REACH RS3

Multi-band IMU RTK GNSS receiver

User guide

Version: 1.0

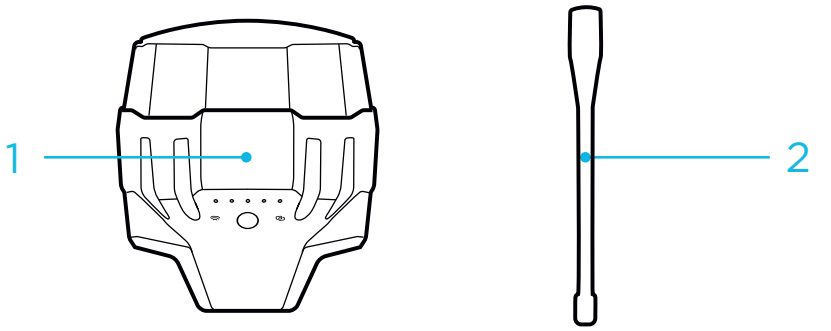
Introduction

Reach RS3 is a multi-band RTK GNSS receiver with a built-in LTE modem and tilt compensation, designed for surveying, mapping, and navigation. The receiver delivers centimeter precision, streams its real-time position in the NMEA format, and records raw data in the industry-standard RINEX format.

Reach RS3 comes with the Emlid Flow app for the configuration of the receiver and surveying.

Package contents

1. Reach RS3
2. LoRa antenna
3. USB Type-C cable
4. User guide
5. Carrying bag
6. Shoulder strap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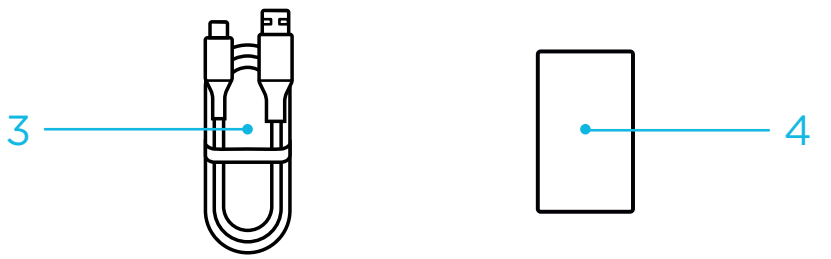
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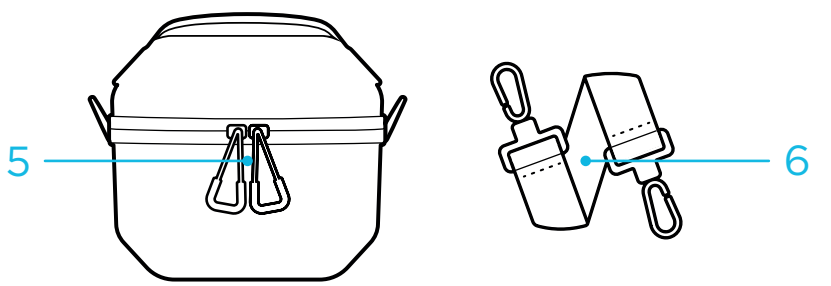
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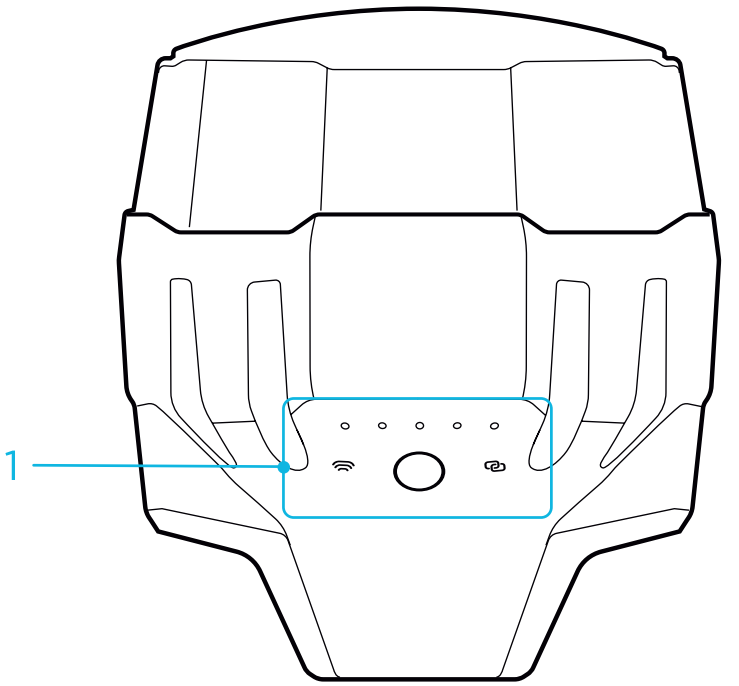
Overview

1. Front panel
2. Extension port
3. Nano-SIM port
4. Ventilation holes
5. Thread mount
6. USB Type-C port
7. Antenna port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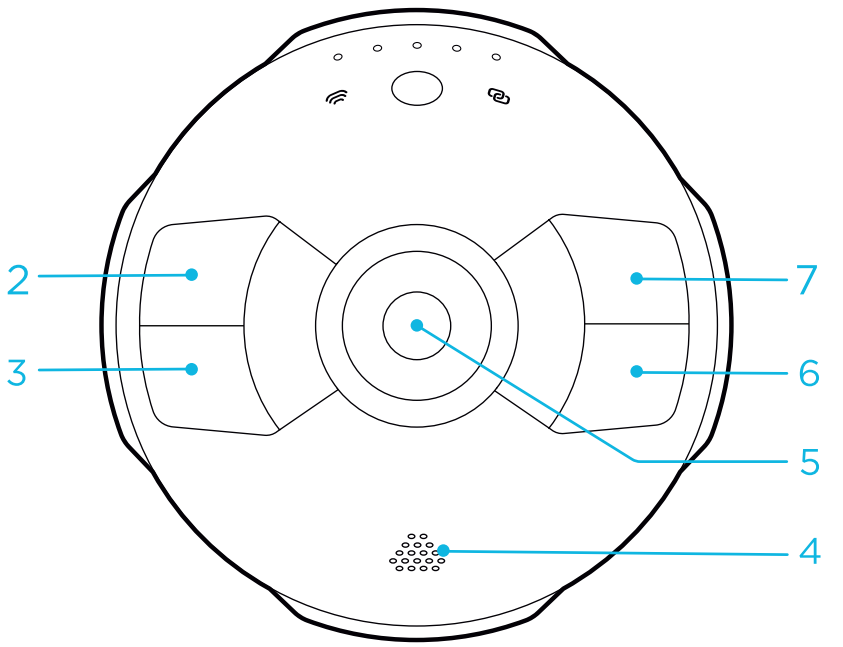
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LED status

1. Battery LEDs

The LEDs indicate the loading state and battery charge.

Running white
Loading

Solid white
Ready for use
Charge level

Blinking white
Charging

Solid red
Low charge

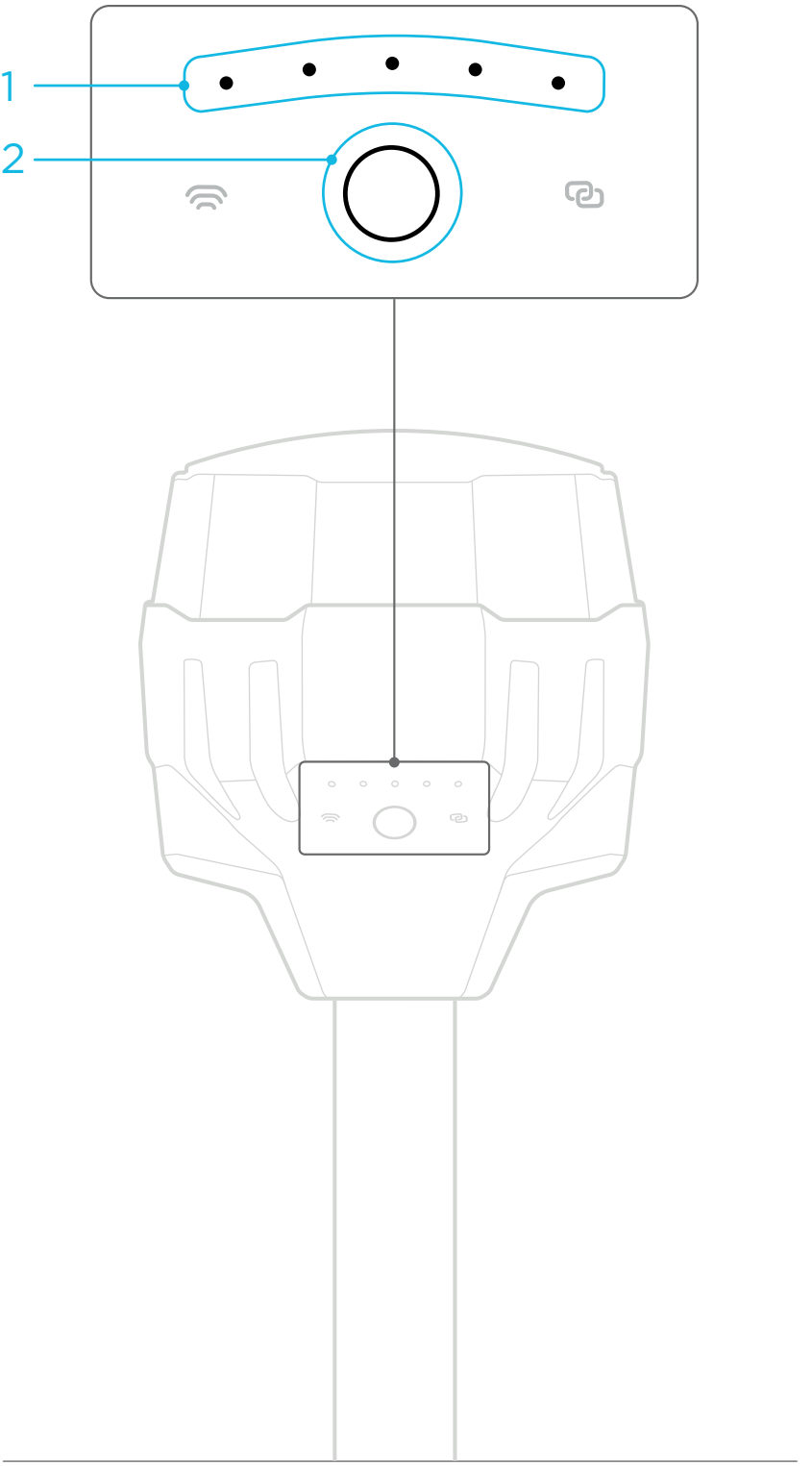
Blinking red
Not enough charge to boot

2. Power LED

The LED indicates the on-state and point collection mode.

Solid white
On

Blinking white
Point collection mode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LED status

3. Wi-Fi LED

The LED indicates the network connection and its state.

Solid white
Broadcasting Wi-Fi

Solid blue
Connected to Wi-Fi

Blinking blue
Scanning networks

4. RTK LED

The LED indicates RTK status and the correction output state.

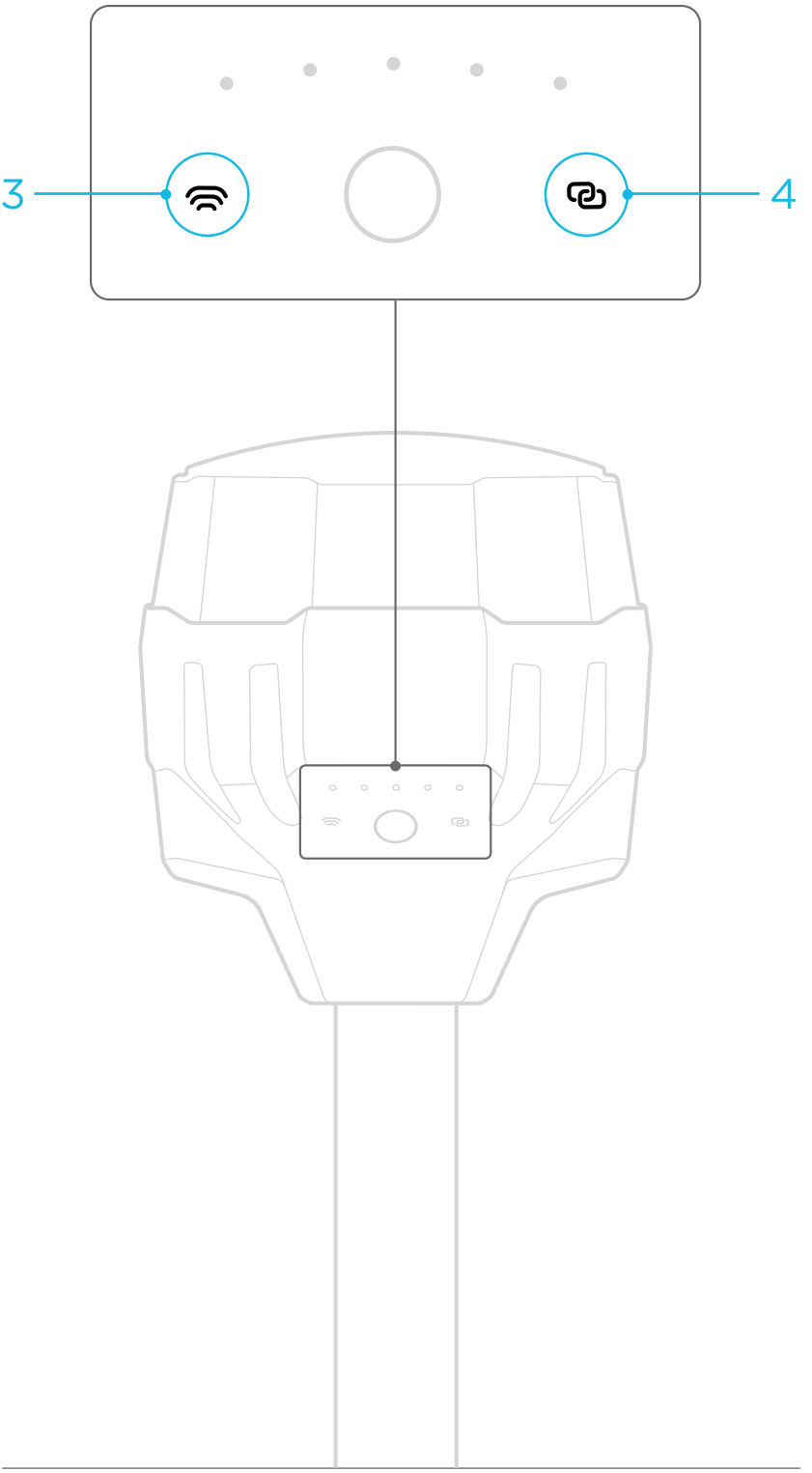
Switching between white and blue every 2 seconds
Correction output is on

Solid white
FIX

Fast blinking white
FLOAT

Slow blinking white
SINGLE

Off
No solution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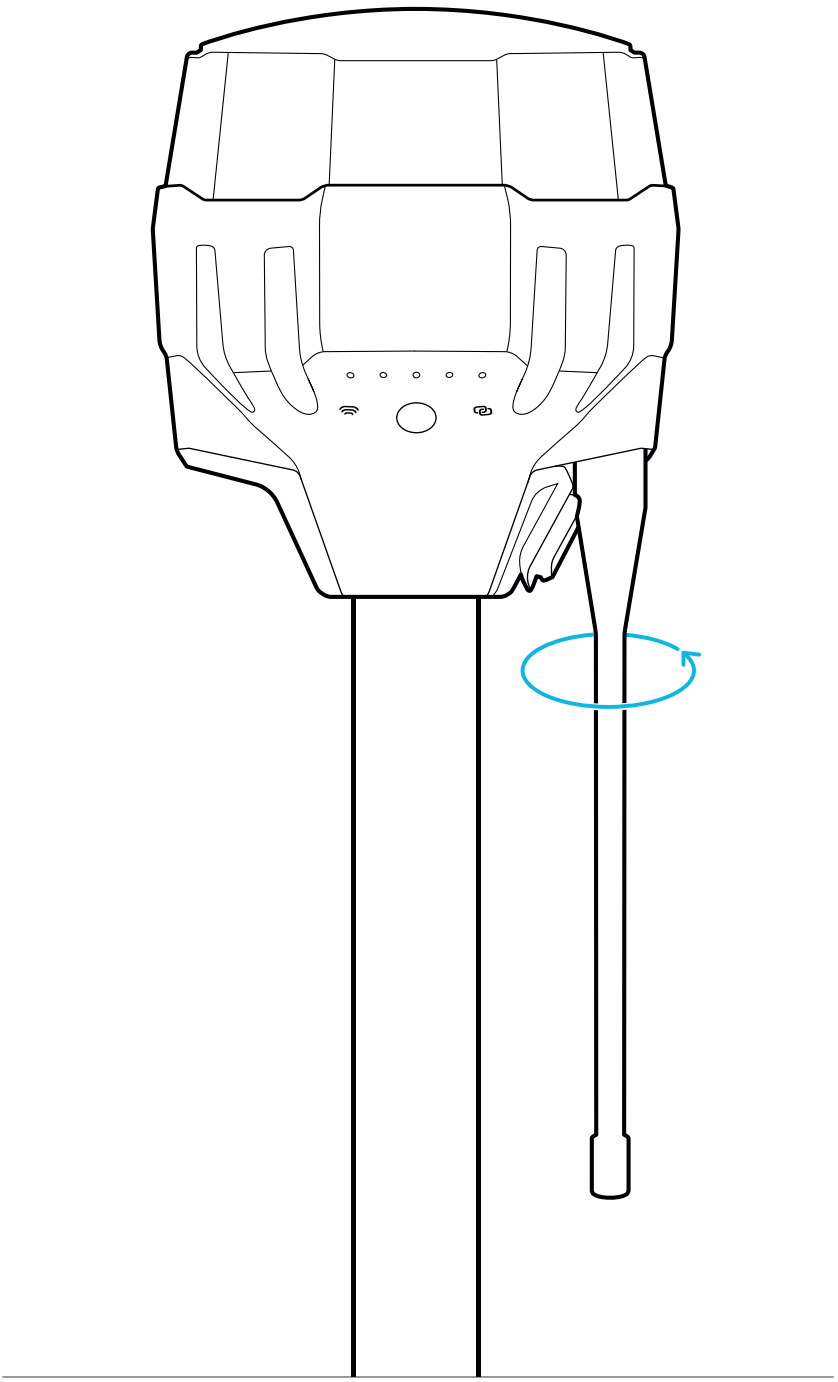
Antenna attachment

To attach the antenna, lift the silicone flap on the LoRa connector and carefully screw in the antenna.

Note: Use only an external antenna that is designed to be used with Reach RS3.

Caution: Antennas are excellent conductors of electricity, so use extreme caution when operating near power lines and other sources of electric current or during stormy weather.



SIM card insertion

To insert a SIM card, follow the steps below:

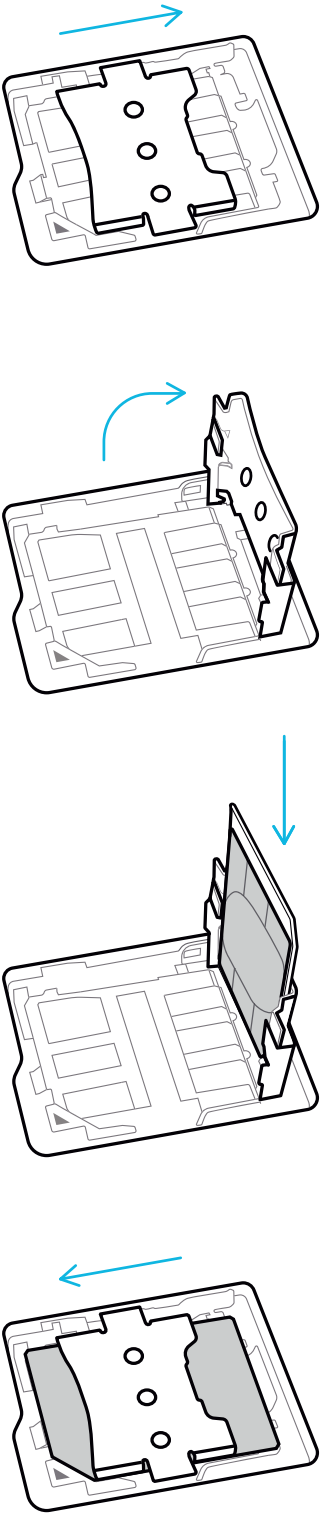
Caution: To prevent slot damage, use it with care.

1. Slide the metallic cover to the right to unlock the slot.

2. Pull the cover up to open the SIM card slot.

3. Insert your SIM card as shown in the picture.

4. Return the slot cover to the horizontal position and slide left to lock the slot.



Installation introduction

If this is your first time using Reach RS3, following these guides will help you to complete initial setup of your Reach.

1.install the RS3 device

1.1 Insert the SIM card into the card slot;
Shown in SIM card insertion Page

1.2 Insert antenna to the polt;
Shown in Antenna attachment Page

1.3 Load the RS3 device on the survey pole by screw

2.install the Emlid flow app
Shown in First Steap Page

3. Connect to Reach RS2/RS2+/RS3

3.1 Setting up wifi connection
Establish the wifi connection between your Reach unit and device

*Power up the unit and wait until it is loaded
*Look at the Network LED of the receiver to check the mode

3.2 Placement

You can place your smartphone near the window in your house and it will obtain GNSS coordinates after somer time,but for RTK such environment wonnot be sufficient. For RTK to work there are special requirements for placing the base.

Operation

Charging

To charge the receiver, take a USB Type-C cable and plug the USB connector to a computer USB port or USB wall charger rated 5 V 2 A.

Note: Reach RS3 supports USB Power Delivery allowing fast charging from USB PD 5 V 3 A compliant adapters.

Powering on/off

To turn on or off Reach RS3, press and hold the power button for 3 seconds.

Hard reset

To hard reset Reach RS3, follow the steps below:

1. Press and hold the Power button for 15 seconds.
2. The Battery LEDs will start blinking, and the receiver will turn off.
3. Turn on the receiver.

First setup

Get started with your Reach RS3 in just three steps:

1. Download the Emlid Flow app.

   GooglePlay AppStore

2. Connect to Reach RS3 over Wi-Fi.

   reach:xx:xx
   emlidreach

3. Launch Emlid Flow on your device.

To explore the Reach RS3 guides, tutorials, and videos, scan the QR-code:

https://emlid.com/docs/

Specification

Positioning

Precision	Static	H: 4 mm + 0.5 ppm V: 8 mm + 1 ppm
	PPK	H: 5 mm + 0.5 ppm V: 10 mm + 1 ppm
	RTK	H: 7 mm + 1 ppm V: 14 mm + 1 ppm
Convergence time		~5 s typically
Signal tracked		GPS/QZSS L1C/A, L2C, GLONASS L1OF, L2OF, BeiDou B1I, B2I, Galileo E1B/C, E5b
Tilt compensation		10 mm + 0.7 mm / °tilt
Number of channels		184
Update rates		Up to 10 Hz

Connectivity

LoRa radio	Frequency	868MHz(Europe) 915MHz(North America)
	Power	0.1W
	Distance	Up to 8 km
LTE modem	Regions	Global
	Bands	FDD-LTE: 1, 2, 3, 4, 5, 7, 8, 12, 13, 18, 19, 20, 26, 28, 66 TD-LTE: 38, 40, 41 UMTS (WCDMA/FDD): 1, 3, 2, 4, 5, 6, 8, 19 Quad-Band, 850/1900, 900/1800 MHz
	SIM card	Nano-SIM
Wi -Fi		802.11b/g/n

Bluetooth		4.0/2.1 EDR
Ports		RS-232, USB Type-C
Data protocols	Corrections	NTRIP, RTCM3
	Position output	NMEA, LLH/XYZ
Data logging		RINEX
Internal storage		16 GB

Mechanical

Dimensions	126 x 126 x 142 mm
Weight	950 g
Temperature	+5...+45 °C

Electrical

Autonomy	16 hrs as LTE RTK rover, 22 hrs of logging
Battery	Li-Ion 5200 mAh, 7.2 V, 37.44 Wh
Charging	USB Type-C 5 V 2 A
Certification	FCC, CE

Safety instructions

To ensure the safe operation of your Reach RS3, observe the following safety instructions:

Caution: Failure to comply with safety instructions can lead to malfunction or damage to the receiver.

- Never disassemble or modify the receiver.
- Keep the receiver free from mechanical stress, shocks, or impacts. Otherwise, the unit may be damaged and/or lose its IP67 protection class.
- Keep the receiver free from moisture, water, and dust.
- Do not expose the receiver to open-flame sources.
- Do not expose the receiver to direct sunlight for a long period of time.

- Observe safety precautions when using the receiver in dangerous places.
- Do not obstruct the ventilation holes of the receiver.
- Do not let foreign objects into the receiver.
- Do not let insecticides, benzene, and thinner come in contact with the receiver.
- Handle cables carefully. Hold the plug when unplugging the cable.
- Do not install the receiver in a confined space. This may negatively affect heat dispersal.
- Do not place any other equipment on the receiver.

Use and care

Although Reach RS3 is designed to withstand challenging environments, it is necessary to handle it with care, follow safety instructions, and comply with the operating limits given in the specification.

Caution: Do not open the receiver, it leads to the loss of warranty. Only certified services are allowed to open the device to assure it will keep its protection class IP67.

Cleaning

To clean Reach RS3 from dirt, follow the steps below:

1. Rinse the receiver with fresh water.

2. Dry the receiver with a soft cloth.

Caution: Do not use heat sources such as air dryers or ovens to dry the device. It may damage the receiver.

Storage

To prepare your Reach RS3 for storage, follow the steps below:

1. Turn off the unit by pressing and holding the power button for 3 seconds. Make sure that the device is off—the power LED should go out.

2. Unplug cables.

3. Store the unit and cables in the case at room temperature.

Note: Check the device every three months and charge its battery to at least 60%.

Transportation

To protect your Reach RS3 from damage, transport it according to the following instructions:

Transportation in the field

Carry the receiver and its accessories in the carrying bag or carry it attached to the tripod upright.

Road transportation

Transport the receiver and its accessories in the carrying bag and properly secure it in a road vehicle.

Railway, air, sea transportation

Transport the receiver and its accessories in the carrying bag and follow the carrier's instructions when applicable.

Note: The receiver contains a non-removable lithium battery. When transporting the receiver by air, observe the applicable national and international rules and regulations.

Regulatory information

Certification

United States of America

Federal Communications Commission (FCC) Statement

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 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.
- This equipment must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

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

European Union

CE Declaration of Conformity

This device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

Recycling and disposal

The product's packaging is recyclable and can be reused. The recycling and disposal of the receiver and its components may vary in accordance with applicable local rules and regulations.

For countries in European Union (EU)

This product and the supplied accessories, excluding the batteries, constitute the applicable product according to the WEEE directive.

If you need more information on your Reach RS3 or technical support, scan the QR code:

https://emlid.com/support/

emlid.com