2024

FLS BLE BASE

NIKOLIN
FUEL CONTROL

SAINT PETERSBURG, RUSSIA.
nikolin.spb.ru

OPERATING INSTRUCTIONS.

01.01.2024

1. PURPOSE AND PRINCIPLE OF OPERATION.

1.1 Assignment

The base of the wireless fuel level sensor BLE.BASE (hereinafter referred to as BLE.BASE), in accordance with Figure 1, provides wireless connection between the fuel level sensor FLS.NIKOLIN.BLE (hereinafter referred to as BLE FLS) and the navigation terminal (hereinafter referred to as tracker).

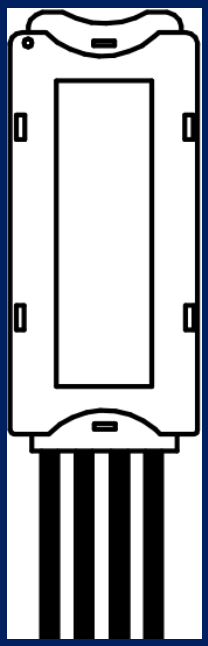

Figure 1 - External view of the base of the wireless fuel level sensor BLE.BASE

The sensor measures the following parameters: fuel level, temperature, battery voltage, RSSI (signal strength) and other parameters as requested by BLE.BASE. The sensor then transmits these parameters via the Bluetooth Low Energy (BLE) Escort BLE protocol. The base data update period is about 10 seconds.

1.2 Principle of operation

BLE.BASE receives requests from external devices via RS-485 interface and responds with level and temperature information. The response is sent via the same RS-485 interface using the LLS protocol 2...5 milliseconds after the request is received. Only requests sent from the network address registered in the sensor base memory are serviced.

2. TECHNICAL SPECIFICATIONS.

Table 2 shows the technical characteristics of BLE.BASE.

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Characteristics	Wireless fuel level sensor base BLE.BASE
Supply voltage, V	9 … 36
Current consumption, mA, not more than	30
Operating range (under normal operating conditions in the absence of interference and obstacles when working with the sensor), m, not less than	10
Digital mode: - tracker operation interface - communication protocol - communication speed - sensor interface - communication protocol	 RS-485 LLS 19200 bps Bluetooth LE (BLE) ESCORT BLE
Output signal range: - digital signal	0 ... 4095 or 0 ... 1023 units
Period of data exchange with the sensor, seconds, not more than	10
Receiver sensitivity / transmitter power	-96 dBm / 4 dBm
Protection degree of the shell according to GOST 14254	IP67
Protection against electric shock according to GOST 12.2.007.0	Class III
Operating conditions: - ambient temperatures, ºC; - ambient temperature limit, ºC; - atmospheric pressure, kPa	 -40 … +50 -60 … +85 84 … 106,7
Overall dimensions, mm, not more than	56 x 23 x 10
Weight, kg, not more than	0,1

3. DELIVERY SET.

Table 3 shows the delivery set of BLE.BASE.

Table 3 - BLE.BASE delivery kit.

Name	Quantity
Wireless fuel level sensor base BLE.BASE	1 pc.
Mounting kit	1 pc.
Passport	1 pc.
Packaging	1 pc.

4. OPERATING INSTRUCTIONS.

- Installation and operation of BLE.BASE should be carried out by the personnel who have studied this manual;
- Before installing BLE.BASE it is necessary to carry out its external inspection, if there are any mechanical damages (cracks, chips, dents, etc.) it is not allowed to use it;
- It is forbidden to supply BLE.BASE with supply voltage different from that specified in this manual;
- The BLE.BASE does not contain any parts that may be a source of ignition;
- Do not disassemble the BLE.BASE;
- When installing the BLE.BASE on a vehicle, special equipment or stationary storage facility, follow the approved safety requirements related to this work according to the type of facility to which the BLE.BASE is installed.

5. TRANSPORTATION AND STORAGE.

1. BLE.BASE must be stored in its packaging until it is put into operation. It is stored in dry rooms at ambient air temperature from minus 20 °C to plus 30 °C and relative air humidity not more than 75 %. Conductive dust, aggressive substances and their vapors are not allowed in storage rooms.

2. BLE.BASE is transported in the factory packing in closed vehicles.

6. DISPOSAL.

1. The product is subject to disposal, which is performed by the operating organization in accordance with the norms and regulations established in the territory of the country.

2. BLE.BASE does not contain any harmful substances and components that are hazardous to human health and the environment during and after operation, as well as during disposal. Plastics and non-ferrous metals are recyclable.

3. The device does not contain precious metals in quantities that require accounting.

7. CONNECTING AND SETTING UP BLE.BASE.

BLE.BASE is connected to the tracker and the on-board network of the vehicle, according to Figure 2.

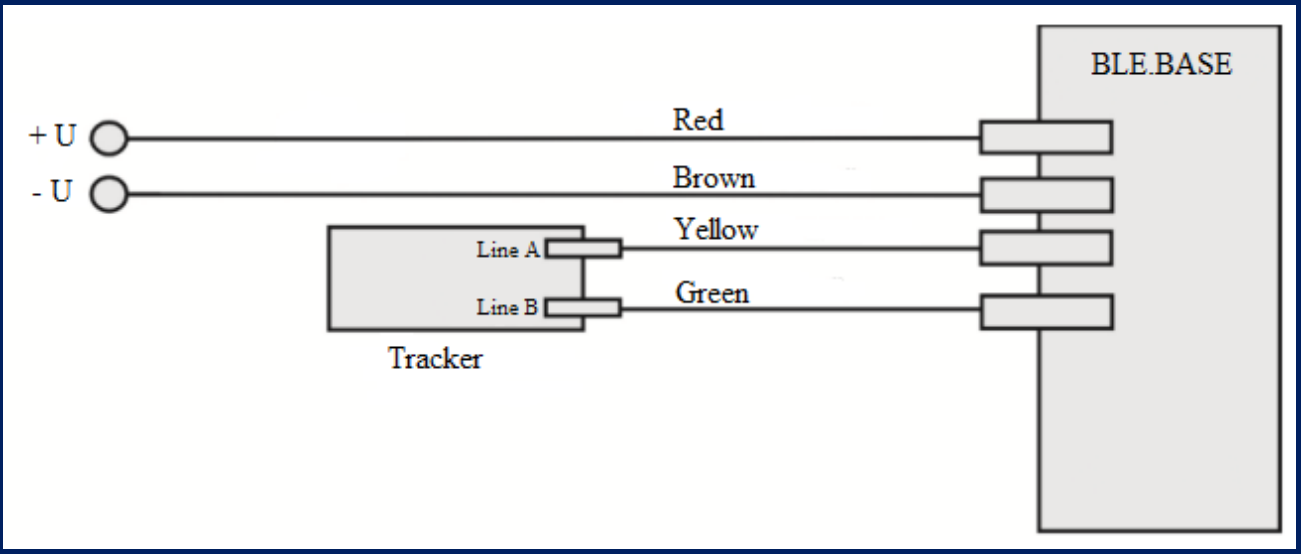

Figure 2 - Diagram of base connection with tracker in RS-485 mode

7.1 Connecting BLE FLS to the tracker via BLE.BASE

Connecting BLE FLS to the tracker via BLE.BASE is performed when the sensor is installed far away from the tracker or there are obstacles between the tracker and BLE FLS, so that it is impossible to establish a Bluetooth connection between the sensor and the tracker.

In order to connect BLE FLS to the tracker via BLE.BASE, you must first connect the base to the tracker. To do this, connect BLE.BASE to the tracker inputs «RS485A» and «RS485B», and supply 12V power to the base. Then turn on the laptop with installed software «NTC Configurator» and connect the cable from the laptop to the tracker.

It is necessary to remember that during installation of BLE FLS, it is necessary to turn it with antenna in the direction of BLE.BASE location.

Next, find BLE.BASE in the mobile application «RFL» by its MAC-address and click connect, according to Figure 3.

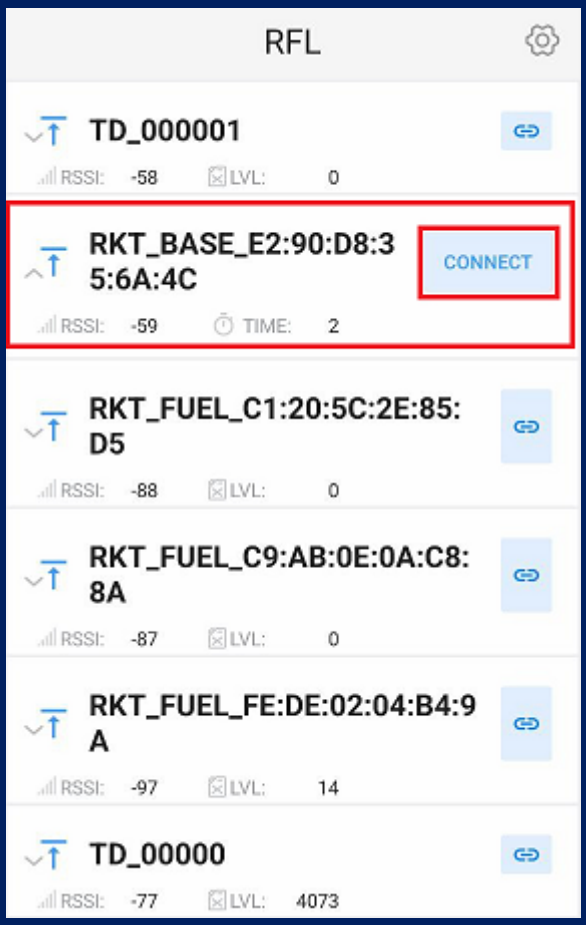

Figure 3 - Connecting to BLE.BASE

In the window that appears, select BLE FLS by its MAC address and click on the «Add» icon, as shown in Figure 4.

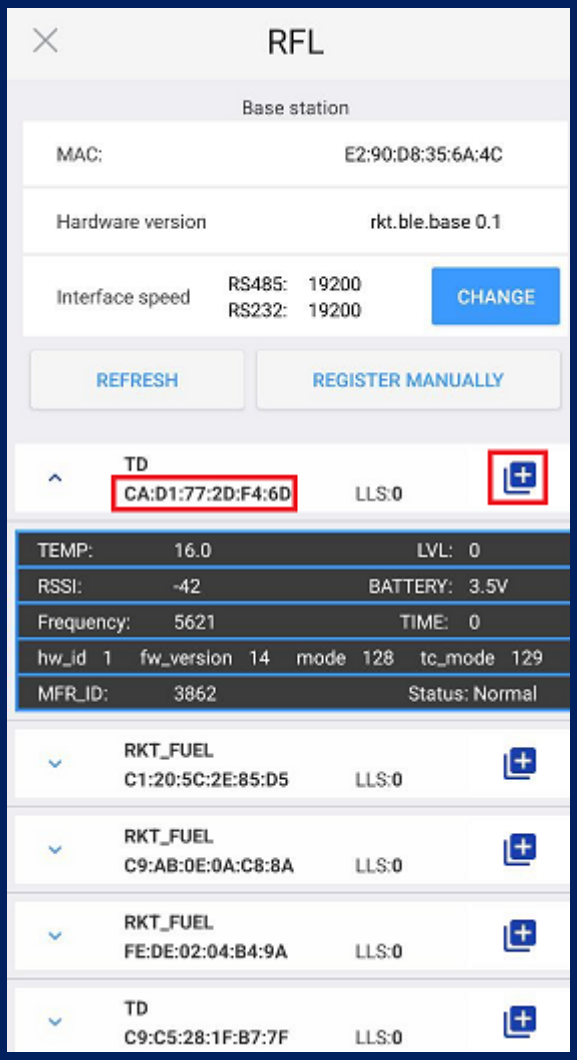

Figure 4 - Adding BLE FLS to BLE.BASE

After clicking the icon «Add», a window will appear in which you must enter the value «LLS», according to Figure 5. Enter the value «1», it means that the communication address of BLE.BASE and this BLE FLS is equal to one and click «OK».

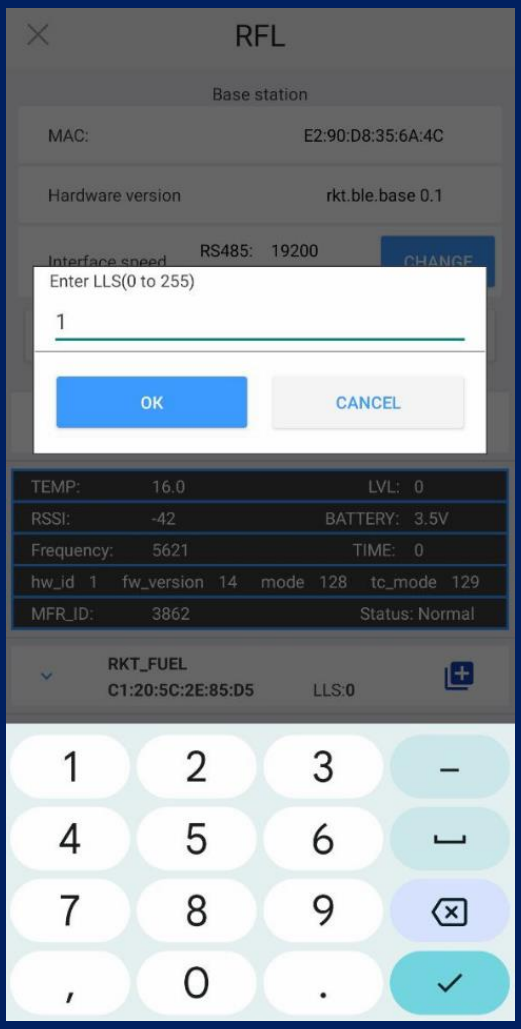

Figure 5 - Entering BLE.BASE and BLE FLS communication address.

After entering the communication address, you can see the LLS of the sensor and the «Delete» icon, which removes the BLE FLS from the database, as well as the sensor parameters, according to Figure 6.

You can also see the «Base Station» tab and the «Interface Speed» item. By clicking on the «CHANGE» button you can specify the interface that is used and set its speed.

After adding BLE FLS and configuring BLE.BASE, click on disconnect «×».

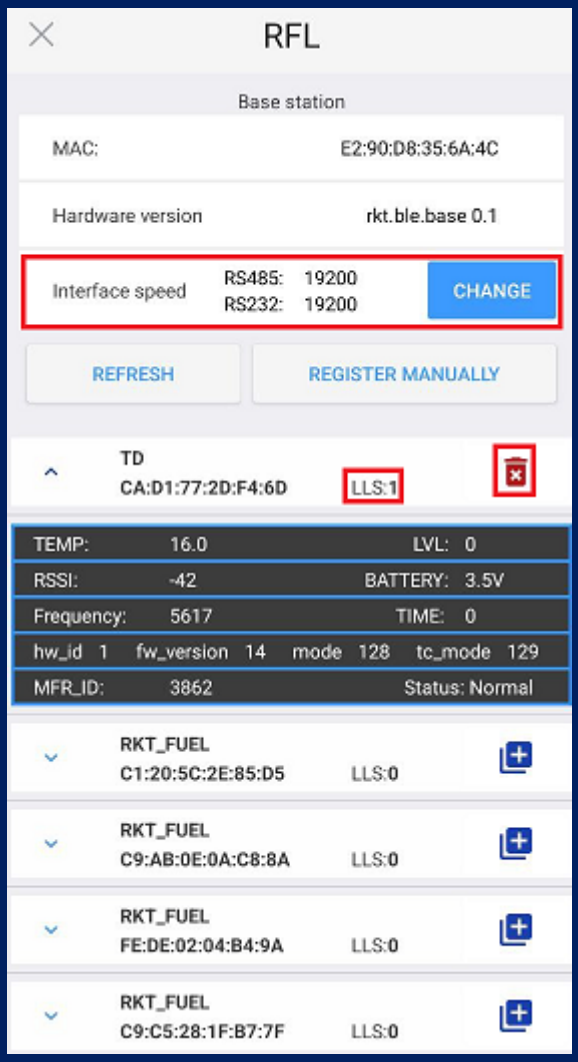

Figure 6 - Viewing BLE FLS through the base.

Note - before configuring the connection of BLE.BASE to the tracker, it is necessary to enter BLE FLS and in the column «Remote control parameters», uncheck «Escort emulation», as well as in «escort_id» set the value to «0», according to Figure 7. Then press save changes «✓» and disconnect «×».

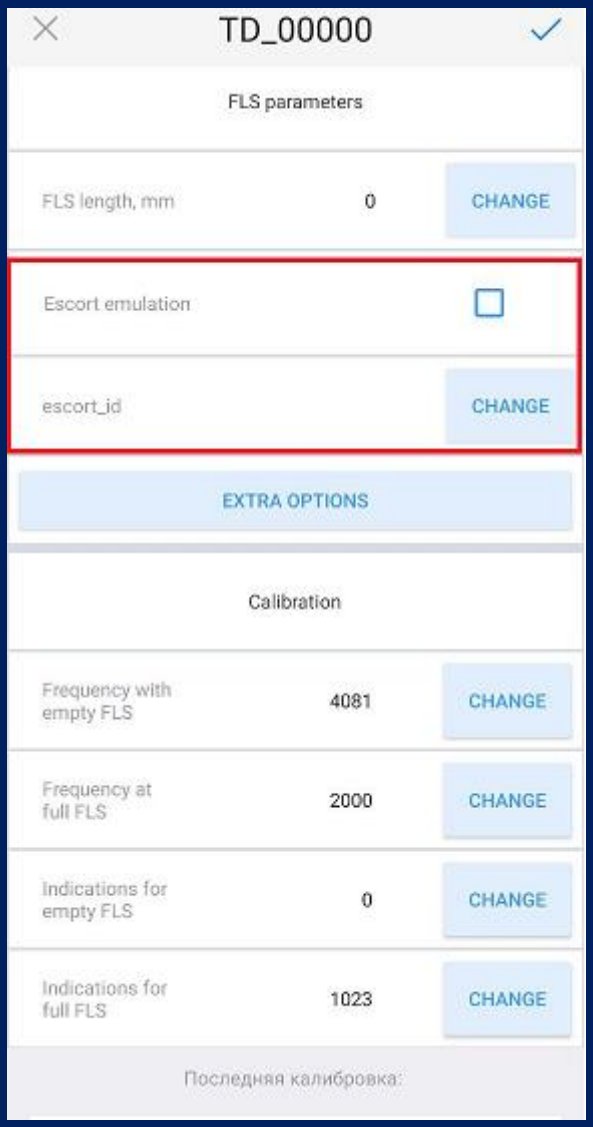

Figure 7 - Disabling «escort emulation» and «escort_id»

Let's consider the connection of BLE.BASE, on the example of connection to the tracker «SMART S-2423», firm «Navtelecom» LLC. Start «NTC Configurator» and open «Read device configuration». In the window that appears, select the «Bluetooth» tab and uncheck «Use Bluetooth module» in accordance with Figure 8.

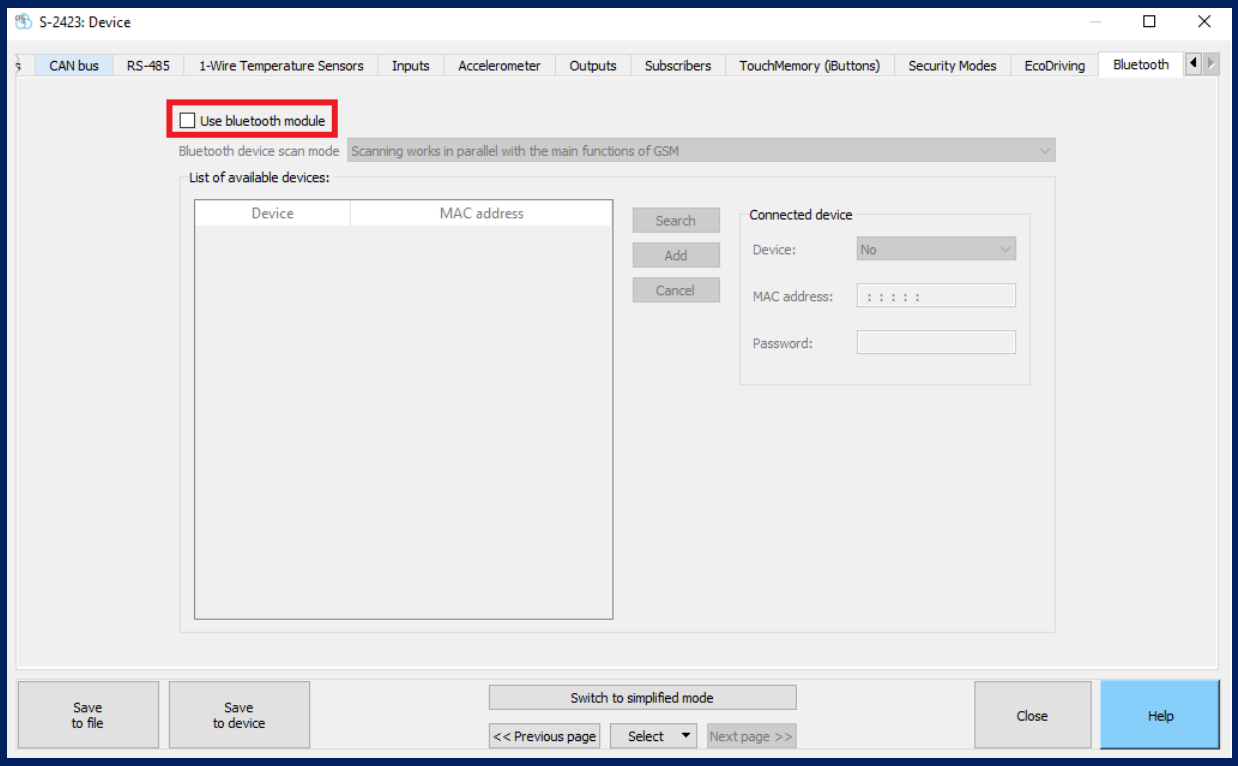

Figure 8 - Disabling the Bluetooth module

Then go to the «RS-485» tab, and in the item «Fuel level asensor» select «Connect sensor 1». In the column «Network address» set the address that was set in the base settings for the BLE FLS, in our case it is «1», according to Figure 9. Here you can also configure averaging and filtering.

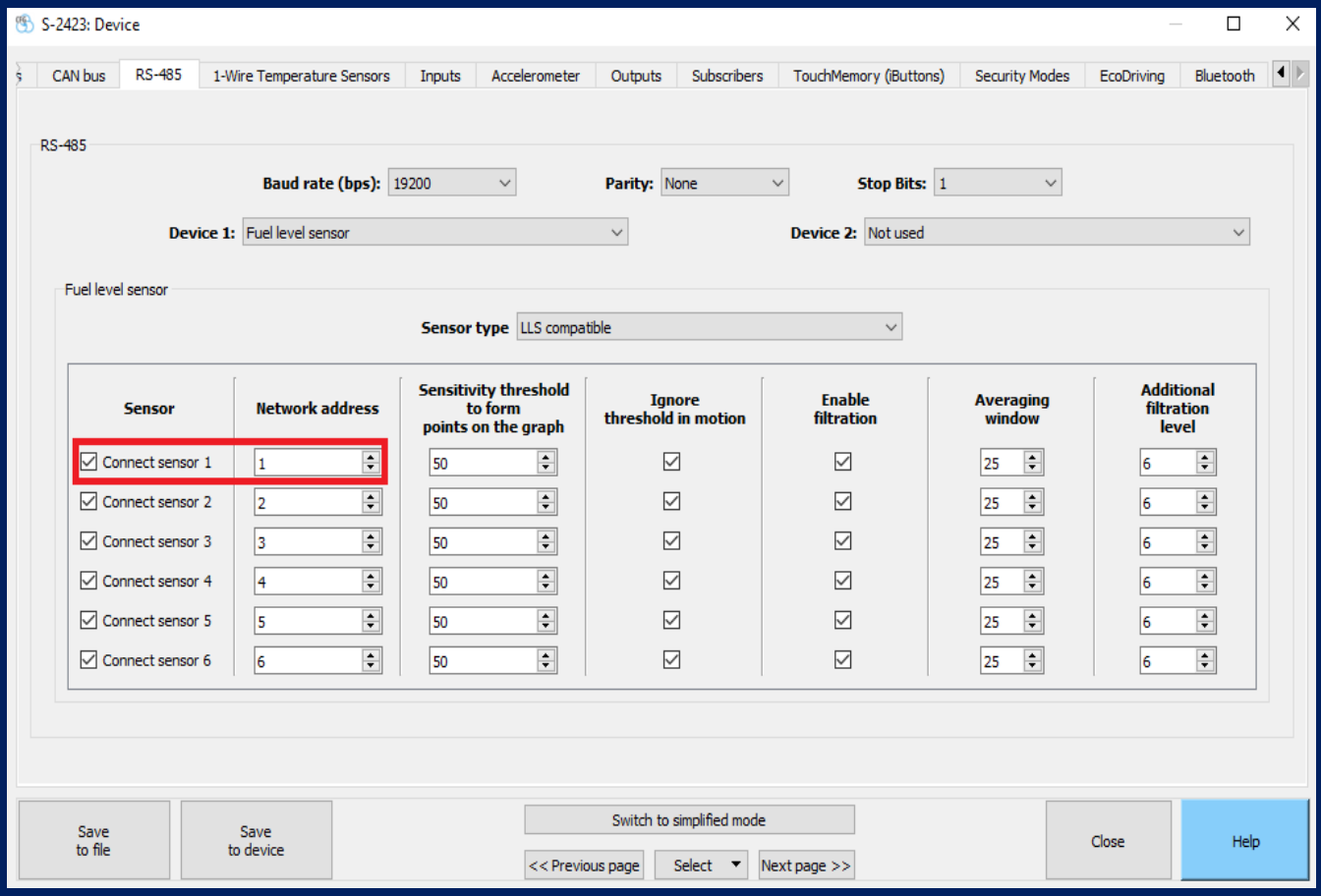

Figure 9 - Setting the network address.

Then go to the «Protocol settings» tab and in the «Fuel level sensor RS-485/BT» column select the BLE FLS data to be displayed according to Figure 10.

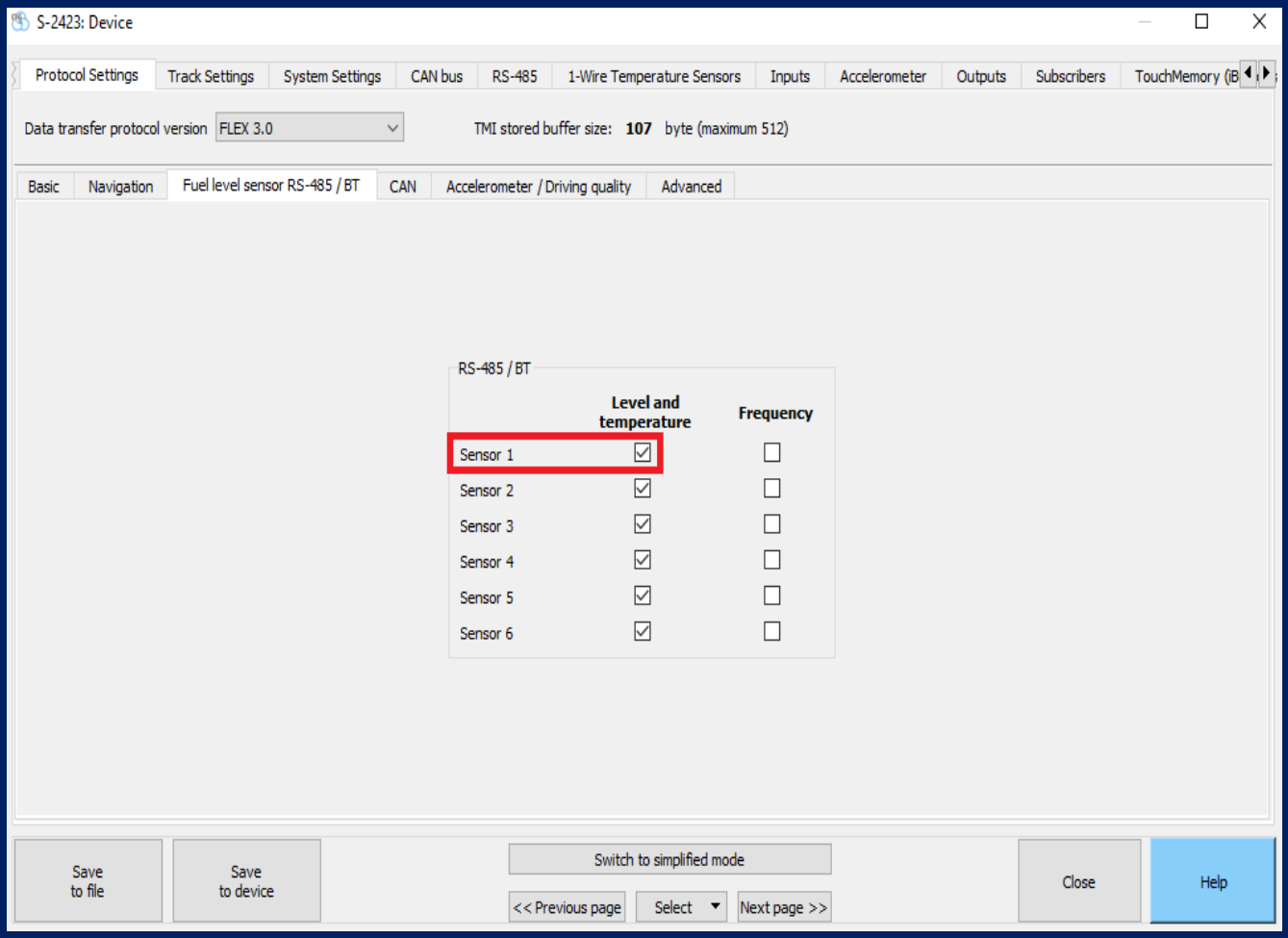

Figure 10 - Customizing the displayed data

After configuring the BLE FLS, click «Save to device» and in the first window that appears click «Yes» and in the second window click «OK», according to Figure 11.

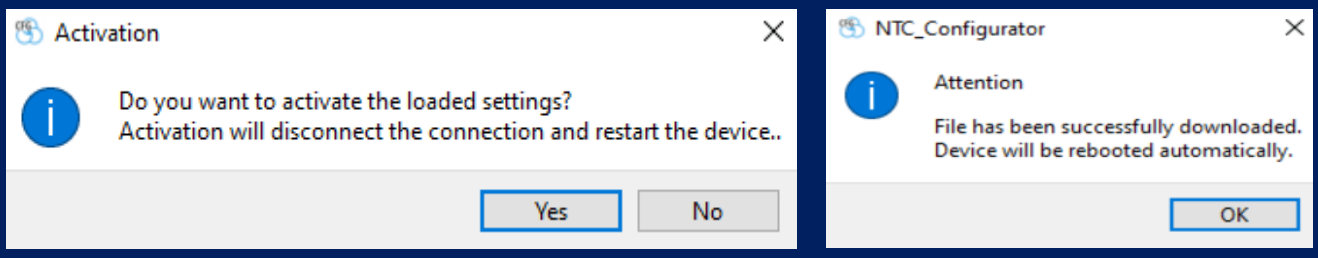

Figure 11 - Loading Settings

Then click close and select «Telemetry» in the program window. Go to the «Fuel level sensors» tab and we can see the values of BLE FLS connected to the tracker through the base, according to Figure 12.

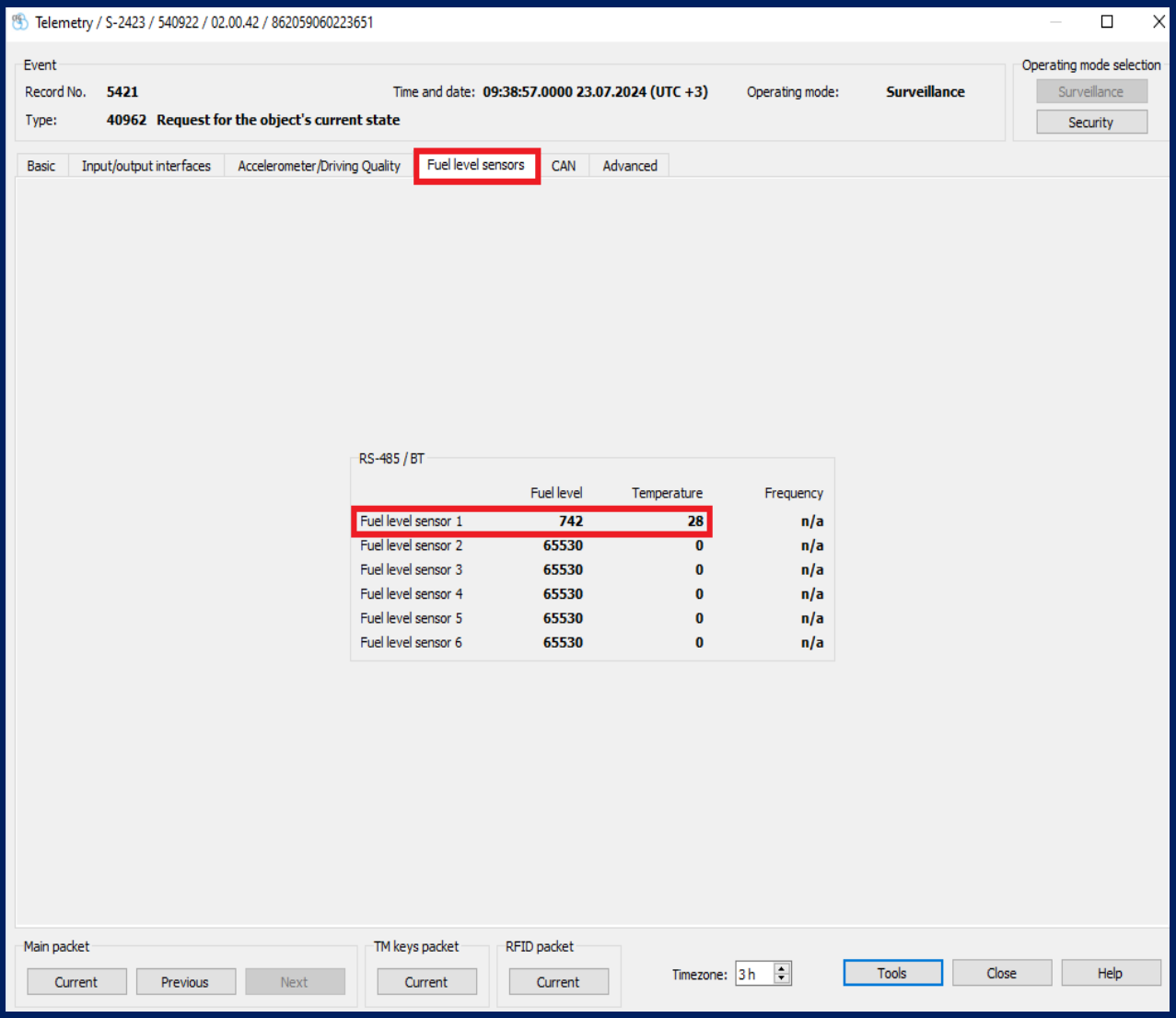

Figure 12 - Checking the operation of «BLE FLS» connected through the base.

If the values are not displayed or changed, close the «NTC Configurator» application and then start it again.