ESCORT TD-BLE WIRELESS CAPACITIVE FUEL LEVEL SENSOR

ESCORT TD-BLE-BASE
WIRELESS CAPACITIVE FUEL LEVEL SENSOR ADAPTER

ESCORT BLE-BASE-USB
Hardware configuration tool for wireless capacitive fuel level sensor

ESCORT-TL-BLE WIRELESS TEMPERATURE/LIGHT SENSOR

Manual

Red.2019-09-15

CONTENT

1. GENERAL INFORMATION

High-precision fuel level sensors (FLS, also measuring instruments or sensors) of ESCORT trade mark are designed for defining of clear oil-based fluids (petrol, diesel, bio-diesel, kerosene etc.) in fuel tanks, tanks and storage capacities. The measuring device (sensor) "TD-BLE" is used in the automotive mechanisms as the measuring device of level of fuel, industrial application - as the measuring device of level of any light mineral oil.

Adapter of wireless capacitive fuel level sensor "BLE-BASE" provides connection of wireless fuel level meter "TD-BLE" or wireless temperature and illumination sensor "TL-BLE" and navigation terminal via RS-485 interface.

Configuration tool of the wireless capacitive fuel level sensor "BLE-BASE-USB" provides configuration (adjustment) of the "TD-BLE" wireless fuel level sensor and is connected to the PC via USB interface.

"TL-BLE" wireless temperature and illumination sensor determines the temperature and illumination of the surrounding area. It is used to control the temperature of refrigeration chambers (refrigerators).

All sensors are designed to work in transport and vehicle monitoring systems and are usually used in combo with GNSS trackers.

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2. SPECIFICATIONS

Table 2.1. Specifications of ESCORT TD-BLE wireless capacitive fuel level sensor

Parameter	Value / units
The measurement error in the workspace, no more	1%
Modes of operation	digital
Digital Mode: - interface - the communication protocol	Bluetooth LE (BLE) Escort BLE
Range of action (under normal operating conditions in the absence of interference and obstacles when working with the base)	10 meters
The period of data exchange with the base	10 seconds
The sensitivity of the receiver / transmitter power	-90 dBm / 4 dBm
The degree of protection according to GOST 14254	IP67
Protection against electrocution according to GOST 12.2.007.0	class III
Operating conditions: - temperature, - ambient temperature - Atmosphere pressure,	-40...+50°C -60...+85°C 84 ... 106.7 kPa
Dimensions, no more	80x80x(L + 21)mm, where L - sensor length in mm
Conditional sensor length	indicated on the label (pasted in the passport)
Weight, no more kg	0,35+0,4xL, where L-sensor length in meters

Table 2.2. Specifications of ESCORT BLE-BASE wireless capacitive fuel level sensor adapter

Parameter	Value / units
Modes of operation	Digital
Digital Mode: - Interface with the tracker - the communication protocol - baudrate - Interface with the sensor - the communication protocol	RS-485 LLS 19200 bps Bluetooth LE (BLE) Escort BLE
Output signal range: - digital signal	0 ... 4095 units. or 0 ... 1023 units.
Range of action (under normal operating conditions and in the absence of interference with obstacles during operation sensor),	10 meters
Period for communication with the sensor,	10 seconds
The sensitivity of the receiver / transmitter power	-96 dBm / 4 dBm
The degree of protection according to GOST 14254	IP67
Protection against electrocution GOST 12.2.007.0	class III
Operating conditions: - temperature - ambient temperature - Atmosphere pressure	-40...+50°C -60...+85°C 84 ... 106.7 kPa
Dimensions, no more	56x23x10 mm
Weight, no more	0.1 kg

Table 2.3. Specifications of ESCORT BLE-BASE-USB Hardware configuration tool for wireless capacitive fuel level sensor

Parameter	Value / units
Modes of operation	digital
Digital Mode:	
- PC communication interface	USB
- Data exchange protocol	LLS
- Data transfer speed rate	19200 bps
- Interface of communication with sensor	Bluetooth LE (BLE)
- Data exchange protocol with sensor	Эскорт BLE
Range of action (under normal operating conditions and in the absence of interference and obstacles during operation base), not less	10 meters
Period for communication with the base,	10 seconds
The sensitivity of the receiver / transmitter power	-96 dBm / 4 dBm
The degree of protection according to GOST 14254	IP67
Protection against electrocution GOST 12.2.007.0	class III
Operating conditions:	
- temperature	$-40...+50^{\circ}C$
- ambient temperature	$-60...+85^{\circ}C$
- Atmosphere pressure	84 ... 106,7 kPa
Dimensions, no more	65x23x10 мм
Weight, no more	0,1 kg

Table 2.4. Specifications for the wireless temperature and light sensor TL-BLE

Parameter	Value/Units
Temperature measurement error in the working area, max. °C	±1
Error of light measurement in the working area, not more than	20 %
Operating modes	Digital
Digital mode:	
- Interface	Bluetooth LE (BLE)
- data exchange protocol	Escort BLE
Range of operation (under normal operating conditions with no interference and no obstacles when working with the base), not less than	10 Meters
Data exchange period with the base	10 seconds
Receiver sensitivity / transmitter power	-96 dbm/ 4 dbm
Degree of enclosure protection according to GOST 14254	IP67
Protection against electric shock in accordance with GOST 12.2.007.0	III Class
Operating conditions:	
- temperatures	$-40...+50^{\circ}C$
- Ambient temperatures	$-60...+85^{\circ}C$
- atmospheric pressure	84 ... 106,7 kPa
Dimensions, no more	94x60x36 mm
Mass, no more	0,5 kg

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3. DESIGN

Рис. 3.1. TD-BLE Capacitive Fuel Level Sensor Design

Fig. 3.2. BLE-BASE wireless capacitive fuel level sensor base design

Fig. 3.3 Wireless capacitive fuel level sensor BLE-BASE-USB configuration tool design

Case design

Fig. 3.4 TL-BLE Wireless temperature and light sensor design

4. SCOPE OF DELIVERY

4.1. Scope of supply of capacitive fuel level sensor TD-BLE

NAME	Quantity	Ser. number	NOTES
Sensor «Escort TD-BLE»	1		
Mounting Kit: Self-tapping screws 5.5x38 with washer Number Seal FAST-330 Gasket Centralizer Protective cap	1 4 1 1 1 1		
Technical data sheet	1		
Packaging	1		
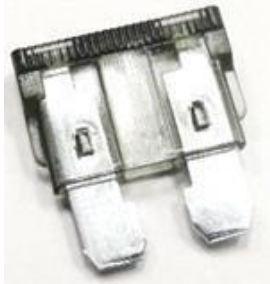
Types of components (the image may differ slightly from the original):

Protective cap	Gasket
Self-tapping screws 5.5 x 38 with washer	Number Seal FAST-330
Centralizer	

4.2. Scope of supply of the BLE-BASE wireless capacitive fuel level sensor adapter

NAME	Quantity	Ser. number	NOTES
BLE-BASE wireless capacitive fuel level sensor adapter	1		
Mounting Kit:	1		
Fuse 1A	1		
Fuse holder	1		
Technical data sheet	1		
Packaging	1		

Types of components (the image may differ slightly from the original):

Fuse 1A	Fuse holder

4.3. ESCORT BLE-BASE-USB Hardware configuration tool for wireless capacitive fuel level sensor

ESCORT BLE-BASE-USB Hardware configuration tool for wireless capacitive fuel level sensor	1
Technical data sheet	1
Packaging	1

4.4. Scope of supply of wireless temperature and illumination sensor TL-BLE

ESCORT-TL-BLE wireless temperature/light sensor	1
Technical data sheet	1
Packaging	1

5. PACKAGE

The wireless capacitive fuel level sensor ESCORT TD-BLE and wireless capacitive fuel level sensor adapter ESCORT TD-BLE-BASE with mounting kits are packaged in a semi-rigid packaging (corrugated cardboard), up to 3 pcs. in one box. The installation kit and wireless capacitive fuel level sensor adapter ESCORT TD-BLE-BASE are packed in a ZIP-package.

6. MOUNTING

Below there is a diagram of placing the sensor and the base on a vehicle. Base should possibly be placed in line of sight with respect to the FLS to ensure reliable radio communication.

The sensor base should be installed in the cabin as close as possible to the FLS or near the window to ensure a better signal (Figure 6.1).

The sensor and the base should be oriented relative to each other for better signal, as shown in Fig 6.2.

When installing one should consider RSSI (signal strength) from the sensor measuring it via using a smartphone on Android OS and NRF Connect software - more details are in the article «connection and use of a mobile phone on Android OS»)
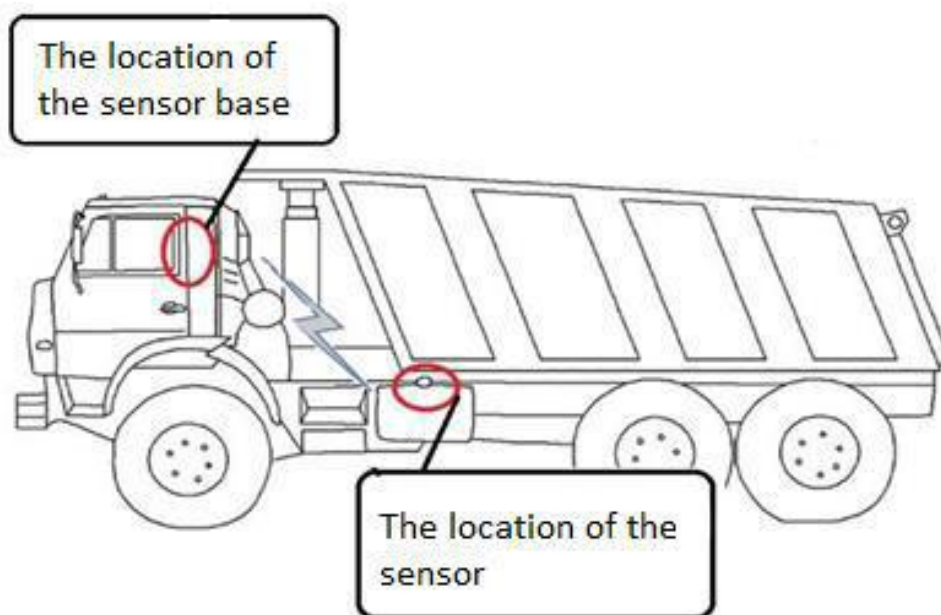
Fig. 6.1. Installation scheme
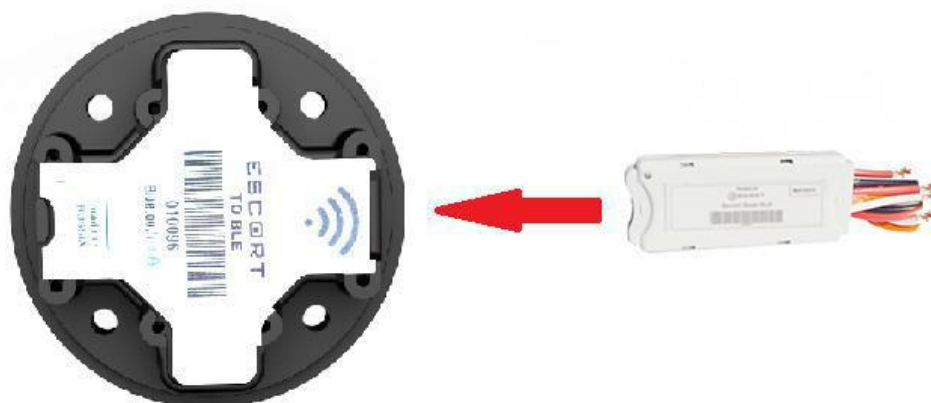
Fig.6.2. Orientation of the base relative to the wireless capacitive fuel level sensor

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7. GETTING STARTED

A sensor (FLS) and an adapter (base) are a pair of devices linked together by a unique BLE UUID service identifier. The base initiates a connection to the sensor, and in the event of a connection failure, the sensor is reconnected.

In order to establish a connection between the base and the sensor it is necessary that they are in the area of availability for each other, the base was supplied with power according to the connection diagram.

In case of connection problems, it is necessary to check the sensor operation with the help of Android OS phone by searching for devices by NRF Connect program (item Connection and work with mobile phone on Android OS), changing the position of the base relative to the remote control, to achieve the best level of RSSI, watching it in NRF Connect program and placing the mobile phone in the place of the proposed base attachment.

8. OPERATION MODE

The sensor measures the required parameters (fuel level, temperature, battery voltage, RSSI, etc.) on request from the adapter (base) and transmits the parameters via Escort BLE protocol via Bluetooth Low Energy (hereinafter BLE). Readings update period is about 10 seconds.

Currently there are two types of bases of the meter: BLE-BASE-USB, connected to the PC via USB, which is used to set up sensors (level calibration, etc.), and BLE-BASE, designed only for reading readings from sensors (up to four devices simultaneously) and working with the tracker via RS-485 interface.

The BLE-BASE base is waiting for a request from an external device via RS-485 interface. After 2...3 milliseconds after the request has been received, the response is sent with the level and temperature information via the RS-485 interface via LLS protocol. The queries are only served with a network address stored in the meter's database.

The peculiarity of RS-485 operation of the meter base is that except for the network address to which the temperature and fuel level are transferred, the following network address is used, for example, if the fuel level and temperature (standard settings) are transferred to the 3 network address, then 4 network address will also be used. The next network address is used to transmit the signal strength (RSSI) values to the temperature field and the battery level of the fuel level sensor (VBAT*10) to the level field. This feature should be taken into account when the tracker is used with several meters, as there may be a collision of network numbers.

It is also necessary to keep in mind that during operation, if the connection between the sensor and the BLE BASE is lost, the latest relevant data on fuel level, battery charge and temperature are transmitted to the navigation terminal, and RSSI (signal reception level) will be -127 dBm.

The configurator on the PC can be used to set up the sensor through the BLE-BASE-USB device (setting the upper and lower levels, configuring the operating mode, setting the user password and rebooting). A mobile configurator can also be used for configuration.

For light and temperature sensor:
The level is the illumination in lux;
Temperature is the temperature in °C.

Calibrations performed for the fuel sensor (upper lower level setting, operating mode) are not applicable.

To work with the temperature sensor, the software identical to the fuel sensor is used.

9. CONNECTING AND WORKING WITH MOBILE PHONE ON ANDROID OS

1. Check for BLUETOOTH LE support (BLE 4.0 and above) on your device in the operating instructions.

2. Install and open the Escort Configurator. The first time you start the application, you will be prompted to select the interface language. You can then change the language in the side menu that appears when you drag to the right of the top left of the screen.
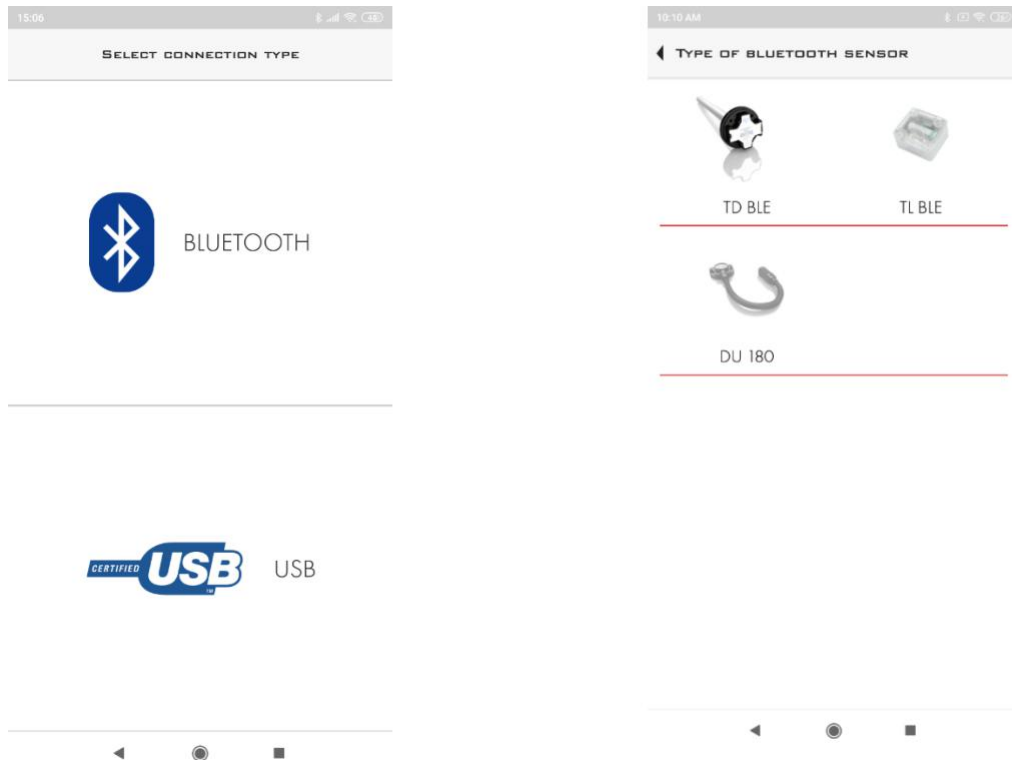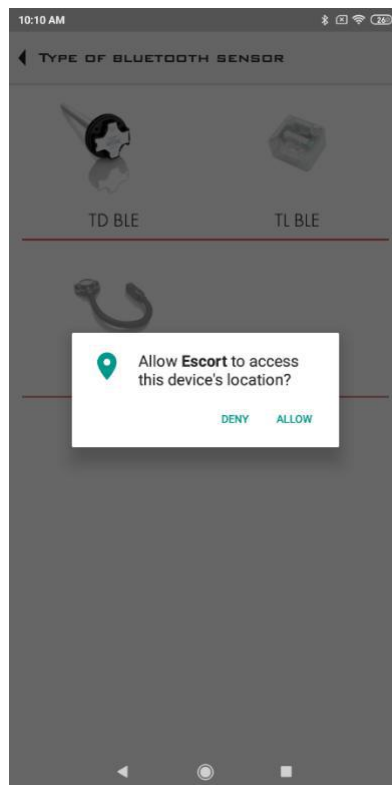

Language selection	Change the language

This chapter describes how to connect TD-BLE sensors.

1.   On the home screen, select the connection type (Bluetooth or USB) and the sensor model.

2.   The first time you start the application, you must provide access to the location of the device that will be requested once

3.   In the Sensor Search window, you can select a sensor from among the found devices or enter a device name in the field, e.g. TD_100001 (for the fuel level sensor TD-BLE).

4.   Click the Connect button to connect to the sensor
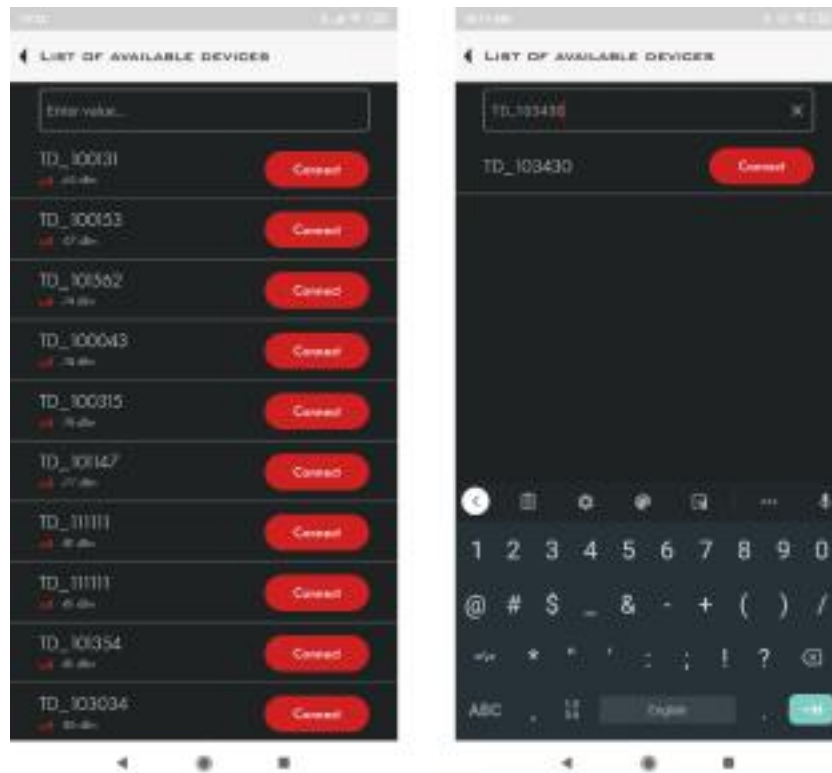
5.   Once connected, a window will appear with the basic sensor readings.

6.   When you click the Settings button, a window will appear where you can change the following parameters:
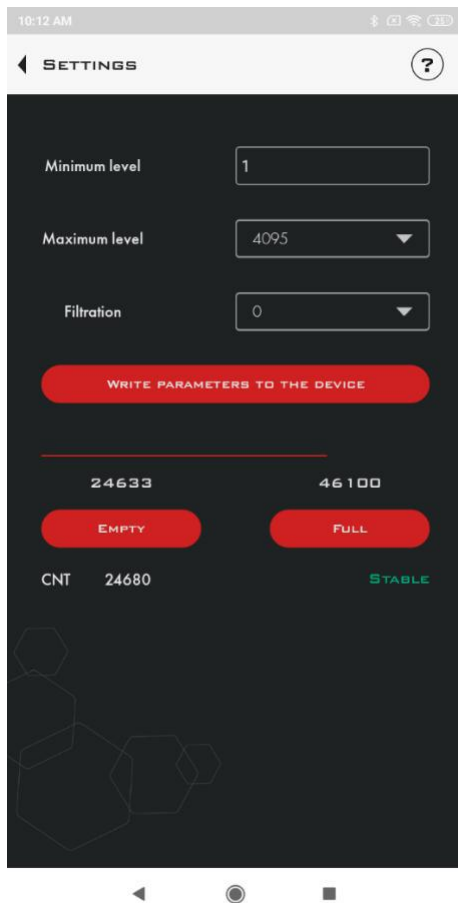
The minimum level is the minimum processed value that the sensor generates.

Maximum level is the maximum processed value that the sensor generates(1023 or 4095).

Filtration is a tool that allows you to smooth out short level jumps in the movement of the vehicle.

Empty - setting the value *empty* during calibration

Full - setting the value to *full* during the calibration process
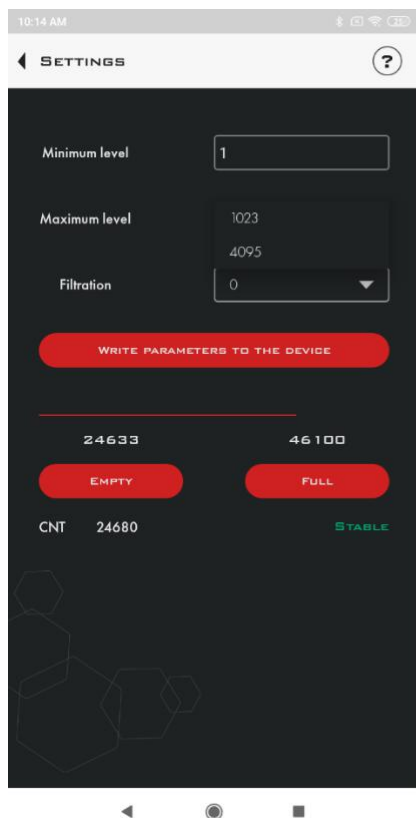
Selection of measurement range
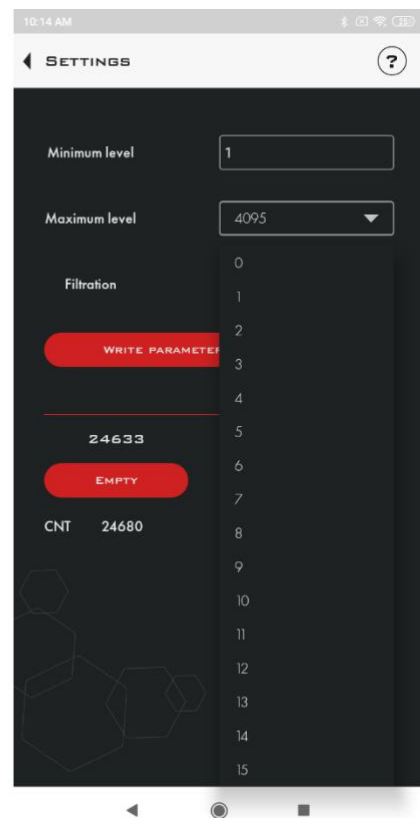
Changing the degree of smoothing

ESCORT. Wireless capacitive fuel level sensor ESCORT TD-BLE. Wireless capacitive fuel level sensor base ESCORT TD-BLE-base. Wireless temperature sensor ESCORT-BTR. Manual. Page 19 of 49

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7.   When you press the **Advanced** button (on the main screen), a window will appear where you can set a password to protect the sensor from unauthorized changes and enter a password to change or delete the settings. It is also possible to manually enter Full and Empty values.

8.   To set a password, enter a password up to 6 digits long and press the **Set** button

NOTE THAT THE PROCEDURE OF RESETTING THE PASSWORD IS VERY TIME-CONSUMING WE RECOMMEND YOU TO BE VERY THOUGHTFUL ABOUT SETTING THE PASSWORD AND ITS SAFETY
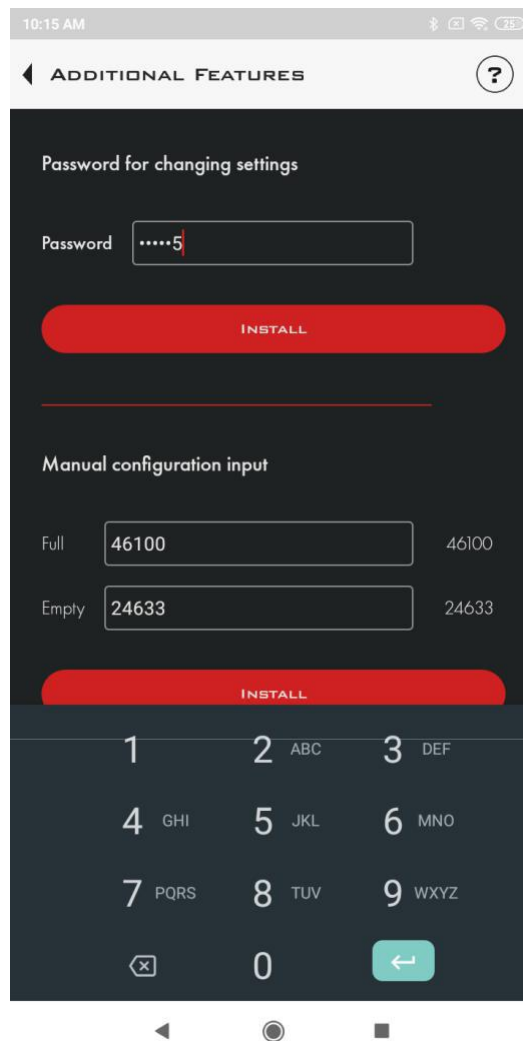

Setting a new password

9.   To delete the previously set password, you should enter it in the Password field and then press the **Enter** and **Delete** buttons one by one.

As a result, a notification about successful deletion of the password will appear at the bottom of the screen.
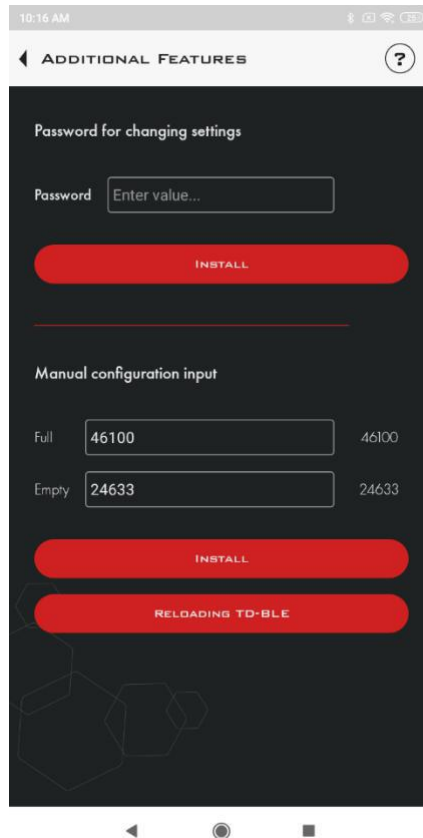
Password delete

To authorize and change the sensor settings, you should enter the previously set password and press the Enter button. At the bottom of the screen you will be notified that the password has been successfully entered.
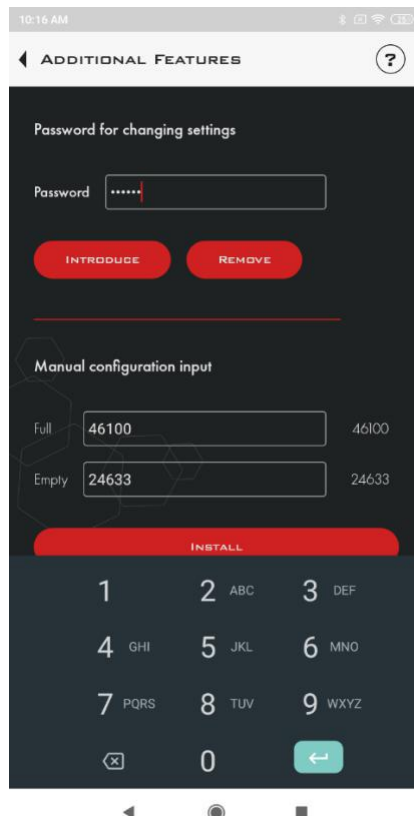
10. SENSOR FIRMWARE UPDATE PROCEDURE (FLS)

1. Check for Bluetooth LE support (BLE 4.0 and above) on your device in the instruction manual

2. Make sure that the sensor is in the receiving area and can be detected by nRF Connect (available from Google Play Market)

3. Download the firmware to your device in advance

4. Set the sensor to firmware update mode by rebooting the sensor (via the mobile configurator, which is also available on Google Play Market)

5. After the sensor is rebooted, the sensor is in software update mode for 30 seconds

6. In software update mode, a new device named TD_UPDATE will appear in nRF Connect (Fig. 1)

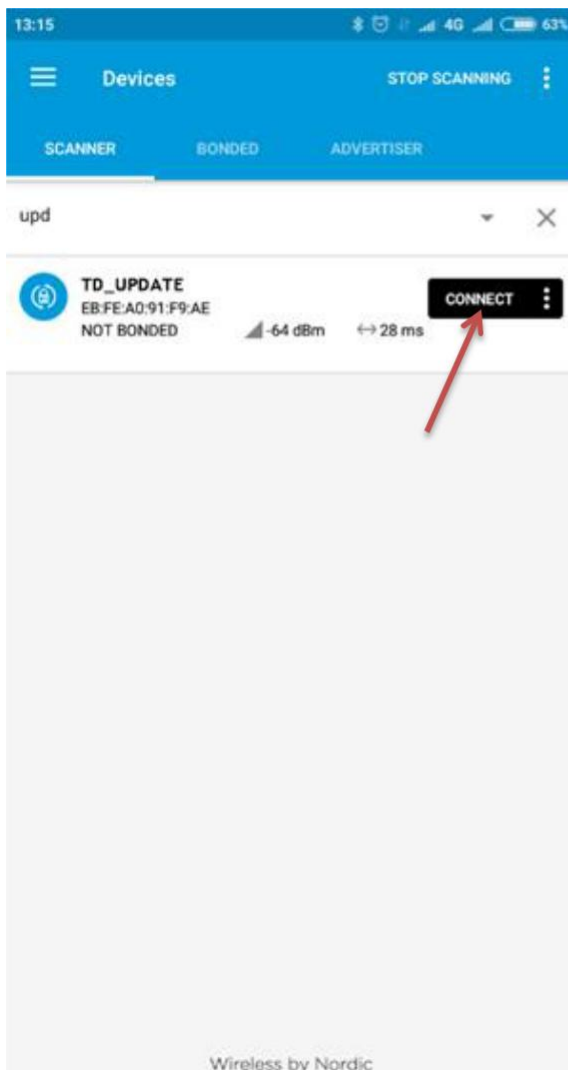7. Connect to the TD_UPDATE device (Fig. 1)
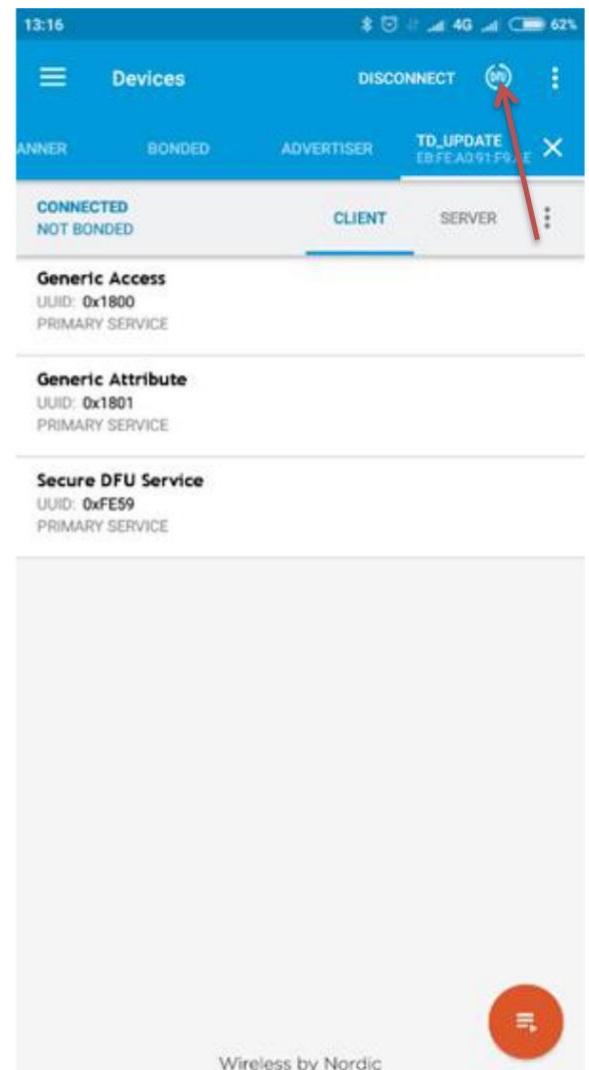
Fig.10.1. DFU Device	Fig.10.2. Connecting to TD_UPDATE

8. After clicking on the DFU icon (Fig. 2), a menu will appear to select the sensor software file, where you need to select the Distribution packet (ZIP), then in the file manager to select the firmware file previously copied to the smartphone (Fig. 3)

9. If everything is done correctly, the download schedule will appear on the screen. Wait for the firmware update to be completed (100%) (Fig. 4)
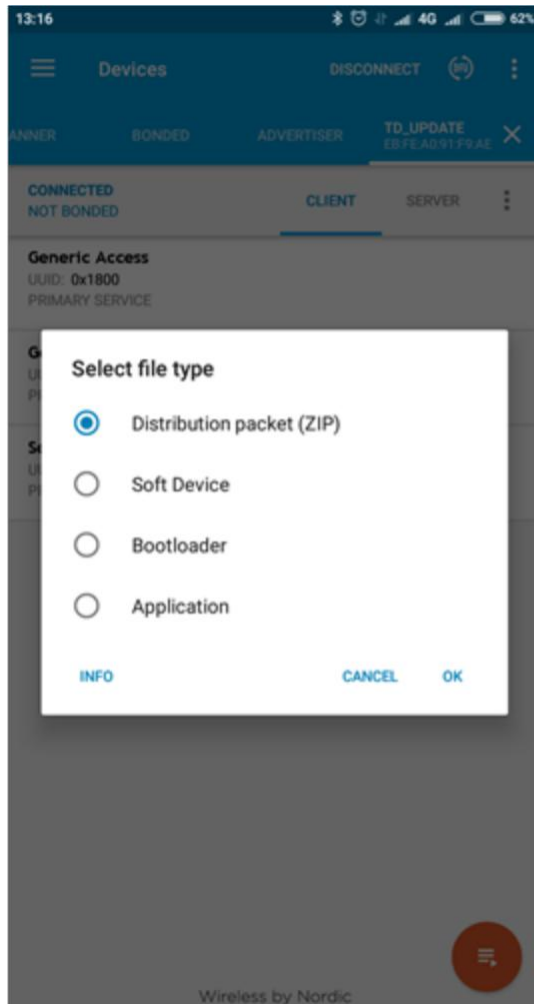

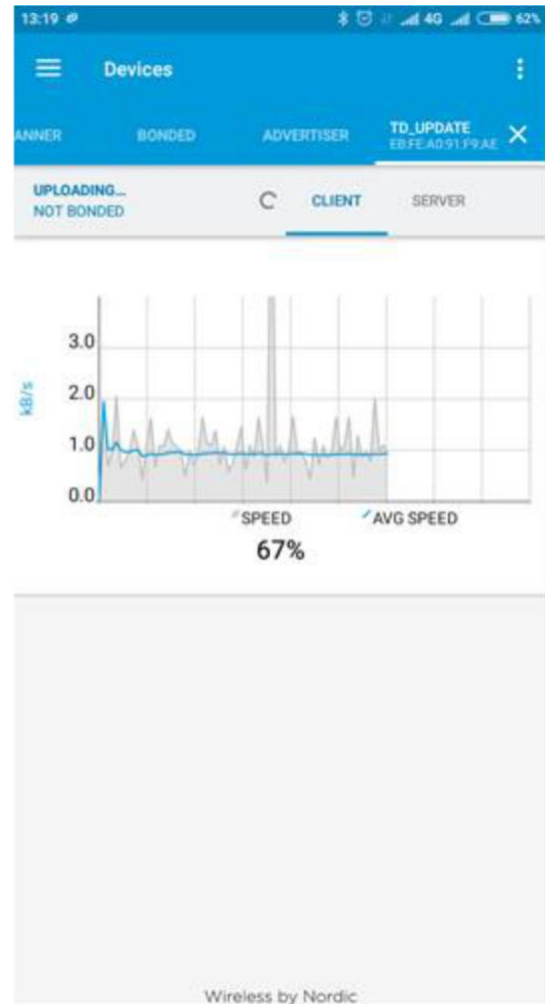Fig. 10.3. Choose firmware file   Fig. 10.4. DFU Loading Graph

10. After a successful software update, the sensor will automatically reboot
11. Sensor calibrations in DFU OTA update mode remain unchanged.

BLE base firmware

1. Connect the base to the C-200M inverter

2. Open the configurator for the PC, click the **Service Firmware** button

3. Press the "Firmware base" button and the timer will appear

4. In the nRF Connect program, locate the TD_BASE_UPDATE device, connect to it and follow the same procedure as the remote control (described in the manual above).
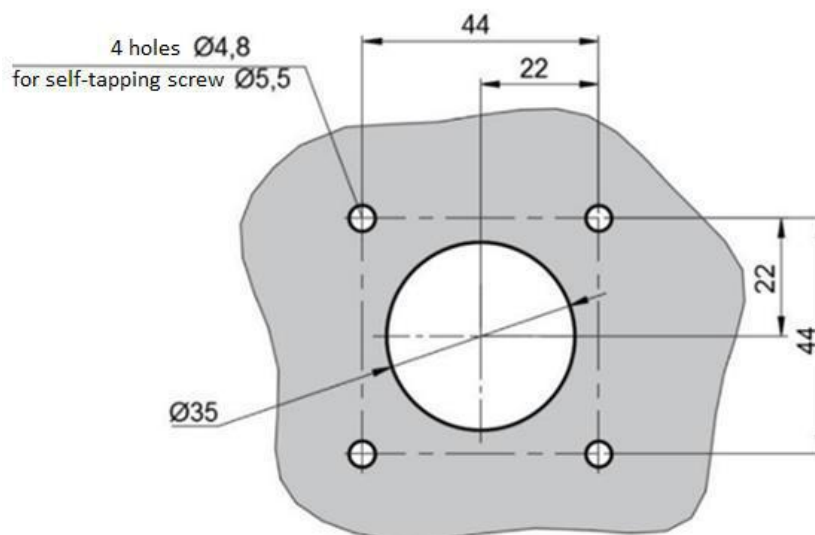
11. MOUNTING TO A TANK

The most common method of mounting is fixation on self-tapping screws with a sealing washer.

It is also possible to install sensor on threaded stover nuts, welded bushings and other structural elements. The sensor can be installed at pre-arranged locations using screws and bolts with strength classes of at least 4.8. In this case, it is necessary to ensure the tightness of the connection between the sensor body and the tank. For additional protection it is allowed to use an automotive oil and petrol resistant sealant.

If it is necessary to reduce the standard length of the sensor, cut it to a length not less than 150 mm with a hacksaw, clean from the metal chips, install a centralizer, make re-calibration or gauging. The length between the edge of metal pipes and the bottom of the tank without centralizer should be at least 15 mm.

The following is used to prepare place for installation:

✓ bimetallic bit of Ø 35 mm;

✓ drill of Ø 4,8 mm

* The diameters of the holes are given for self-tapping screws, if necessary, mark places for another fastening according to the centers of specified holes.

Fig.11.1. Connecting dimensions
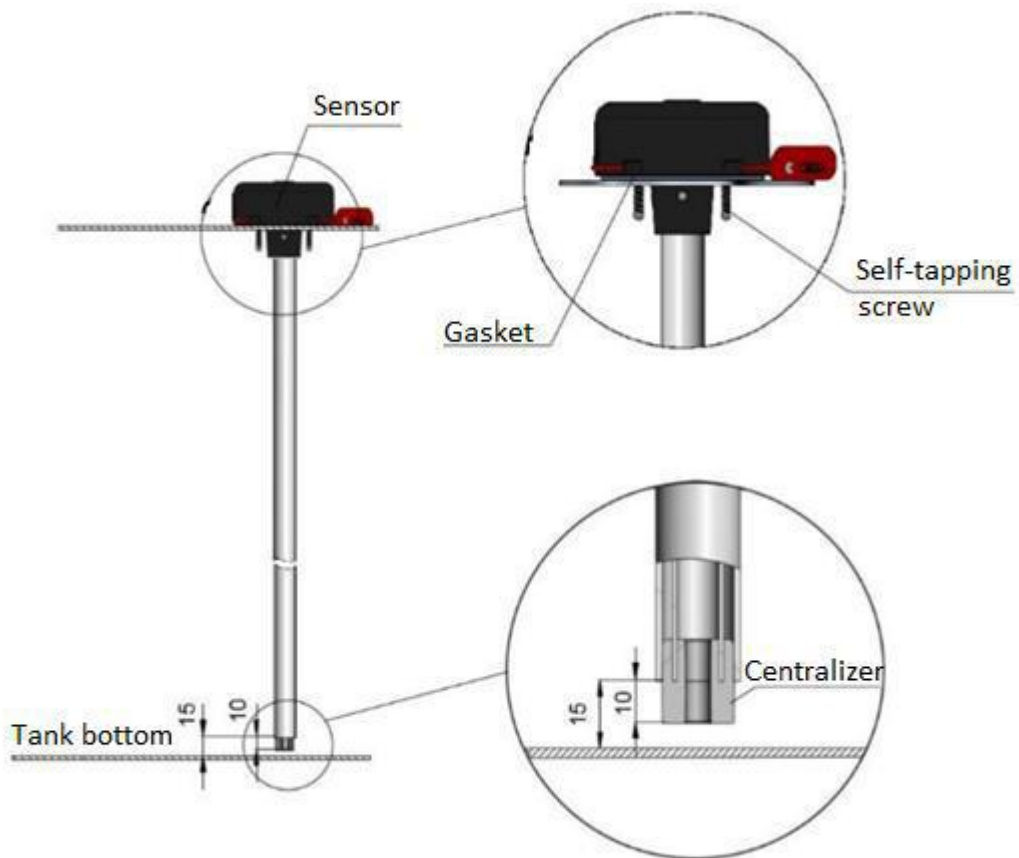

Fig.11.2. Bimetallic bit

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Fig.11.3. Sensor mounting on a tank

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12. INSTALLATION TEMPERATURE SENSOR

Before final installation, make sure that rubber gasket (gasket cord) was established in the body lid. Before installing the lid on the body, spread the gasket with a neutral silicone sealant along the contour. Put the sealant on rubber gasket joints (gasket cord joints).

13. TROUBLESHOOTING

PC Configurator Error Codes

Value (current)	Units	Transcript
7000	arb. u	Short circuiting between the external and internal measuring tubes
6500	arb. u	The configuration "Empty" is incorrectly set or the break in the external and / or internal measuring tubes

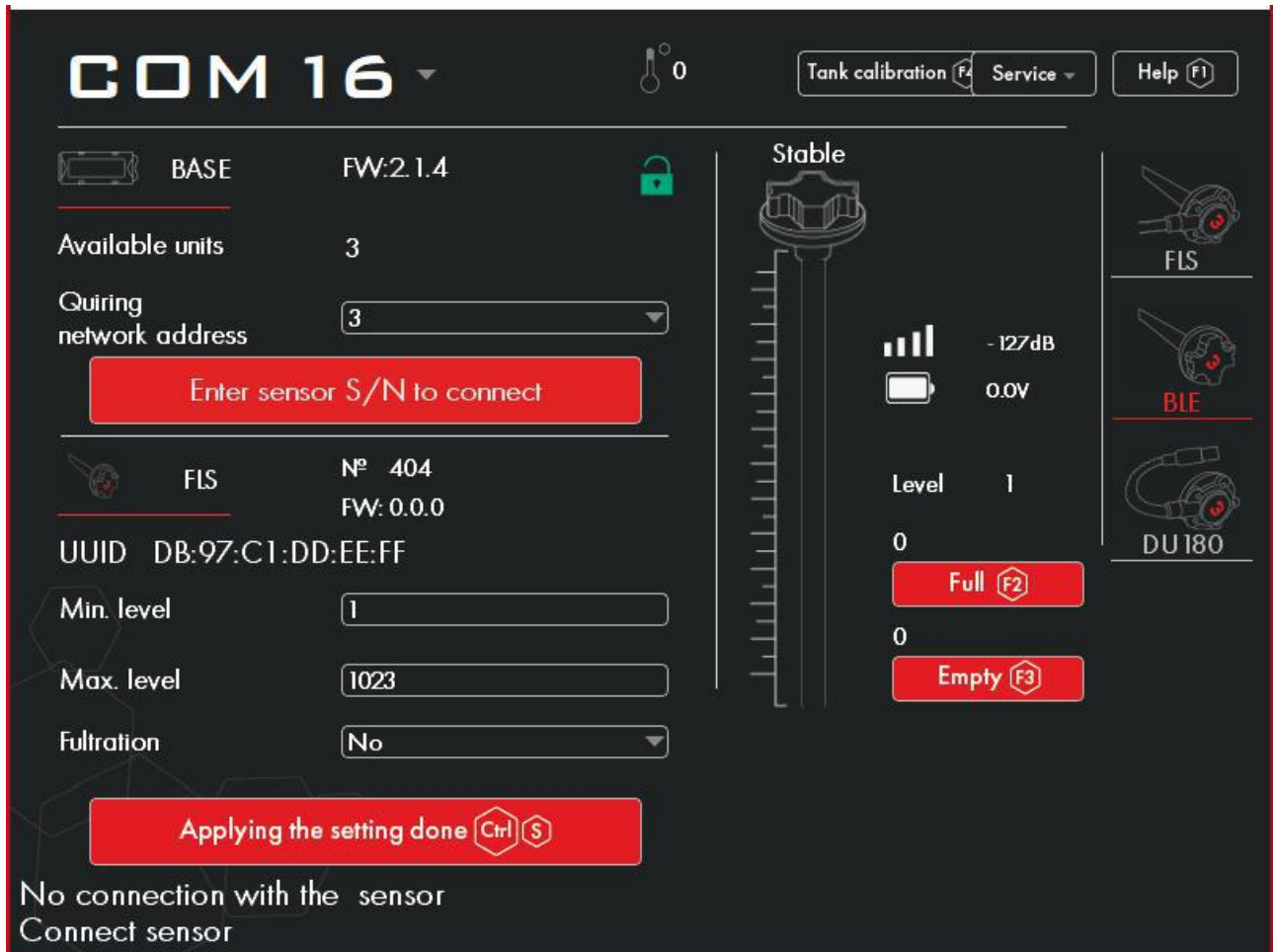## 14. WORKING WITH THE CONFIGURATOR

14.1. Configuring the sensor via BLE-BASE-USB
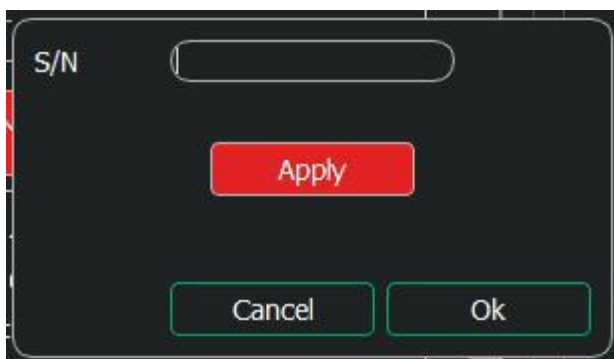
Appearance after starting the configurator:

In order to connect the TD BLE sensor for setting, the BLE-BASE-USB device must be connected to a PC. In the configurator, select the desired COM port and then click on the BLE icon.
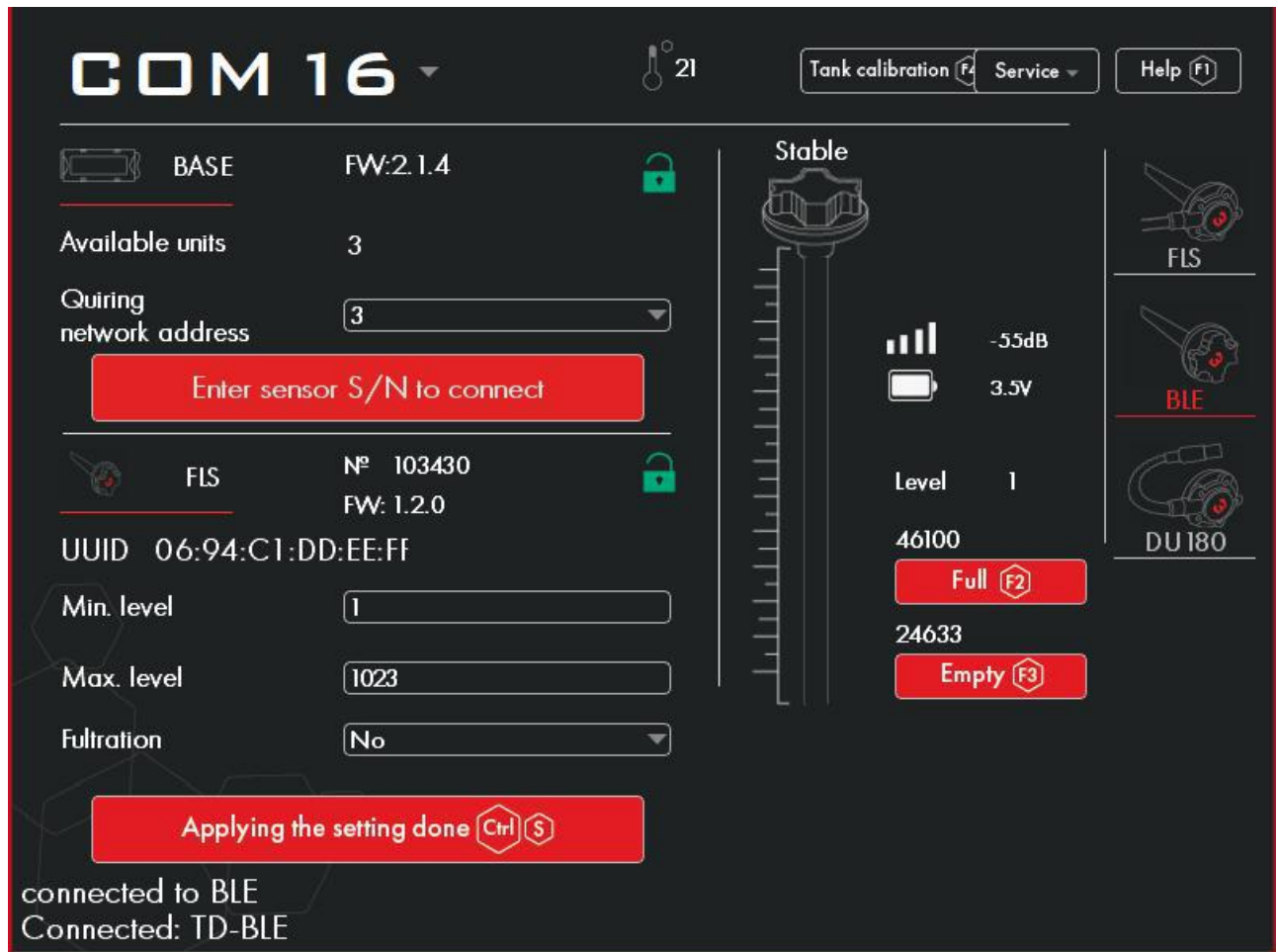
1.   Window shall appear:

Then press the "Enter the S/N sensor to be connected" button

In the window that appears, you must enter the serial number of the sensor that you want to connect for configuration.

2. After the sensor has been connected to the BLE-BASE-USB device, the current data will appear in the configurator window:

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All basic sensor parameters are displayed here and all basic sensor settings are made.

Basic sensor parameters:

- Serial number

- Firmware version

- UUID (Bluetooth module identifier)

- RSSI (signal reception level; evaluated by receiver, i.e. BLE-BASE-USB device)

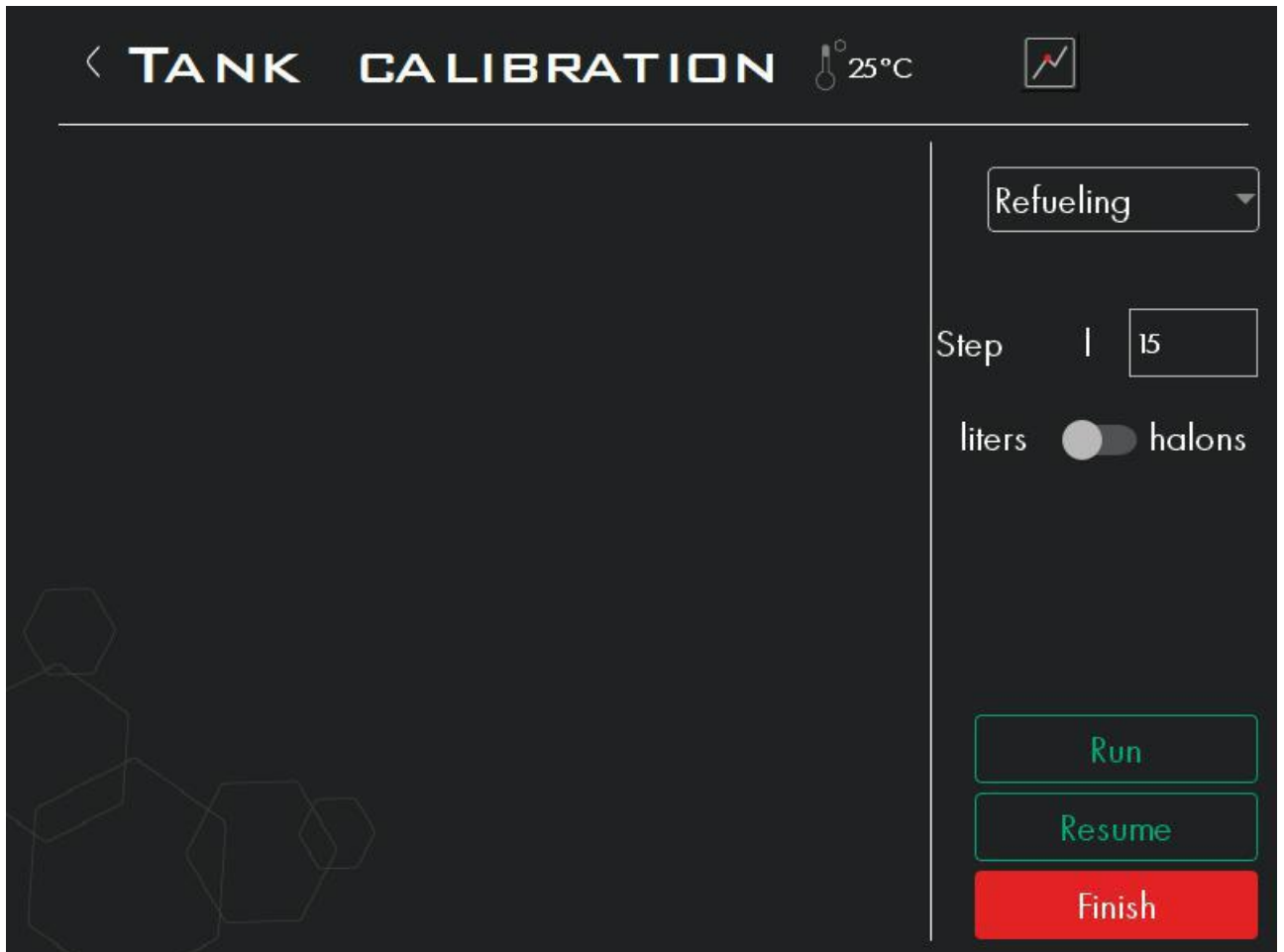- Battery charge;

Basic sensor settings:

- Level measuring range (1023 or 4095)

- Filtering

- Calibration Full and Empty.

After changing the settings, you should save them by pressing the "Write parameters to the device" button.

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3.   Next is a section with additional functions:

Tank calibration:

Used to perform the calibration procedure and save the result as a file with csv extension on the PC.

To start working with this function it is necessary:

1)   Choose the method of performing the calibration procedure (by pouring or draining fuel from the tank)

2)   Choose the step with which to carry out the calibration (in other words, the volume of the next portion)

3)   Select volume unit

4)   Press the "Start" button

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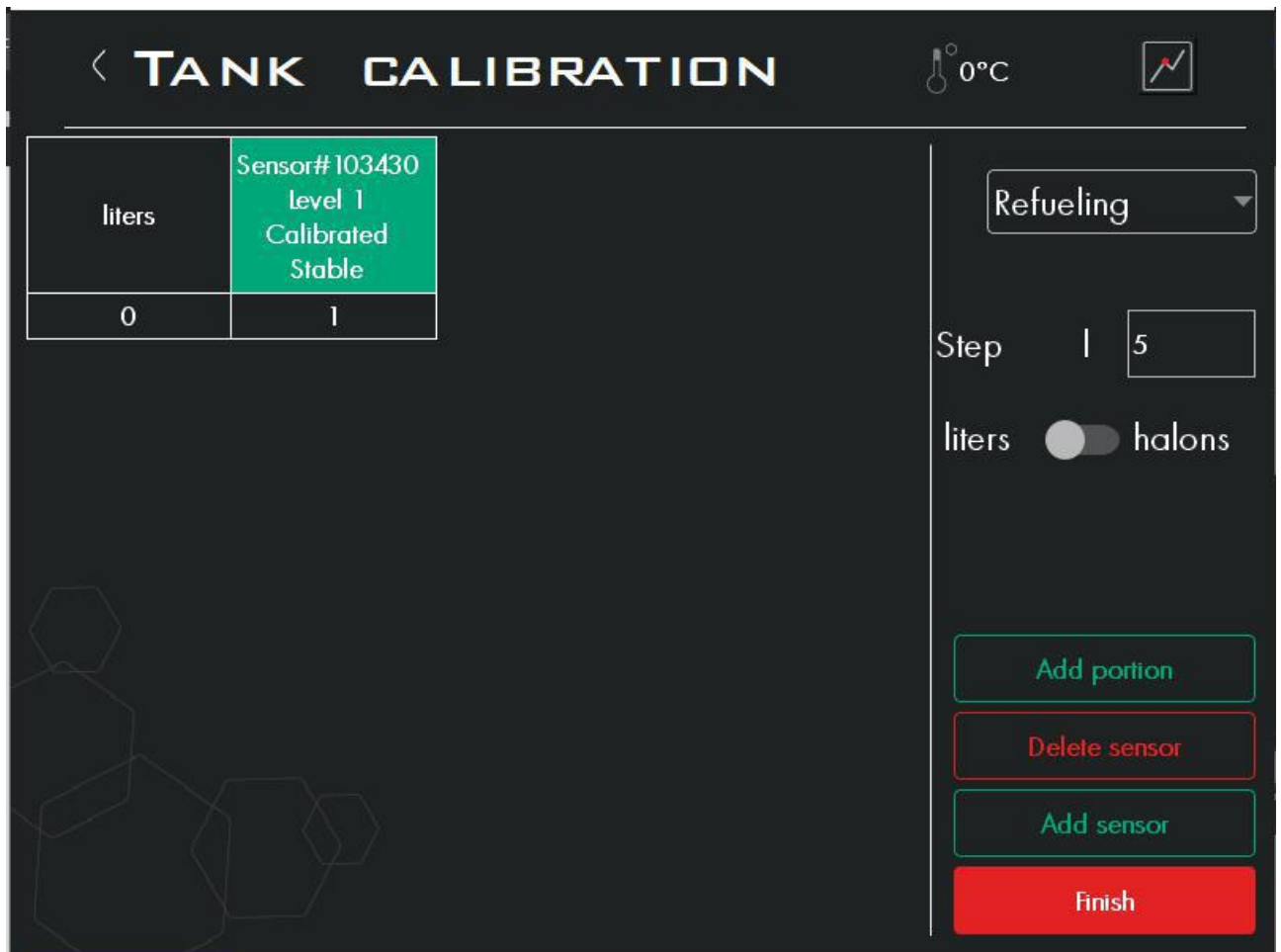
By default, the first line is automatically filled with volume 0 and sensor reading 0. If necessary, you can edit these values at any stage.

Then you should fill up the next portion of fuel, wait for the level to stabilize and press the "Add a portion" button
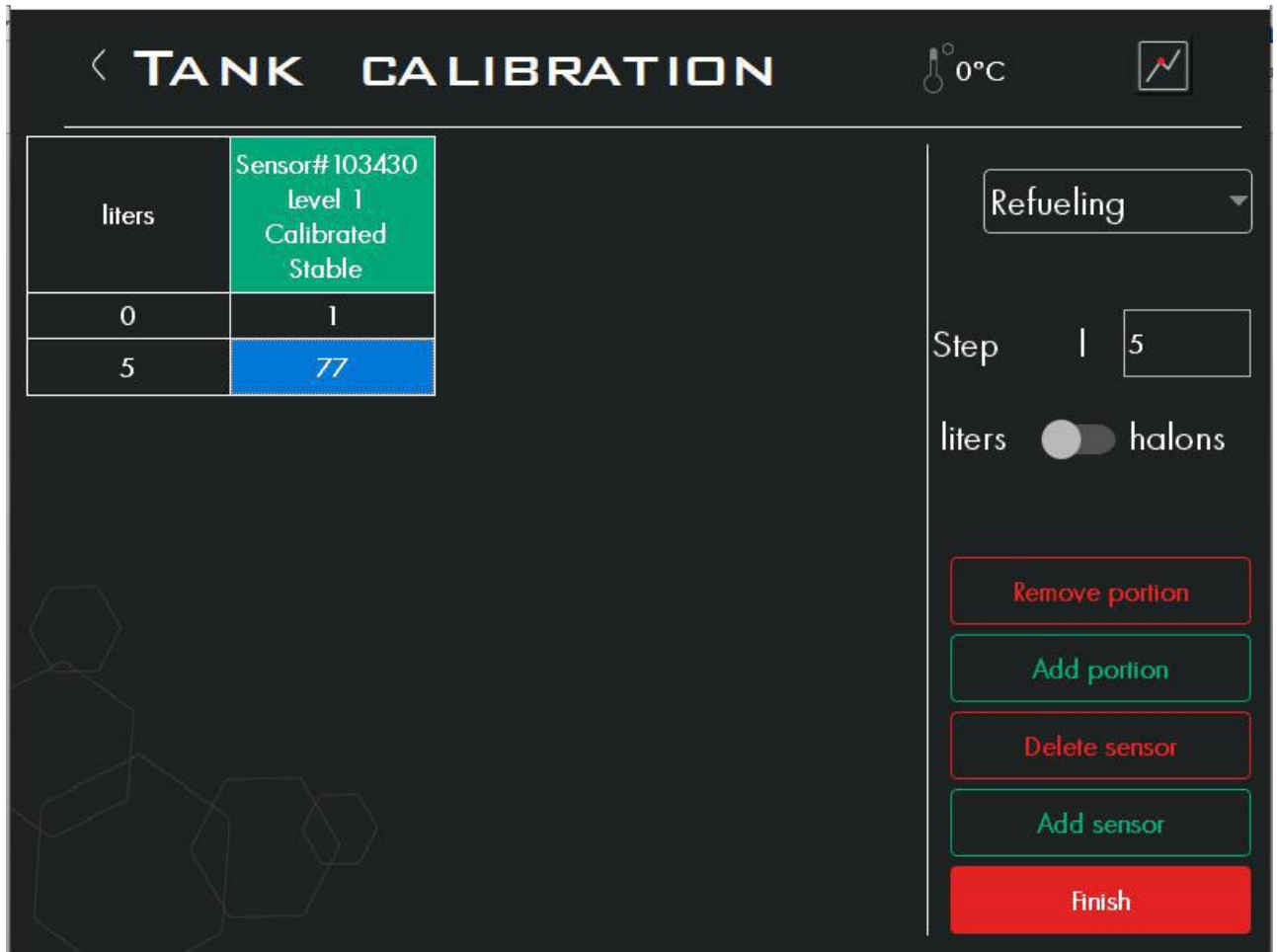
Then repeat the above steps until the tank is completely filled.

Then press the "Finish" button to save the table to a file. Propose a file name and select the path to be saved in the PC.

Please note that when switching to the "Tariff" menu it is possible to resume the previously interrupted tariffing procedure. To do this, press the "Resume" button and select the previously saved calibration table file.

Besides, at any stage of calibration there is a possibility to estimate the calibration table chart by pressing the corresponding icon:

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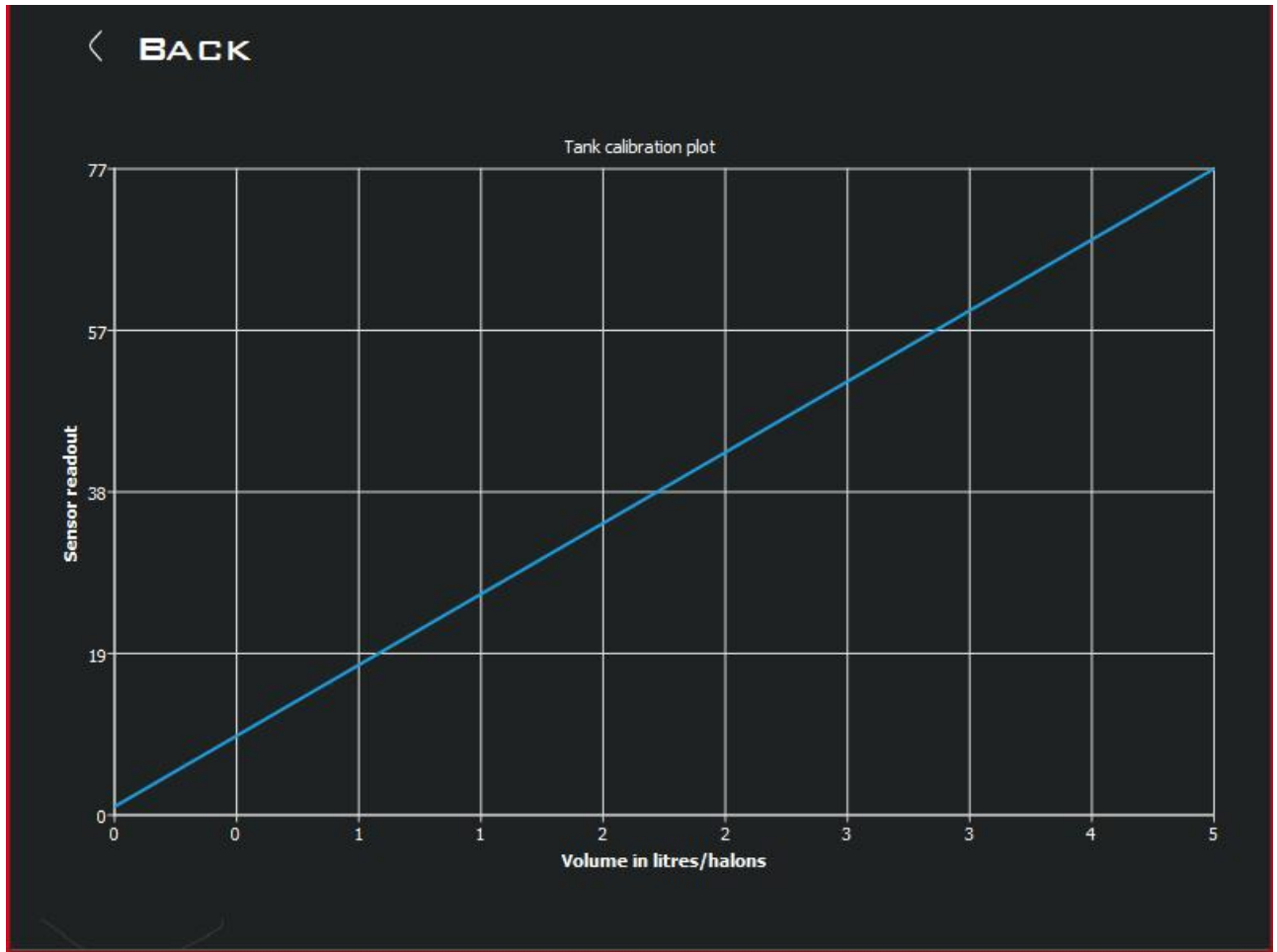
During the operation of the vehicle, fuel level in the tank can vary greatly. Smoothing is used to eliminate fuel consumption jumps on the graph. The median smoothing type offers a choice of 16 fixed smoothing levels. The degree of smoothing 15 is used for extremely harsh operating conditions with constant strong vibrations and large spikes in the fuel level. This may be special equipment, working in mines, coalmines, etc.

Recommended Median Smoothing parameters:

Degree	Description
0-1	Best for stationary tanks
2-6	Recommended value for trucks when driving on a flat asphalt road.
7-12	Recommended value for tractors, agricultural machines
13-15	Recommended value for mining machinery

Service menu:
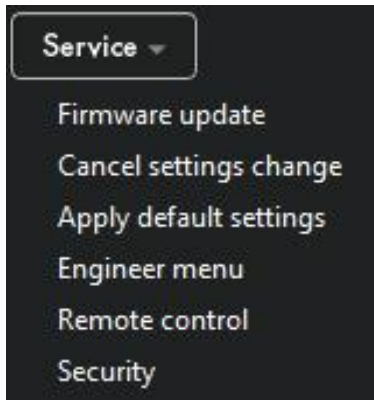
Firmware update selection:
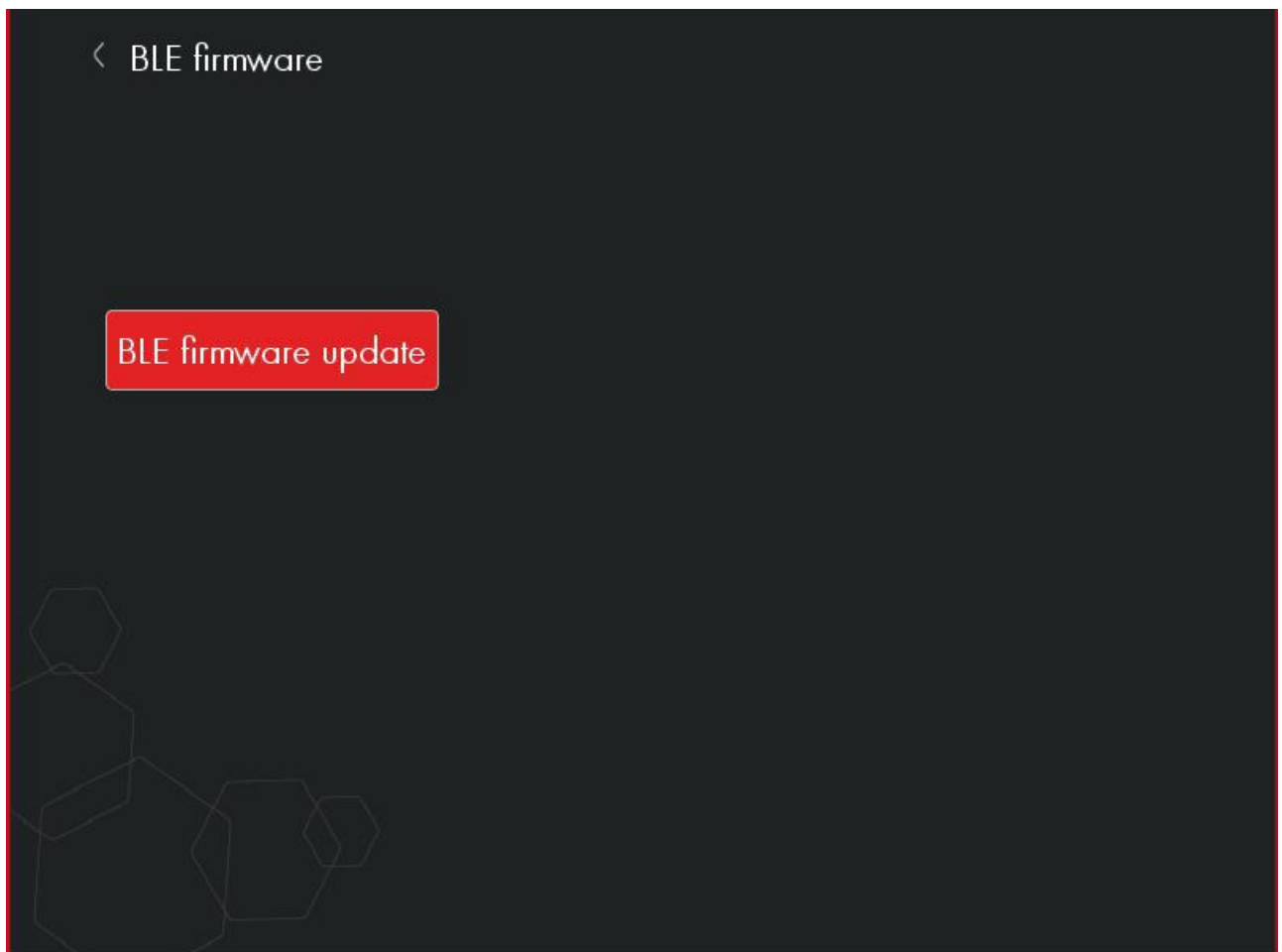
In order to start the flashing process of the sensor, press the "BLE firmware update" button. After that the sensor will reboot and will be available for firmware update for about 20-30 seconds. The firmware process itself should be performed via a smartphone with OS Android, in the program nRF Connect, and the archive with the firmware should be copied to the smartphone memory in advance. For more details, see the firmware manual.

"Cancel unsaved settings" - allows you to return the display of the current sensor settings in the configurator, for example, if you have made a number of changes, have not yet saved and forgotten what exactly changed.

"Load factory settings" - allows you to return to factory settings.
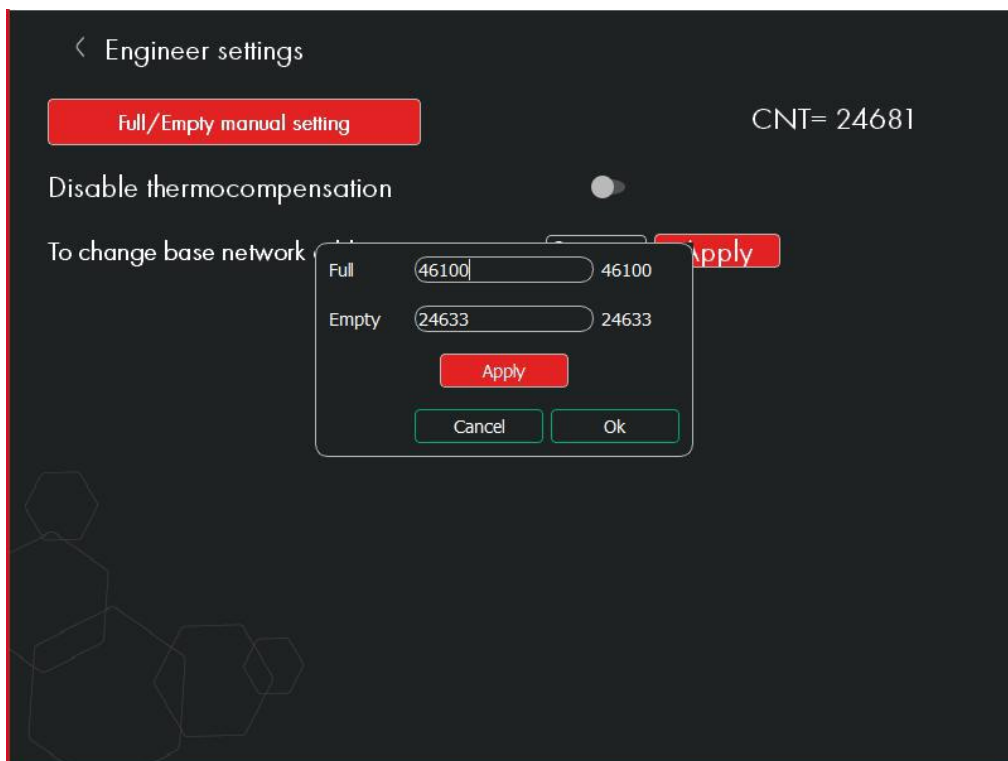
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Engineering menu:
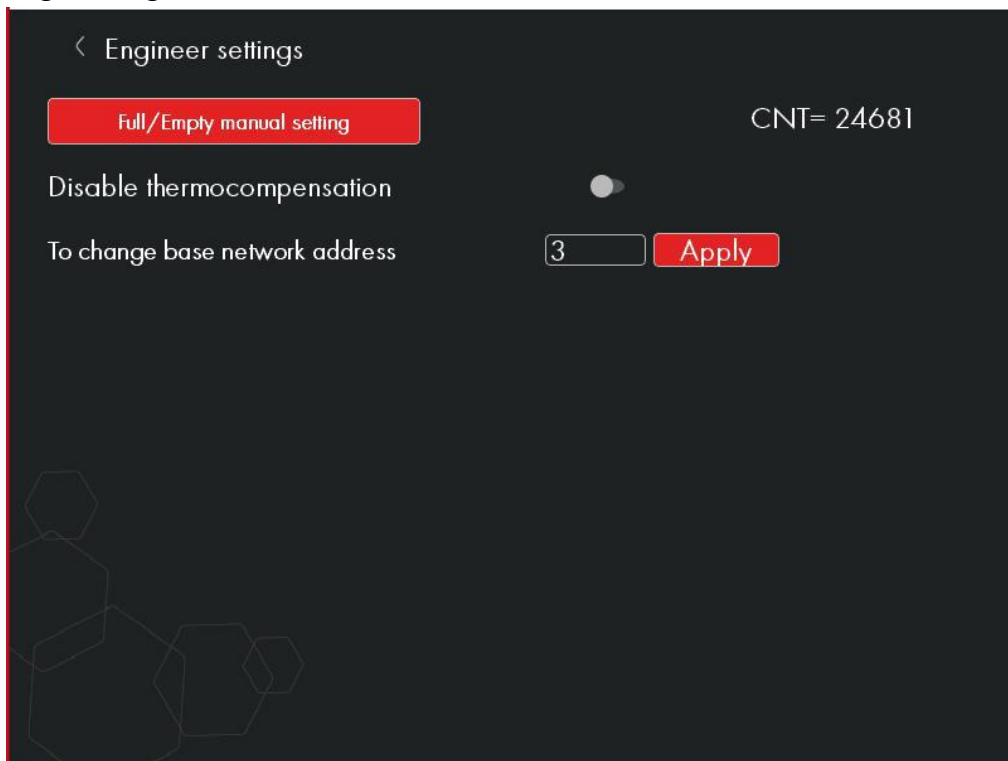
This is a menu of additional functions and features.

This menu item displays the raw current sensor reading (CNT).

In addition, there is a function to manually enter the calibrations "Full" and "Empty":

"Remote control" is only valid for wired sensors.

"Security - Setup/change/delete password menu to change settings:
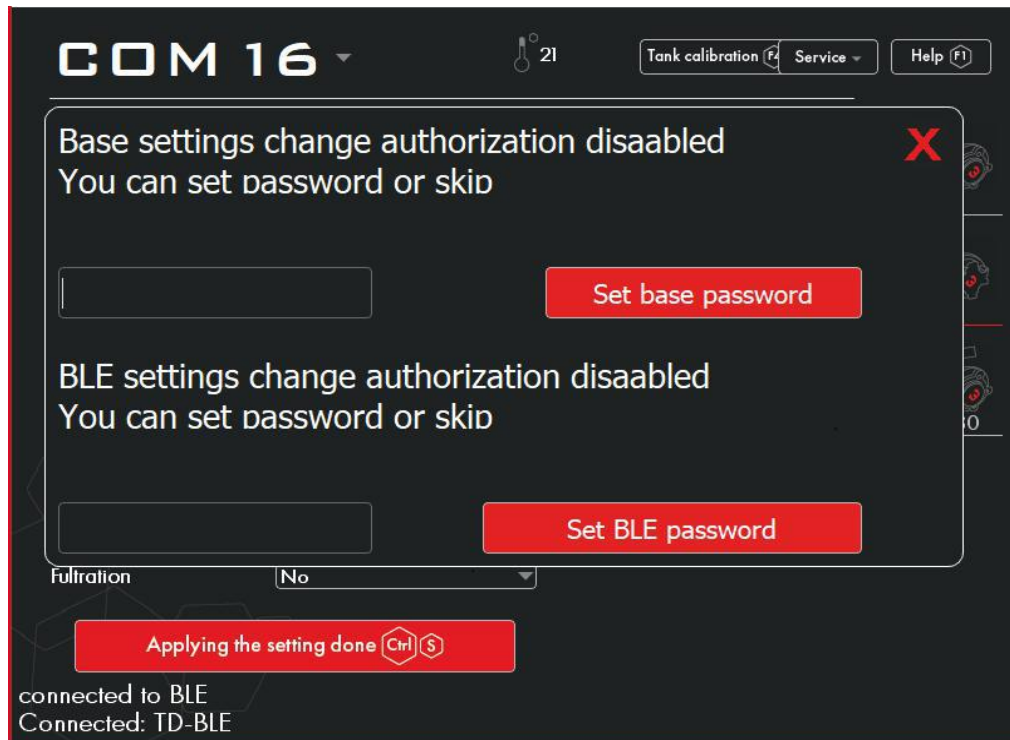
Enter the password and click "Set password" button

When a password has already been set, you must enter or delete the password to change the sensor settings. To do this, enter the password and press the necessary button.

!!! *We strongly recommend to pause between operations in 5-10 seconds, as communication with the sensor is carried out via Bluetooth, working out commands with a slight delay!!!*

ESCORT. Wireless capacitive fuel level sensor ESCORT TD-BLE. Wireless capacitive fuel level sensor base ESCORT TD-BLE-base. Wireless temperature sensor ESCORT-BTR. Manual. Page 36 of 49

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15. Setting up the BLE-BASE to work with the tracker

In order for the TD BLE or TL BLE sensor to transmit data to GPS trackers that do not have Bluetooth 4.0 or do not support the Escort BLE protocol, it is necessary to use the BLE Base device, which connects to the tracker via RS485 interface and has the ability to receive data from 4 sensors simultaneously.

In order to work in such a bundle to BLE Base it is necessary to bind 1-4 sensors.

To configure the device BLE Base must be connected to the interface converter Escort C-200M.


After connecting BLE-BASE to the PC via C-200M and clicking the BLE icon in the configurator will appear a window with the ability to connect up to 4 sensors to this database.

To bind the sensor, press the button "Connect sensor" and enter the following combination in the appeared window: TD_serial number of the sensor or TL_serial number. Then press the "Connect" button.

!!! **We strongly recommend that you use the free connection slots for the sensor in following order: from left to right, from top to bottom. Between operations make a pause for 5-10 seconds as communication with the sensor is carried out via Bluetooth with a slight delay!!!**
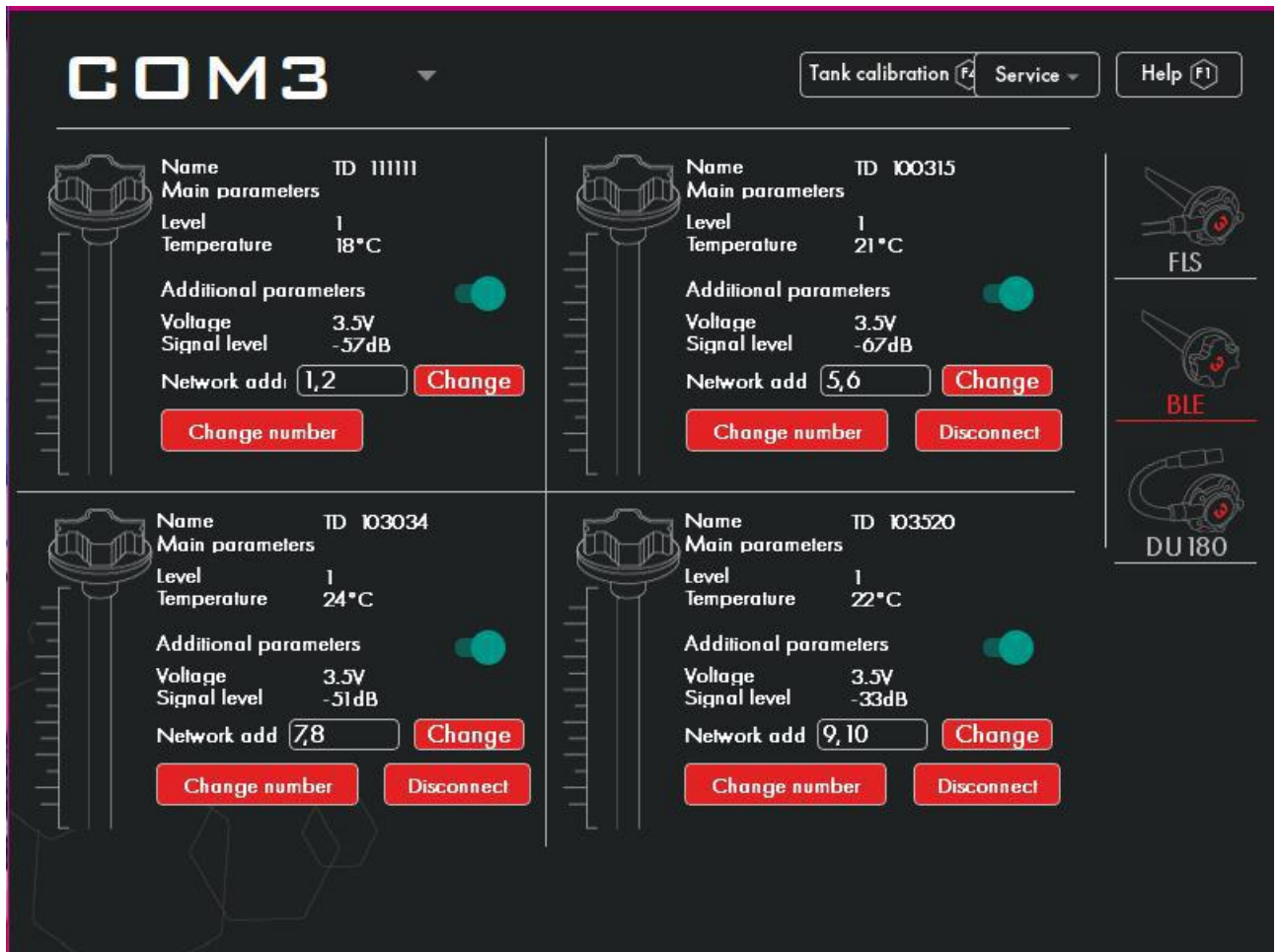
This is the window where the connection to the 4-sensor base is displayed.

Here we can change the network address to which the data from the sensor will be sent.

Note that RS-485 data from the sensor is transmitted to 2 network addresses:

1)   Fuel level and temperature are the main ones;

2)   by additional (following the default) - battery charge and signal reception level (RSSI).

The transmission of additional parameters can be turned off.

!!! **We strongly recommend that you use the free connection slots for the sensor in following order: from left to right, from top to bottom. Between operations make a pause for 5-10 seconds as communication with the sensor is carried out via Bluetooth with a slight delay!!!**

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APPENDIX 1

Programming mode wiring diagram with BLE-BASE adapter when connected to PC
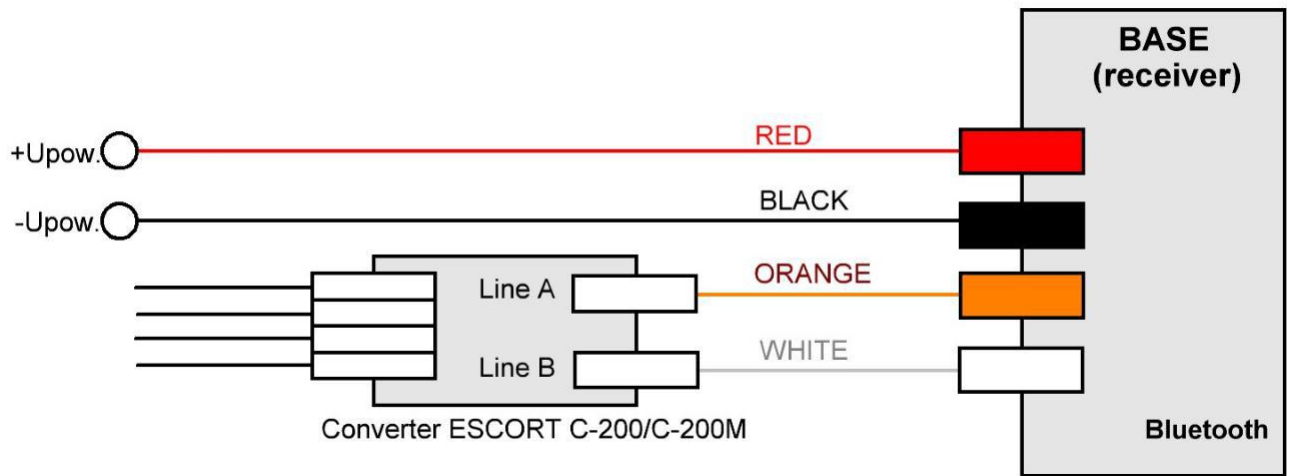
RS485 mode wiring diagram

APPENDIX 2.

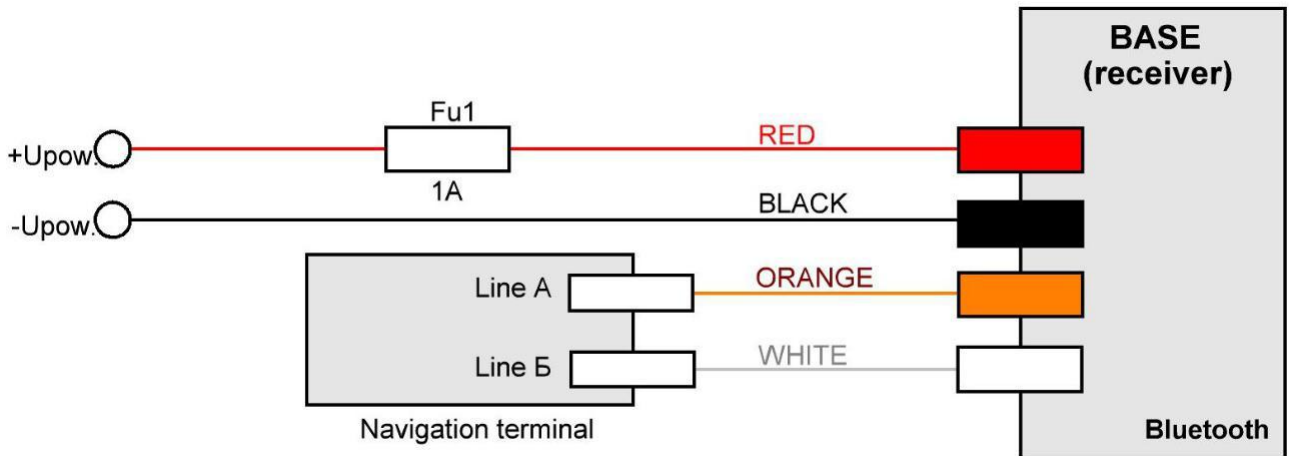**Connecting the TD-BLE sensor to TELTONIKA FMB trackers (except for FMB6XX series)**

TELTONIKA FMB trackers (except for FMB 6xx series trackers) support connection of external devices via Bluetooth interface (including Bluetooth 4.0 (BLE)). Support for connection of Escort brand TD BLE and TL BLE sensors is integrated.

To connect a sensor, you need to enter its MAC-address into the tracker memory. To do this, go to the BLUETOOTH 4.0 tab in the tracker configurator:
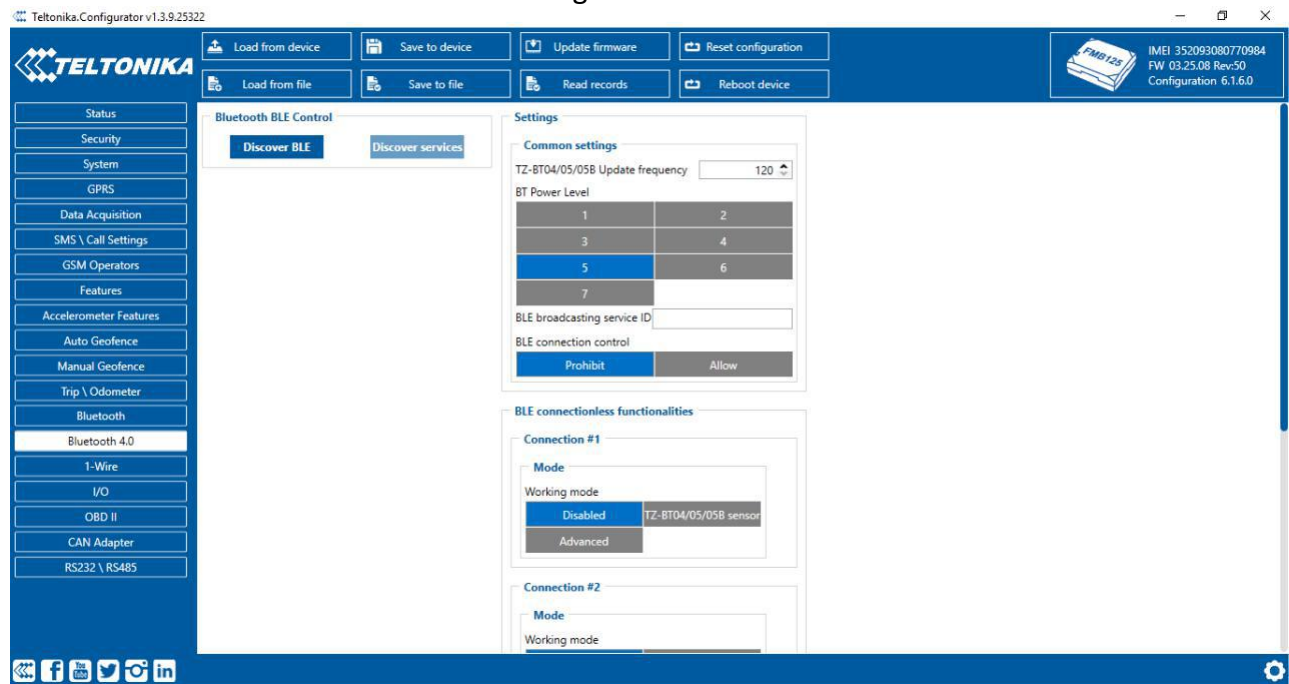
In the BLE CONNECTION FUNCTIONALITIES field, select a memory slot (four slots are available - CONNECTION #1, #2, #3 and #4) and press the ADVANCED button. In the menu that appears, enter the MAC address of the sensor in the MAC field:
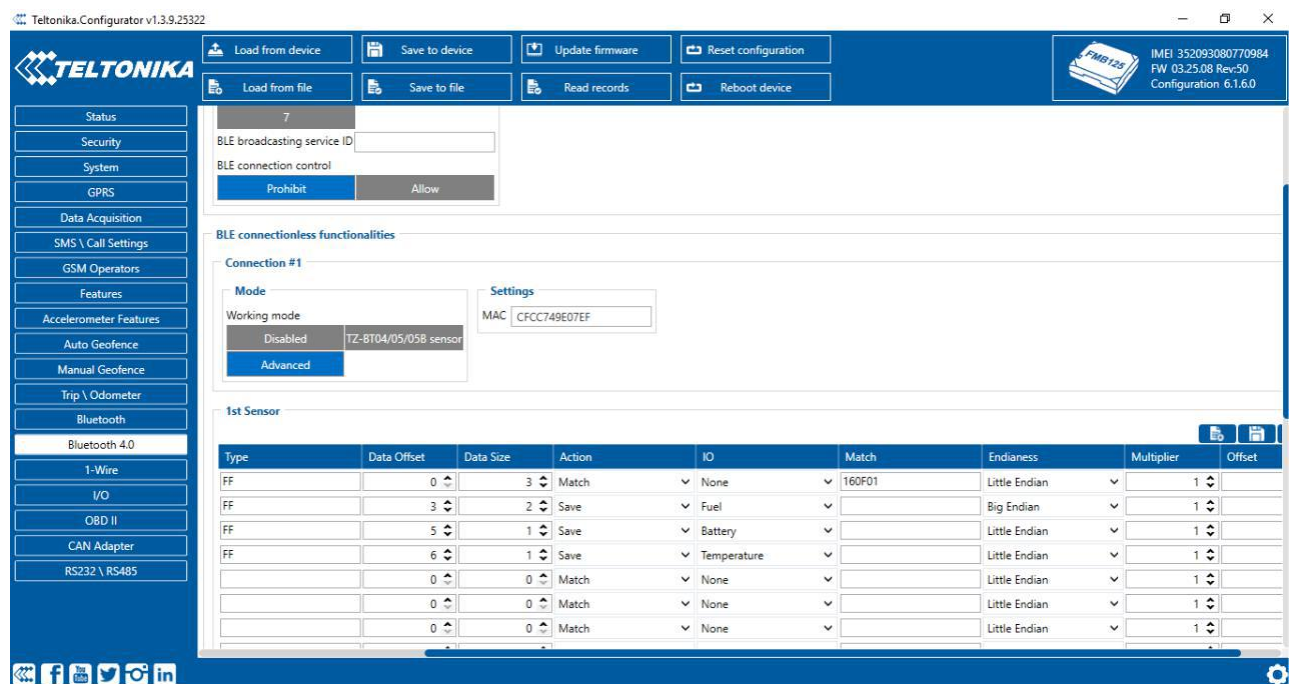
Note the table below - it also needs to be filled in. This procedure is automated - just press the PRESET SELECTION button (in the upper right corner of the table) and select the ESCORTFUEL preset (for fuel level sensors):
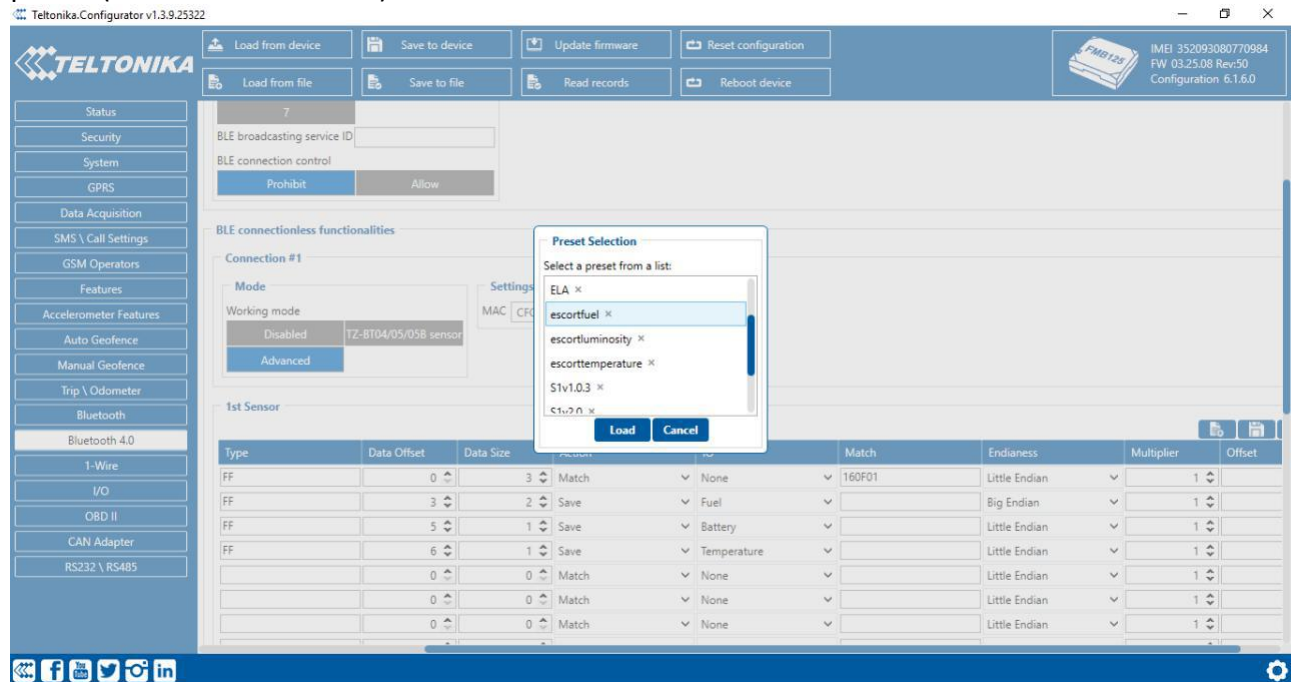
For ESCORT TL BLE sensors, select the ESCORTTEMPERATURE preset:
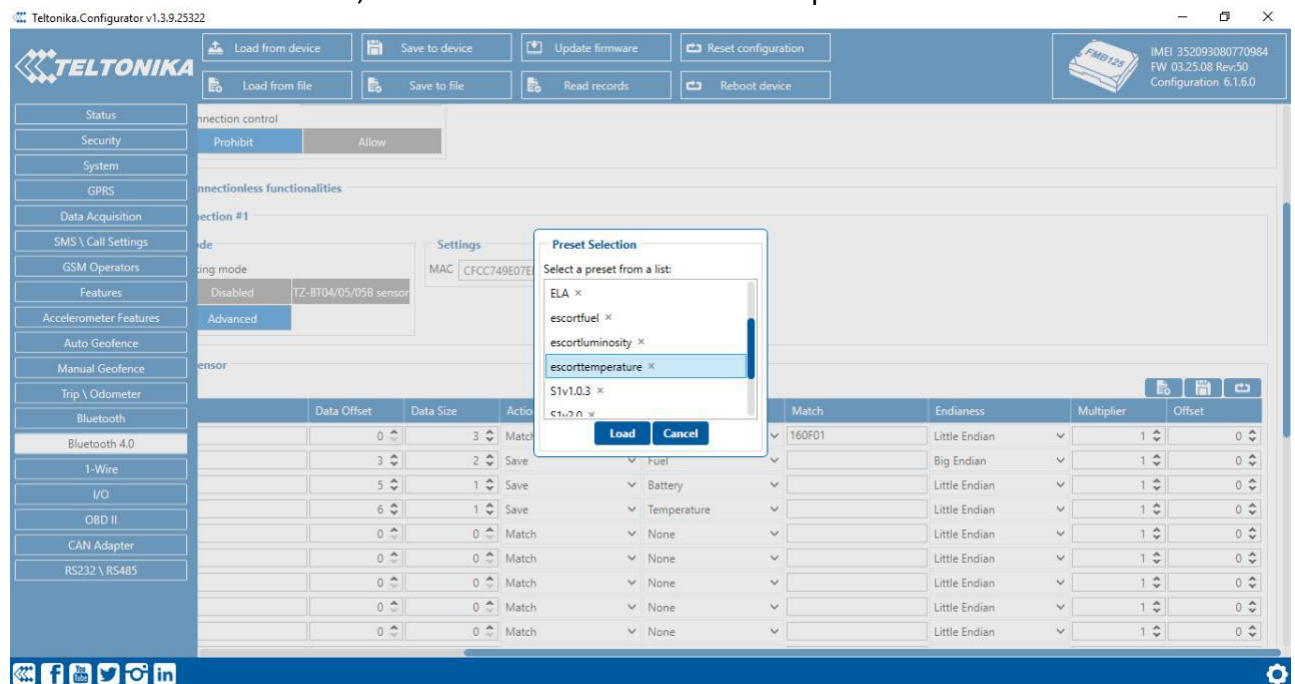
Then press the SAVE TO DEVICE button in the top menu of the configurator - after that the changes made will be saved in the tracker's memory.

If you want to connect more than one sensor, follow the same procedure for the other three memory slots.

If you do not know the MAC address of the sensor and its name,there are several ways to find them out:

The first way is to use the mobile Escort configurator**.**

When Bluetooth data transfer is enabled, open the configurator and connect to the sensor. Once connected, the MAC address will be listed directly in the main menu.

The second option is to use the nRF Connect application.

When Bluetooth data transfer is enabled, enter the Scan mode. The MAC address will be listed below the sensor name.

Use the following table to decipher the data from the tracker:

Name	Memory slot 1 (CONNECTION #1)	Memory slot 2 (CONNECTION #2)	Memory slot 3 (CONNECTION #3)	Memory slot 4 (CONNECTION #4)
Temperature	io_25	io_26	io_27	io_28
Battery charge	io_29	io_20	io_22	io_23
Humidity	io_86	io_104	io_106	io_108
Fuel level	io_270	io_273	io_276	io_279
Illumination	io_335	io_336	io_337	io_338

APPENDIX 3.

Connecting the TD-BLE sensor to the NEOMATICA ADM007 trackers

To connect the Escort BLE sensors, go to the Commands section. And lead the following commands:

1.   **PROTOCOL 40** – the command includes transmission of data blocks "analog input" and "FLS";

2. BLESCANSTART - the command starts scanning and displaying all the Bluetooth devices in the area;

In the list that appears for each device, a string is displayed that includes the device name (for FLS it is TD_100..., for thermometer it is TT_...) and its Mac address (e.g. 3A9B2D4C1A1A).

3.   BLEFUEL <space> <выбор network number selection: 0, 1 or 2>, <MAC- address of the required датчика> - the command establishes the connection of the selected sensor to the terminal and assigns it to one of the tracks of the transmitted parameters.

Example of what a command console looks like:

[18:40:47]: BLESCANSTART

[18:40:47]: BLE environment scan is started (about 60 sec)...

[18:41:18]: BLESCANSTART: address: 'ESF2A9527B1D'; name: 'TD_100001'; rssi:

48-; advertising: '0201060A0954445F313030303031

[18:41:47]: BLESCANSTART: BLE environment scan is over

[18:43:33]: BLEFUEL 0,ESF2A9527B1D

18:43:34]: BLEFUEL: (0): ESF2A9527B1D, (2), (1): (1): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0): (0),

If you do not know the MAC address of the sensor and its name, there are several ways to know them:

The first way is to use the Escort mobile configurator.

When Bluetooth data transfer is enabled, open the configurator and connect to the sensor. Once connected, the MAC address will be listed directly in the main menu.

The second option is to use the nRF Connect application.

When Bluetooth data transfer is enabled, enter the Scan mode. The MAC address will be listed below the sensor name.

APPENDIX 4.

Connecting the TD-BLE sensor to the SMART trackers of the S-24XX series

NAVTELECOM trackers of SMART S-24XX series support connection of external devices via Bluetooth interface (including Bluetooth 4.0 (BLE)). Support of connection of TD BLE and TL-BLE sensors of Escort brand is integrated.

This function is an option and is defined by the configurator automatically. If the Bluetooth option is not available, the "Use Bluetooth module" flag cannot be set. To enable the Bluetooth function, select the "**Use Bluetooth module" flag**.
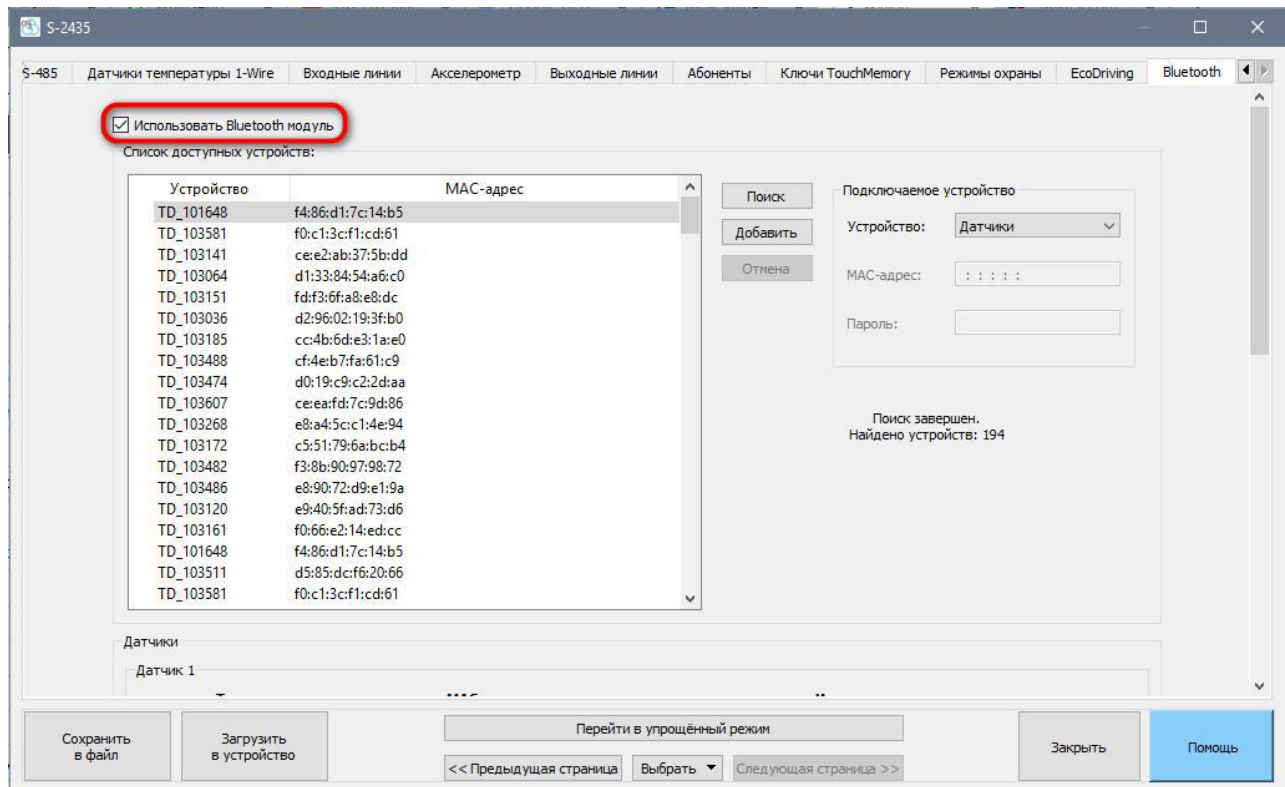
SMART terminals can only work with one Bluetooth headset or wireless fuel level sensors and wireless temperature sensors (up to 4 in total). To establish communication between the terminal and an external device, fill in the "Device", "MAC-address" and "Password" fields in the "Connected device" area and upload the configuration to the terminal.

Description of the "plug-in device" area

Device column – this column displays the type of device to be connected. When connecting a wireless headset for voice communication with the driver, select the "Headset" profile. If you plan to connect wireless fuel level or temperature sensors, you must select the "Sensors" profile. If the "No" profile is selected, the terminal does not work with an external device.

The "MAC Address" field is the unique identifier of the external device to be connected. For example, 1C:48:F9:AE:6D:0A.

Password - Password for access to the external device to be connected. For example, 0000.

You can use the **"Search"** function to automatically find external devices.
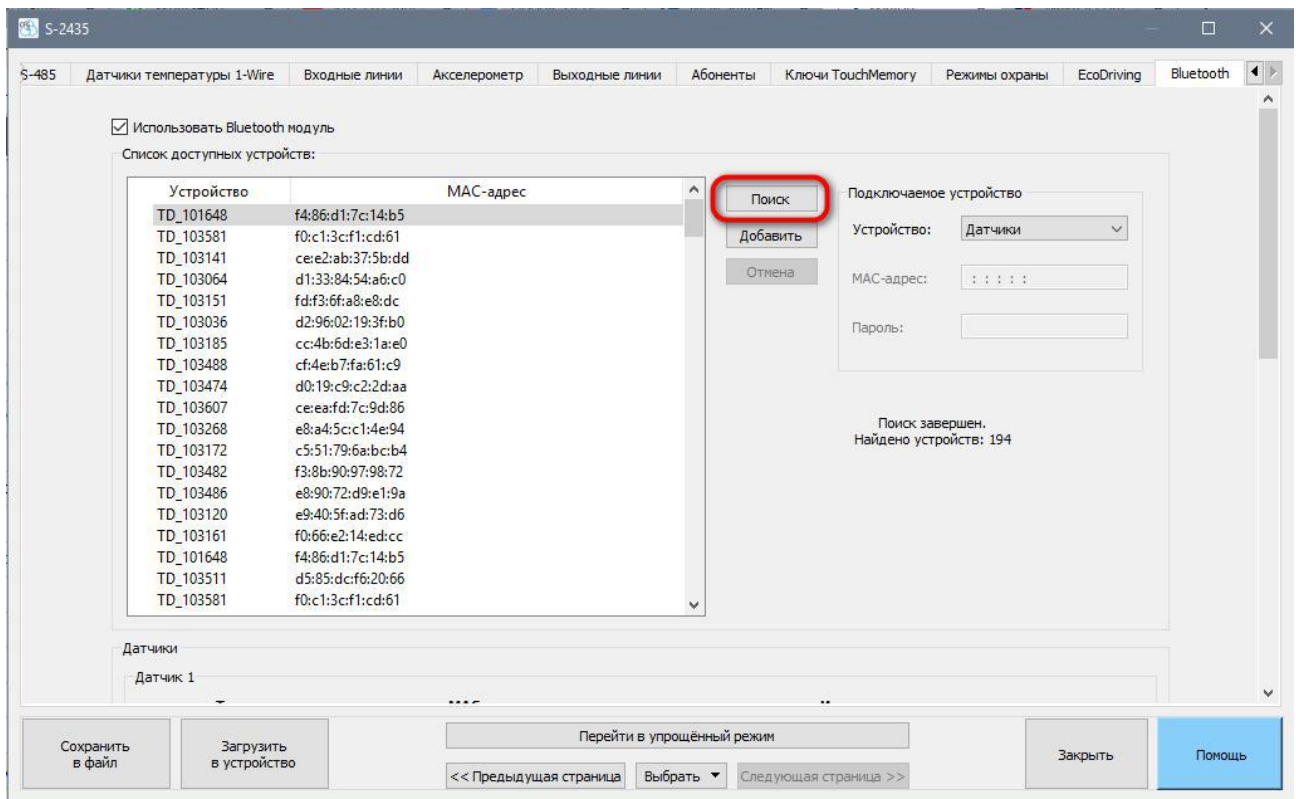
WARNING!

***Before using the "Search" function, make sure that:***

- The "Use Bluetooth module" flag is already written in the terminal. If this flag is not set, set it and write the configuration to the device. Wait for the device to reboot, turn on the modem and register with the network (the GSM LED will blink in a series of short flashes or light up permanently);

- the external device is on and in "pair" standby mode.

After clicking the "Search" button, the terminal searches for all available devices and adds them to the "Available devices list". During the search the corresponding indication will be displayed.

If the search is completed and no device can be "paired" with, the following message will be displayed: **"Search is complete. No active devices found".**

In this case, make sure that the external devices are connected, set to "pair" standby mode and within range of the Bluetooth module of the terminal. You can search for devices as many times as you like.

If one or more devices are found at the end of the search, a message will be displayed indicating that the search has been successfully completed, and the found devices will be listed in the "Available devices list"
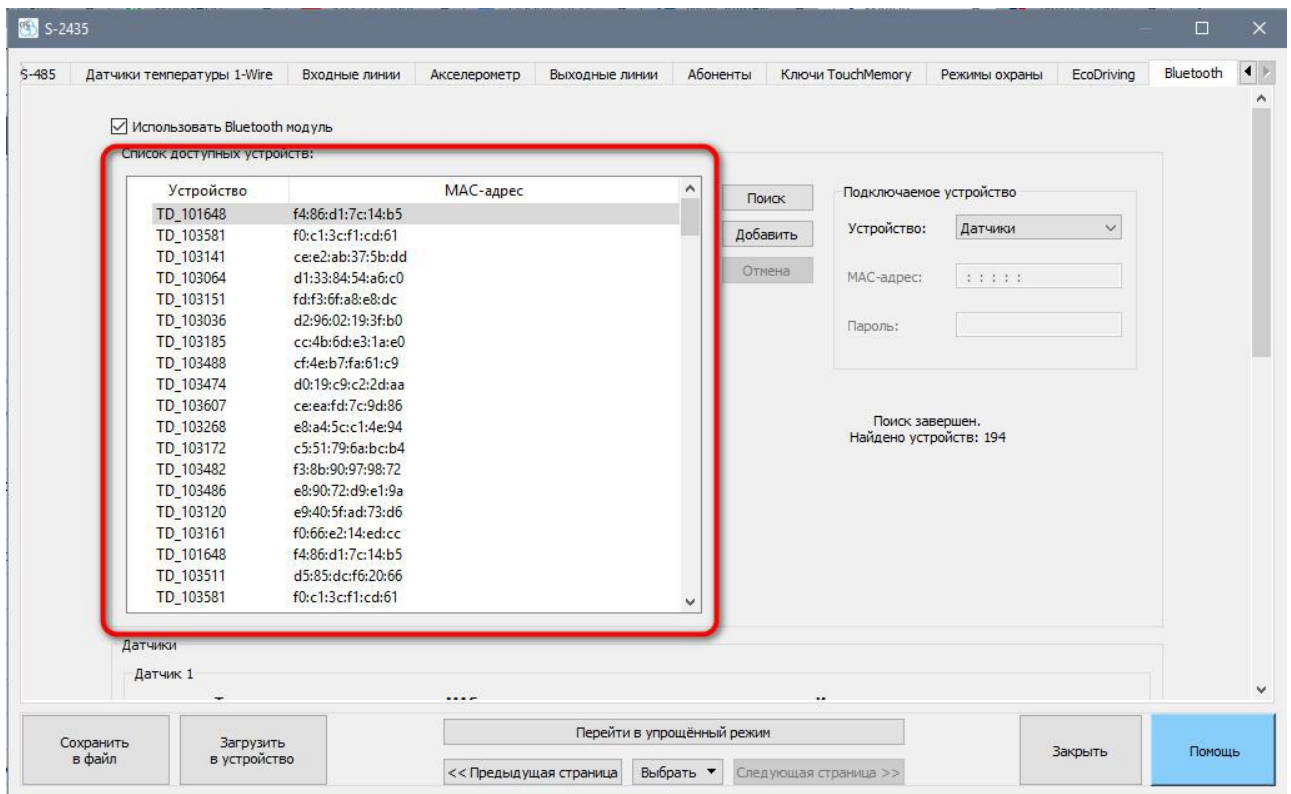
To enter the MAC-address of the found device in the field "MAC-address", select the necessary device in the list and click **"Add"**.

Connecting wireless fuel level sensors and wireless temperature sensors.

The Bluetooth module in the device must be turned on Select **"Sensors"** from the drop-down menu as the type of device to be connected
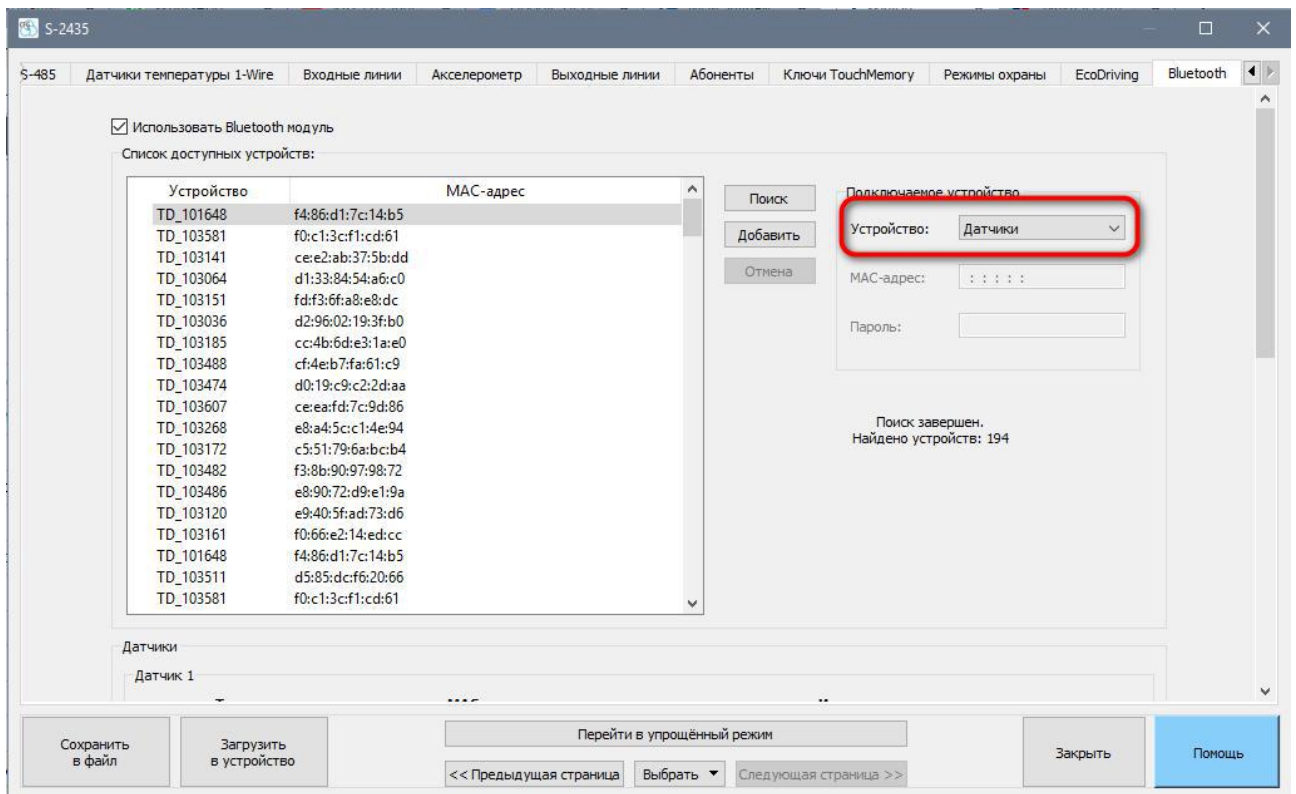
In the areas below you must specify the sensor type ("FLS" or "Temperature sensor"), MAC address, enter the actual sensor name and model.
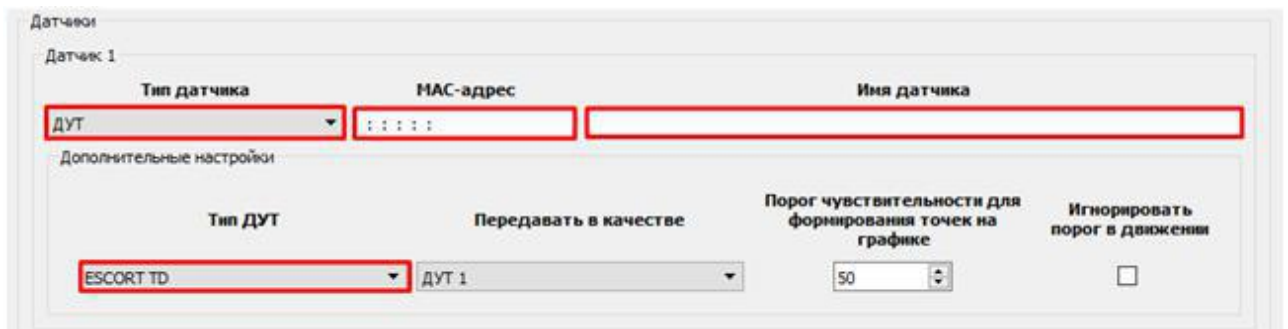
If you do not know the MAC address of the sensor and its name, there are several ways to know them:

The first way is to use the mobile configurator Escort.

When Bluetooth data transfer is enabled, open the configurator and connect to the sensor. Once connected, the MAC address will be listed directly in the main menu..

The second option is to use the nRF Connect application

Enter Scan mode when Bluetooth data transfer is enabled. The MAC address will be listed below the sensor name

The third option is to use the NTC Configurator**.**

To obtain the MAC address of the sensor and its name, you must perform the following actions:

1) If the "Use Bluetooth module" flag is not yet set on the device, set it to "Use Bluetooth module" and write the configuration to the device.

2) Wait until the unit restarts, turns on the modem and registers with the network (the GSM LED will blink in a series of short flashes or light up permanently).

3) Go back to the configuration on the "Bluetooth" tab and search for available devices. As a result, you will receive a list of sensor names and addresses.

Data from the BLE fuel level sensors are transmitted in the fields for RS-485 fuel level sensors. For each BLE sensor it is necessary to define clearly in what field for RS-485 FLS it will be transferred to the server.

WARNING!

Make sure that BLE sensors are transmitted only in the parameters of those remote control units that are not configured on the RS-485 tab.

Ultimately, the sensor settings should look like this: