.	Name	Type	Description
1	Battery level indicator	LED	• Solid blue: With external power supply (charging). • Solid green: The battery level is between 30% and 100% (not charging). • Solid red: The battery level is below 30% (not charging).
2	Satellite tracking indicator	LED	• Off: The receiver does not track any satellite or tracks less than four satellites. • Solid blue: The receiver tracks at least four satellites.
3	Differential correction indicator	LED	• Blinks blue once per second: The base station mode is enabled successfully. • Blinks green once per second: The positioning status in rover mode is fixed solution. • Blinks red once per second: The positioning status in rover mode is single point solution, float solution, or RTD.

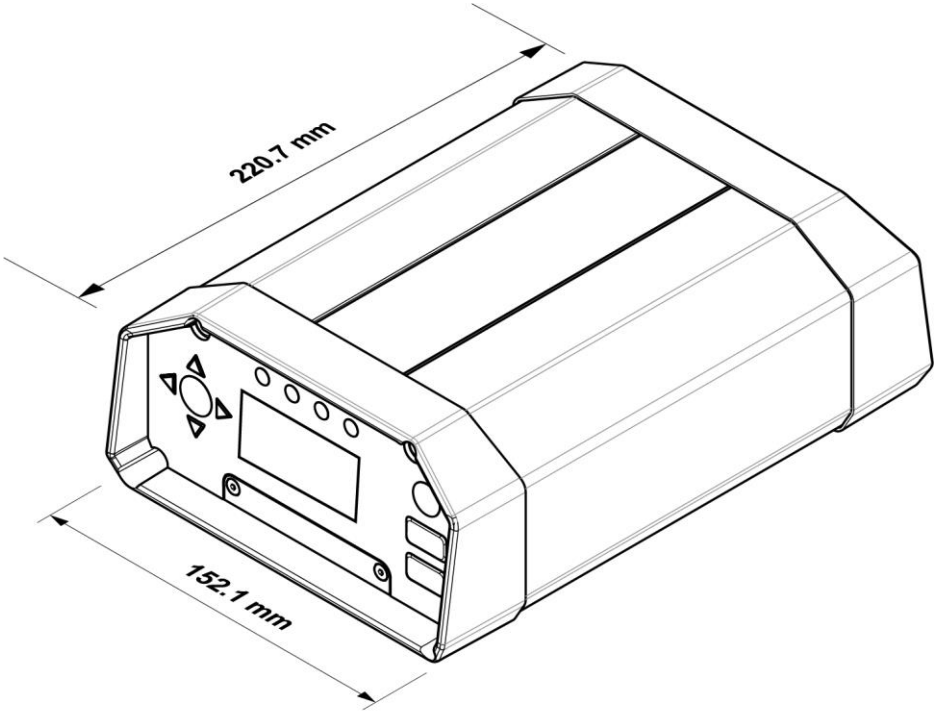
No.	Name	Type	Description
4	Network indicator	LED	• Solid green: Ethernet/4G/Wi-Fi connection works, and data can be transmitted stably. • Blinks green once per second: 4G/Wi-Fi signal strength is poor, and data cannot be transmitted.
5	Power button	Button	Turn on or off the receiver.
6	Escape button	Button	Exit operations on the screen.
7	Reset button	Button	Reset the receiver.
8	Force restart button	Button	Use a card removal pin to press and hold the button for 1 second and then release it, and the receiver will restart automatically.
9	USB DEVICE port	Type-C	Connect to a Type-C cable to burn firmware. Put on the cover and fasten the screws after firmware burning to protect the port.
10	USB HOST port	Type-C	Connect to an external storage device to log data or use a USB flash drive to upgrade the receiver firmware. Use storage devices and USB flash drives from mainstream brands, for example, Kingston and SanDisk.
11	SIM card slot	Micro	Micro-sized IoT SIM cards are supported. Put on the cover and fasten the screws after inserting or replacing the IoT SIM card to protect the slot.
12	Force burning button	Button	Press and hold this button, connect to an AC power supply through the power adapter, turn on the AC power supply, and then release this button to enter the force burning mode.
13	Navigation arrow buttons and OK button	Button	Control the operations on the screen.

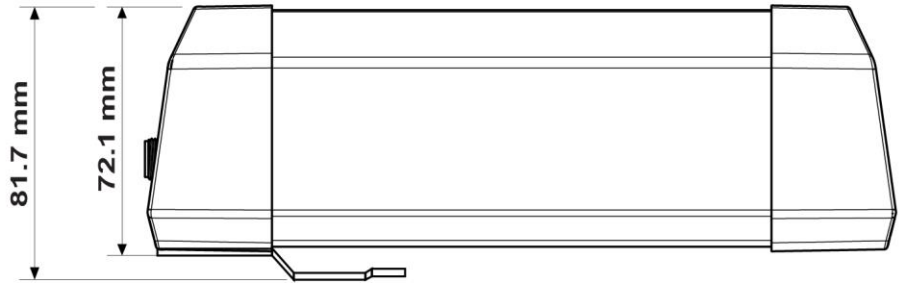
1.2.2 Rear Panel



No.	Name	Type	Description
1	EVENT input port	SMA	Inputs external events.
2	4G antenna port	SMA	Connects to the external 4G antenna.
3	PPS output port	SMA	Outputs PPS signals.
4	External power supply port	2-pin LEMO	Provides power to the receiver.
5	COM1 port	DB9	Configures and transparently transfers GNSS board data.
6	Ethernet port	8-pin LEMO to RJ45	Configures and views the receiver parameters.
7	VENT	N/A	Keeps air pressure at the same level inside and outside the receiver.
8	GNSS antenna port	TNC	Connects to the external GNSS antenna.
9	COM2 port	7-pin LEMO	Outputs receiver data.
10	External clock port	SMA	Inputs external clock signals (reserved).

1.3 Dimensions



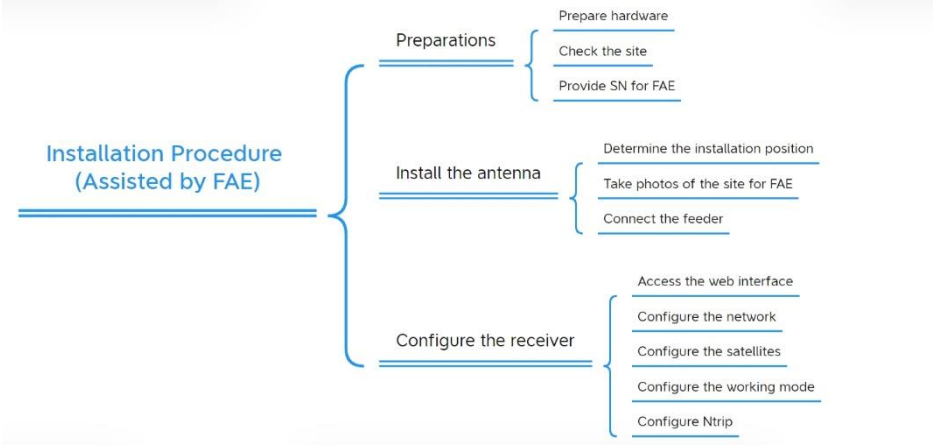


2 Quick Start Guide

2.1 Preparations

No.	Item	Qty.	Description
1	N10 GNSS Reference Receiver	1	
2	Network cable	1	To configure the receiver network. Its length should be decided on site.
3	PC (with a network port)	1	To configure the receiver.

Note: Provide the receiver SN for the FAE before the installation, and the FAE will provide the Ntrip Caster information for you. The SN, such as FJN1023300002ZC, can be found on the nameplate at the bottom of the receiver or on the side of the packaging.



2.2 Installing the GNSS Antenna

To improve the quality of satellite data received by the receiver and minimize problems caused by unstable receiver status, the following requirements must be followed when you install the GNSS antenna.

- Ensure that there is no interfering object within 300 meters of the GNSS antenna. Interfering objects include tall buildings, trees, large areas of waters, beaches, and large areas of photovoltaic panels, as shown below.

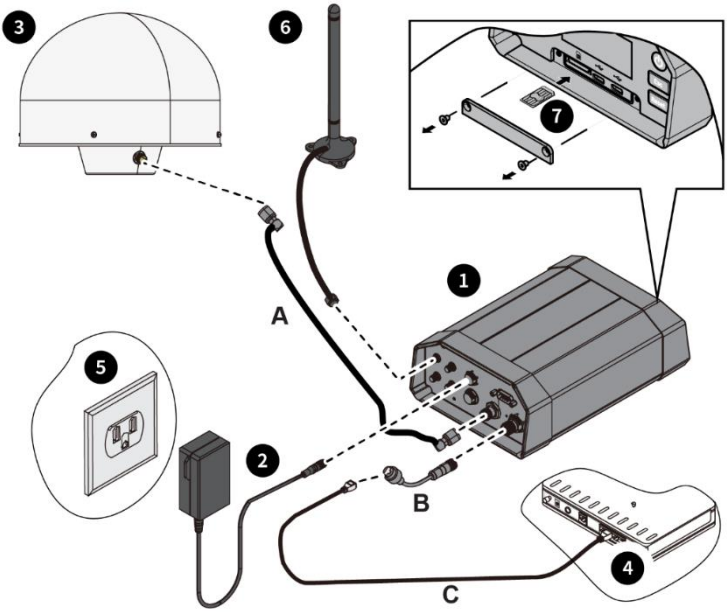


- Ensure that there is no obstruction beyond a vertical angle of 10° above the GNSS antenna. That is to say, there is no obstruction in the line of sight. Setting up the GNSS antenna at a higher position will facilitate the reception of satellite signals.
- Ensure that there is no electromagnetic interference within 300 meters of the GNSS antenna. Electromagnetic interference can be generated by microwave stations, microwave channels, radio transmitting stations, and high-voltage power lines, as shown below.



- The reference station should be set up in areas with easy access to the communication network, stable power supply, convenient transportation, and good public security.

2.3 Device Connections



No.	Name	Remarks
1	N10 GNSS Reference Receiver	N/A
2	Power adapter	N/A
3	Choke ring antenna	N/A
4	Ethernet	External network (to be prepared by the user)
5	AC power supply	External power supply (to be prepared by the user)
6	4G antenna	N/A
7	IoT SIM card	Micro-sized 4G SIM card (to be prepared by the user)
A	Feeder	N/A
B	Network cable adapter	N/A
C	Network cable	To be prepared by the user

2.4 Configuring the Receiver

After connecting the cables as shown above, turn on the receiver and configure it through the following procedure.

2.4.1 Accessing the Web Interface

- Enable Wi-Fi on the PC, find the receiver Wi-Fi "FJN10*SN*", and enter the password "123456789" to connect to it.
- Open a browser and enter 192.168.200.1 in the address bar. Enter the username "admin" and the password "123456" to log in.
- The web interface of the receiver appears.

2.4.2 Configuring the Network

To check the Ethernet/4G/Wi-Fi network status of the receiver, choose Network Settings > Network Status.

Method 1 (DHCP):

- Use the network cable to connect the Ethernet port of the receiver to the Ethernet port of the router or switch.
- Go to Network Settings. Under Wired Network, set Connection Type to DHCP, and click Save. The settings take effect automatically.

Method 2 (static IP):

- Use the network cable to connect the network port of the PC to the Ethernet port of the router or switch.
- Open a browser and access any website to ensure that the network is working normally.
- Go to Settings > Network and Internet > Network and Sharing Center > Ethernet > Details in Windows 10 to access and record the IPv4 address, IPv4 subnet mask, IPv4 default gateway, and IPv4 DNS server information, which are required when configuring the wired network of the receiver. If you are using a different operating system, operations may vary slightly.
- Unplug the network cable from the PC and then plug it into the Ethernet port of the receiver via the network cable adapter.
- Go to Network Settings. Under Wired Network, set Connection Type to Static IP, enter the IP address, subnet mask, default gateway, and DNS information recorded above (enter DNS1 and retain the default value 8.8.8.8 for DNS2), and click Save.

Method 3 (4G network):

- Use a hex wrench to remove the screws from the cover on the front panel of the receiver, take

down the cover (put on the cover after installation and commissioning), and insert a micro-sized 4G IoT SIM card into the SIM card slot as instructed.

- Go to Network Settings. Under Mobile Network, set Network Module to On, and Network Mode to 2G/3G/4G (auto), enter the APN information provided by the carrier, and click Save. The settings take effect automatically.

Method 4 (Wi-Fi network):

- Go to Network Settings. Under Wi-Fi Client, Click Obtain Wi-Fi Name 1 to select the target Wi-Fi name, enter the corresponding Wi-Fi password in Wi-Fi Password 1, and click Save.

2.4.3 Configuring the Satellites

- Choose Satellites > Tracking (Table) > Settings.
- Set Elevation Mask Angle to 15°, and click OK. The settings take effect automatically.

2.4.4 Configuring the Working Mode

- Choose Receiver Config > Reference Station. Under Work Mode, set Mode to Base over known point.

1. If the reference station position is unknown,

- Click Obtain Current Position, set the Sampled Points to a positive integer in the range of 1 to 10,000 (60 by default), and click OK. After the sampling is complete, click Save.

2. If the reference station position is known,

- Enter the latitude, longitude, and elevation, select N or S, select E or W, and click Save.

2.4.5 Configuring Ntrip

- Choose I/O Config > Data Transmission, find TCP Client/Ntrip Server 1 (or any of the other three TCP Client/Ntrip Server links) in the list, and click Connect on the right. On the pop-up, set Protocol to NTRIP, enter the Ntrip Caster information provided by the FAE, including the server IP address, port, username, password, and mountpoint. Under RTCM Data, choose RTCM3.2 and MSM4，and set 1006 and 1033 to 10s, 1074, 1084, 1094, and 1124 to 1s, Ephemeris to 60s, and other settings to Off, and then click OK.
- After the above operations are complete, the FAE will inform you whether the receiver configuration is successful.

Appendix 1 Specifications

Functionality	Positioning	Channels	1,408
		Frequencies	BDS B1I/B2I/B3I/B1C/B2a GPS L1C/A/L2P (Y)/L2C/L5 GLONASS L1/L2 Galileo E1/E5a/E5b QZSS L1/L2/L5
		Accuracy	Single point (RMS) Horizontal: 1.5 m Vertical: 2.5 m
			RTK (RMS) Horizontal: 0.8 cm + 1 ppm Vertical: 1.5 cm + 1 ppm
			Static differential (RMS) Horizontal: 2.5 mm + 1 ppm Vertical: 5.0 mm + 1 ppm
		Update rate	Up to 5 Hz
		Protocols	NMEA-0183, RTCM 2.x/3.x
		GNSS antenna	Survey GNSS antenna or choke ring antenna
	4G network	4G module	Universal
		Coverage	Global (except the Antarctic and Arctic regions)
		SIM card slot	Micro SIM
	Wi-Fi network	Wi-Fi hotspot	For configuring the receiver
		Wi-Fi hotspot properties	Name: FJN10*SN* Initial password: 123456789 Initial IP address: 192.168.200.1
		Wi-Fi client	For receiver networking (connect to a 2.4 GHz Wi-Fi network using DHCP)
	Ethernet	Ethernet transceiver	Transmission speed: 10/100 Mbps

			Initial IP address: 192.168.1.6
I/O	USB	USB port	Compliant with USBIF USB2.0 standards. Max. transmission speed: 480 Mb/s
		Connector Type	Type-C
		Usage	For connecting to an external storage or updating firmware
	LEMO	LEMO connector	2-pin, applicable power supply: DC 9 V–36 V, recommended power supply: DC 12 V
	RJ45	Aviation connector	Ethernet port
	COM1	RS232 connector	DB9 connector
	COM2	RS232 connector	7-pin LEMO
	GNSS	GNSS antenna	TNC connector
	4G	4G antenna	SMA connector
	PPS	PPS output	SMA connector
	EVENT	External event input	SMA connector
	CLK	External frequency standard input	SMA connector, reserved
Power supply	Protection	Input voltage	DC 9 V–36 V AC 90 V–260 V
		Over-voltage protection	Threshold: DC 38 V
		Protection against reverse connection	Supported
	Powering method		Lithium battery of 22000 mAh (under standard conditions); External DC power supply via LEMO connector
	Battery life		>24 h
	Restart		Remote restart supported

Physical and environmental	Power consumption	⩽10 W
	Dimensions	L×W×H: 220.7×152.1×81.7 mm
	Weight	2.08 kg
	IP rating	IP67
	Operating temperature	-40℃ to 65℃
	Storage temperature	-40℃ to 80℃

Appendix 2 Packing List

No.	Item	Qty.
1	N10 GNSS Reference Receiver	1
2	Power adapter	1
3	4G antenna	1
4	Network cable adapter	1
5	Clip	1
6	Plug (The quantity depends on your country/region.)	2 (for EU)
		1 (for US)
		1 (for China)
7	M3 hexagon socket countersunk head screw	2
8	Hex wrench	1
9	N10 GNSS Reference Receiver Quick Start Guide	1
10	Warranty	1
11	Certification	1

!	Note: This is a general packing list. If there is any inconsistency with the actual shipment, refer to the contract. Check the received items against this list or the contract, and contact your dealer if you have any questions.