GUIDELINEGEO | MALÅ

Setup guide

For Emlid RS2 / RS2+ / RS3 with MALÅ GX and EL WR systems and cable

Introduction

This document provides instructions on configuring the Emlid Reach RS2 / RS2+ / RS3 for use with MALÅ GX Controller and EL WR Controller, connected by a serial RS232 cable to the Emlid GNSS antenna.

The following four typical scenarios are defined and described in this guide:

- Single Emlid RS2 / RS2+ / RS3 unit without any RTK correction
- Single Emlid RS2 / RS2+ / RS3 unit using SIM card for RTK correction
- Single Emlid RS2 / RS2+ / RS3 unit using hotspot on mobile device for RTK correction
- Two Emlid RS2 / RS2+ / RS3 units used as base-rover set up

To set up and run the Emlid RS2 / RS2+ / RS3 unit, you will need a mobile phone or a tablet. Download the *Emlid Flow* app from Google Play or App Store to your mobile device. More information on GNSS measurements with Emlid RS2 / RS2+ / RS3 units are available on https://emlid.com/support/reach-rs2/ and https://emlid.com/reachrs3/

Preparing the Emlid RS2 / RS2+ /RS3

Start your Emlid unit by pressing and holding the start button. When started, wait until the battery indicators (nr 1 in the picture to the right) becomes solid. This takes approximately 60 seconds.

Make sure that the Wi-Fi indicator (No. 2 in the picture) is white. This indicates that the Emlid hotspot is active.

> Note: If the Wi-Fi indicator is blue, the Emlid unit is connected to a Wi-Fi hotspot. Connect to the same Wi-Fi network with your mobile device or move the Emlid unit away from the Wi-Fi network (to disconnect from the network). Then restart the Emlid unit and ensure the Wi-Fi indicator is white.

Connecting the Emlid Flow app to the Emlid unit

Make sure you have disconnected your phone or tablet from any Wi-Fi network.

Open the Wi-Fi settings on your phone or tablet and connect to the Wi-Fi network created by your Emlid unit. This is called *reach:xx:xx* Use the password *emlidreach* to connect.

> Note: If the Emlid is connected to a Wi-Fi network, you can connect your mobile device to the same network and proceed as below.

Start the *Emlid Flow* app on your phone or tablet.

Press the refresh button in the app and connect to the correct Emlid RS2 / RS2+ / RS3 unit.

If you have several Emlid units powered on simultaneously, like a base and a rover, both will be displayed in the list.

> Note: You can rename the Emlid units in the Emlid Flow app, for easier differentiation.

> Note: More information is found here
> https://docs.emlid.com/reachrs2/before-you-start/first-setup/
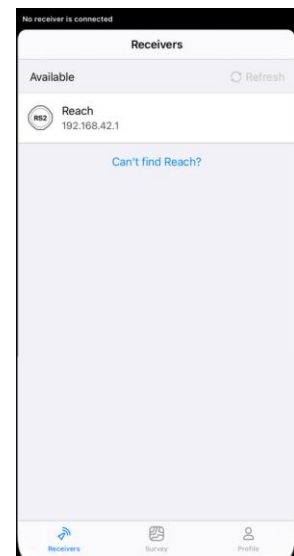
> Note: Please ensure the firmware on the GNSS receiver is up to date by checking on the EMLID Flow App. Failure to do so may result in errors or issues when connecting to the GPR.

Set up for a single Emlid rover without correction

Follow the guide above (*Connecting the Emlid Flow App to the Emlid unit*) to connect your phone or tablet to the Emlid Reach RS2 / RS2+ / RS3 unit.

Go to the Settings menu in the Emlid Flow app and choose Settings and then Position Streaming 1 (Position streaming 2 should be OFF). Set this to Serial and press on the pen symbol to choose RS-232, baud rate (e.g., 9600 or 19200) and format (NMEA).
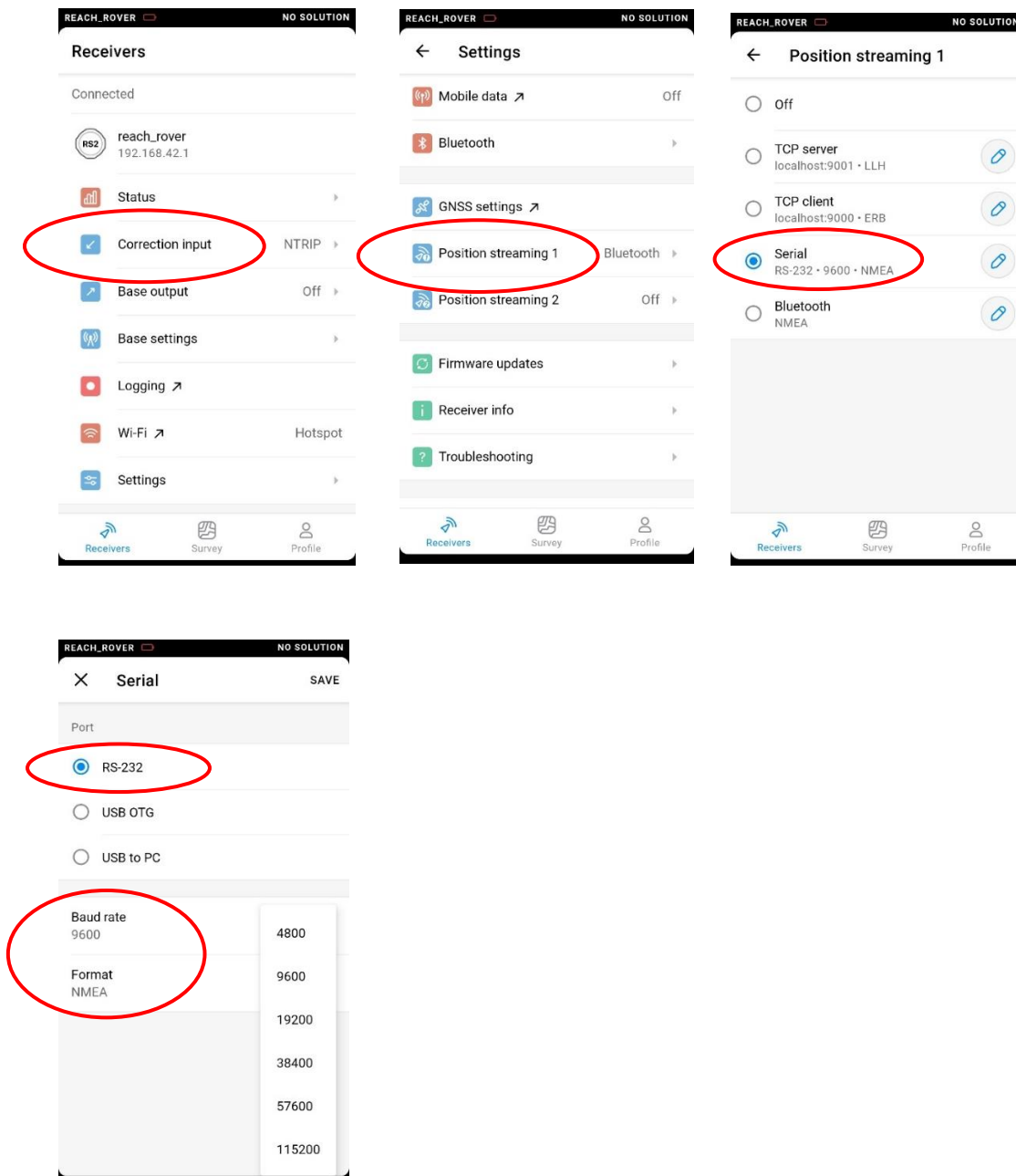
> **Note:** Set the refresh rate of the Emlid unit to 5 Hz or more to receive adequate coordinates to position the GPR effectively.
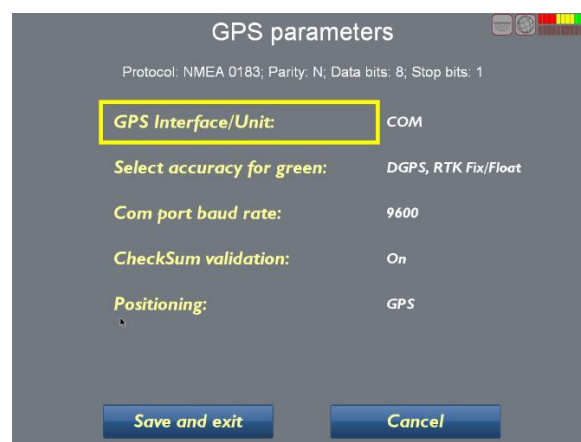
> **Note:** The settings used for Baud Rate must be the same in the Emlid Flow app as well as in the MALÅ GX or EL WR Controller.

Go to the Settings menu [icon] in the MALÅ GX / EL WR Controller, press **NEXT SCREEN >>** and choose **GPS Parameters**

Set the GPS Interface/Unit to COM for communication with RS-232 cable. Now the settings for accuracy, baud rate and checksum can be made.

The Select accuracy for green option allows the user to set the tolerance for the GNSS precision indicator displayed at the top right of the monitor's screen while in operation. High is used when utilizing an RTK GPS.

> **Note:** Select the correct values for the Com port baud rate (the same as in the Emlid Flow app).

GPS parameters

Protocol: NMEA 0183; Parity: N; Data bits: 8; Stop bits: 1

GPS Interface/Unit:	COM
Select accuracy for green:	DGPS, RTK Fix/Float
Com port baud rate:	9600
CheckSum validation:	On
Positioning:	GPS

Save and exit **Cancel**

The CheckSum validation option is used in most cases. For a Leica 1200 Robotic Total station, which delivers an NMEA protocol without checksum, this should be turned OFF.

Connect the Emlid serial cable to the MALÅ Controller (9-pin D-sub connector) and the Emlid unit (to Ext).

When the positioning data is received, the GPS indicator will be green, yellow or red. Coordinate data is also displayed on the lower part of the GPS Parameters window.

*S/N 21-0055907 CBL103 Reach RS+/RS2/RS3 cable 2M with DB9 female connector*

Set up for a single Emlid rover using SIM card

Insert your SIM card (with Internet subscription) into the Reach RS2 / RS2+ / RS3 unit (see blue arrow).

Follow the guide above (*Connecting the Emlid Flow App to the Emlid unit*) to connect your phone or tablet to the Emlid Reach RS2 / RS2+ / RS3 unit.
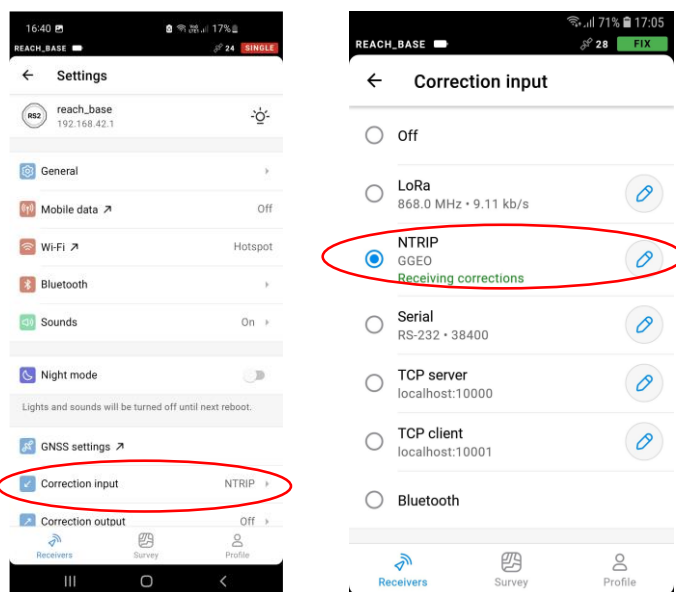
Go to the Mobile data settings in the app, enter a PIN code if needed and fill out the information regarding APN (Access Point Name). When all the information has been added, turn on the Mobile data.
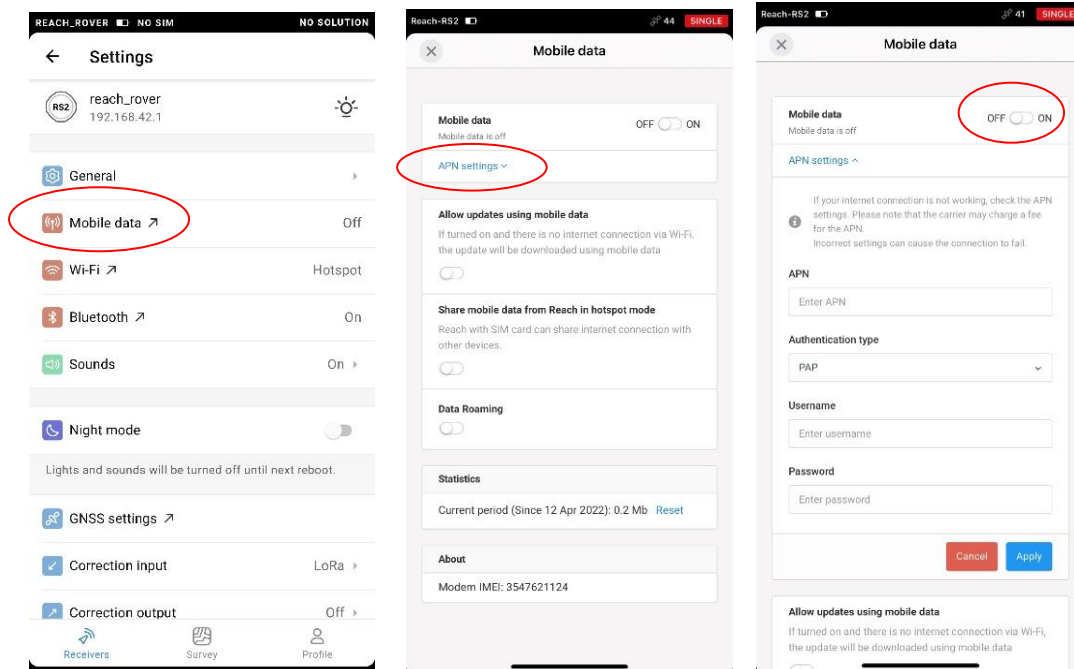
Create an NTRIP (Networked Transport of RTCM via Internet Protocol) profile in My NTRIP Profiles.
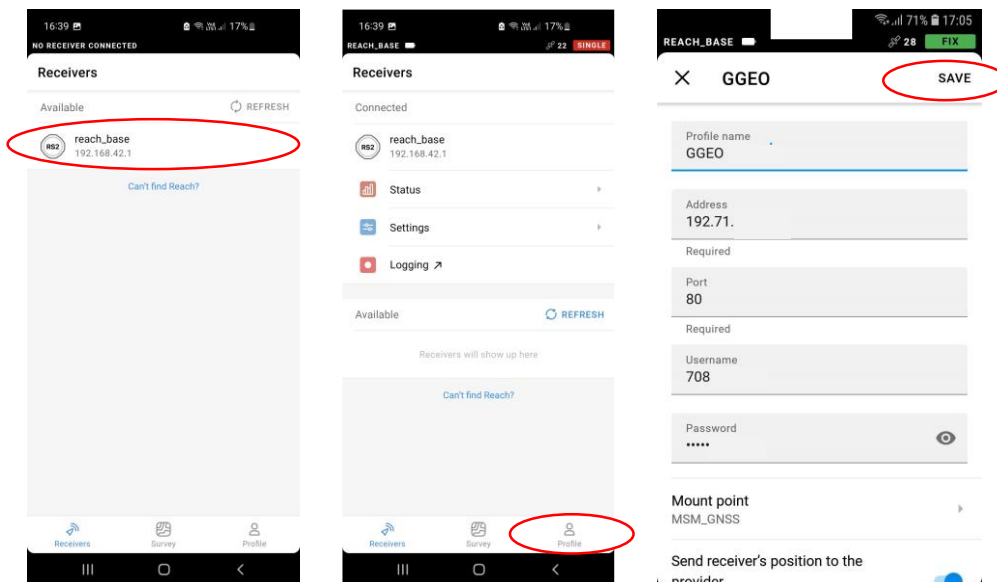
Choose this profile for setting the correction input.

Follow the guide above (*Set up for a single Emlid rover without correction*) for settings on Positioning streaming (serial, baud rate and format) as well as settings for the MALÅ GX and WR Controllers.

Set up a single Emlid unit using hotspot on a mobile phone

If you do not have a SIM card (with Internet subscription) you can use your mobile phone to provide the Emlid with an internet connection.

This will allow the Emlid to receive corrections to your positioning data through an NTRIP (Networked Transport of RTCM via Internet Protocol) service.
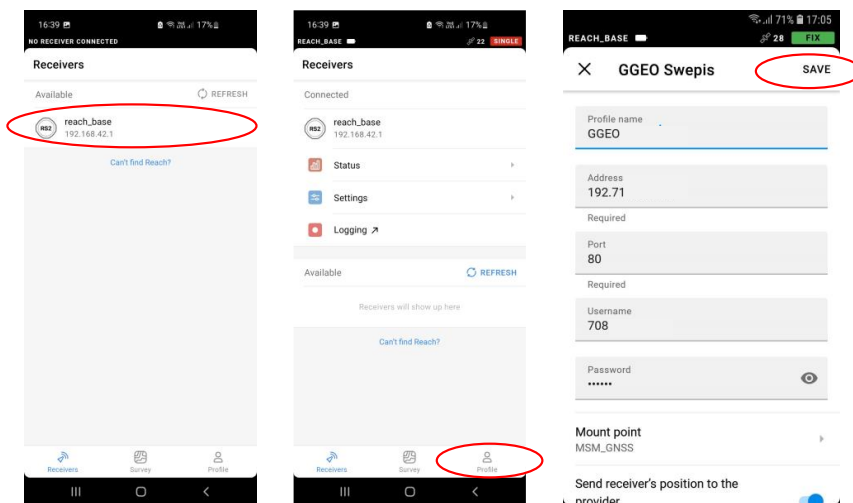
Start by configuring a hotspot on your mobile phone to share your mobile internet.

The hotspot in this guide is named *MALAdemo* with password *mala0123*, you can choose any name you like.
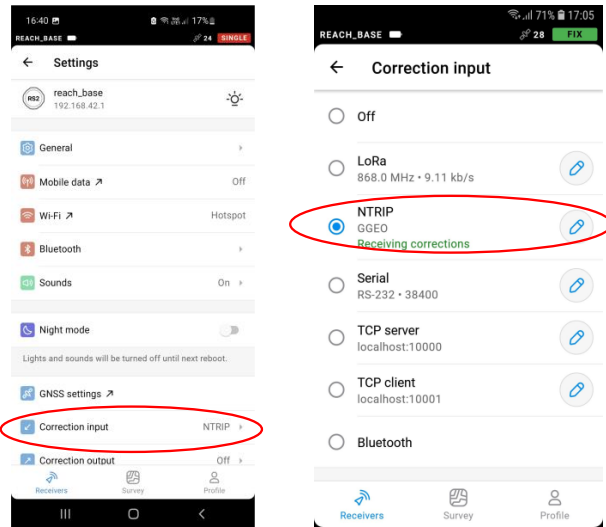
Follow the guide above (*Connecting the Emlid Flow App to the Emlid unit*) to connect your phone or tablet to the Emlid Reach RS2 / RS2+ / RS3 unit.

Create an NTRIP profile in *My NTRIP Profiles*.

Choose this profile for setting the correction input.

Follow the guide above (*Set up for a single Emlid rover without correction*) for settings on Positioning streaming (serial, baud rate and format) including the settings for the MALÅ GX and EL WR Controllers.

Note: The value used for Baud Rate must be the same in the Emlid Flow app and the MALÅ GX or EL WR Controller.

Now follow the sequence below to connect to the Wi-Fi hotspot provided by the mobile phone.
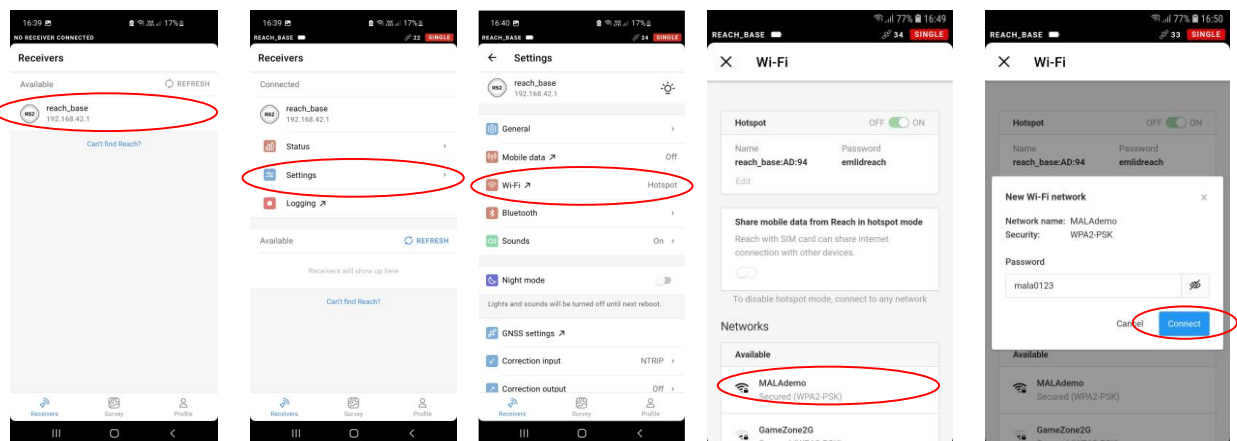
Set up of two Emlid units used as base-rover

If you do not have any correction service via the Internet and NTRIP as explained above, you can use two Emlid units to create a base-rover set up instead.

One Emlid (the base) is mounted on a tripod at a preferably known position or on a fixed, clear and open location, that provides good GNSS reception. The second Emlid unit (the rover) is used as a receiver mounted on the GPR antenna and provides corrected positions by cable to the MALÅ Controllers.

Both Emlid units, the base and the rover, must be equipped with LoRa (Long Range) antennas, to allow correction data to be sent from the base to the rover.

The LoRa antennas are found in the Emlid RS2 / RS2+ / RS3 transport bags

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Note: It is important to set up the base correctly to achieve a good positioning result. For more information visit https://docs.emlid.com/reachrs/ppk-quickstart/placing-the-base

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Base configuration

Follow the guide above (*Connecting the Emlid Flow app to the Emlid unit*) to connect your phone or tablet to the Emlid Reach RS2 / RS2+ / RS3 unit.

Choose *Off* as correction input and *LoRa* for correction output.
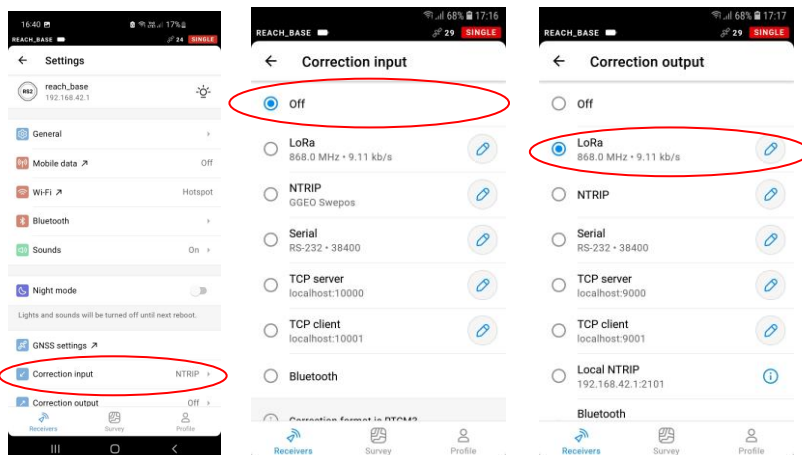
Place the base unit on a tripod at an open spot with good reception of GNSS satellites and restart the Emlid base unit. To achieve the highest level of positioning, leave the base on for several minutes before starting the rover. When sufficient time has passed, switch on the rover and place it at least > 10 m away from the base.

Rover configuration

Follow the guide above (*Connecting the Emlid Flow app to the Emlid unit*) to connect your phone or tablet to the Emlid Reach RS2 / RS2+ / RS3 unit.

Choose *LoRa* as correction input and *off* for correction output.
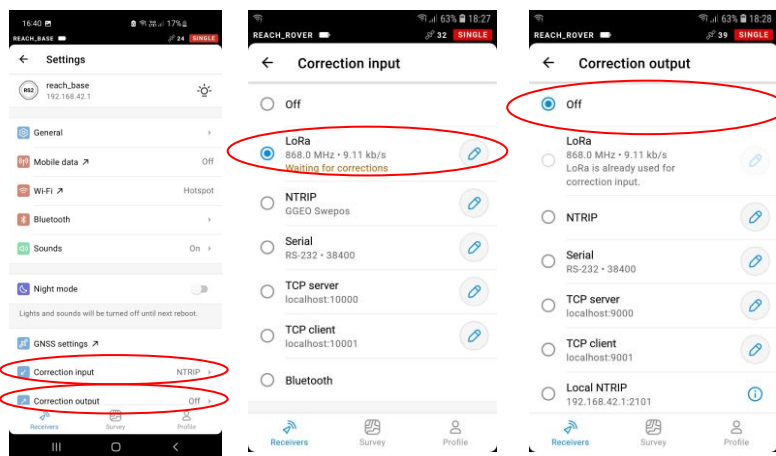
Follow the guide above (*Set up for a single Emlid rover without correction*) for settings on the Positioning streaming (serial, baud rate and format) and the settings on the MALÅ GX and EL WR Controllers.