SOJI
STABILITY

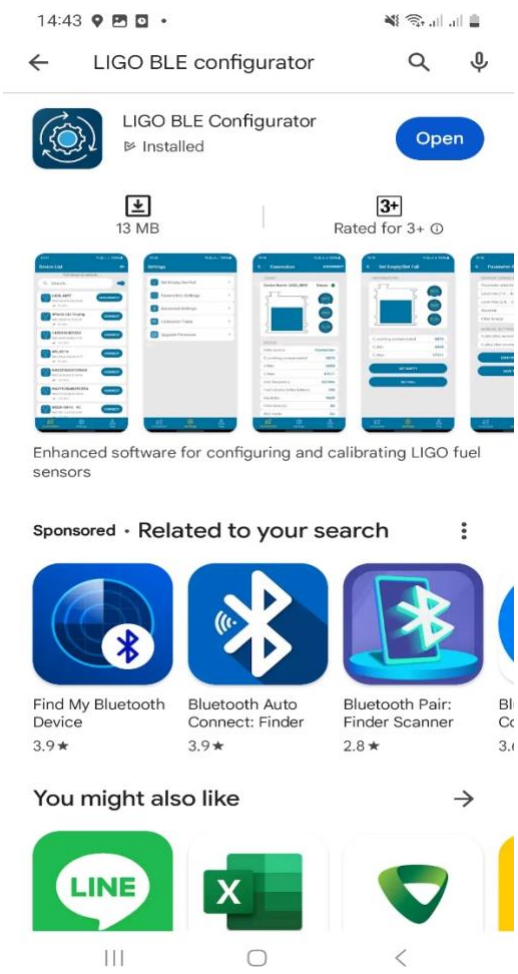
LIGO BLE CONFIGURATOR APP USER GUIDE

March 05, 2024

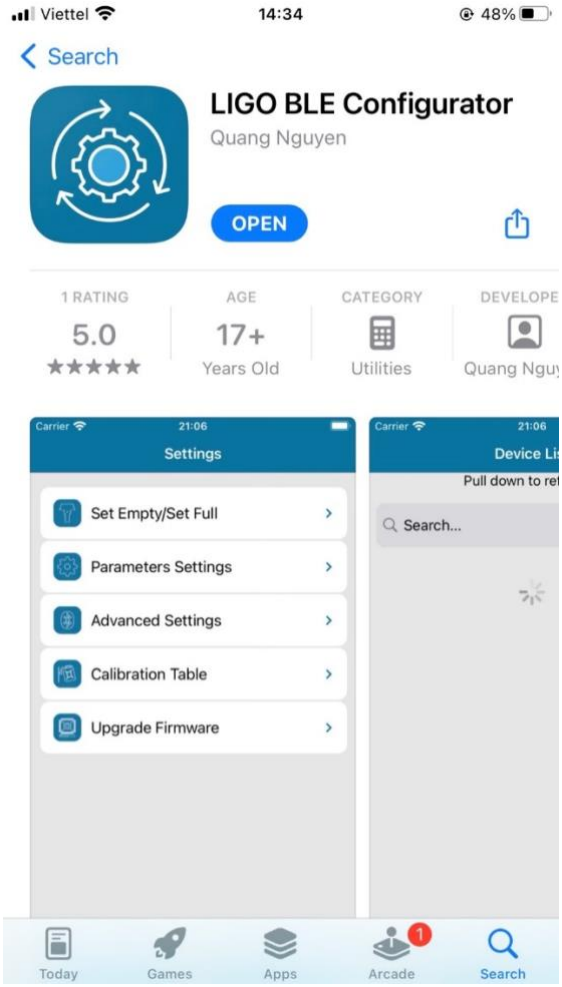
Contents

I. Download the LIGO BLE Configurator App

- Open Google Play/ App Store on mobile phone.
- Search for LIGO BLE Configurator App.



LIGO BLE Configurator on Google Play

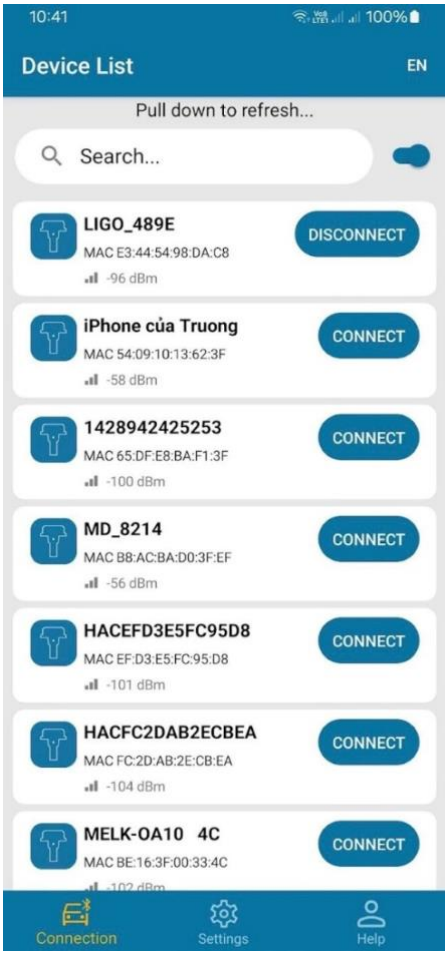


LIGO BLE Configurator on App Store

II. Instructions for using LIGO BLE Configurator App

- Turn on Bluetooth mode on mobile phone.
- Open the app LIGO BLE Configurator.
- In the Connection tab, choose the sensor in the device list by clicking “Connect”.

For example



⚠ ***Error Alert***: If it is unable to set a connection between the app and the sensor, users may encounter one of these following issues:

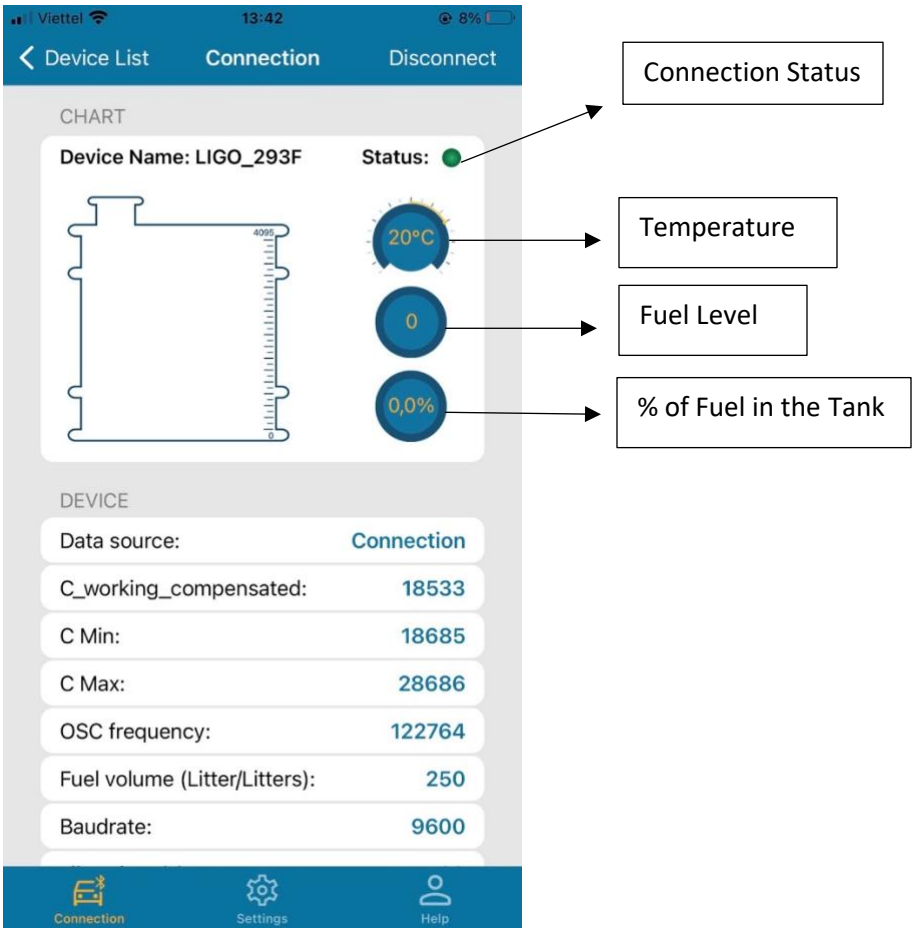
- Bluetooth mode on the phone is not activated
- The sensor is not powered
- The BLE mode on the app is set to "Off" (*To configure the sensor, users need to connect the sensor to the computer*)

Users should thoroughly check to troubleshoot the error. If it still doesn't work, users need to configure the sensor on the computer with the connecting cable or use LMC to check the issue.

Note: Users should stand within a radius of just 2-3 meters from the sensor to ensure accurate data connection.

1. Connection

1.1. Chart



- Status: It shows the connection status of the sensor with the app.

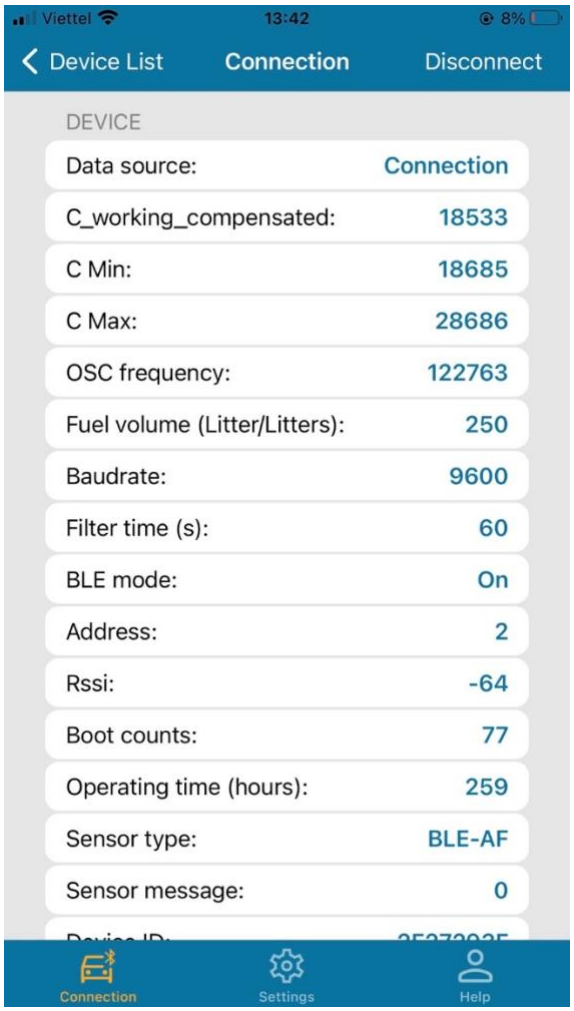
Green: Connected

Red: Disconnected

- Fuel Level: From 0 to 4095.

- % of Fuel in the Tank = The value of “Fuel Level” / 4095 (%).

1.2. Device



Data Source: Connection.
C-working-compensated: The actual compensated capacitance derived from the raw data (compensated for factors such as temperature).
C_min: The lowest capacitance of the sensor.
C_max: The highest capacitance of the sensor.
OSC frequency: Initial measuring generator frequency (Hz).
Fuel Volume (Litter/ Litters): The actual fuel volume in the fuel tank.
Baudrate (bit/s): From 2400 to 115200. Default value: 19200 bit/s.
Filter Time (s): The output signal processing time. Default time: 60 seconds.
BLE Mode*
Address: The network address for the sensor in the RS485 bus.
Rssi: The signal strength of Bluetooth.

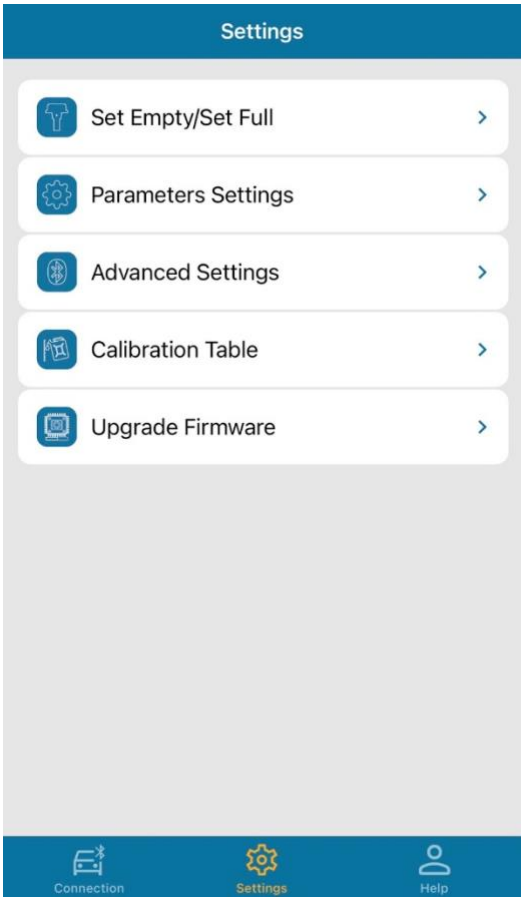
Boot Counts: The number of sensor restarts (power cycles).
Operating Time (hours): Total operating time of the sensor (in hours).
Sensor Type: Signal output of the sensor (AF, RS232, RS485).
Sensor Message: Sensor working message.

Sensor Message	Transcript of the malfunction	Possible Solution
255 or 254	Calibration error	Check if the measuring probe's actual size value is inserted correctly and (or) re-calibrate the sensor
253	Short circuit in measuring probe tubes	Wash the measuring probe tubes with clean fuel, clean fuel tank of mud and water
252	Calibration error	Check if the measuring probe's actual size value is inserted correctly and (or) re-calibrate the sensor
251	Hardware failure	Contact supplier
250	Calibration error	Check if the measuring probe's actual size value is inserted correctly and (or) re-calibrate the sensor

Device ID: IMEI of sensor (unique ID).

2. Settings

The interface of the Settings tab with 5 different setting categories:



2.1. Set Empty/ Set Full

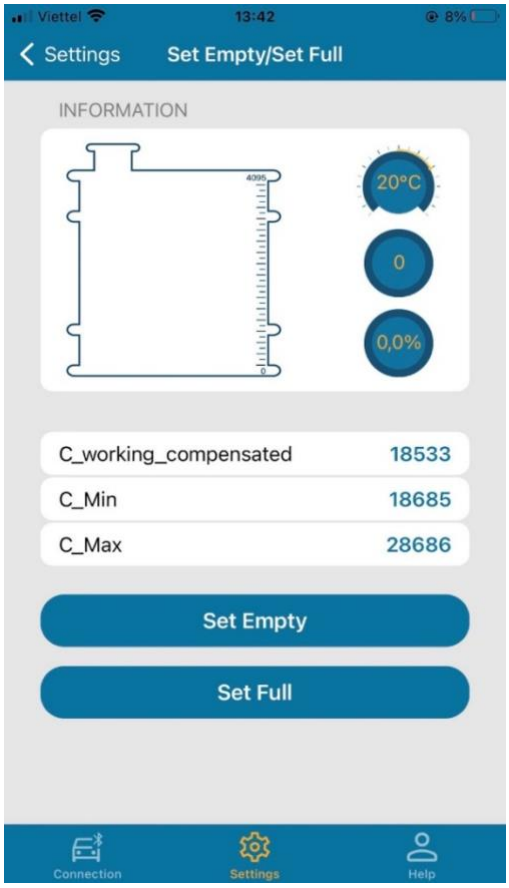
When the tubes of the LIGO BLE sensor are extended or shortened, users need to recalibrate the full and empty levels for the sensor.

Set Empty

- Keep the sensor outside the fuel and allow the fuel to flow down the measuring piece for 1 minute.

Note: Do not touch the top part of the measuring tube.

- Press the "Set Empty" button **(Default password: "1234").**
- Wait for the sensor to complete the step.



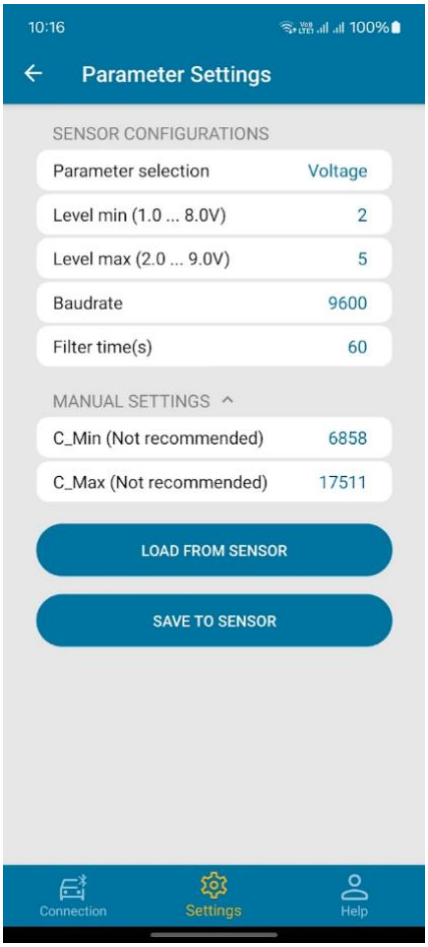
Set Full

- Immerse the LIGO BLE sensor in the fuel to the full length of the measuring piece.
- Press the “Set Full” button **(Default password: “1234”).**
- Wait for the sensor to complete the steps.

Note: In normal conditions, if the sensor is installed correctly:
C-min = or < C-working-compensated = or < C-max

2.2. Parameter Settings

BLE_AF



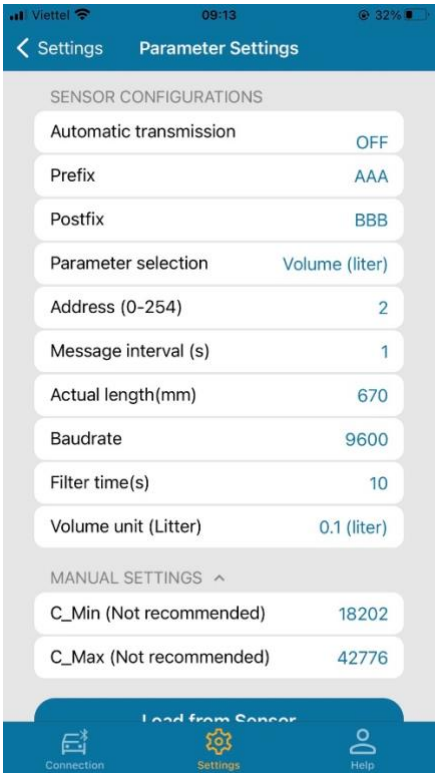
Sensor Configuration

Parameter Selection: Voltage.
Level Min: Min level of output voltage.
Level Max: Max level of output voltage.
Baudrate (bit/s): From 2400 to 115200. **Default value: 19200 bit/s.**
Filter Time (s): The output signal processing time. **Default time: 60 seconds.**

Manual Settings *(not recommended)*

In this option, users can type C_min and C_max values manually.

BLE_RS232



Sensor Configurations

Automatic transmission: This mode applied only for RS232/ RS485 defines sensor output message type.

- Off – no automatic message transmission, sensor waits for tracking device request.
- HEX - automatic message transmission in binary format (used by default).
- ASCII - automatic message transmission in text format.
- ASCII EXT – automatic message transmission in extended text format. Additional **Prefix** and **Postfix** configurable parameters are available for this mode to insert the required header or end of the message.

Parameter selection: Selection of output value type for sensor data.

One of the following output value types available for RS232 and RS485 sensor:

- Fuel level in units (0...4095).
- Fuel level in millimeters (mm).
- Fuel volume in liters (L).
- Fuel volume in percentage (%).

Address (0-254): The network address for the sensor in the RS485 bus.

Message interval (s): Time period the sensor automatically sends output message to the tracking device. The parameter value range is 1-255 seconds with 1 second step.

Actual length (mm): The actual length of the sensor probe.

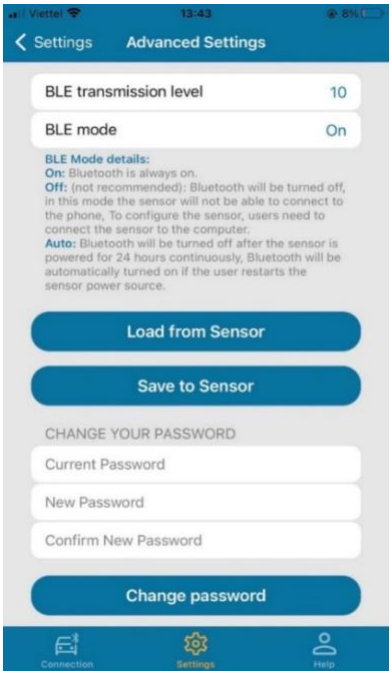
Baudrate: From 2400 to 115200. **Default value: 19200 bit/s.**
Filter time (s): The output signal processing time. **Default time: 60 seconds.**
Volume unit: 0.1 liter or 1 liter.
*Example: When the sensor data output is 100, and the selected volume unit is 0.1 liter => The total volume in liters = 100 * 0.1 = 10 liters*
When the sensor data output is 100, and the selected volume unit is 1 liter
*=> The total volume in liters = 100 * 1 = 100 liters*

Manual Settings *(not recommended)*

In this option, users can type C_min and C_max values manually.

2.3. Advanced Settings

In this setting, users can make some advanced changes related to BLE Transmission level, BLE Mode, or Password



BLE transmission level: This option allows users to set the transmission intensity for the sensor (from 0 to 10).
*BLE mode, there are three modes as listed below:

- **On**: Bluetooth is always on.
- **Off** (not recommended): Bluetooth will be turned off, in this mode the sensor will not be able to connect to the phone. To configure the sensor, users need to connect the sensor to the computer.
- **Auto**: Bluetooth will be turned off after the sensor is powered for 24 hours continuously. Bluetooth will be automatically turned on if the user restarts the sensor power source.

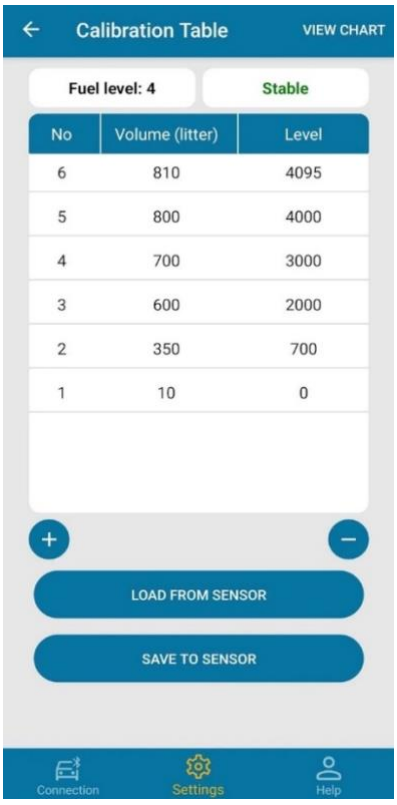
After choosing the right mode -> Press the “Save to Sensor” button.
Password: The password is used for configuring the sensor. **Default password**: “**1234**” and users can set a new password if necessary.
Note: *In case of forgetting the password, users can contact the manufacturer to reset it.*

2.4. Calibration Table

To improve the accuracy of the sensor once it's installed in a fuel tank or container, users should calibrate it according to the specific dimensions and volumes of that container.
Calibration of the fuel tank is the fuel tank filling up – from empty to full, with certain filling amount, and recording the LIGO BLE sensor readings in the Calibration Table.
To perform the calibration, users can follow these steps:

- Empty the fuel tank.
- Calculate the number of calibration attempts ***(Maximum: 30 times).*** Then get the pre-calculated amount of fuel for each refill.
- Fill in the pre-calculated fuel into the tank and enter that value into "Volume (litter)" column.
- Wait for the “Fuel level” value to stabilize (*Indicated by the status color changing to Stable in green*) and input that value into the "Level" column. Then press “Save to Sensor” button.

For example:

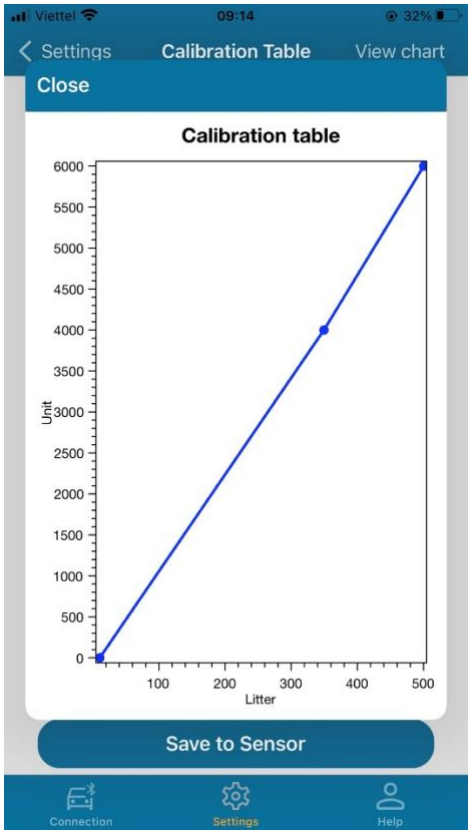


- Press (+) to add more lines.
- Continue to fill in pre-calculated fuel into the tank.

Note: In the "Volume" column, the next value = the previous value + the additional value.

- Repeat these steps until the fuel tank is full.
- Press "Save to sensor" button.

Users can view the chart by clicking “View Chat” on the top right of the screen.
For example:



The Calibration chart can show if the calibration process is being done correctly. The graph will be a figure moving upwards from left to right; if any abnormal points are observed on the graph *(The subsequent value of 'Litter' is smaller than the previous value*), users must check to ensure the calibration is being conducted accurately.

2.5. Firmware Upgrade

When the firmware is upgraded, the developer can send the firmware upgrade file to the user to upload at this setting.

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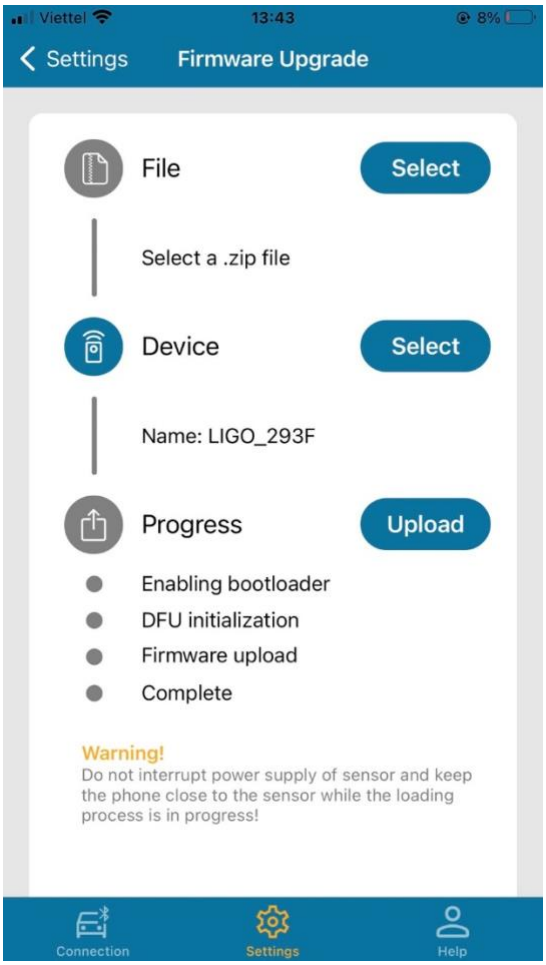

Follow these steps:

- Click “Select” in the “File” section and choose the firmware upgrade file from the mobile phone.
- Click “Select” in the “Device” section and choose the name of the sensor to upload.
- Click “Upload” and wait until the upgrade process is completed.

Revision history

Date	Version	Changes
05-March-2024	1.0	Initial release