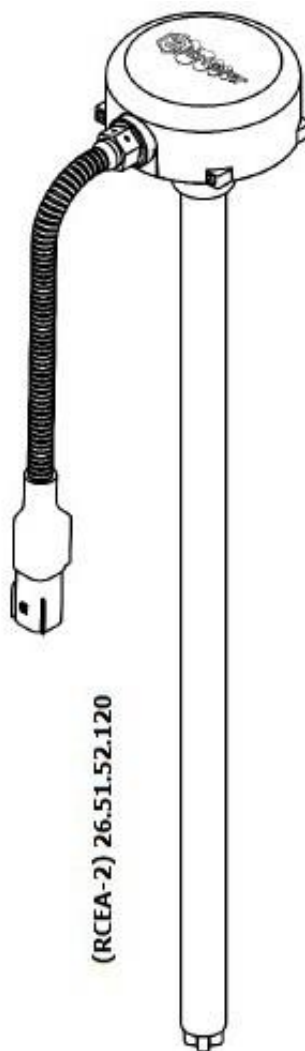
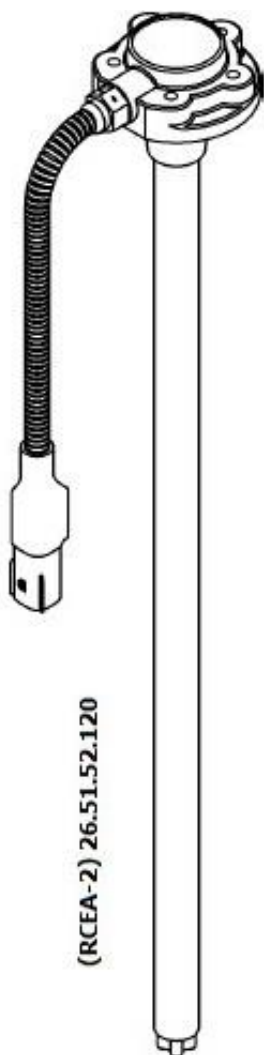


CAPACITIVE FUEL LEVEL SENSOR
TD-100, TD-150, TD-500, TD-600, TD-online

OPERATION MANUAL

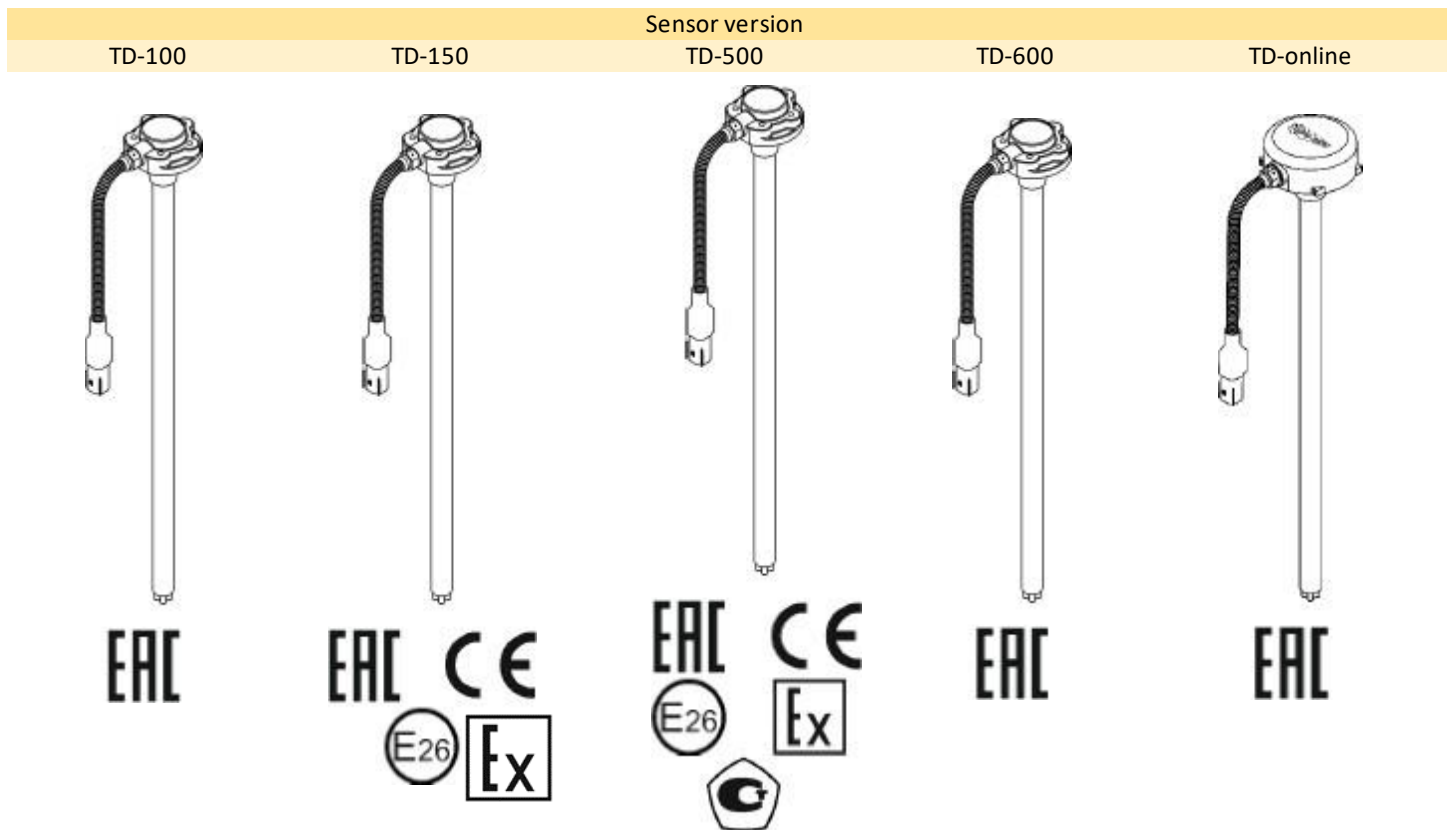


CONTENT

1. GENERAL INFORMATION	4
2. SPECIFICATION	6
3. DESIGN	8
4. SCOPE OF SUPPLY	9
5. PACKAGE	11
6. OPERATING MODE	13
6.1. RS-232.....	13
6.2. RS-485.....	13
6.3. Frequency	13
6.4. Analog.....	13
6.5. Periodic (impulse).....	13
6.6. Periodic (RS-485).....	13
7. CONFIGURATOR FOR TD-100, TD-150, TD-500, TD-600 SENSORS	14
7.1. Connection	14
7.2. Mounting to a tank	17
7.3. Configurator software	20
7.4. Smoothing.....	24
7.5. Calibration.....	26
7.6. Tank calibration.....	28
7.6.1. Tank calibration with two sensors	32
7.7. Service.....	34
7.8. Firmware.....	35
7.9. Engineer Menu.....	36
7.10. Remote control.....	41
7.11. Security	42
7.12. Instructions for the Escort mobile configurator.....	44
7.12.1. Functionality.....	44
7.12.2. Extras.....	49
7.12.3. Settings.....	50
7.12.4. Help	53
8. CONFIGURATOR TD-ONLINE	54
8.1. "Sensor" tab	54
8.2. "Tracker" Tab	55
8.3. "Server" tab	56
8.4. BootLoader Escort	56
8.5. TD-online Settings	57
8.5.1. Connection	57
8.5.2. General configuration.....	57
8.5.3. GSM Settings.....	58
8.5.4. Server settings	58
8.5.5. Calibration.....	60
8.5.6. Motor hours setting.....	60
8.5.7. Press the ENGINE button MUTE	60
8.5.8. Remote settings	61
8.5.9. Firmware change	62
9. CONNECTION	63
9.1. Electrical connection	63
9.1.1. General information	63
9.1.2. TD-100.....	64
9.1.3. TD-150.....	66
9.1.4. TD-500.....	69







9.1.5. TD-600.....	71
9.1.6. Combining of sensors into group.....	73
9.1.7. TD-online.....	73
9.1.8. Contacts and wires	74
9.1.9. Voltage chart.....	75
9.2. Connection to servers	77
10. INSTALLATION.....	80
10.1. General information.....	80
10.2. Sealing TD-100, TD-150, TD-500, TD-600.....	80
10.3. TD-online	81
10.3.1. Mounting to a tank	81
10.3.2. Micro-SIM card installation	83
10.3.3. Sealing.....	84
11. POSSIBLE MALFUNCTIONS AND WAYS OF FIXING THEM.....	85
11.1. Error Codes.....	85
11.2. Possible malfunctions and ways of fixing them	85
12. LIST OF EQUIPMENT AND PROGRAMS	86
12.1. TD-100, TD-150, TD-500, TD-600	86
12.2. TD-online	86
13. REFERENCES	86
14. TRANSPORTATION AND STORAGE.....	86
15. CONTACT DETAILS.....	87
16. DOCUMENTS	88
16.1. Certificates	88
16.2. Declarations.....	96
16.3. Licences	99
17. TERMS AND DESIGNATIONS.....	108
ANNEX A. PROTOCOL ESCORT FUEL SENSOR	109

1. General information



Basic modes of operation				
-	-	-	RS-232	-
RS-485	RS-485	RS-485	RS-485	RS-485
-	-	CAN (1)	-	-
-	-	Modbus	-	-
frequency mode	frequency mode	frequency mode	frequency mode	-
-	analog mode	analog mode	analog mode	-
-	-	periodic mode (pulse)	periodic mode (pulse)	-
periodic mode RS-485	periodic mode RS-485	periodic mode RS-485	periodic mode RS-485	-
-	-	-	-	Wialon IPS(2)
-	-	-	-	EGTS (2)
-	-	-	-	GSM-GPRS (2)
-	-	-	-	GPS (2)
-	-	-	-	GLONASS (2)

Notes:
 (1) - sensors versions with the specified operating modes are available
 (2) - for FLS TD-online SIM protocol RS-485 is used for configuration, and Wialon IPS and EGTS through built-in GSM-GPRS transmitter for sending data, GPS and GLONASS for coordinates determination

	- complies with the European safety standards		- complies with the International Safety Standards		- complies with the safety standards of Russia
	- corresponds to the Russian standards of explosion safety		- is a registered measuring instrument in the Russian Federation		- explosion protection

High-precision fuel level sensors (also meters or sensors) of ESCORT trade mark are designed to determine the filling level of oil products in fuel tanks, vessels and storage reservoirs. The sensors are used in automotive engineering as fuel level meters, and in industry - as level meters of any light oil products.

All sensors are designed for operation in vehicle and machine monitoring systems and, as a rule, are used together with GPS and GLONASS trackers.

TD-online sensor, in contrast to others, has a built-in GPS/GLONASS-tracker (terminal). The tracker registers information (fuel level and location, speed, direction of movement, object and other parameters) and transmits information via mobile operator channels (GSM-GPRS) via Wialon IPS or EGTS protocols to transport monitoring servers (for example, WialonHosting). The information registered by the sensor is additionally saved in non volatile memory (up to 32,000 rewritable records).

TD-online sensor allows connecting of up to 7 additional external devices (including sensors).

The sensors can be configured either directly through the Universal Adjustment Device (UAD) ESCORT C-200/C-200M when connected to a computer/laptop, or remotely by special commands directed to connected GPS/GLONASS tracker, including but not limited to the help of SMS-commands. The specification of FLSs were confirmed by obtaining the appropriate certificates. Depending on the modification and factory settings, it transmits the signal through digital interfaces (RS-232, RS-485, J1939 (CAN)) via LLS protocol, typical to FLSs, in frequency or analogy modes, TD-150 and TD-500 sensors are certified for work in explosive environments.

2. Specification

Name	Reference document	Units / Designation	Sensor model				
			TD-100	TD-150	TD-500	TD-600	TD-online
Length (5)	-	mm	150...6000	150...6000	150...6000	150...6000	150...6000
Power supply voltage	-	V	7 ... 80	7 ... 80	9 ... 36	7 ... 80	9 ... 36
Measurement error	-	%, maximum	1	1	1	1	1
GPS / GLONASS Module	-	-	No	No	No	No	Yes
GSM Module	-	-	No	No	No	No	Yes
- nano-SIM card	-	-	No	No	No	No	Yes
Remote configuration (4)	-	-	Yes	Yes	Yes	Yes	Yes
Digital mode:	-	-	Yes	Yes	Yes	Yes	Yes
- interface RS-232	-	-	No	No	No	Yes	No
- interface RS-485	-	-	Yes	Yes	Yes	Yes	Yes
- interface J1939(CAN) (1)	-	-	No	No	Yes	No	No
- LLS protocol	-	-	Yes	Yes	Yes	Yes	Yes
- Modbus protocol	-	-	No	No	Yes	No	No
- GSM standard	-	-	No	No	No	No	Yes
- Wialon IPS protocol	-	-	No	No	No	No	Yes
- EGTS protocol	-	-	No	No	No	No	Yes
- level measurement scale (2)	-	relative units	0 ... 1023	0 ... 1023	0 ... 1023	0 ... 1023	No
- level measurement scale (2)	-	relative units	0 ... 4095	0 ... 4095	0 ... 4095	0 ... 4095	0 ... 4095
- data communication rate (6)	-	BPS	19200	19200	19200	19200	19200
Motor hours (track of operating time of the vehicle's engine)	-	-	No	No	No	No	Yes
Tilt measurement	-	-	No	No	No	Yes	Yes
Frequency mode:	-	-	Yes	Yes	Yes	Yes	No
- output signal range (2)	-	Hz	300...1323	300...1323	300...1323	300...1323	300...1323
- output signal range (2)	-	Hz	300...4395	300...4395	300...4395	300...4395	300...4395
Analog mode:	-	-	No	Yes	Yes	Yes	No
- output signal range	-	V	No	0 ... 9	0 ... 4,9	0 ... 9	No
Periodic mode (pulse)	-	-	No	No	Yes	Yes	No
Periodic mode (RS-485)	-	-	Yes	Yes	Yes	Yes	Yes
Output to the level indicator and emergency level lamp (1)	-	-	No	No	Yes	No	No
- output resistance of the level indicator	-	Ohm (±10%)	No	No	0 ... 110	No	No
Operating conditions:	-	-	severe	severe	severe	severe	severe
- ambient temperatures	-	°C	- 40...+ 50	- 45...+ 50	- 45...+ 50	- 40...+ 50	- 40...+ 50
- extreme ambient temperature	-	°C	- 60...+ 85	- 60...+ 85	- 60...+ 85	- 60...+ 85	- 60...+ 85
- atmospheric pressure	-	kPa	84 ... 106.7	84...106.7	84...106.7	84...106.7	84...106.7
Protection against electric shock	GOST 12.2.007.0-75	class	III	III	III	III	III
Ingress protection rating	GOST 14254-96	IP	67	67	67	67	67
Explosion-Proof Certificate	-	-	No	Yes	Yes	No	No
- Russian codes:	TR CU 012/2011	-	No	Yes	Yes	No	No
- hazardous areas	GOST R 51330.9-99	-	No	0, 1, 2	0, 1, 2	No	No
- type of explosion protection	GOST R 51330.11-2005	-	No	ia (3)	ia (3)	No	No
- explosion-proof marking	GOST R 51330.0-2005	-	No	0ExialIBT6 X	0ExialIBT6 X	No	No
- working explosion hazardous area	GOST R 51330.11-2005	-	No	IIA, IIB, T1 ... T6	IIA, IIB, T1 ... T6	No	No
Certificate/declaration of electromagnetic compatibility	-	-	Yes	Yes	Yes	Yes	No
- International codes:	UNECE Rules No.10, ed.5	-	No	Yes	Yes	No	No
- European regulations	meets the Rules of UNECE No.10, ed.5	-	No	Yes	Yes	No	No
- Russian codes:	TR CU 020/2011	-	Yes	Yes	Yes	Yes	Yes

(1) – a separate version without output to the level indicator is provided for FLS TD-500 with interface J1939 (CAN);

(2) - it is possible to select two different scales/ranges when setting up the FLSs. The upper value corresponds to the maximum length of the FLS in the measuring part with the exception of the zone of minimal measured level, the lower value corresponds to the edge of the tubes of the measuring part;

(3) - "ia" type of explosion protection - intrinsically safe electrical circuit of "ia" level;

(4) - remote adjustment of the sensors by messages is carried out by when connecting the FLSs in the monitoring system to the GPS/GLONASS tracker; TD-online sensor has its own built-in GPS/GLONASS tracker;

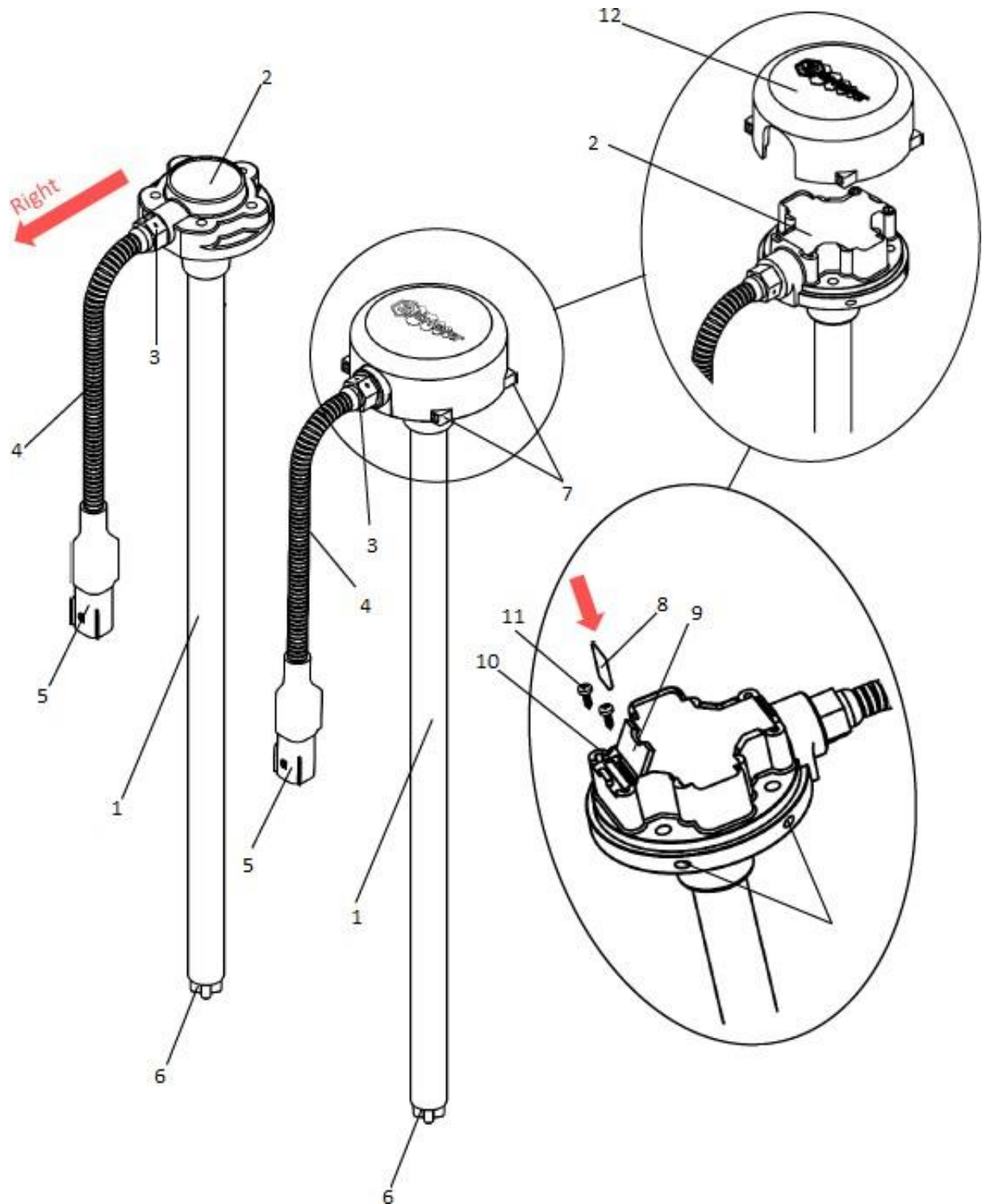
(5) - as agreed with the manufacturer, the length depends on the operating conditions of the sensor, an additional section (of up to 3000 mm) on the mechanical collapsible collet connector is used for a length of more than 3000 mm;

(6) - it is possible to change the data rates

Additional features of FLS TD-online:

Name	Reference document	Units/Designation	TD-online
Power supply (peak performance)	-	-	-
- input current I_i	-	mA	200
- input capacitance C_i	-	pF	100
- input inductance L_i	-	mH	10
Signal circuit (peak performance):	-	-	-
- output voltage U_o	-	V	5.6
- output current I_o	-	mA	120
- output capacitance C_o	-	μ F	1
- output inductance L_o	-	mH	1
Position finding:	-	-	-
- GPS Standard	-	-	Yes
- GLONASS Standard	-	-	Yes
- receiver sensitivity	-	dBm	-156
- number of receiver's channels	-	-	12
Data communication:	-	-	-
- GSM 850/900/1800-1900 Standard:	-	-	Yes
- GPRS Multi-slot class 12	-	-	Yes
- transmitter power	-	W	2
Non volatile memory:	-	-	Yes
- max.number of entries	-	-	32000

3. Design



TD-100, TD-150, TD-500, TD-600

- 1 - measuring section
- 2 - sensor head with mounting flange
- 3 - cable gland
- 4 - extension cord
- 5 - electrical connector MOLEXMX 150
- 6 - centralizer

TD-online

- 1 - measuring section
- 2 - sensor head with mounting flange with protective cap
- 3 - cable gland
- 4 - extension cord
- 5 - electrical connector MOLEX MX 150
- 6 - centralizer
- 7 - tie-down lugs of protective cover on seal
- 8 - micro-SIM card
- 9 - SIM-card slot cover
- 10 - SIM-card slot
- 11 - self-tapping screws of the SIM-card slot cover
- 12 - protective cap

4. Scope of supply

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

Self-tapping screw 5,5x38 with washer

Self-tapping screw 5,5x38 with washer (sealing)



Gasket (except TD-online)

Gasket (only for TD-online)



Protective cap (TD-online)

Enumerated plastic seal SILTECH and Sealing wire PP-N 0,8-600



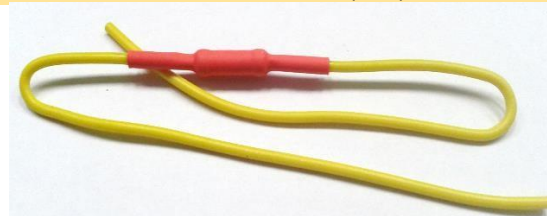
Seal FAST-150

Seal FAST-330



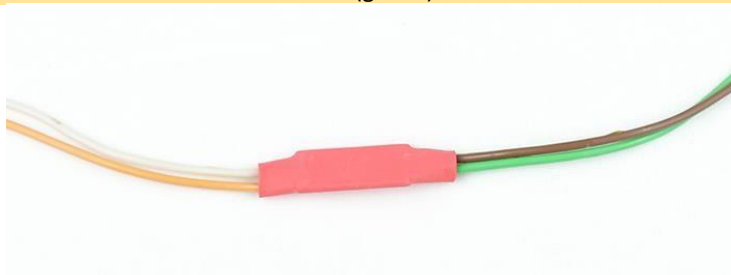
Ballast 120 Ohm (Black)

Ballast 620 Ohm (Red)



Filter (green)

Centralizer



Fuse-holder



Fuse 1A/2A



Sealant in tube (5 ml)



Connecting cable (7 m)



List of components

Name	Quantity				
	TD-100	TD-150	TD-500	TD-600	TD-online
Self-tapping screw 5,5x38 with washer	4	4	4	4	4
Self-tapping screw 5,5x38 with washer (sealing)	1	1	1	1	No
Gasket	1	1	1	1	1
Ballast 120 Ohm (Black)	No	No	1	No	No
Ballast 620 Ohm (Red)	No	No	1	No	No
Optoisolator (red)	No	No	option	No	No
Filter (green)	No	No	1	No	No
Fuse-holder	1	1	No	1	1
Fuse 1A	1	1	1	1	No
Fuse 3A	No	No	No	No	1
Number plastic seal SILTECH	1	1	1	1	No
Sealing wire PP-N 0,8-600	1	1	1	1	No
Seal FAST-150	1	1	1	1	1
Seal FAST-330	No	No	No	No	1
Protective cap	No	No	No	No	1
Centralizer	1	1	1	1	1
Sealant in tube (5 ml)	No	No	No	No	1
Connecting cable (7 m)	1	1	1	1	1
Shipping package	1	1	1	1	1

The manufacturer reserves the right to make changes in design and complete set product without prior notice to the customer.

5. Package

The sensors are up to 1 meter long equipped with connecting cables with mounting kits; packed in a rigiflex packaging (corrugated cardboard), up to 3 pcs. in one box. The installation kit is packed in a ZIP-lock bag. Packaging of 2 TD-100 sensors is recommended.



The sensors longer than 1 meter are packed in rigid package (particleboard + HDF sheet):



6. Operating mode

6.1. RS-232

FLS awaits for a request from an external device. After the request is received, data on fuel level and temperature are generated and sent via RS-232 interface over LLS protocol.

6.2. RS-485

FLS waits for a request from an external device. Response with information about fuel level and temperature is sent via RS-485 interface over LLS protocol after 2÷3 milliseconds upon receiving the request. Only requests with the network address stored in FLS memory are served.

6.3. Frequency

FLS continuously generates a frequency corresponding to the measured level. The lower level corresponds to a frequency of 300 Hz. The maximum level corresponds to a frequency of 1323/4395 Hz, depending on the settings. Generation of signal begins after 15 ÷ 30 sec. upon connecting to the sensor.

6.4. Analog

FLS generates an analog voltage corresponding to the measured level. The zero level corresponds to the lower value of the range; the maximum level corresponds to the upper value. The signal is generated after 15 ÷ 30 seconds upon powering on the sensor

6.5. Periodic (impulse)

FLS generates a pulse packet with a frequency of 27 Hz. The number of pulses in the packet corresponds to the measured level. A packet of 2 pulses corresponds to the zero level, a packet of 1025 pulses corresponds to the maximum level. The first pulse packet is formed after 15 ÷ 30 seconds upon powering on the sensor. The packages are formed with an interval of 62 seconds.

6.6. Periodic (RS-485)

FLS sends information containing level and temperature without request from external devices via RS-485 interface over LLS protocol every 2 sec.

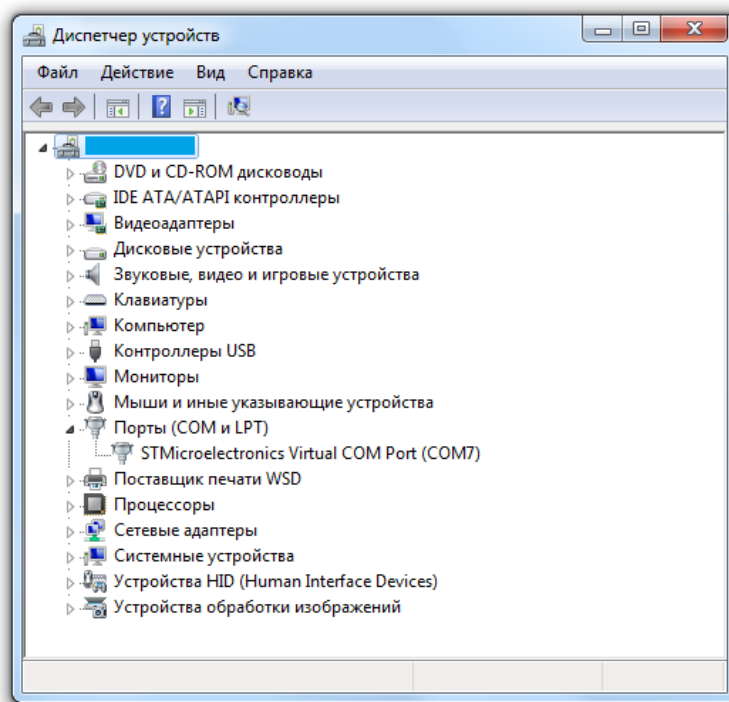
7. CONFIGURATOR for TD-100, TD-150, TD-500, TD-600 sensors

7.1. Connection

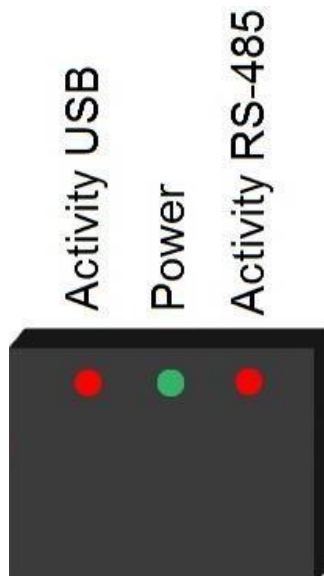
To configure the sensors, use the Escort Configurator v1.0.x.xx software, which is located on the fmeter.ru website in the DOWNLOAD section, also you will need a laptop / computer / tablet and a C-200 or C-200M interface converter (RS-485 converter <> USB). C-200M Converter allows you to connect additional power via the second USB-slot. For the operation of the configurator, it may be necessary to install Microsoft System Component Files and Libraries from the company's website.

To connect a sensor with a CAN bus, you additionally need your own device (RS485-CAN-USB converter) and setup program.

To begin working with the C-200 / C-200M interface converter, you need to install the STM32 Virtual COM Port Driver driver to your computer. It could be downloaded from the official website of the manufacturer of sensors or from the website of the driver developer (<http://www.st.com/en/development-tools/stsw-stm32102.html>). After installing the driver, the corresponding device will appear when the sensor is connected to the computer via the C-200 / C-200M converter in the Device Manager (shown in the example of Microsoft Windows 7).



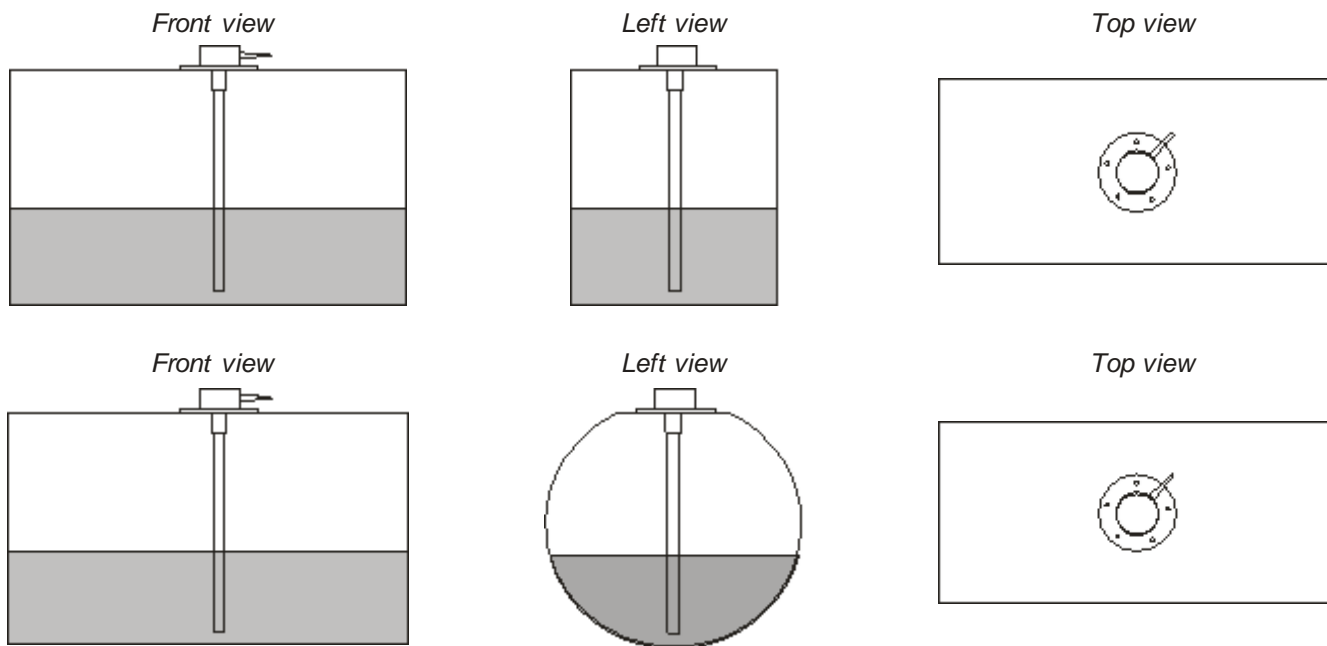
The C-200 / C-200M interface converter has 3 LED indicators that show the activity of the power channels, USB, RS-485. While connecting and working with the converter, it is necessary to make sure that the corresponding indicators are active.



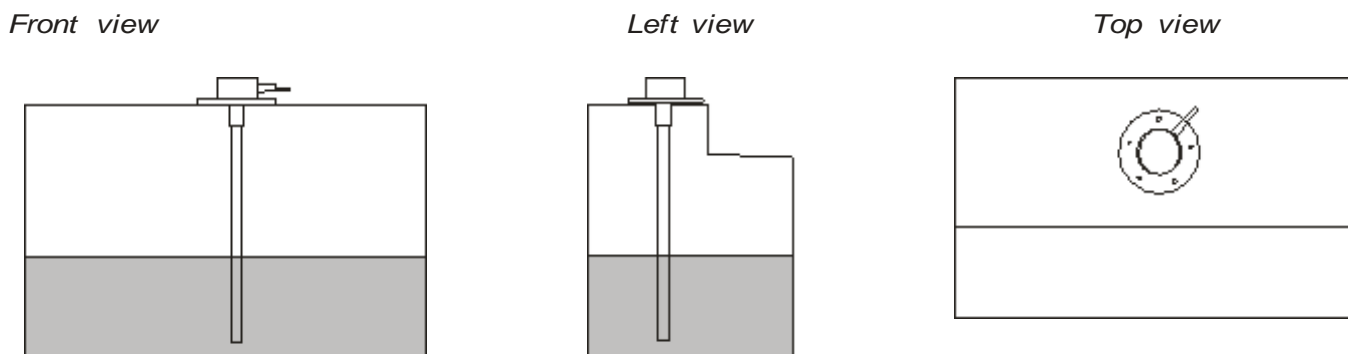
At release from production, the sensor has a standard length of 1000 mm. Before starting work, it is necessary to cut the fuel sensor to the depth of the fuel tank, taking into account the installation of the centralizer (10mm) and the necessary clearance between the centralizer and the bottom of the fuel tank (5 mm), followed by calibration. To do this, make a hole in the geometric center of the upper part of the fuel tank, measure the distance from the upper wall of the fuel tank to the bottom, the sensor length is selected according to the depth of the tank minus 15 mm (see explanation above). Please be advised that if the tank is low and wide, it is necessary to install two fuel sensors in opposite corners of the tank.

When connecting and installing the sensor to a vehicle, special equipment or storage facility, comply with the approved safety requirements (for example, complete drying of the fuel tank of the trucks prior to mounting and connecting the sensor) associated with the performance of these works in accordance with the type of facility on which the sensor should be installed.

If the tanks are of correct (simple, regular) shape, the sensor should be installed along the centre line. The sensor installation in the centre of the tank reduces the dependence of the sensor readings on the inclination of the vehicle.

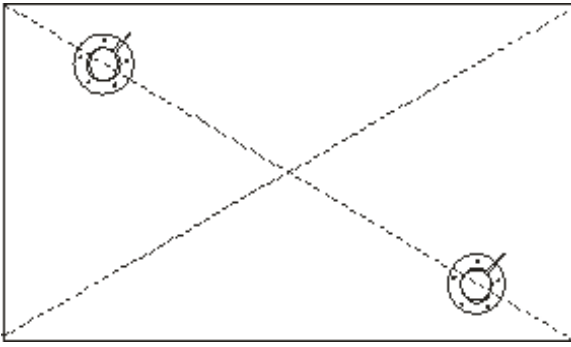


If shape of the tank is irregular, the gauge must be installed in the place of tank's maximum depth closer to the geometric centre of the tank.

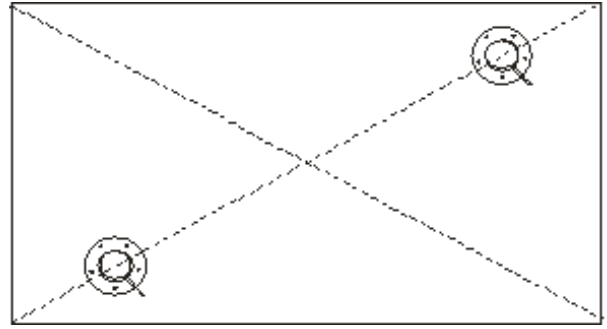


It is recommended to install two gauges in one tank in order to improve the accuracy of the readings and to reduce fluctuations in the level readings. It is mostly used in tanks with a capacity of more than 600 liters with the length of more than 1500 mm. The sensors are installed along the centre line at a length of 1/3 and 2/3 of the tank.

Top view



Top view

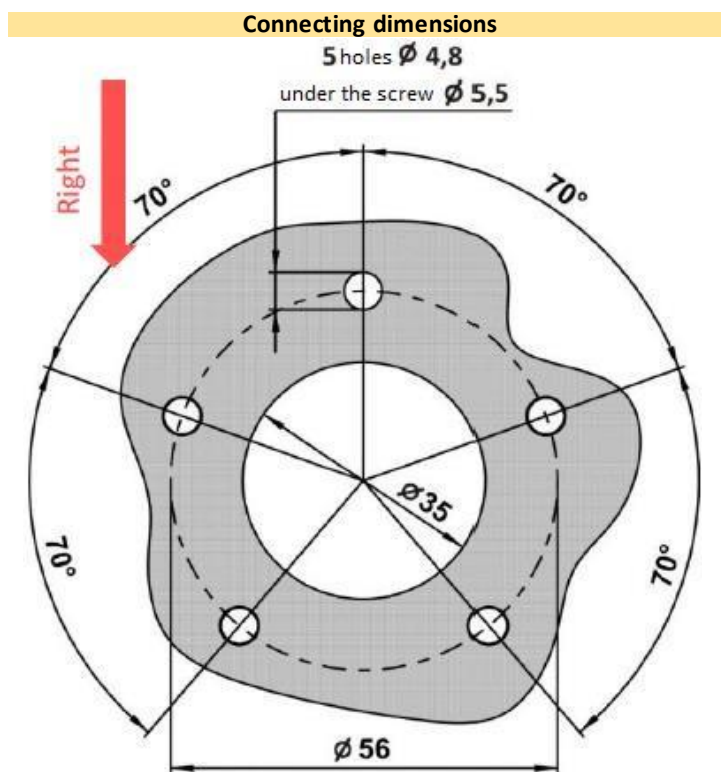


The gauge installed inside the tank must be at least 20 mm away from the stiffening rib, partitions, and surfaces of equipment located in the tank.

7.2. Mounting to a tank

The most common method of mounting TD-100, TD-150, TD-500, TD-600 sensors 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. In this case, it is necessary to ensure the tightness of the connection between the sensor body and the tank. The sensor could be installed at pre-arranged locations using screws and bolts with strength classes of at least 4.8. For additional protection, it is acceptable to use 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, make re-calibration or gauging, install a centralizer. 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 $\varnothing 35$ mm and drill of $\varnothing 4,8$ mm.



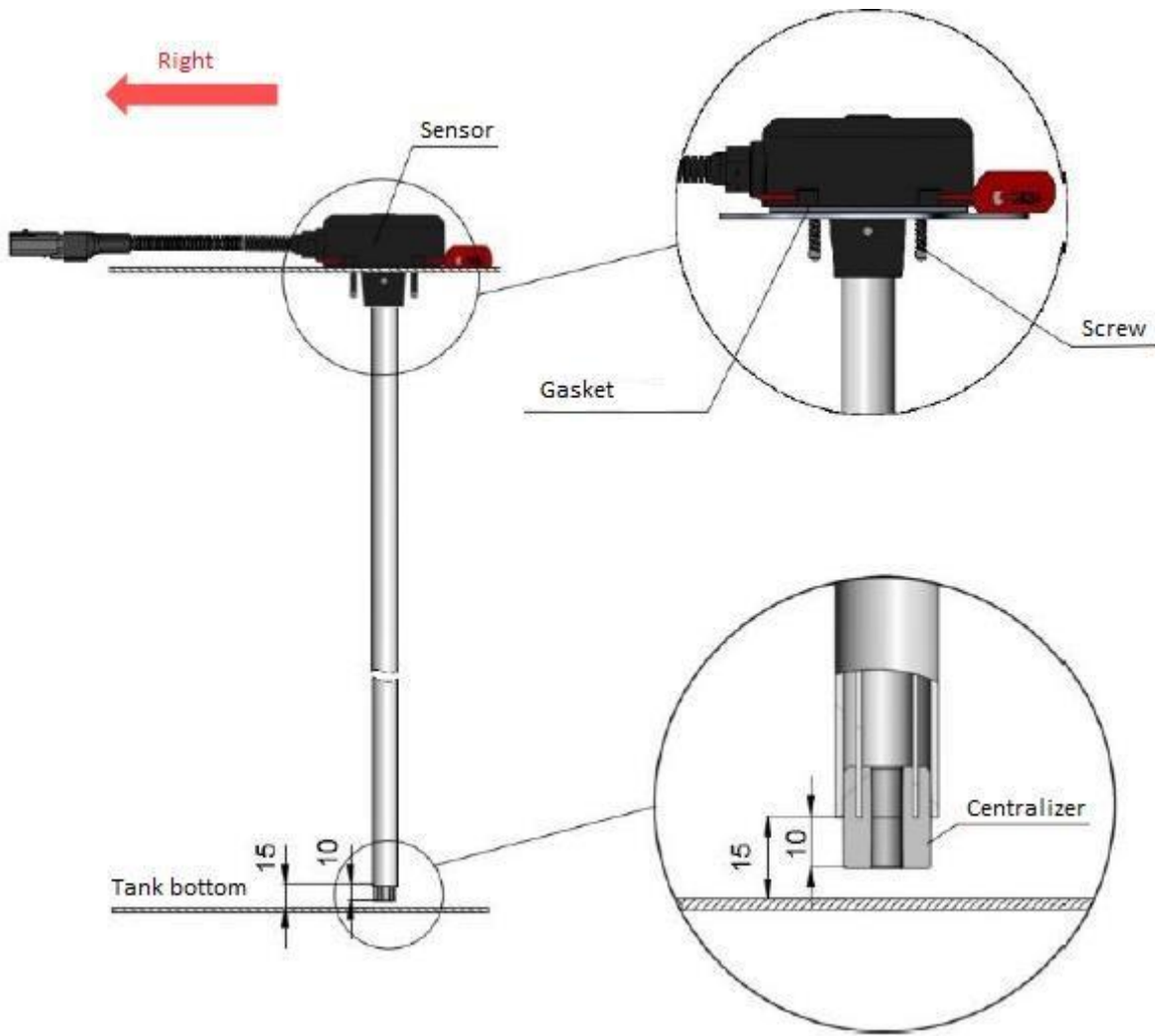
* The diameters of the holes are given for self-tapping screws, if necessary, mark places for another fastening according to the centres of specified holes

The following is used for installation: Self-tapping screw 5,5x38 with washer, Self-tapping screw 5,5x38 with washer (sealing); Gasket

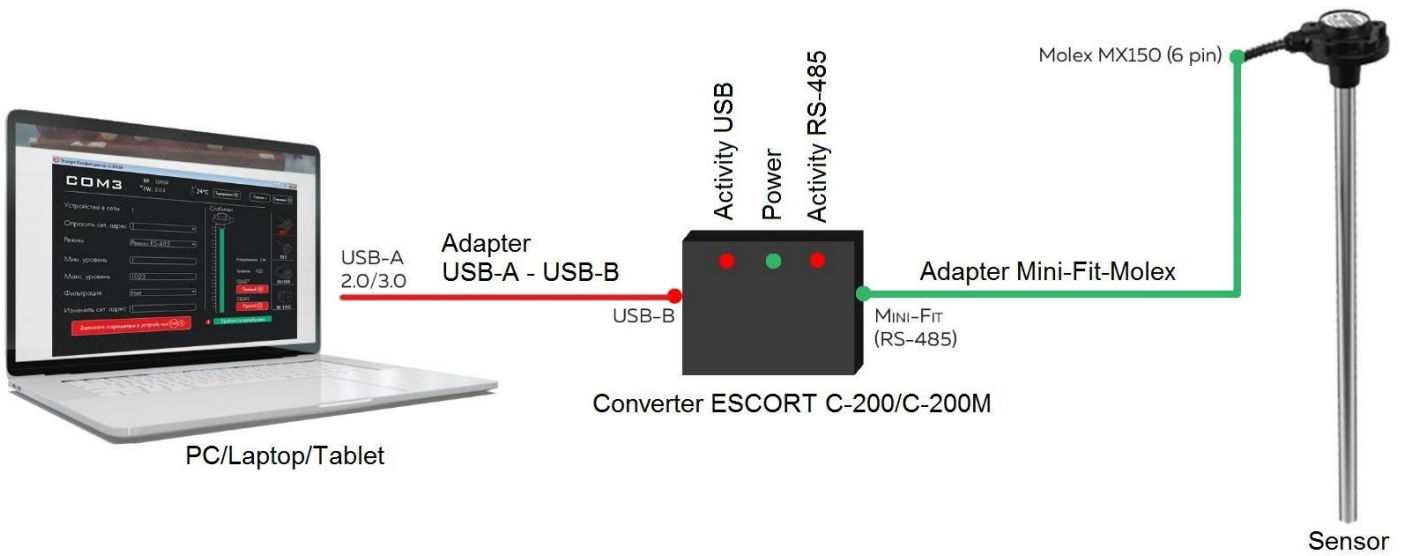
Bimetallic bit

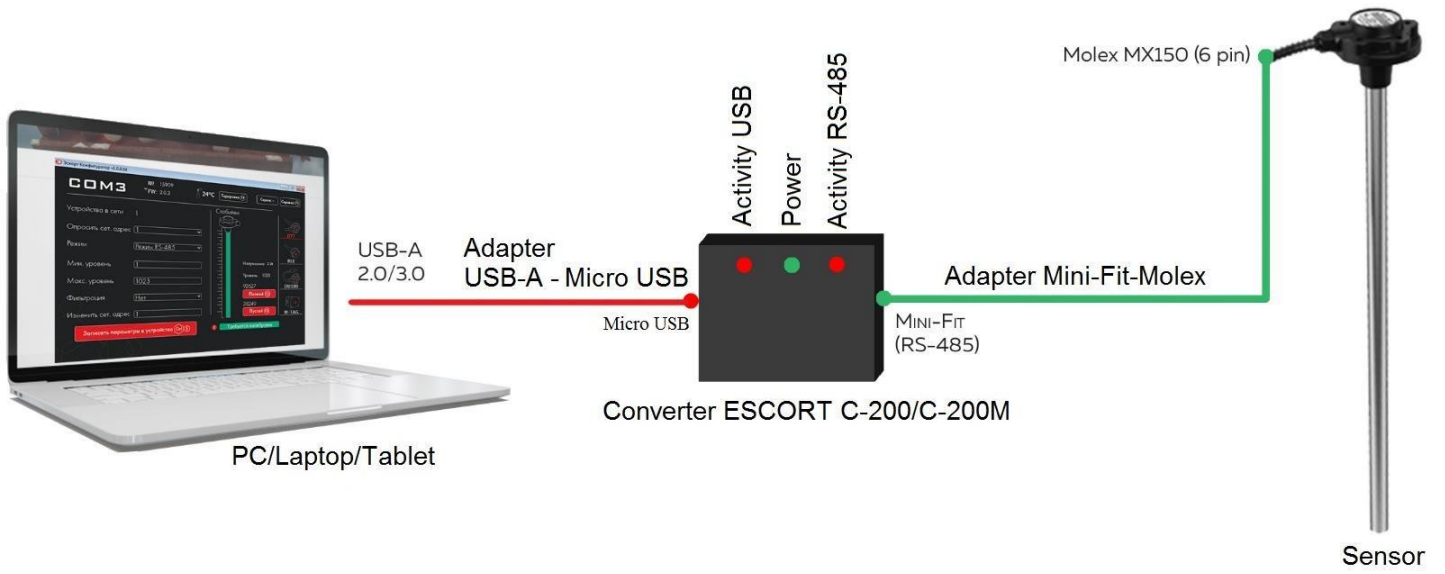


Installation chart of a measuring device on a fuel tank



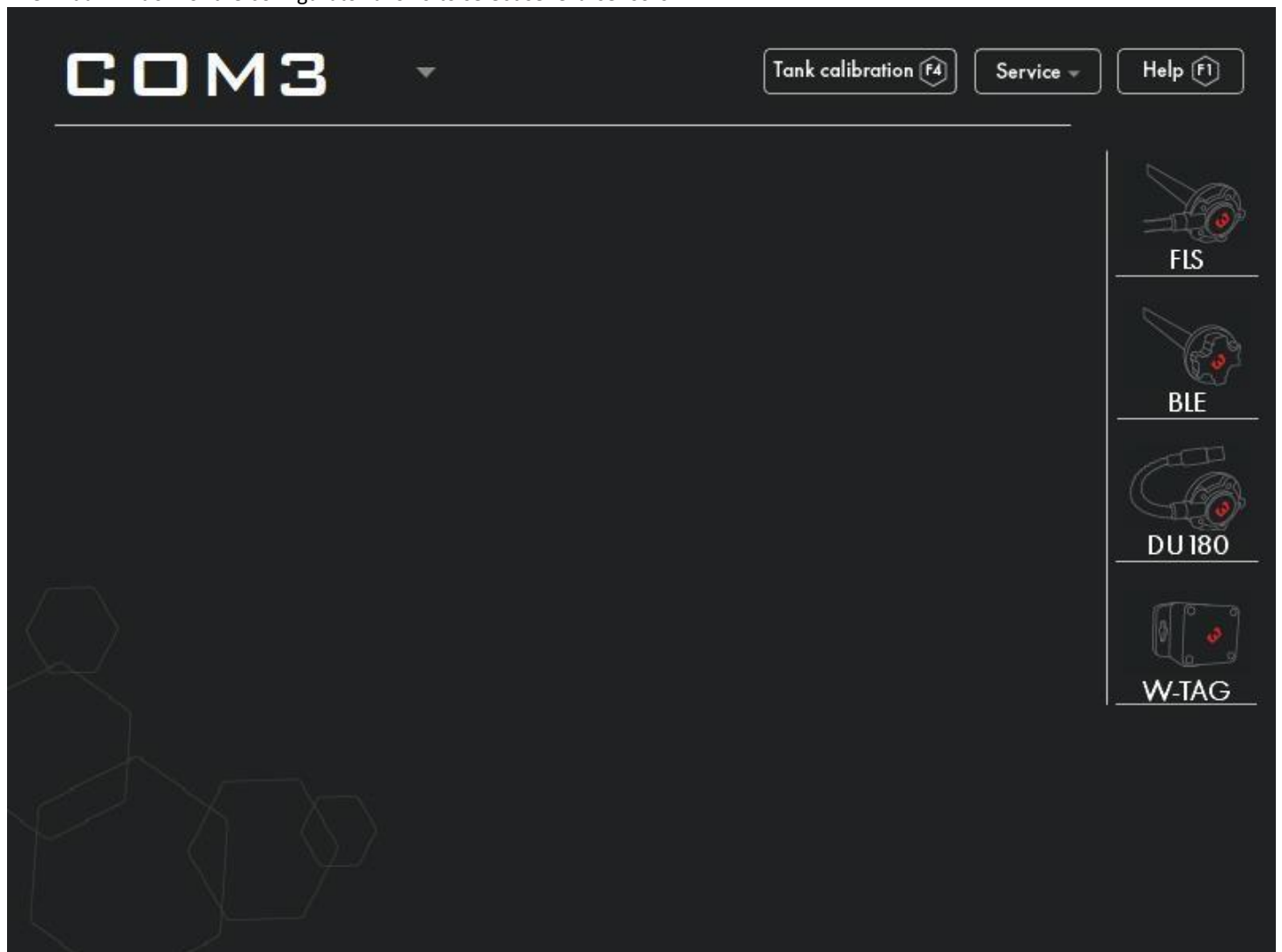
Next, perform the calibration. To do this, turn the sensor upside down (measuring tube up), connect it to a computer / laptop / tablet using a C-200 or C-200M converter, and connect cable adapters through the appropriate electrical connectors as shown in the diagram below:





7.3. Configurator software

The initial window of the configurator allows to select several sensors:

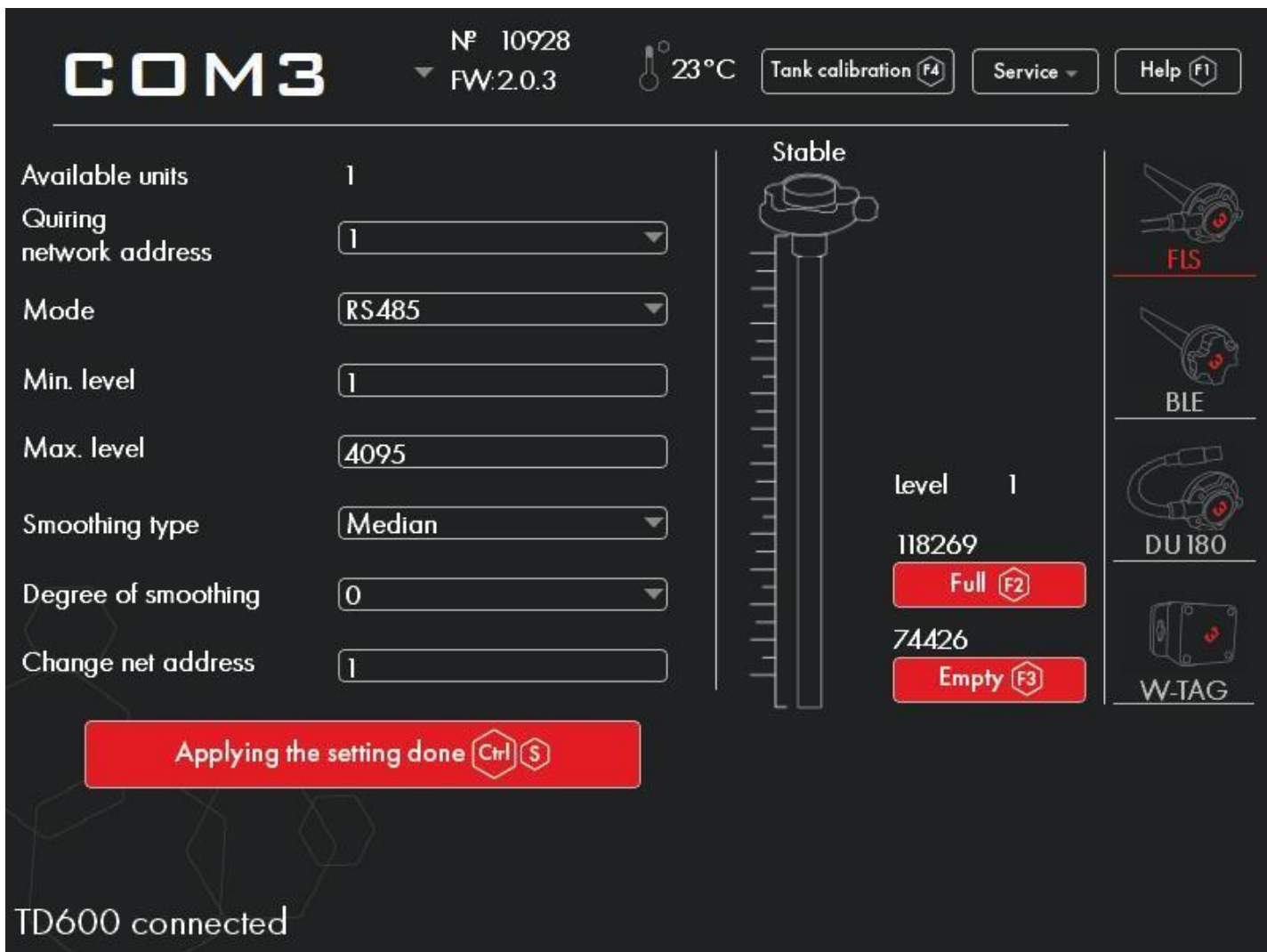


When the USB <> RS-485 converter is connected, the COM port is automatically detected. The search for a connected fuel level sensor occurs when the FLS button is pressed (for TD-100, TD-150, TD-500, TD-600 sensors)



Button for selecting the interface settings for fuel level sensors.

The next window opens, where you can see the sensor serial number, software version, sensor temperature, etc.



COM3

Virtual COM port for the configurator to communicate with FLS via an interface converter. After connecting the interface converter, the COM port will be determined automatically, given that the device driver is correctly installed and there are no more virtual COM ports on the PC. Otherwise, the required COM port must be selected from the list

№ 10928

№***** - Sensor's serial number.

FW:2.0.3

FW: *** - Sensor's firmware version

25°C

Temperature gauge readings

Tank calibration F4

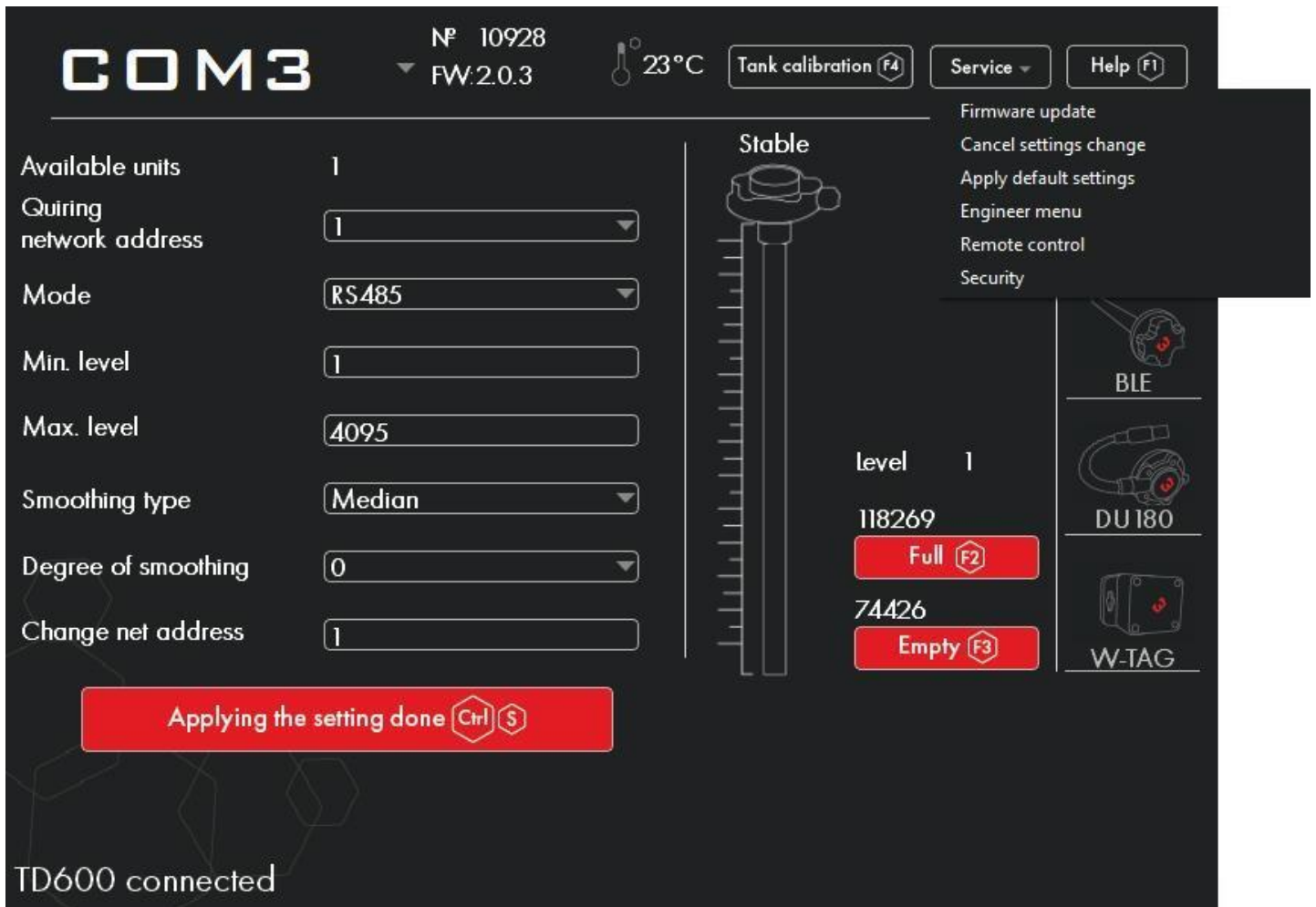
Press to go to the "Calibration" section, where batch calibration of the fuel tank is performed and stored

Service

Press to go to "Service" sub-menu:

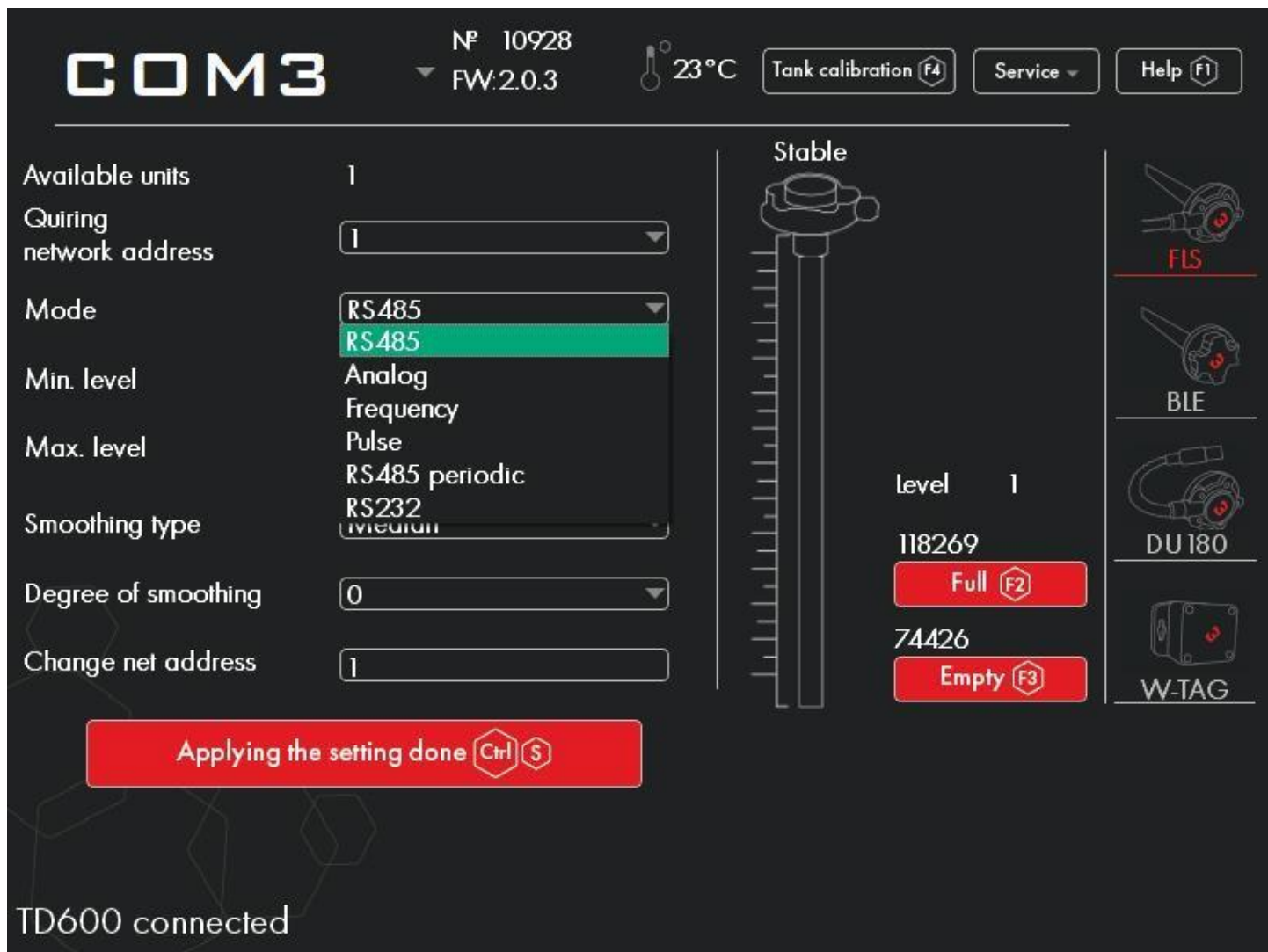
Help F1

An additional window opens on the right with a description of the functionality of a button. The table below shows the functionality of the buttons from the additional window



For details on each procedure from the SERVICE submenu, see below in p.7.6.

Configurator Settings:	Expanding Main Menu Functionality
Available units	Displays a list of network addresses of sensors connected to the interface converter
Network address	By default network address of the connected sensor is 1. If necessary, enter the required network number and save the changes.
Quiring network address	Allows you to select a sensor from the list, if several sensors are connected at the same time, for further setup. When several sensors are connected to the interface converter (with different network addresses), this line has the ability to switch between sensors by selecting the required network address from the list.
Mode	Select the mode of operation of the sensor. After changing the mode, do not forget to save the changes
Minimal level	Minimum processed value that forms the sensor in the range from 0 to 1023. To change, enter the required number and save the changes
Maximal level	Maximum processed value that forms the sensor in the range from 1023 to 4095. To change, enter the required number and save the changes
Smoothing type	Median and intellectual (for details see below in p.7.4)
Degree of smoothing	Depends on the type of smoothing
Change network address	Allows you to change the network address
Apply the setting	Saves changes to the settings in the sensor.



In the photo above you can see how the tab opens for all operating modes for a specific sensor model. In this example, the sensor TD-600 was connected to the configurator with the corresponding list of modes.

Modes	Application	Description
RS485 mode	All sensors	Setting of RS485 mode
Analog mode	TD-500, TD-600	Setting the Analog mode
Frequency mode	All sensors	Switch to Frequency mode
Periodic mode	All sensors	Switch to Periodic mode
Periodic RS485 mode	All sensors	Switch to periodic rs485 mode
RS232 mode	only TD-600	Switch to RS232 mode(not displayed here)

7.4. Smoothing

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. In the sensor there are two smoothing algorithms to choose from: median and intellectual.

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

The intellectual type of smoothing is different in that the degree of smoothing is set automatically by the sensor itself and depends on the rate of change of the fuel level. The sharper level jumps, the greater the degree of smoothing. In this case, when setting up, you need to select only the volume of the tank.

COM3 № 10928 24°C Tank calibration (F4) Service Help (F1)

FW: 2.0.3

Available units: 1

Quiring network address: 1

Mode: RS485

Min. level: 1

Max. level: 4095

Smoothing type: Median
Median
Intelligent

Degree of smoothing: Intelligent

Change net address: 1

Stable

Level: 1

118269
Full (F2)

74426
Empty (F3)

FIS
BLE
DU180
W-TAG

Applying the setting done (Ctrl S)

TD600 connected

COM3 № 10928 24°C Tank calibration F4 Service Help F1 FW:2.0.3

Available units 1

Quiring network address 1

Mode RS485

Min. level 1

Max. level 4095

Smoothing type Median

Degree of smoothing 0

Change net address 1

2

3

4

5

6

7


8

9

Applying the s

TD600 connected

Stable



level 1

118269 Full F2

74426 Empty F3

FLS

BLE

DU 180

W-TAG

COM3 № 10928 24°C Tank calibration F4 Service Help F1 FW:2.0.3

Available units 1

Quiring network address 1

Mode RS485

Min. level 1

Max. level 4095

Smoothing type Intelliaent

Degree of smoothing No

Change net address less than 200 liters

from 200 to 1000 liters


more than 1000 liters

Heavy conditions

Applying the s

TD600 connected

Stable



level 1

118269 Full F2

74426 Empty F3

FLS

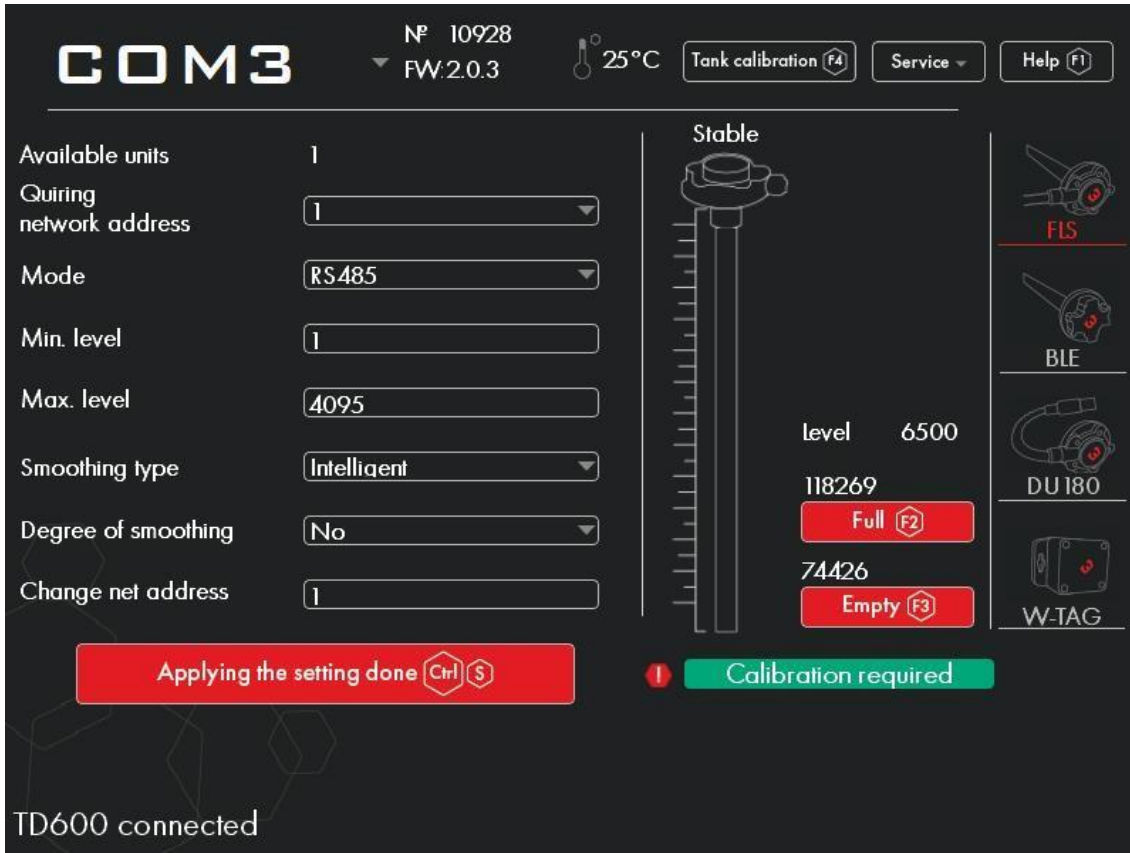
BLE

DU 180

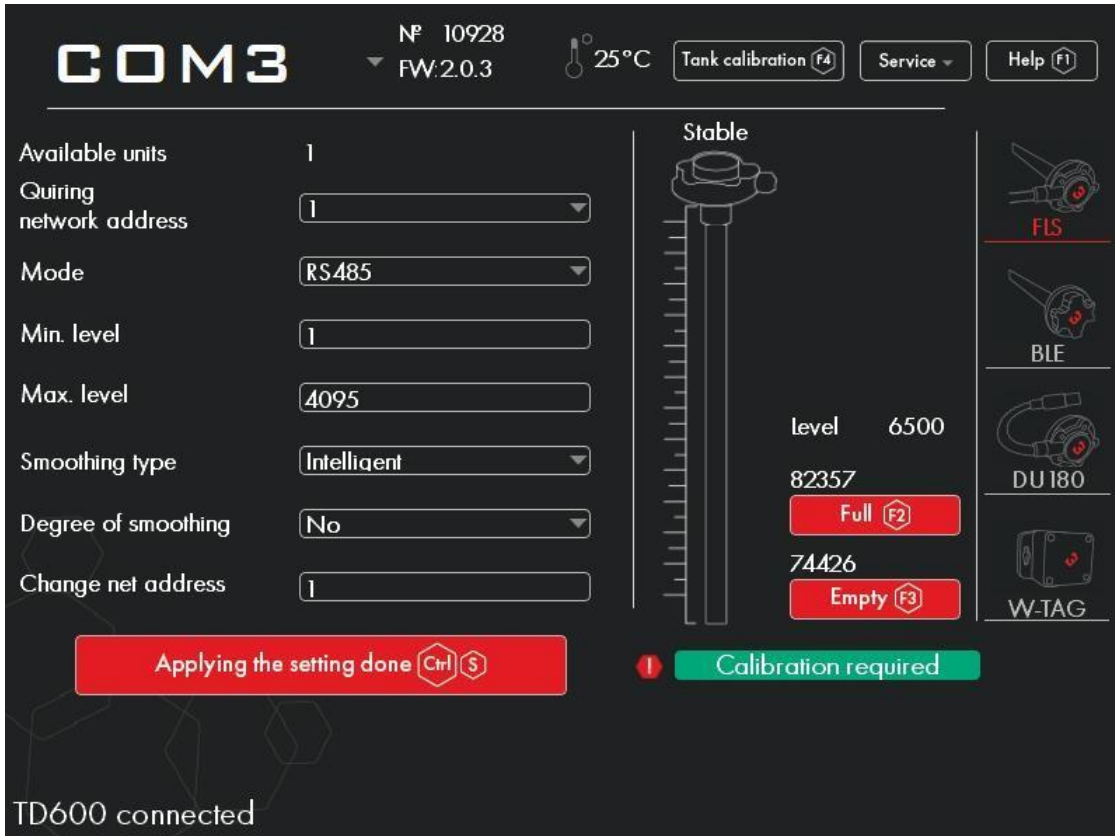
W-TAG

7.5. Calibration

After adjusting the sensor to the depth of a specific tank, you must calibrate it. To calibrate the FULL value, it is necessary to fill the space between the two measuring tubes with fuel. One of the ways is the following: wind the sensor drainage holes with tape, turn the sensor upwards with the measuring part, connect it to a computer / laptop / tablet using a C-200 or C-200M converter. Next, pour fuel into the measuring part of the sensor, wait for the level to stabilize and press the FULL button.



The configuration value FULL will change (in our example from 118269 to 82357)



Next, you need to drain the fuel from the sensor, wait 3-4 minutes to allow the fuel completely out, wait for the level to be stable (the indicator of the measuring part of the fuel changes color from red to green and wait for the STABLE sign) and press the EMPTY button.

The screenshot displays the COM3 software interface for fuel level sensor calibration. At the top, the device is identified as 'COM3' with serial number '№ 10928' and firmware 'FW:2.0.3'. The temperature is shown as '25°C'. Navigation buttons include 'Tank calibration F4', 'Service', and 'Help F1'.

On the left, a settings menu is visible with the following parameters:

- Available units: 1
- Quiring network address: 1
- Mode: RS485
- Min. level: 1
- Max. level: 4095
- Smoothing type: Intelligent
- Degree of smoothing: No
- Change net address: 1

In the center, a vertical scale is labeled 'Stable' at the top. Below the scale, the current level is '1' and the sensor value is '82357'. Two red buttons are present: 'Full F2' and 'Empty F3'.

On the right, a vertical list of sensor models is shown with their respective icons:

- FIS
- BLE
- DU180
- W-TAG

A red banner at the bottom of the settings area reads 'Applying the setting done Ctrl S'. In the bottom left corner, the text 'TD600 connected' is displayed.

The value of the EMPTY level will also change. In this case, the writing CALIBRATION REQUIRED is no longer visible. This means that the calibration process was successful.

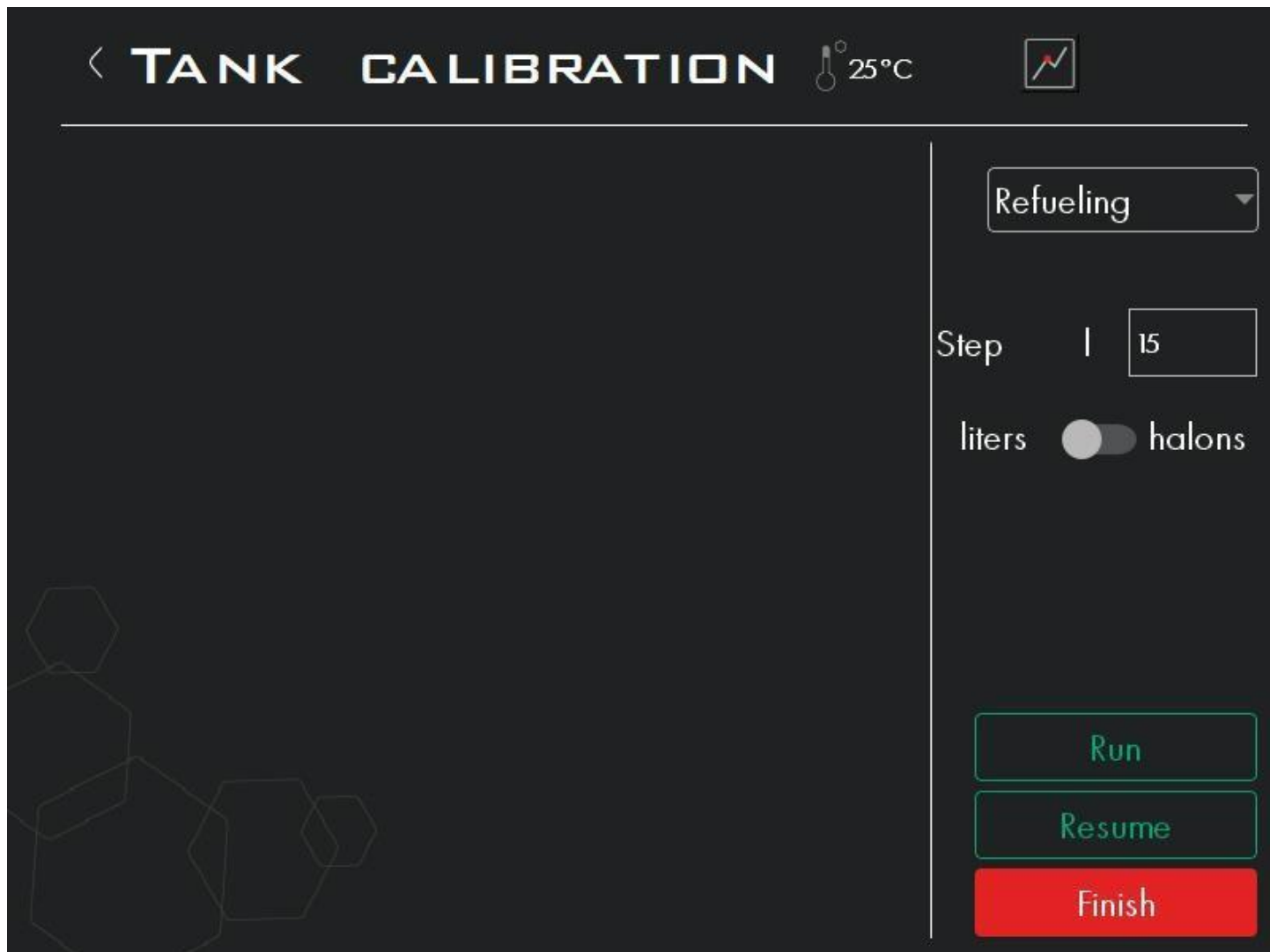
7.6. Tank calibration

The sensor measures the fuel level, not volume. To convert the fuel level to the amount of fuel, it is necessary to perform a calibration procedure. The result of the calibration is the so-called calibration table.

In the main menu of the configurator there is a TANK CALIBRATION button that opens the calibration mode. In places of drastic changes in the geometry of the tank, it is necessary to install at least one calibration point. It is recommended to increase the calibration points in places of expansion or contraction of the tank.

Calibration is performed after mounting the sensor to the tank.

To start, in the calibration menu you need to set the calibration step in liters or gallons.



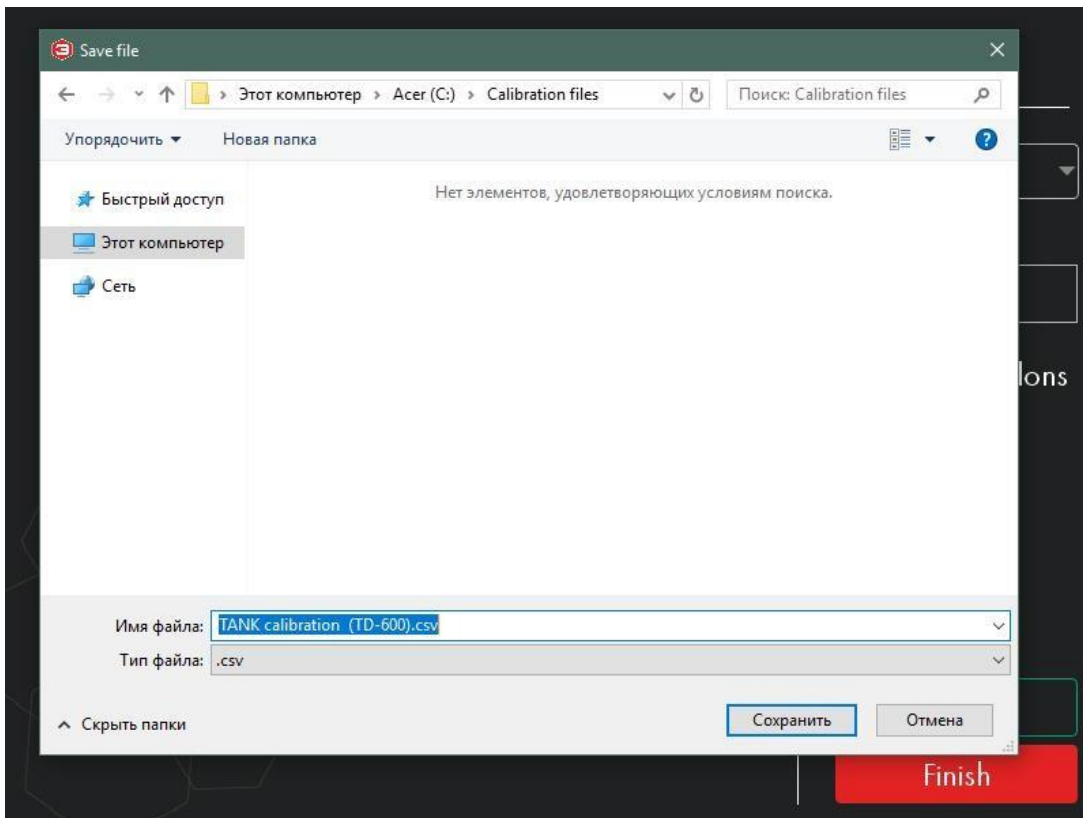
the method by which calibration is carried out (filling or discharging fuel portions)



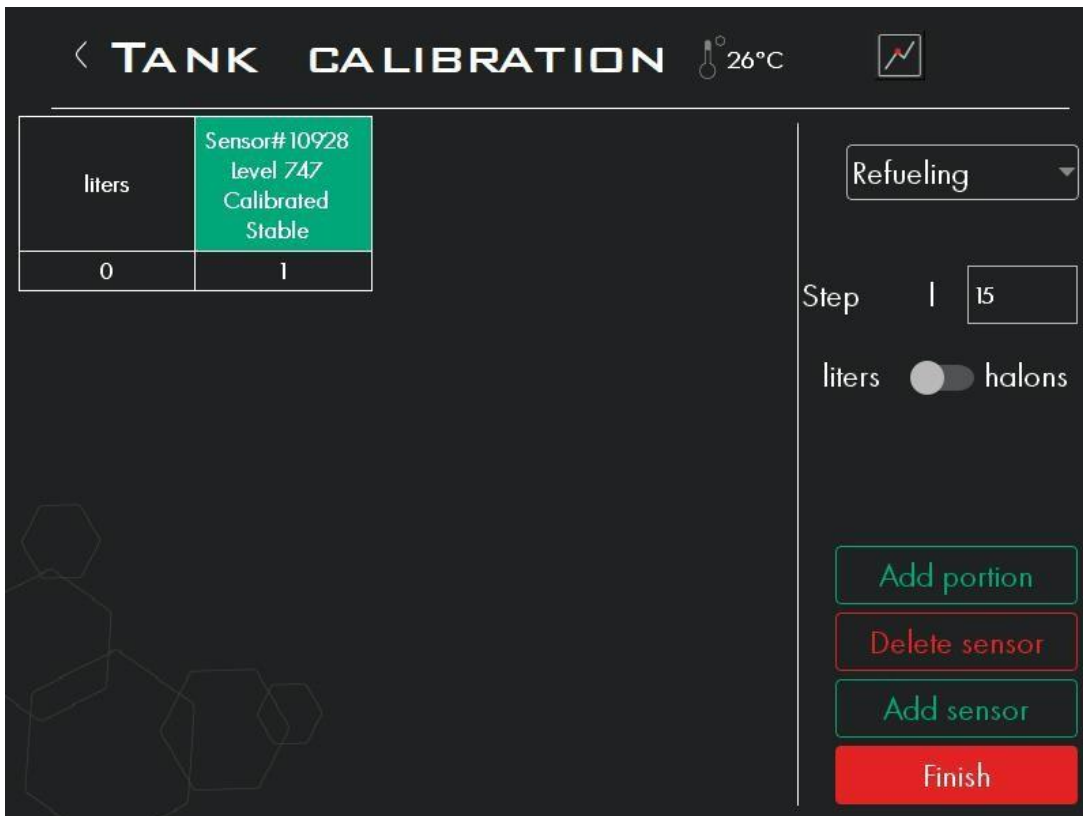
Volume of the filled / drained portion of fuel during calibration When you click the Add Portion button, the current fuel level is automatically recorded in the table, and the next value increased by the refuelling step is recorded in the Liters column.

To start the calibration process, you must click the BEGIN button, after which a window will open asking you to choose the path to save the new calibration file, enter the name and directly save the calibration table file.

All data produced by the calibration will be saved to the created file:





After pressing the SAVE key, the calibration process itself begins:




Indications of the sensor being calibrated. After the level is stabilized, click the “Add portion” button to add the current values of liters and level to the table.

Each time you pour a regular portion of fuel, you need to click on the button ADD PORTION.

< **TANK CALIBRATION**  26°C 

liters	Sensor#10928 level 1495 Calibrated Stable
0	1
15	747

Refueling 

Step | 15

liters halons



Remove portion

Add portion


Delete sensor

Add sensor

Finish

< **TANK CALIBRATION**  26°C 

liters	Sensor#10928 level 4095 Calibrated Stable
0	1
15	747
30	1497
45	2258
60	3049
75	3718
83	4095

Refueling 

Step | 8

liters halons

Remove portion

Add portion

Delete sensor

Add sensor

Finish

Remove portion

deletes the last row in the calibration table

Add portion

adds a row to the calibration table and enters the current level reading. During the calibration process, each new line of the calibration table is added to the file after each pressing of this button. Thus, if the calibration is accidentally interrupted, the previous values will not be lost.

Delete sensor

if more than one sensor is calibrated, this button deletes the last column of the calibration table where the data on the sensor being calibrated is located

Add sensor

adds a column with information about the connected sensor for the subsequent filling with data on the tank calibration process

Finish

completes the tank calibration process

As a result of the calibration, a calibration table is obtained.

The screenshot shows the 'TANK CALIBRATION' screen. At the top, there is a back arrow, the title 'TANK CALIBRATION', a temperature indicator '26°C', and a graph icon. Below the title is a table with two columns: 'liters' and 'Sensor# 10928 level 4095 Calibrated Stable'. The table contains the following data:

liters	Sensor# 10928 level 4095 Calibrated Stable
0	1
15	747
30	1497
45	2258
60	3049
75	3718
83	4095

A dialog box is overlaid on the table with the text 'Want to finish tank calibration?' and two buttons: 'No' and 'Yes'. To the right of the table, there is a 'Refueling' dropdown menu, a 'Step' indicator showing '1' of '8', and a unit selector with 'liters' selected and 'halons' as an option. At the bottom right, there are five buttons: 'Remove portion', 'Add portion', 'Delete sensor', 'Add sensor', and 'Finish'.

Recommended number of portions (calibration points):

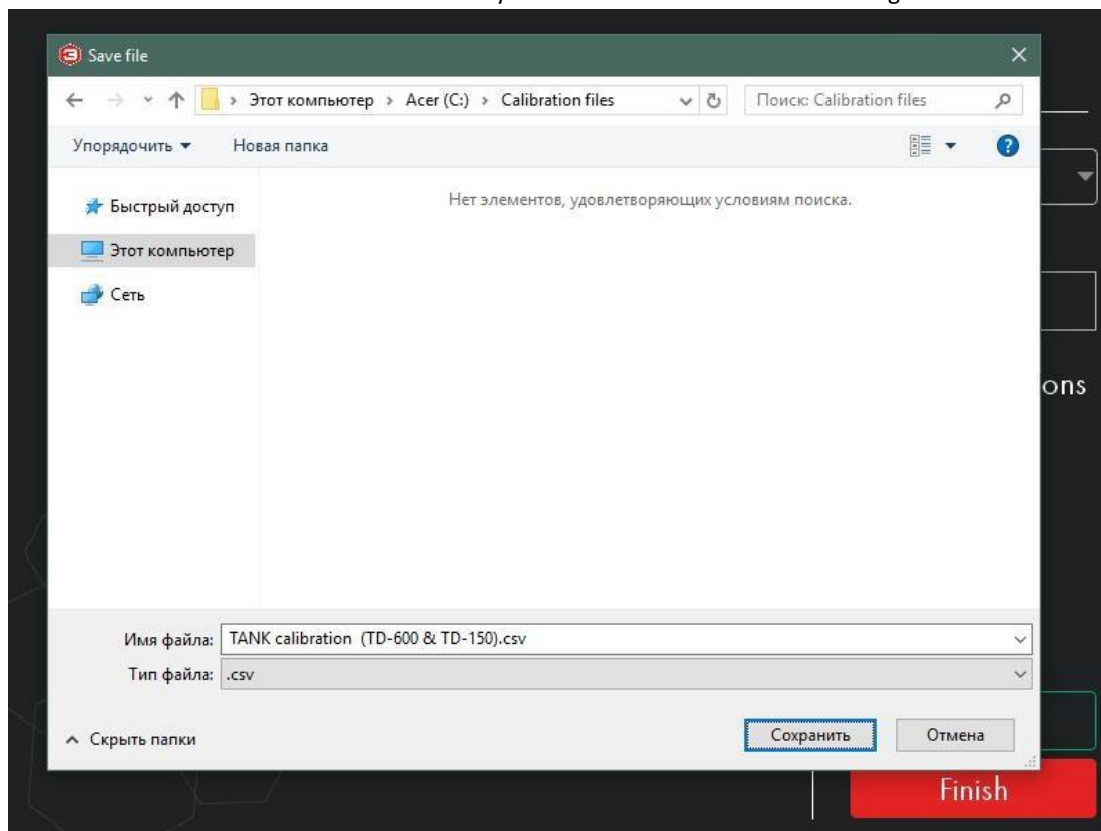
Tank capacity, liters	Filling pitch, liters	The number of control points
0-60	3-6	10-20
61-100	5	12-20
101-500	10	10-50
501-1000	20	20-50
More 1000	based on technical capabilities	

The TD-500 and TD-600 sensors have the ability to transfer data by fuel level immediately in percent (%) or liters in RS-485 mode using the LLS protocol, independently recalculating the fuel level to liters or percent in accordance with a calibration table that is stored in

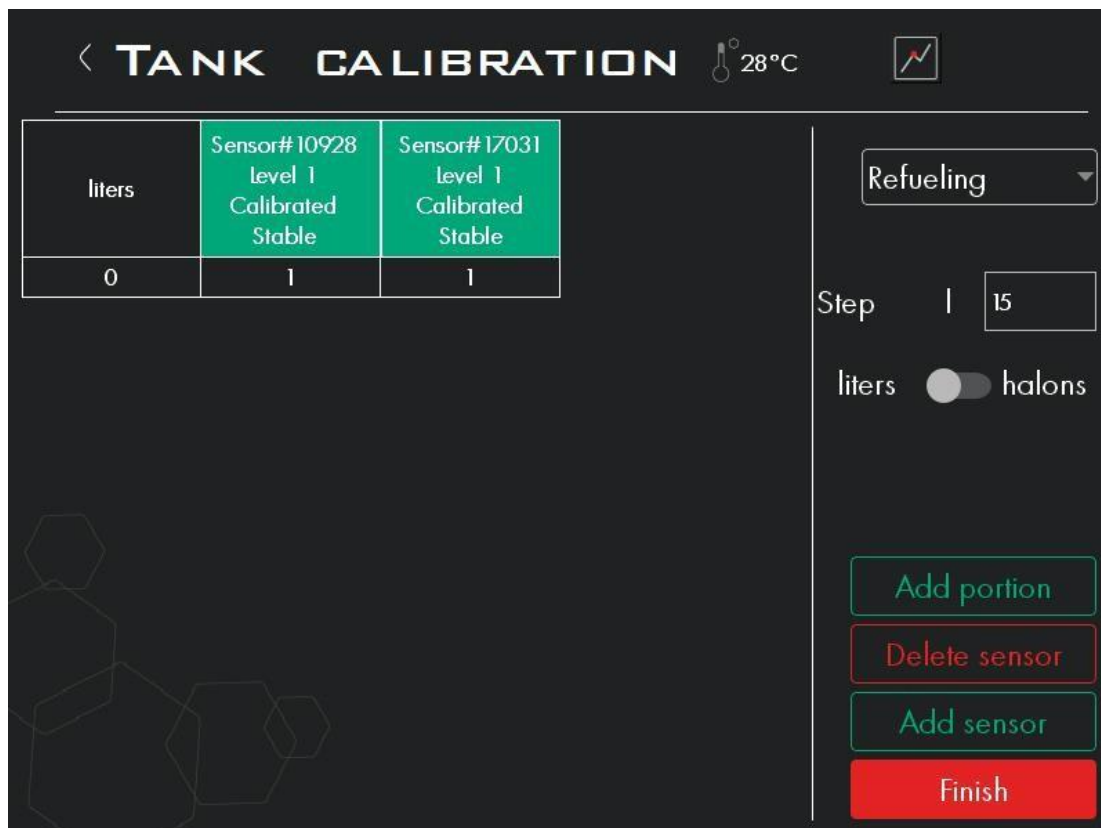
their memory. For this, it is necessary to record the obtained data when using the RECORD TO LITERS function and save them in the sensor memory.

7.6.1. Tank calibration with two sensors

Tank calibration with two sensors is necessary if two sensors are installed on a large-sized tank.



The calibration of two sensors is performed in the same way as the calibration of a single sensor.



TANK CALIBRATION 30°C

liters	Sensor#10928 level 2718 Calibrated Stable	Sensor#17031 level 2711 Calibrated Stable
0	1	1
15	710	708
30	1492	1494
45	2196	2195

Refueling

Step | 15

liters halons

Remove portion

Add portion

Delete sensor

Add sensor

Finish

TANK CALIBRATION 29°C

liters	Sensor#10928 level 4095 Calibrated Stable	Sensor#17031 level 4095 Calibrated Stable
0	1	1
15	710	708
30	1492	1494
45	2196	2195
60	2718	2711
75	3519	3526
87	4095	4095

Refueling

Step | 12

liters halons

Remove portion

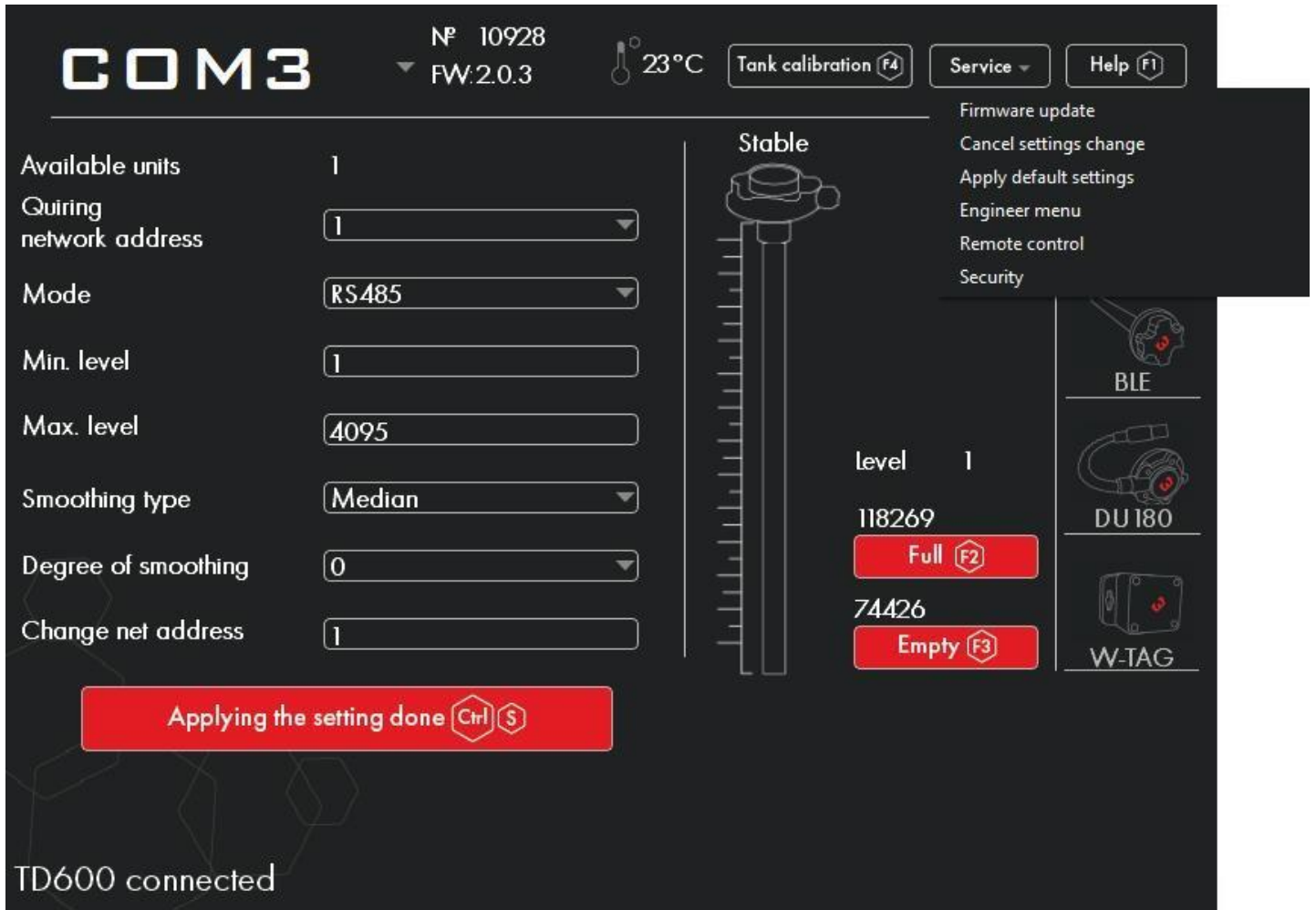
Add portion

Delete sensor

Add sensor

Finish

7.7. Service



Firmware update

allows you to update / change sensor software. To start the firmware process, disconnect the sensor from the interface converter (programmer), select the firmware file, then connect the sensor back. Wait until the progress bar is 100% full.

Cancel settings change

allows you to undo the changes made when setting up the sensor. It is used in case changes were made (without writing to the device), but in the process of configuring the specialist forgot exactly what settings were prepared for the change

Apply default settings

allows you to return the sensor settings to the factory default

Engineer menu

settings menu of additional sensor capabilities, for more details, see p. ENGINEERING SETTINGS

Remote control

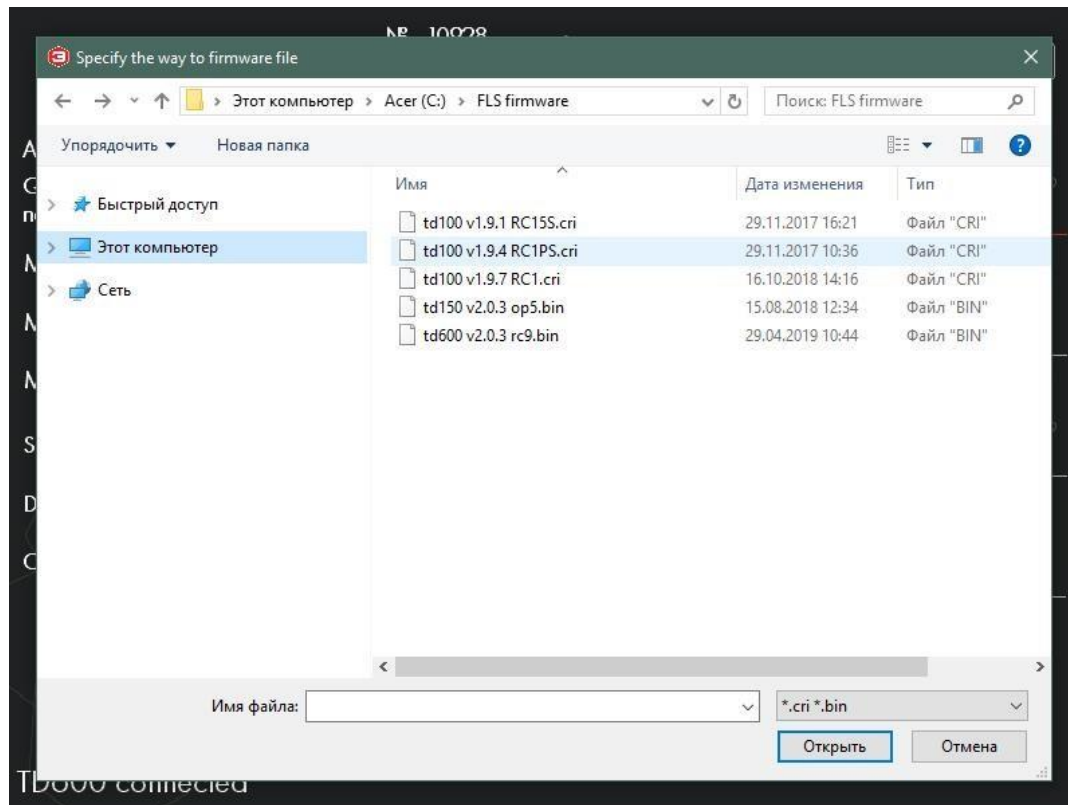
menu where you can form a command for remote work with Escort TD-xxx sensors, which are connected via RS-485 interface to navigation terminals supporting this function. The formed command is sent via SMS, or through the server

Security

allows you to set a password to change the sensor settings. After installation, the password is activated (it will not allow changing the settings) immediately after disconnecting the sensor from the setup program. To change the settings, you must first enter a password. To delete a password, enter it and click the appropriate button.

7.8. Firmware

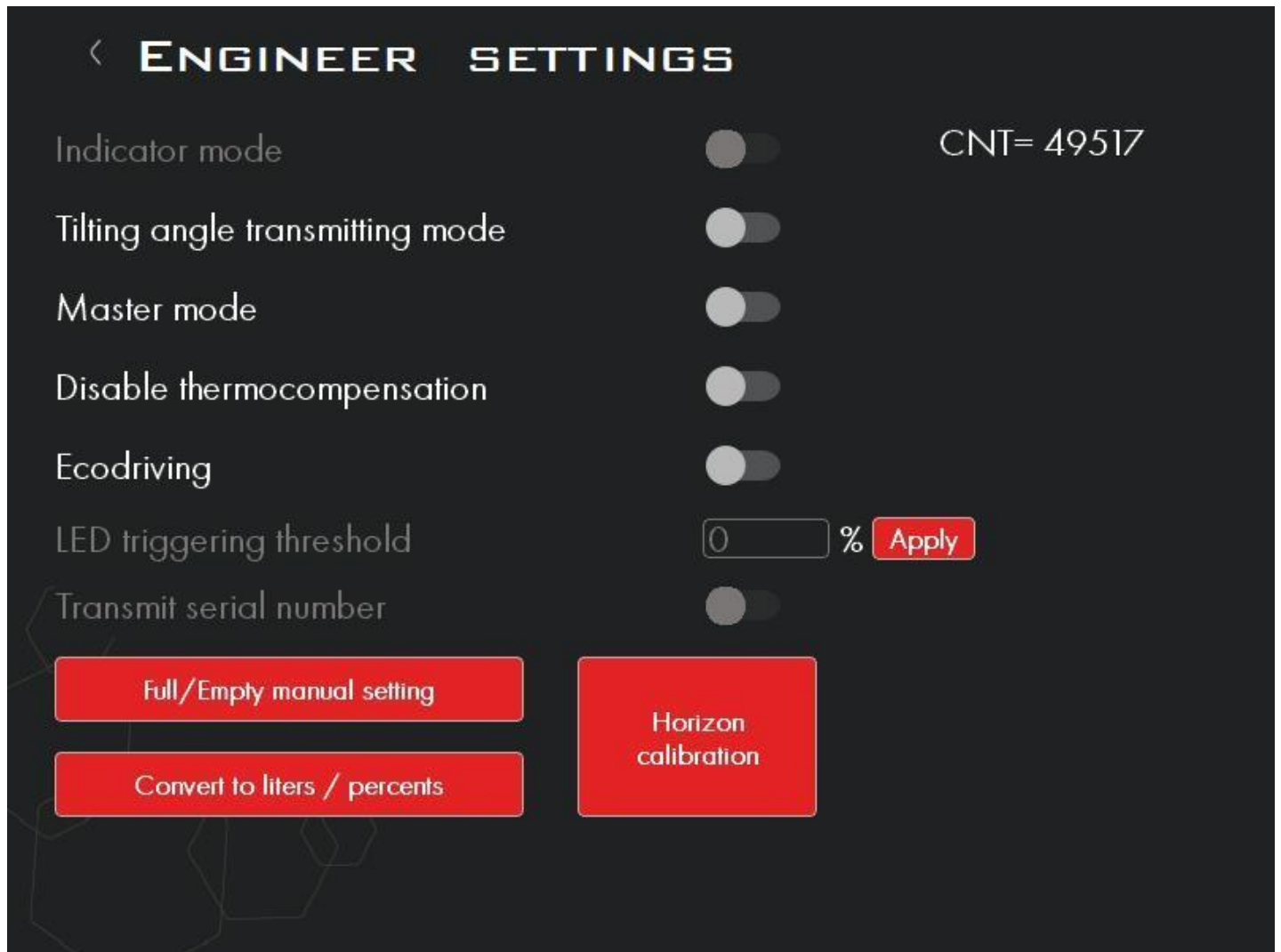
When you click on the FIRMWARE UPDATE button, a window opens for selecting the firmware available on the PC / laptop.



Pressing the OPEN button will start the process of updating the fuel sensor firmware.

7.9. Engineer Menu

When you press the ENGINEER MENU button, the ENGINEER SETTINGS window opens.



CNT= 49517

current raw sensor value (service value, necessary for diagnostics)

Indicator mode

changes the logic of the output of the sensor connected to the standard auto-level auto pointer. The function is necessary if the dial gauge of the fuel level works with reverse logic, that is, with a full tank, the resistance is zero, and with an empty maximum. An example of the use of this function is to connect to a pointer of cars of the GAZ family. Actually for TD-500.

Tilting angle transmitting mode

Includes the function of the sensor to transmit the accelerometer reading. Actually for the TD-600 model. The angle value is transmitted using the LLS protocol with the following network address relative to the fuel level data address. For example, if fuel level data is transmitted to network address 1, then the angle value will be to network address 2.

Master mode

Switches the sensor to the polling mode of the RS-485 interface. In this mode, it is possible via RS-485 interface to connect up to 7 Slave sensors using the LLS protocol to the Master sensor (if the Master mode is not set in the sensor, it will automatically be a Slave device). In turn, the Master sensor transmits both data from connected sensors and its own data via RS-232 interface in ASCII format without a request from external devices. Relevant for the TD-600 model.

Disable thermocompensation

allows you to disable the internal algorithm for recalculating the level depending on the temperature change. Disabling of the thermal compensation is not recommended. Relevant for all models.

Ecodriving

includes data transmission mode for driving quality. Data is transmitted via the LLS protocol in the range from 0 to 15. The value is transmitted by the following network address relative to the fuel level data address. For example, if the data on the level of fuel is transmitted to the network address 1, then the assessment of the quality of waiting will be the network address 2. It is relevant for the TD-600 model.

LED triggering threshold

sets the percentage of the minimum balance of the top-line, at which the lamp of the emergency balance of the regular fuel level indicator turns on. Relevant for TD-500.

Transmit serial number

function in development

Full/Empty manual setting

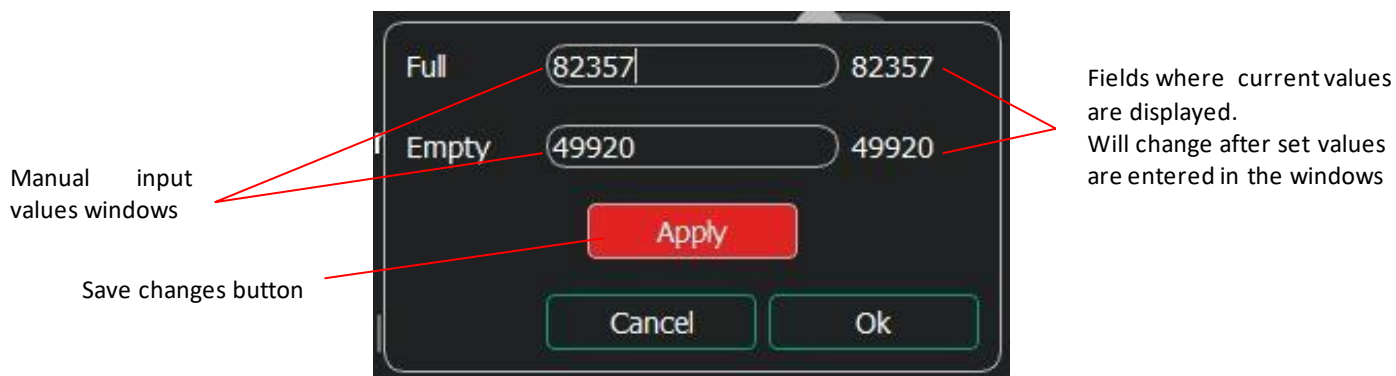
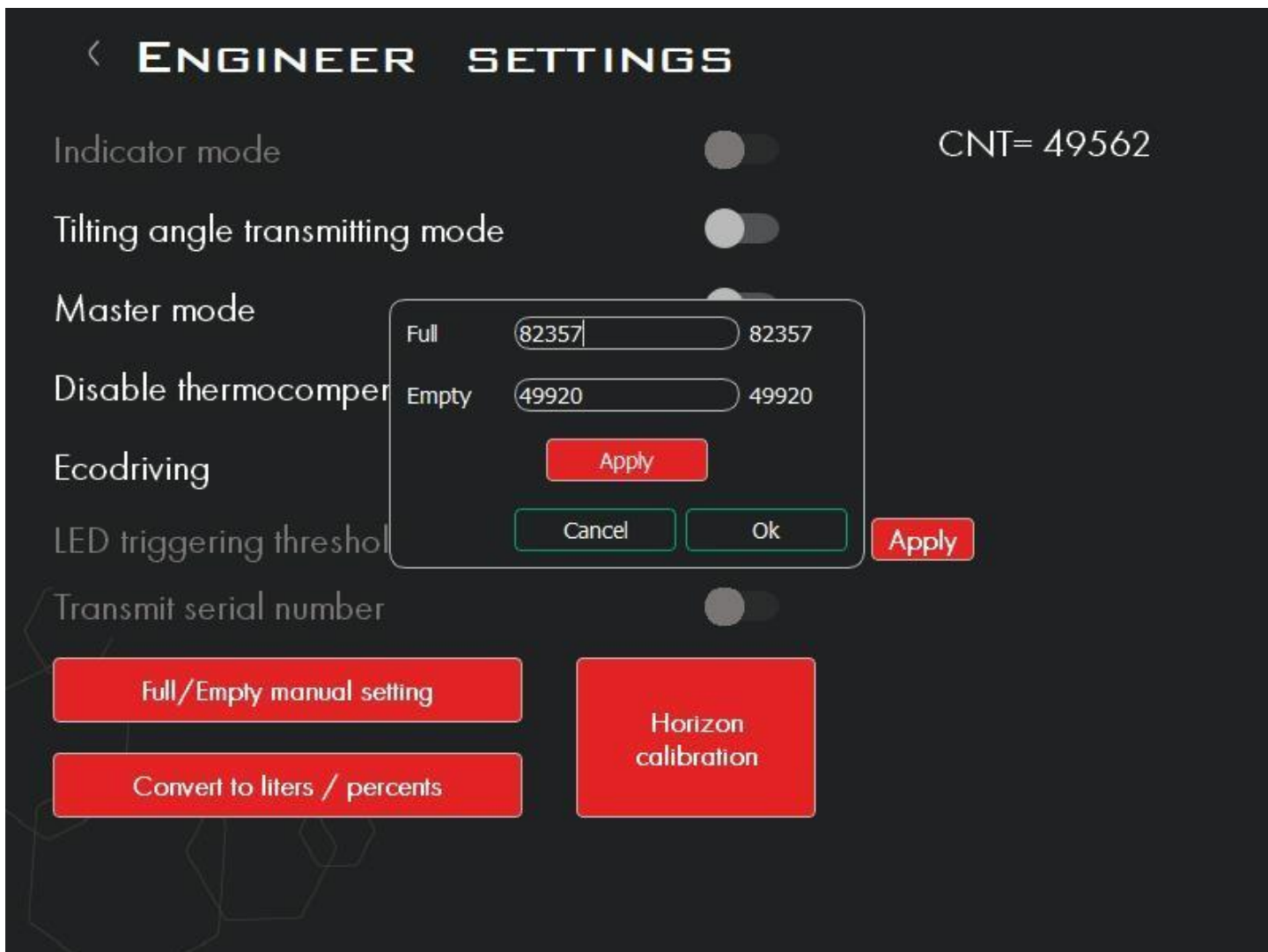
displays a window in which you can manually set / edit the values "Full" and "Empty"

Convert to liters / percents

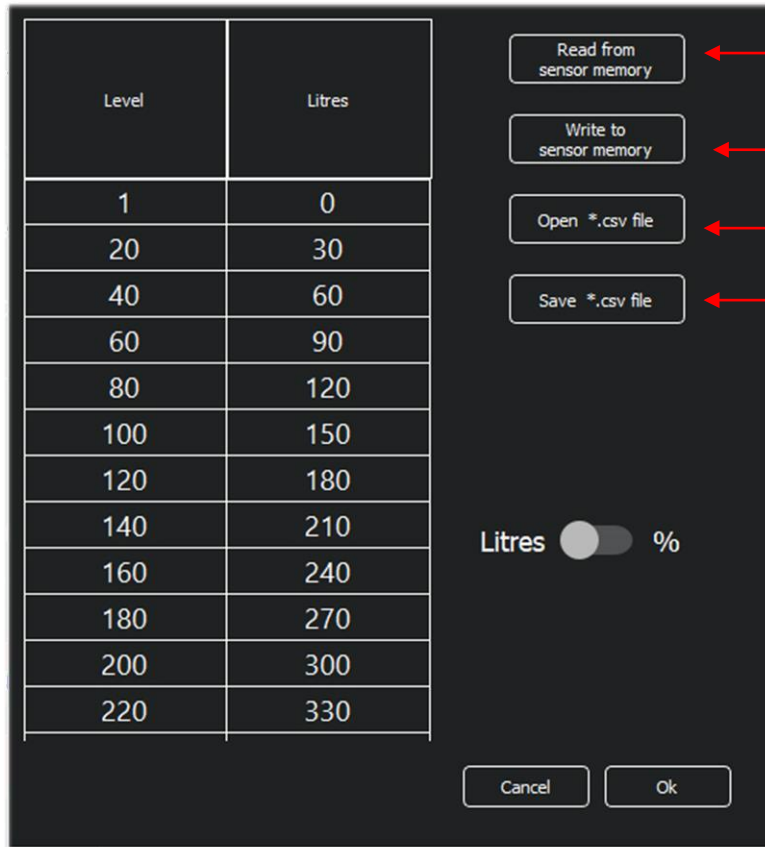
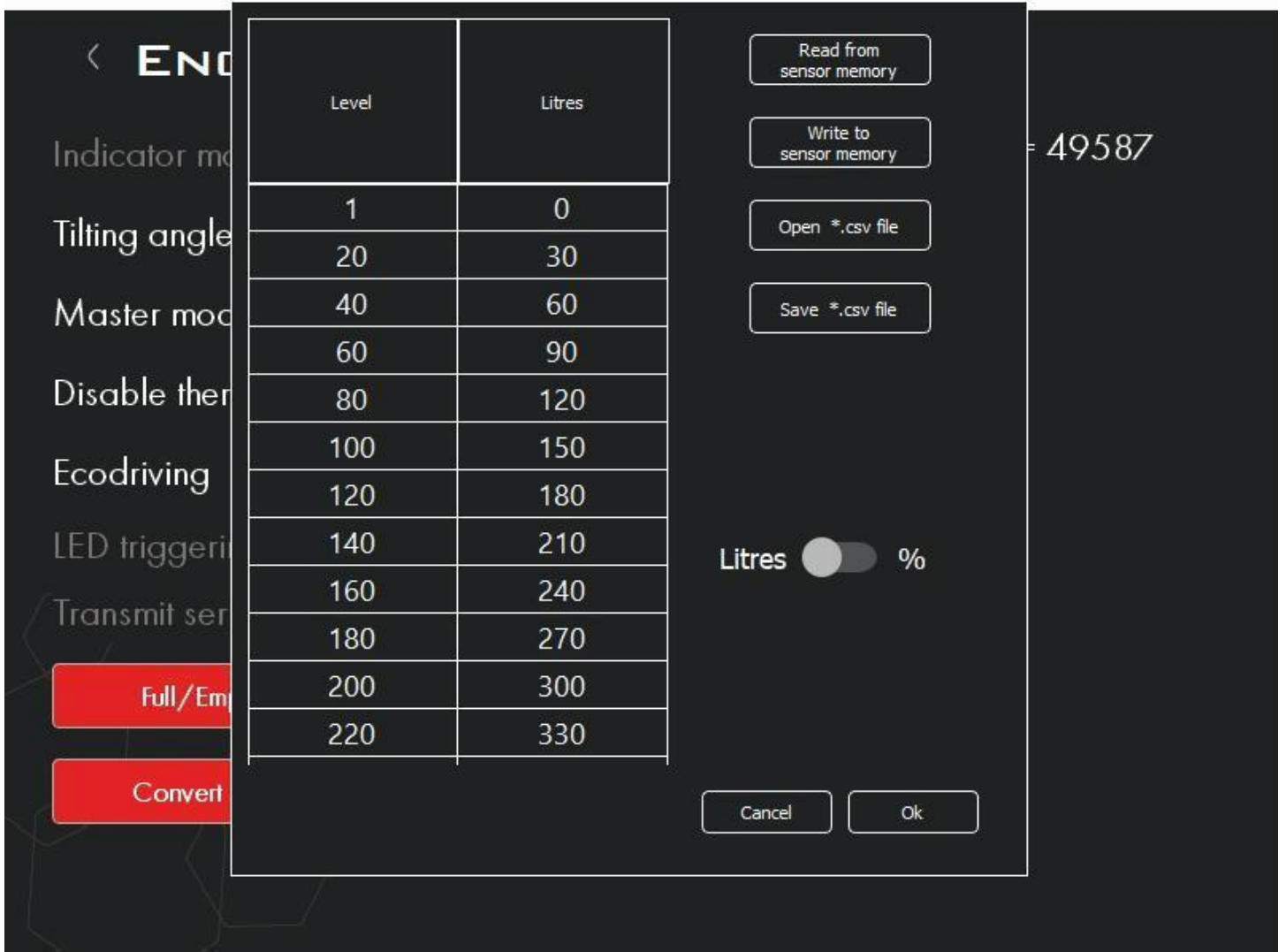
includes the function of recalculating the level of fuel by the calibration table and receiving data in liters or percent. It also displays a window for inputting and saving the calibration table in the sensor memory. Relevant for TD-500 and TD-600 models.

Horizon calibration

allows you to calibrate the reference point (zero angle) for the accelerometer built into the sensor. It is used when the tilt angle transmission mode is on. Relevant for the TD-600 model.



Manual input of an empty and full fuel level in a tank can be used in some cases, for example, when it is necessary to calibrate 15 identical tanks with installation of 15 fuel sensors of the same name and length. In this case, only one fuel sensor is calibrated and then these calibrations are transferred to the other 14 sensors by manual data entry. It is not recommended to use this function en masse due to numerous observed cases of inconsistencies between the actual and nominal sizes of the fuel tanks.



- ← Reading the calibration table from the sensor memory
- ← Saving the displayed calibration table to the sensor
- ← Load table from file *.csv
- ← Saving the displayed table to a file *.csv



In this menu, you can work with the calibration tables created earlier in the calibration process.

If the calibration was made in advance and saved in *.csv format, then it can be loaded into the sensor memory (only relevant for TD-500 and TD-600).

In this menu, you can also enter data into each column of the calibration table manually, without downloading the file.

7.10. Remote control

Internal sensor software has the ability to receive commands written in a certain way to change its settings. This allows you to change meter settings remotely. The command to the meter is sent via GSM communication through the terminal to which the sensor is connected. The command can be sent via SMS to the registered number of the terminal or through the server of the monitoring system operator controlling the equipment.

The remote control function is supported by the Smart and Signal family of trackers.
(Produced by Navtelecom) and AutoGRAPH (produced by Technocom).
Transmission of commands to the sensor is possible only in RS-485 operation mode.

PARAMETER / FUNCTION	DESCRIPTION
(1)	line with code - displays the code for remote control
(2)	firmware usage version 1.7.6 and higher
(3)	remote control command selection window
GENERATE REQUEST	generates command code
REMOTE NETWORK NUMBER	the network address of the sensor that is being remotely controlled

< REMOTE CONTROL

Copy string and paste in file for sending

S485=8:4:1500:19200:3101f2A51BC70000fa

Set mode ▾

Generate

Decode reply

1

Network address

Median ▾


Smoothing type

0 ▾

Choose smoothing level

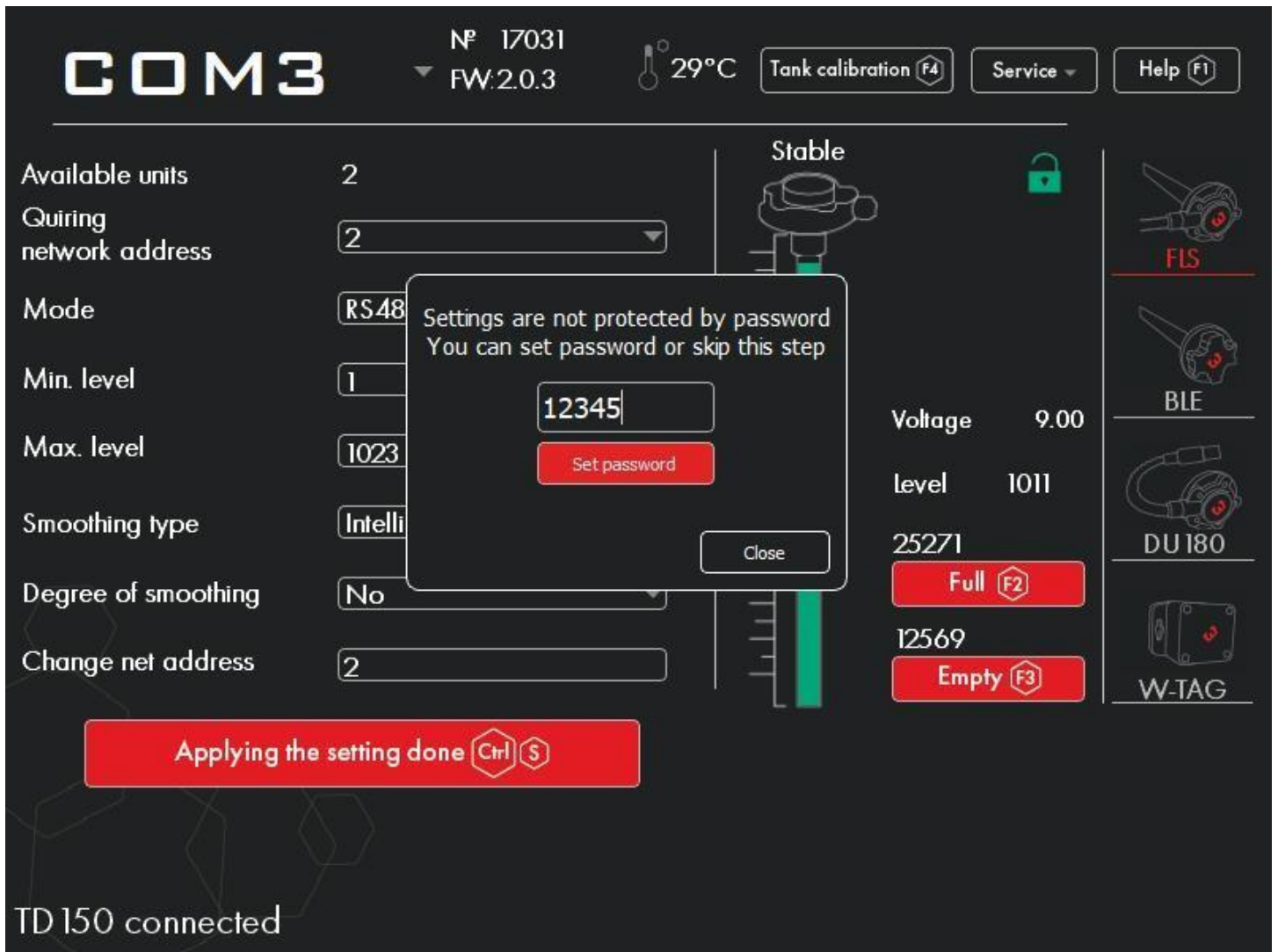
RS485 ▾

Select mode

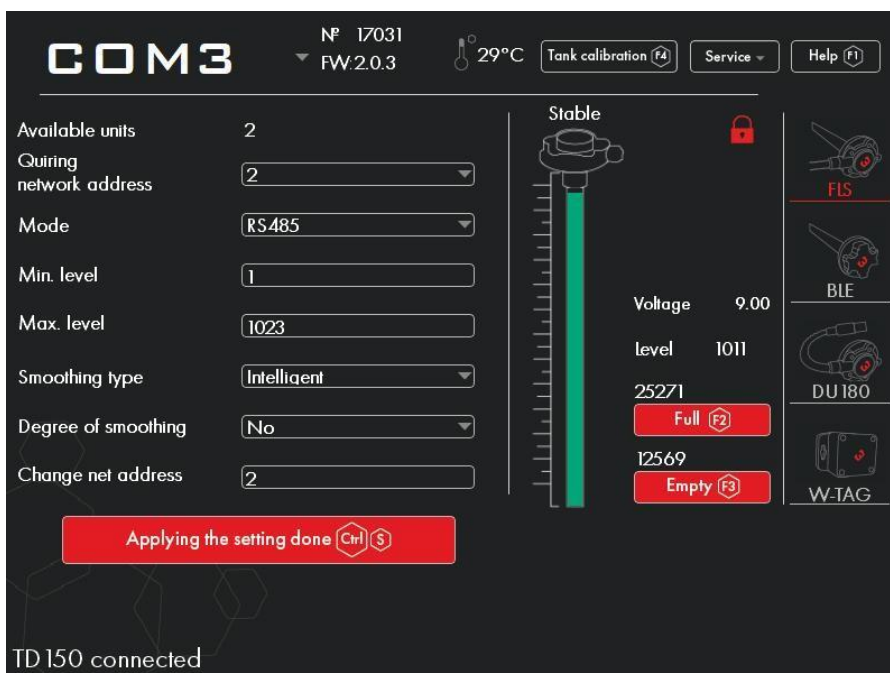


7.11. Security

When you select the SECURITY menu item, a new window opens in which there is a line for entering the password:

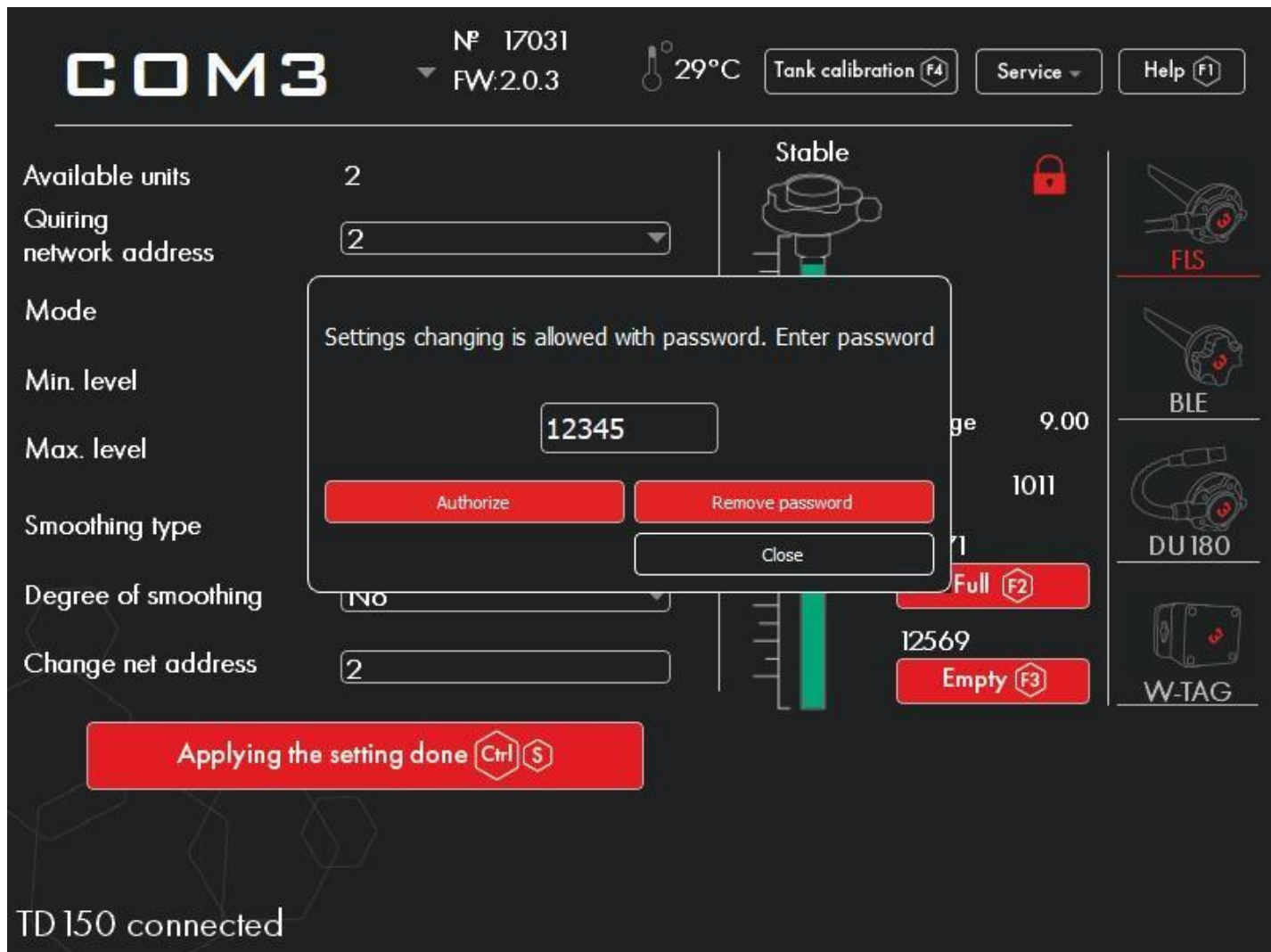


Notice that the lock in the configurator window is highlighted in green. When the password is entered, you must click on the SET PASSWORD button. After the password is set, the lock icon is highlighted in red, indicating that the actions performed are correct.



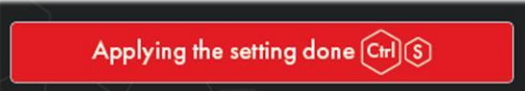
If a password was previously set on the sensor, it is necessary to log in before changing any settings. To do this, in the SERVICE menu, press the SAFETY button, then in the appeared window you will be prompted to enter a password.

If necessary, the previously set password can be deleted.



After that, the icon on the configurator will change its color from red to green. It will say that you can change the parameters. After

you finish entering all the necessary parameters, you need to click on the button



7.12. Instructions for the Escort mobile configurator

7.12.1. Functionality

To connect the sensor to your Android mobile device you will need:



C-200/C-200M

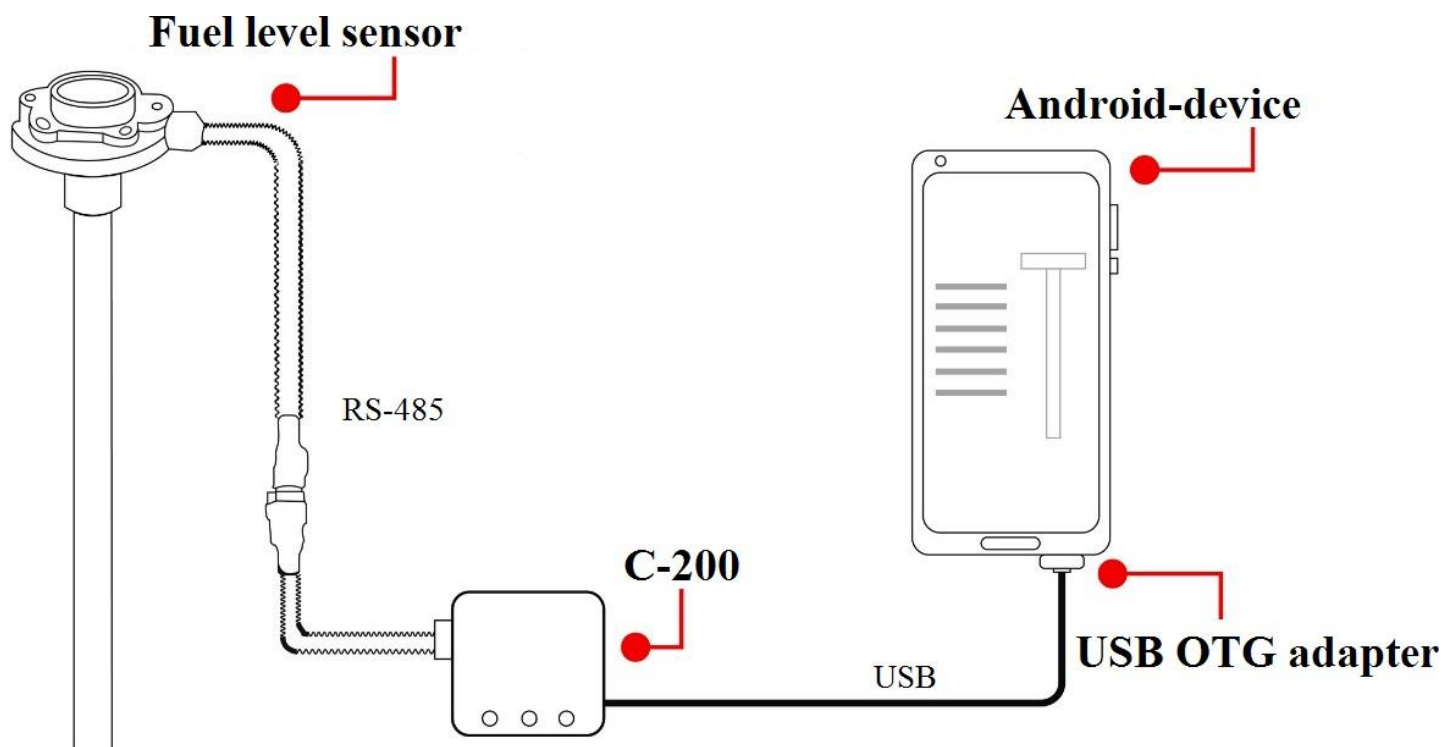


OTG cable



OTG adapter

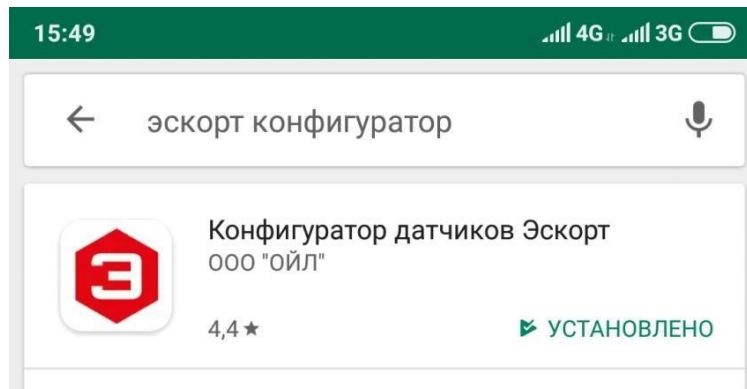
Connect the OTG cable (or adapter) to the mobile device and C200M to the OTG cable (adapter).



With the help of the mobile configurator, the following settings can be changed when connecting via USB:

- 1) View basic sensor information.
- 2) Setting the network address of the sensor.
- 3) Setting the maximum measurement level.
- 4) Setting the required filtering method and level.
- 5) Setting the desired sensor mode.
- 6) Setting the calibration values "Full" and "Empty", as well as checking the current level.
- 7) Setting and removing the sensor password.

Download the Escort Configurator app from Play Market. Download link: <https://play.google.com/store/apps/details?id=ru.fmeter.config>

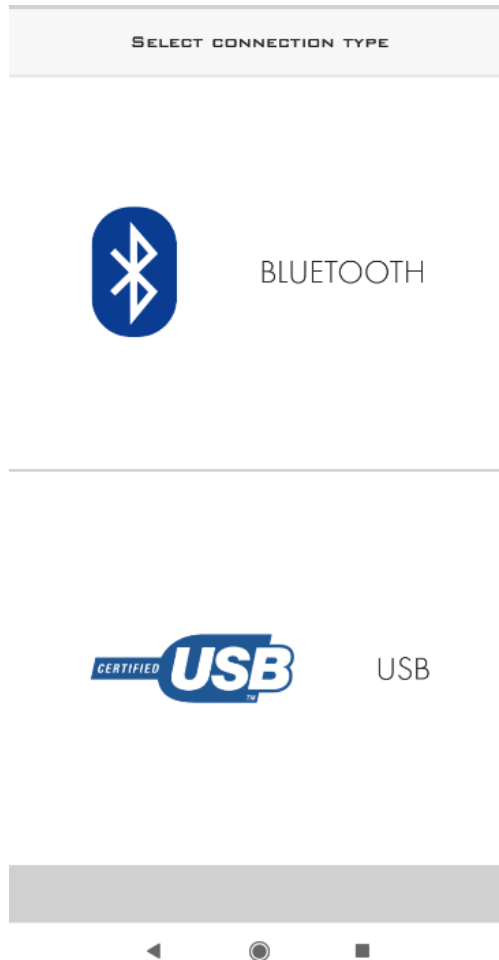


Run the app

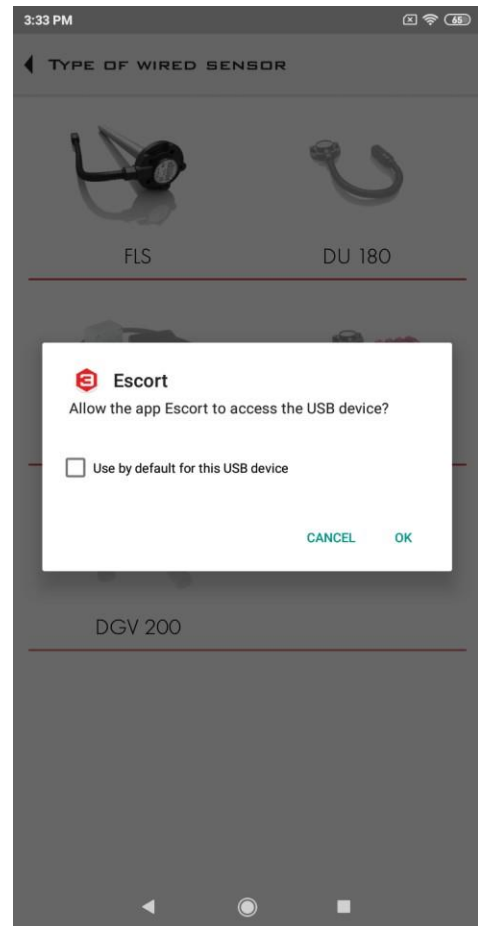


When you start the application, you will be prompted to select the language and interface for connecting to the sensor. Select USB.

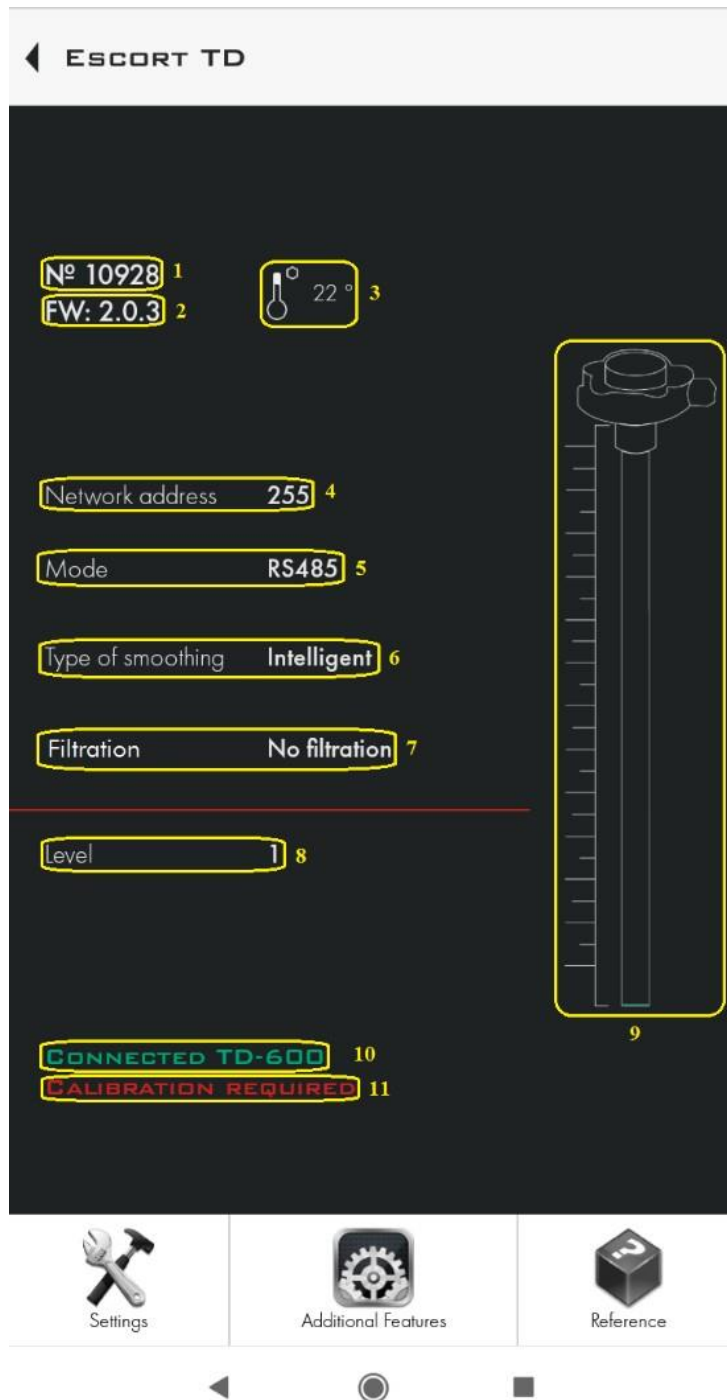




Next, select the fuel level sensor section.



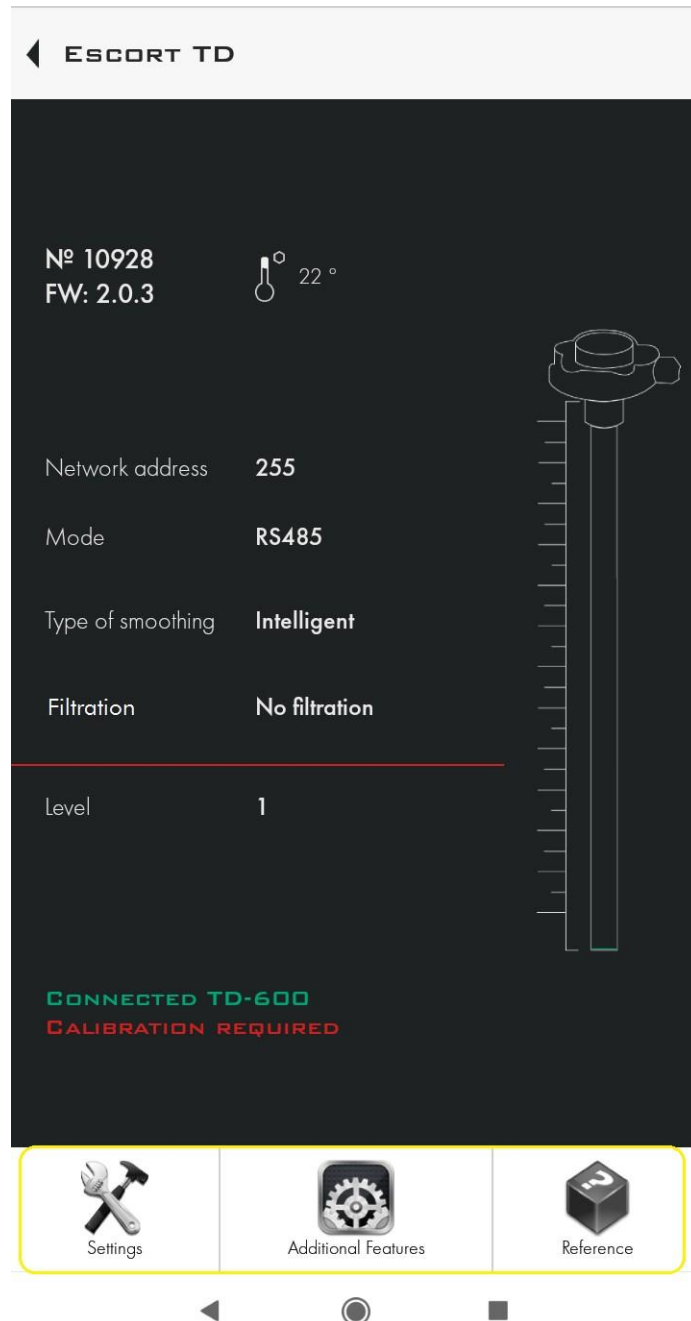
View basic sensor information



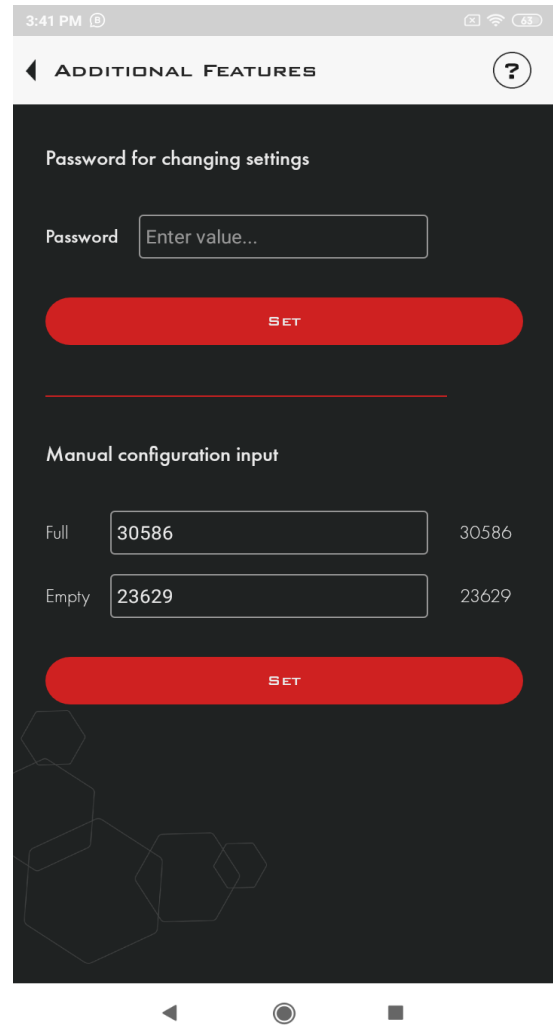
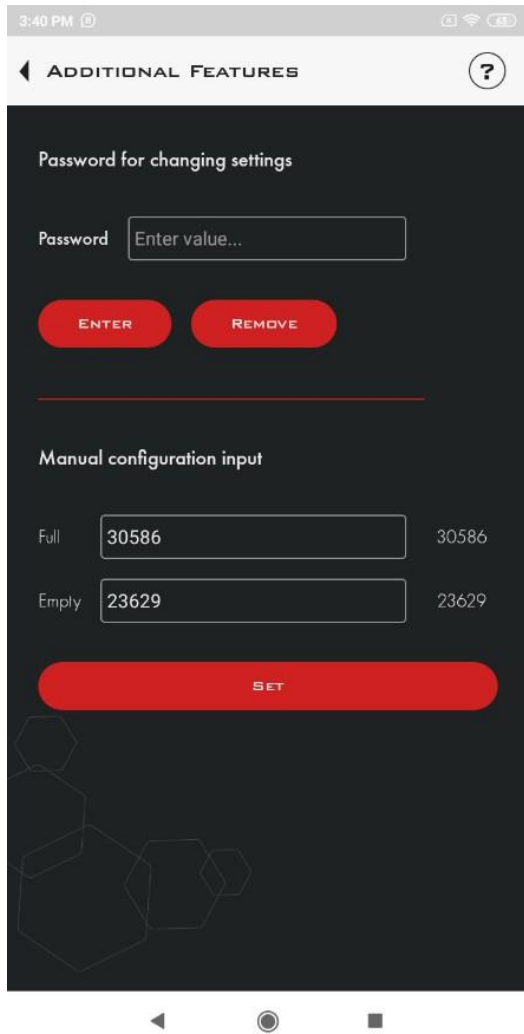
Here you can view basic information about the sensor:

- 1) Serial number of the sensor
- 2) Sensor firmware version
- 3) Current temperature measured by the sensor
- 4) Current network address of the sensor
- 5) Current sensor mode
- 6) Current filtration level set in the sensor
- 7) Степень сглаживания
- 8) Level
- 9) Fuel level scale
- 10) Connected sensor model
- 11) calibration recommendations

There are also buttons at the bottom to go to additional application menus.



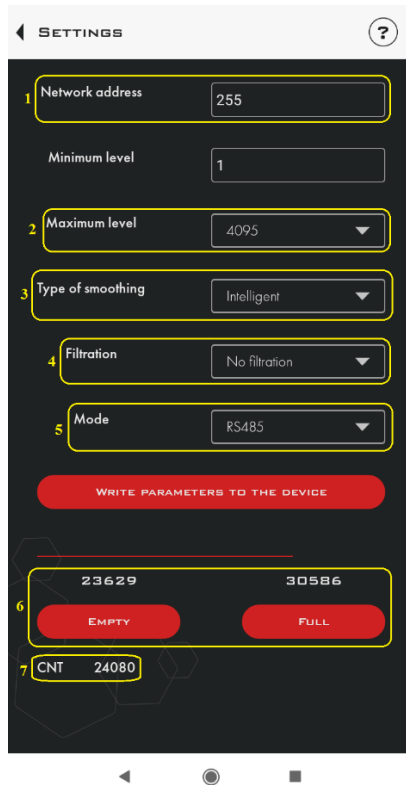
7.12.2. Extras



In this menu item of the configurator you can:

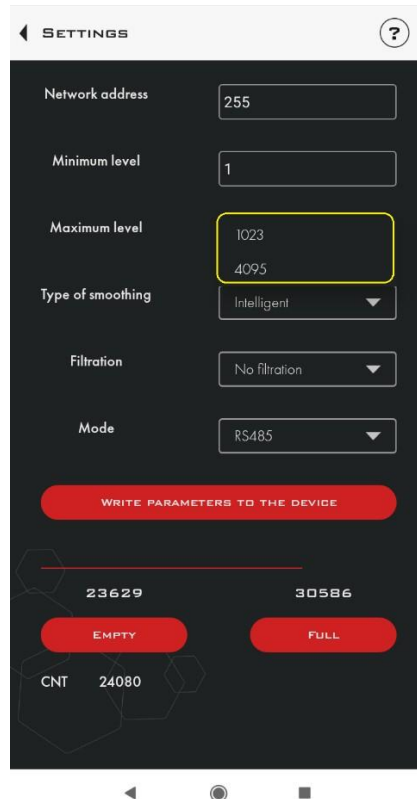
- 1) Set or remove the sensor password
- 2) Set "Full" and "Empty" manually

7.12.3. Settings

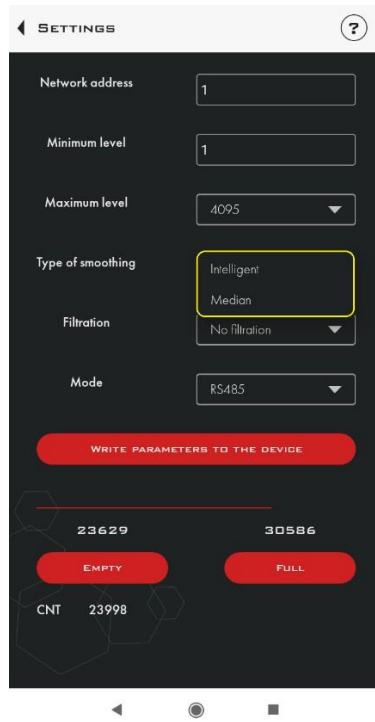


In this menu item you will find the following settings:

- 1) Setting the network address of the connected sensor. It is possible to set the network address of the 1st to 255th network address.
- 2) Setting the maximum measurement level. In conventional units. 1 to 1023, or 1 to 4095. Pressing the arrow will open a drop down menu for selecting the maximum level.

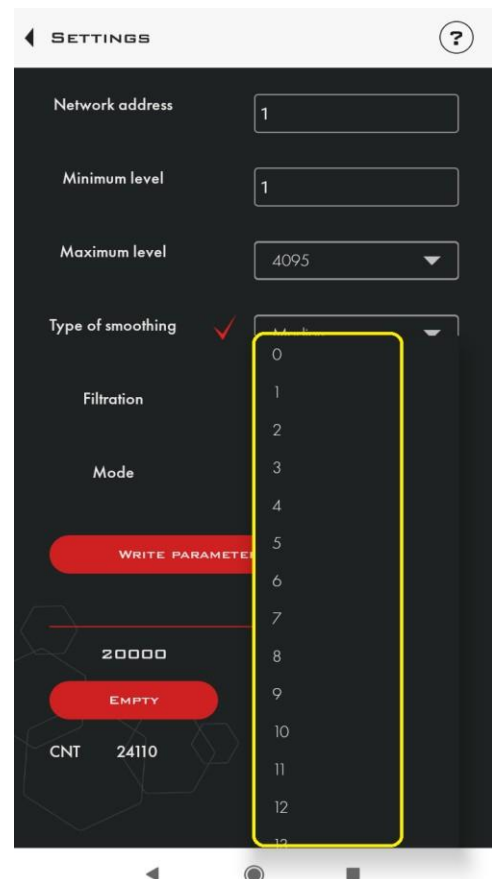
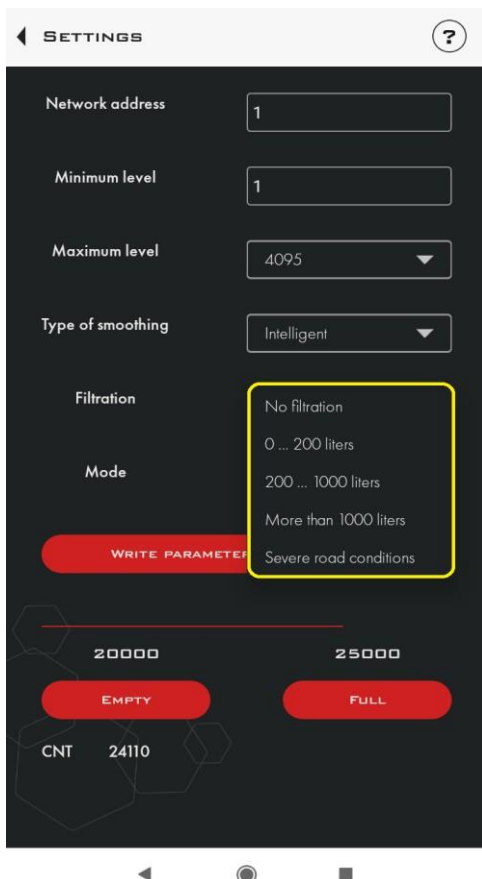


- 3) Select the type of smoothing. (The firmware with the implementation of the median type of smoothing is currently under development.) It is now highly recommended that you select an intelligent smoothing option. Clicking on the arrow opens a drop-down menu with a list of available types of smoothing.

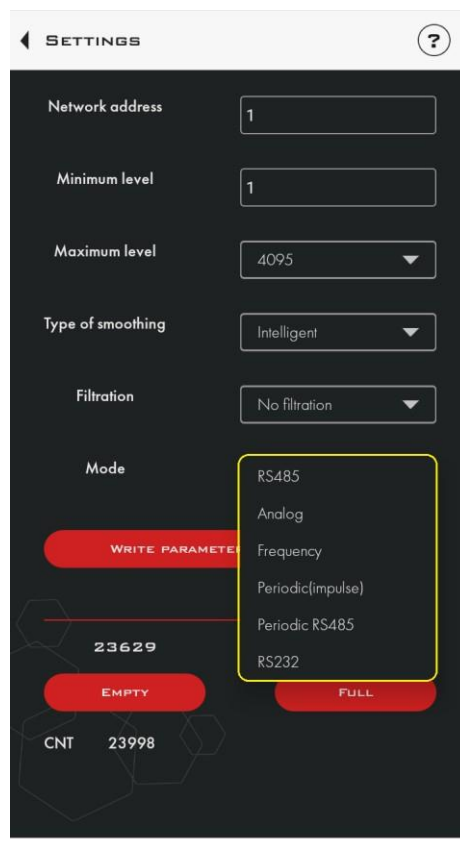
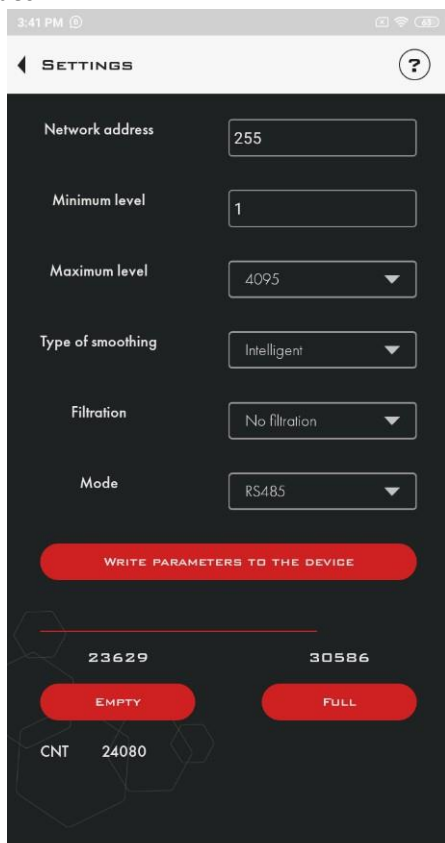


- 4) Smoothing level selection. For each type of smoothing there is a possibility to choose the filtration level:
- For the intelligent type, the tank volume must be set
 - for the median type of smoothing it is necessary to set the value in the range from 0 to 15. Below is a table of recommended values.

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

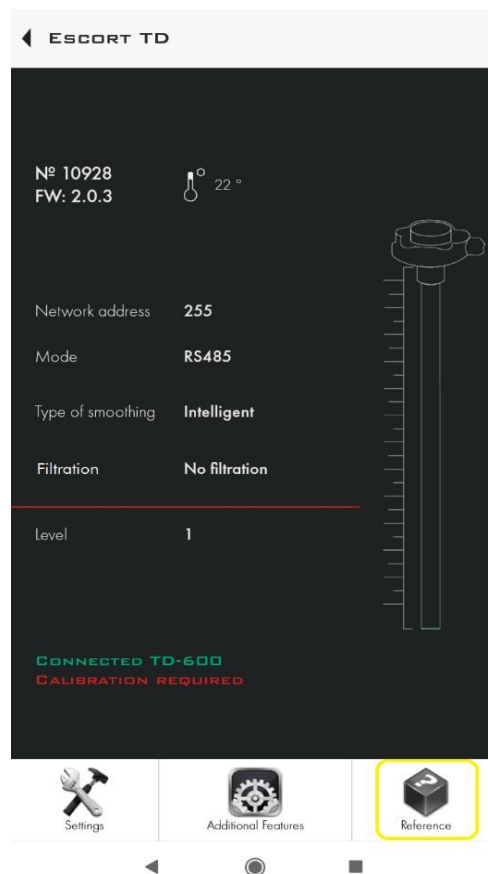
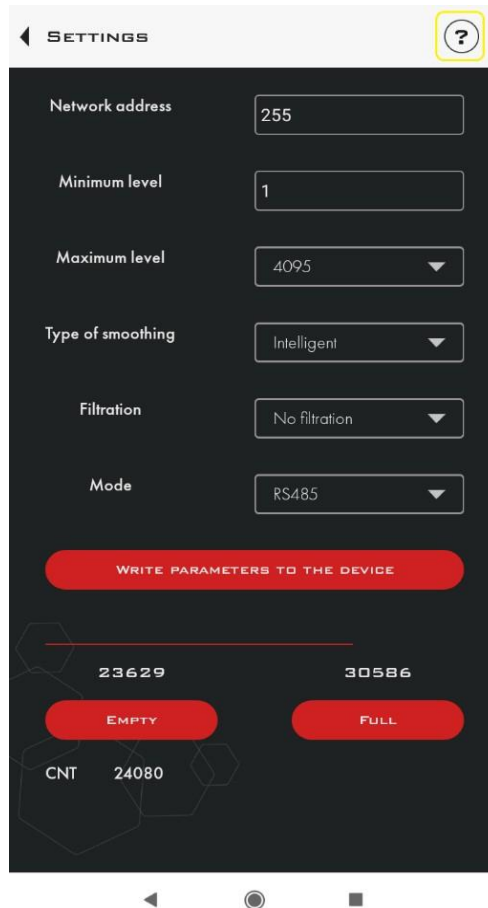


- 5) Select the operating mode of the sensor. Pressing the arrow will open a drop-down menu with a list of available sensor modes.



- 6) Setting the "Full" and "Empty" readings. Allows you to perform a basic calibration of the sensor.
 7) Service parameter.

7.12.4. Help

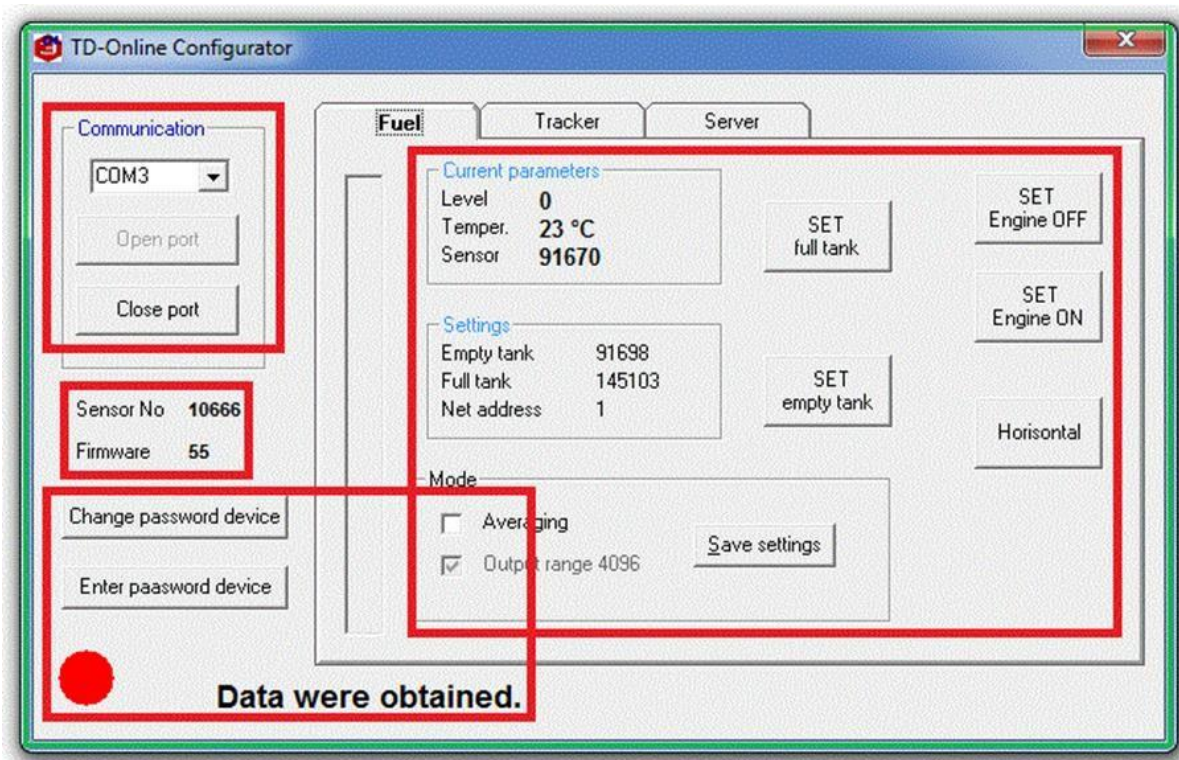


Here you will find information on the mobile configurator.

8. Configurator TD-online

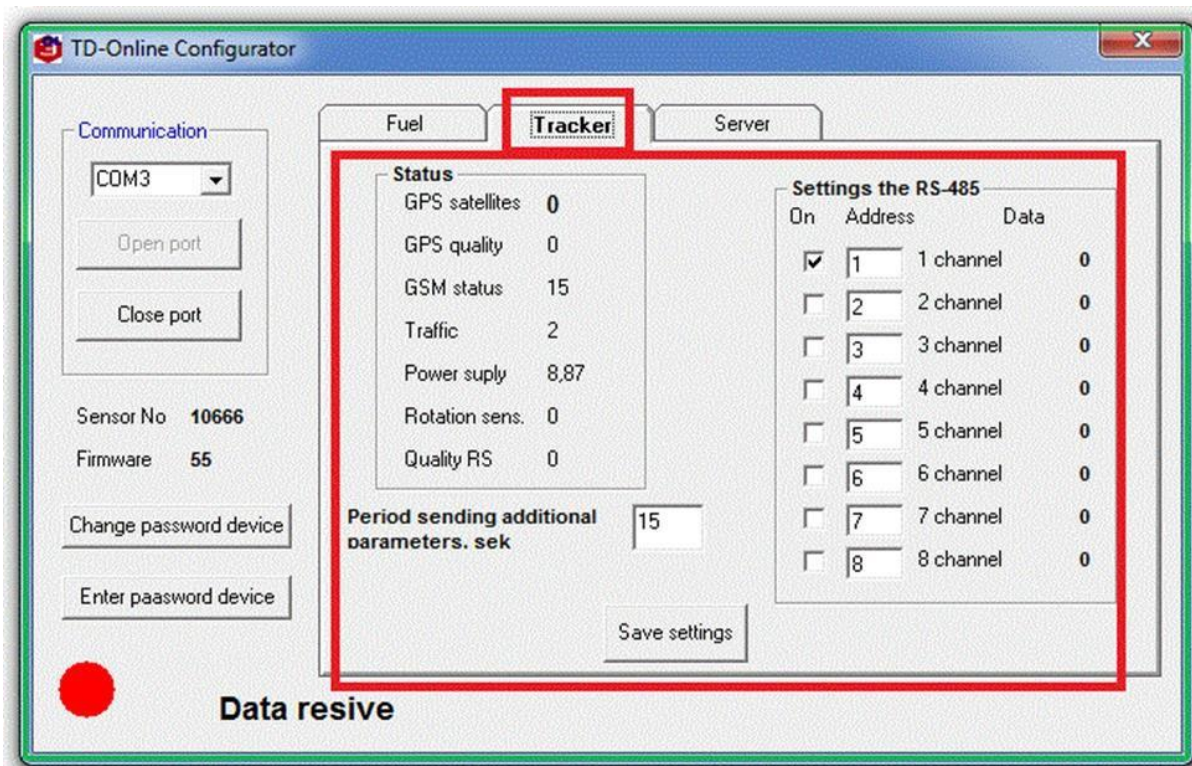
The program "Configurator TD-online" is used to configure TD-online sensor.

8.1. "Sensor" tab



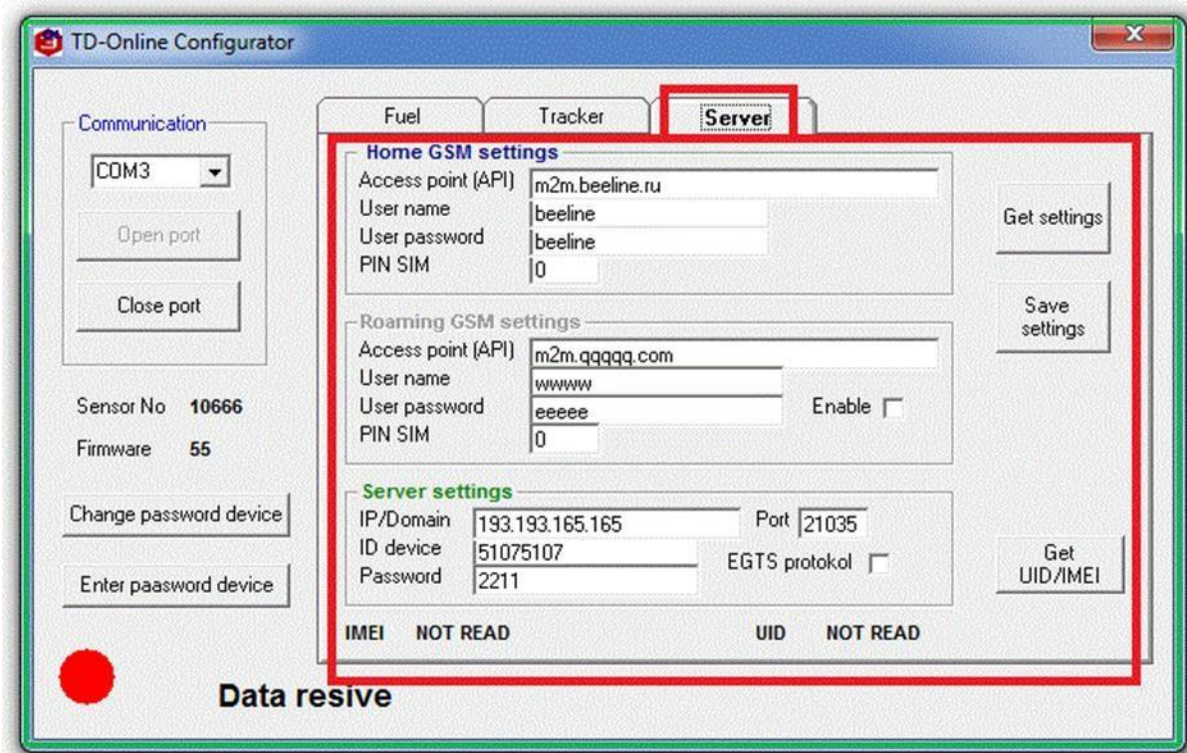
PARAMETER/FUNCTION	DESCRIPTION
OPEN PORT	connect the sensor
CLOSE PORT	disable the sensor
Serial № [XXXXX]	displays serial number of active sensor
SW[XX] version	displays firmware version of sensor
CHANGE PASWORD	sets a password to protect against changes in sensor settings
ENTER PASSWORD	entering a pre-set password
LEVEL	level processed value on the scale of 0 ... 1023 (0 ... 4095 depending on the settings)
TEMPERATURE	sensor temperature
CURRENT	level raw value
EMPTY	minimal level raw value
FULL	maximal level raw value
NETWORK ADDRESS	pre-set network address of the sensor
SMOOTHING	SMOOTHING function enabling
RANGE 4096	switch to scale of 0 ... 4095 c.u.
SET	recording of MODES section settings
SET FULL	recording of maximal level state
SET EMPTY	recording of minimal level state
ENGINE OFF	Recording the status of not running engine
ENGINE ON	recording the status of running engine
HORIZON	recording of the sensor's horizontal position

8.2. "Tracker" Tab



PARAMETER/FUNCTION	DESCRIPTION
OF SATELLITES	number of satellites in range
S/N	signal-to-noise property value
GSM	GSM property value
TRAFFIC	number of information packets transmitted after the sensor was turned on
POW	current value of supply voltage
PERIOD FOR ADDITIONAL PARAMETERS SENDING, SEC	interval of data sending via GSM in seconds
ON	activation of the channels of the connected sensors, 1st channel - measurement of the fuel level of TD-online sensor being set
ADDRESS	specifying a network address number of the connected device
DATA	data values (for example, level, angle, temperature) obtained from the connected devices. One value for one sensor.
SET	recording of settings to sensor

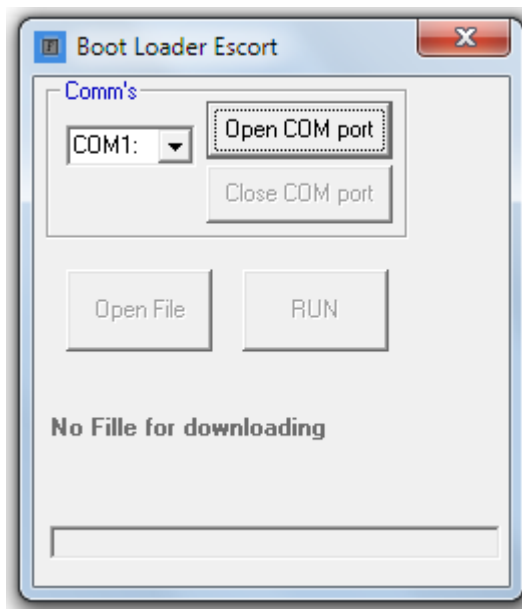
8.3. "Server" tab



See description in Section SERVER SETTINGS

8.4. BootLoader Escort

"BootLoaderEscort" program is used for firmware of TD-150, TD-600, TD-online SIM sensors.



PARAMETER/FUNCTION	APPLICATION
OPEN PORT	connect the sensor
CLOSE PORT	disconnect measuring device from computer port
OPEN FILE	select firmware file
START	enable recording of firmware to sensor SW
NO FILE	status bar (indicated value - there is no selected firmware file)

8.5. TD-online Settings

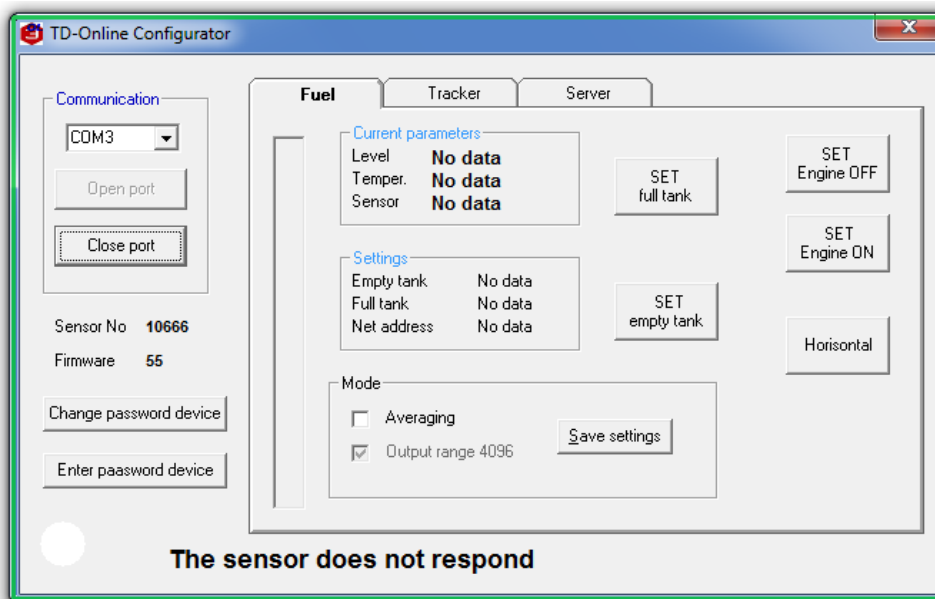
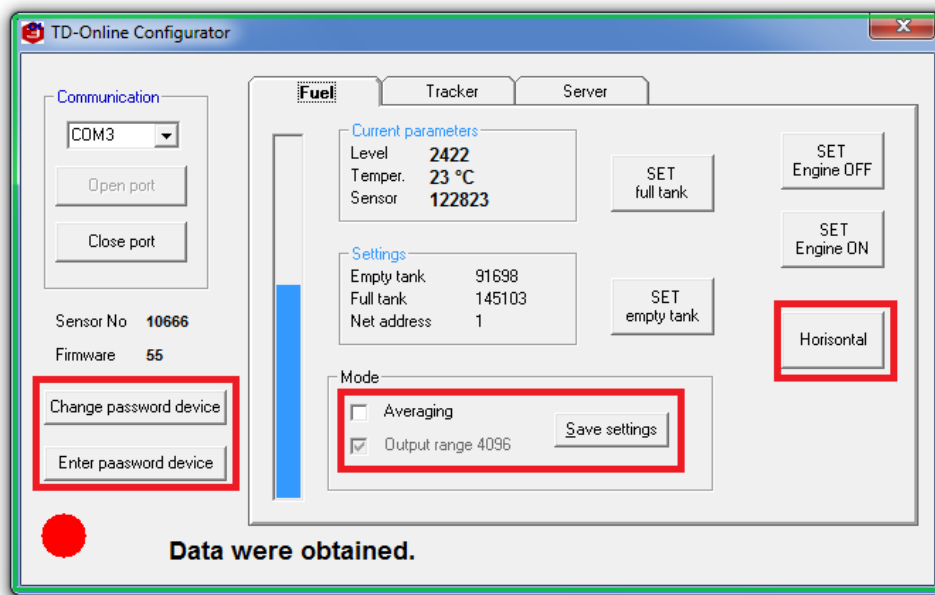
It is recommended to conduct a preliminary check of the performance capability and settings of the device in the laboratory using a laboratory power source that provides an output voltage of $U_{out} = 10 \dots 30 \text{ V}$ and a current I_{out} of at least 1A.

8.5.1. Connection

The program Configurator TD-online, laptop / computer / tablet and converter C-200/C-200M (converter RS485-USB) is used to configure the sensors. The connection scheme is similar to TD-100, TD-150, TD-500, TD-600 sensors.

8.5.2. General configuration

TD-online sensor uses a measuring range of 0 ... 4095 conv. units.



- Make sure to use actively the range of 0 ... 4095 cond. units. (tick mark in the box of DIPAZON 4096)
- If necessary, install or change the password.
- If necessary, set SMOOTHING.
- Align the sensor horizontally.
- Set the reference level (HORIZON)

8.5.3. GSM Settings

Before installing the SIM card in FLS, configure it to use
without requesting a PIN-code on any device (phone, smartphone).

- Connect the sensor to the computer/laptop through C-200 / C-200M device.
- Open the SERVER tab
- The GSMSIM card settings are determined automatically. Check them if necessary:
 - access point;
 - user;
 - password;
 - SIM PIN code (0 by default).

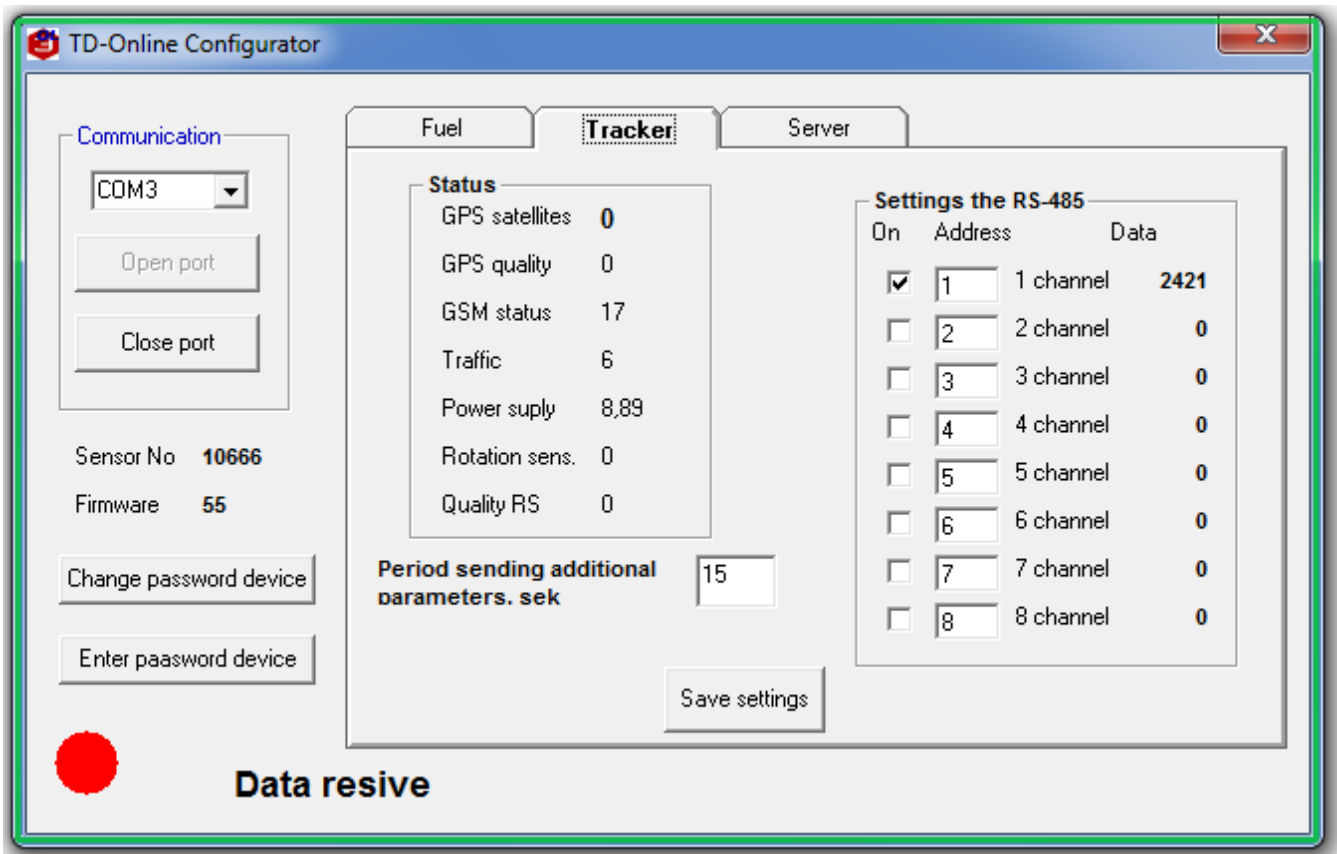
8.5.4. Server settings

WIALONHOSTING

The screenshot shows the 'TD-Online Configurator' window with the 'Server' tab selected. The interface includes the following sections:

- Communication:** A dropdown menu set to 'COM3', 'Open port', and 'Close port' buttons.
- Sensor Info:** Sensor No: 10666, Firmware: 55. Buttons for 'Change password device' and 'Enter password device'.
- Home GSM settings:**
 - Access point (API): m2m.beeline.ru
 - User name: beeline
 - User password: beeline
 - PIN SIM: 0
- Roaming GSM settings:**
 - Access point (API): m2m.qqqqq.com
 - User name: www
 - User password: eeeee
 - PIN SIM: 0
 - Enable checkbox:
- Server settings:**
 - IP/Domain: 193.193.165.165
 - Port: 21035
 - ID device: 51075107
 - Password: 2211
 - EGTS protokol checkbox:
- Status:** IMEI NOT READ, UID NOT READ
- Buttons:** 'Get settings', 'Save settings', and 'Get UID/IMEI'.
- Data resive:** A red circle highlights this status at the bottom left.

- Set the server address and port - 193.193.165.165 and 21035
- Make sure that SIM and IMEI numbers are available by clicking on READ SIM
- Do not fill the field DEVICE IDENTIFIER!
- set the access password to the device - 2211 by default, set another password if necessary
- set the data transfer period
- Click the "SET" button.



- Open the TRACKER tab
- Check the GSM-17 parameter (when setting the connection to the WIALONHOSTING server).
- Set the period for sending the sensor data via the tracker in seconds.
- Verify the activity of 1 channel in RS-485 SETUP section. The relevant box must be ticked (V).
- If it is necessary, change and/or assign the network and activate channels by tick marks in the appropriate fields for devices connected to the sensor (up to 7).
- Click the "SET" button.

Values for the stable operation:

Parameter	Designation	Units	Value
Signal-to-noise ratio	S/N	c.u.	40
GSM-connection status	GSM	c.u.	17
Power supply voltage	POW	V	corr. to operating voltage of the sensor

S/N value of 30 units or less means that the sensor is in poor operating conditions.

The conditional values of the GSM parameter:

Designation	Value
1	power on
2	power off
3	standby
4	modem disconnecting
5	ECHO reset
6	IMEI number request
7	IMEI number received, SIM number request
8	SIM number received
9	GSM registration
10	GSM connection
11	GPRS connection
12	check GPRS connection, get IP number
13	connection to Wialon Hosting
14	registration of login and password on Wialon Hosting server
15	registered in Wialon Hosting
16	exit from connection mode
17	stable registered connection (GSM, GPRS, WialonHosting)

8.5.5. Calibration

- Seal the drain hole of the sensor, for example, with an insulating tape.
- Turn the sensor upside down in a vertical position so that the sensor's head was down.
- Fill the pipes with fuel. Do not allow water and dirt enter to the pipes.
- Wait 1 min
- Click the SET FULL button
- Turn the sensor over and allow the fuel to drain out.
- Wait at least 2 min
- Click the SET FULL button

8.5.6. Motor hours setting

Parameter/Function	Description
MOTOR HOURS	Fixing the time and durability of transport or special equipment engine operation.

- Start the engine of vehicle/special equipment.
- Wait for 3 ... 4 minutes.
- Click the button ENGINE IS STARTED.
- Stop the engine.
- Wait for 3 ... 4 minutes.
- Click the button ENGINE IS STOPPED.

8.5.7. Press the ENGINE button MUTE.

Parameter/Function	Description
QUALITY OF DRIVING	Evaluation of the quality of driving techniques using accelerometer built into the sensor

(reserved)Remote Configuration

8.5.8. Remote settings

GSM

The internal software of the sensor can receive commands written in a certain way to change its settings. This allows changing the sensor settings remotely. The command is sent to the measuring device via GSM connection using SMS message to the registered SIM-card number or through the server operator of the monitoring system that monitors the equipment.

Request format:

Device access password;**Command** =**Parameter**

Response format:

Device access password;**Command** =**Current value of the parameter**

Commands:

Command	Description
?	querying the current state
PLACE	coordinates of location in WGS84 format
API	address of the access point (for example, m2m.beeline.ru)
APIUSER	user name of the access point (for example, beeline)
APIPWD	access point password (for example, beeline)
IP	server address (for example, 193.193.165.165)
IPPORT	server port number (for example, 20332)
RESTART	restart modem
SERVPWD	change of the device access password
SERVID	change of the device identifier
UPDATE_PRG	software change
IMEI	request for the serial number of modem
BB_ERASE	black box formatting
STATUS	querying the current state (software version, serial number, number of satellites, S/N ratio, GSM value, traffic)

Parameters:

Parameter	Value
?	querying the current state
[number/designation]	The current value of the parameter

Error Codes for Response:

Error code	Meaning
BAD STRING	line contains spaces or wrong punctuation marks
Unknown command	invalid command
BAD PASSWORD	invalid device access password

Examples of requests:

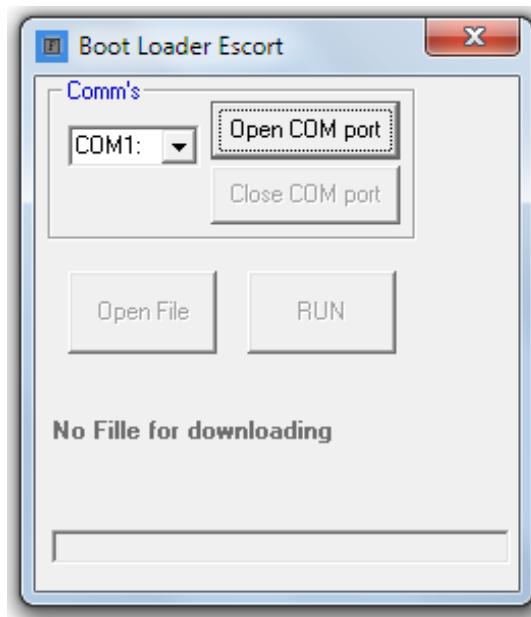
	Format of request		Format of response
1234;API=? Where 1234 is an access password	Request to specify the address of the access point	API=internet.beeline.ru	Response with address indication
1234;IPPORT=?	Request to specify the server port number	PPORT=20332	Response with address indication

Examples of settings:

	Format of request		Format of response
1234;API=internet.beeline.ru Where 1234 is an access password	Request to change the address of the access point	API=internet.beeline.ru	Response with confirmation of changes
1234;IPPORT=20333	Request to change the server port number	PPORT=20333	Response with confirmation of changes

8.5.9. Firmware change

It is possible to update the firmware of the sensor using BootLoaderEscort program.



- Run the BOOTLOADERESCORT program.
- Connect C-200/C-200M converter to the computer.
- Open the port by selecting the required one from the list (if necessary, try the available ports from the list).
- Select the desired firmware file using the OPEN FILE button.
- Start the firmware recording in the sensor memory with the RUN button.
- Wait until the download completes.

9. Connection

9.1. Electrical connection

9.1.1. General information

When connecting and installing the sensor on a vehicle, special equipment or storage facility, comply with the approved safety requirements (for example, evaporation of the fuel tank of the trucks prior to mounting and connecting the sensor) associated with the performance of these works in accordance with the type of facility on which the sensor should be installed.

Depending on the operating mode and the purpose of the sensor the following additional components are used in the power and signal circuits: filters, optocouples, ballast resistors and fuses. The elements are installed in the cab of the driver of the vehicle or other machines. If it is not possible to install in these locations, the additional protection from external climatic conditions (for example, sun, precipitation) and operational impacts (for example, heating, moving parts) should be provided. Additional components should be located at a safe distance from the fuel and its combustible products in explosion-proof areas.

Use fuses of the appropriate rating (see FU1 in diagrams) to protect the power circuit.

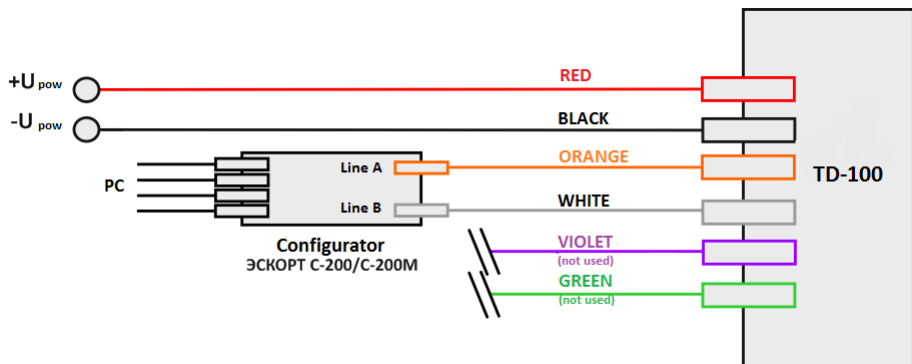
Use the ballast resistors of the appropriate rating (see R1 in the diagrams) to ensure the spark protection of the supply circuit.

Connecting cables should be laid at a certain distance from moving parts and parts that are heated during operation. In the absence of additional insulation of wires of connecting cables, use fire-resisted corrugated polymeric tubes applicable in automotive engineering.

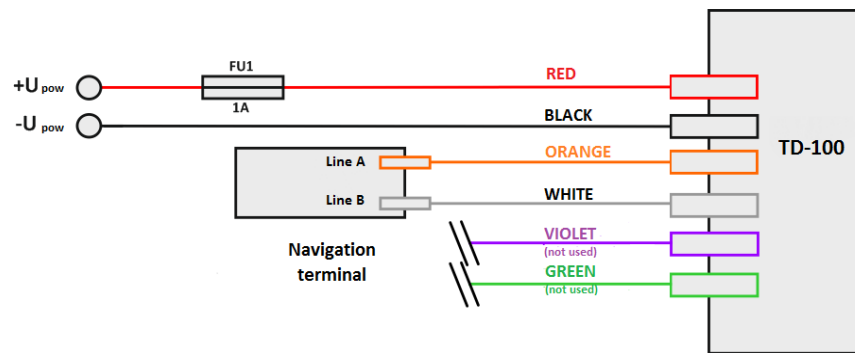
In addition, in the TD-100 and TD-150 models, it is possible to monitor the integrity of the sensor's connection with external devices (navigation terminal, etc.). To do this, connect the "Control" output of the sensor (purple wire) to the negative digital input of the navigation terminal (for more details, see the diagrams in clauses 9.1.2, 9.1.3). In the presence of connection of the sensor to the navigation terminal in the monitoring program, the status of the discrete input will be "connected"; when the connection is broken, the program gives the status "disconnected". For more precise information on setting up a discrete input of a navigation terminal, see the user's manual for a specific sensor model.

9.1.2. TD-100

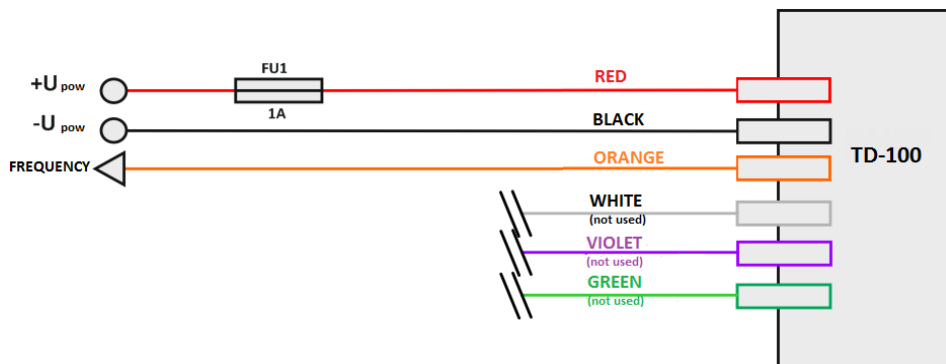
when programming



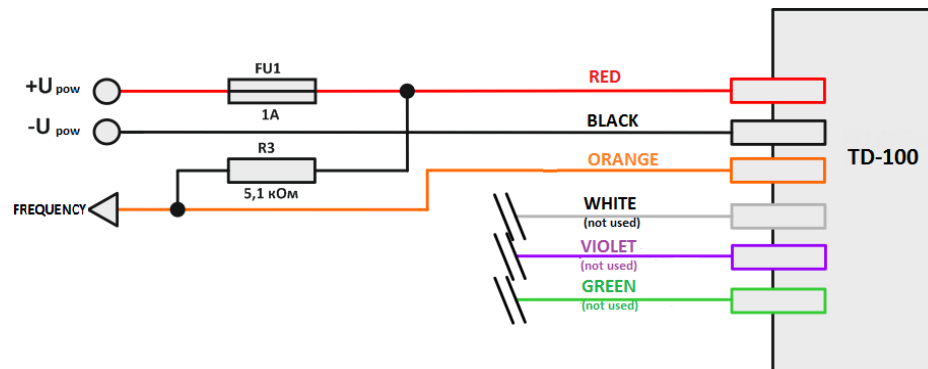
RS-485 mode



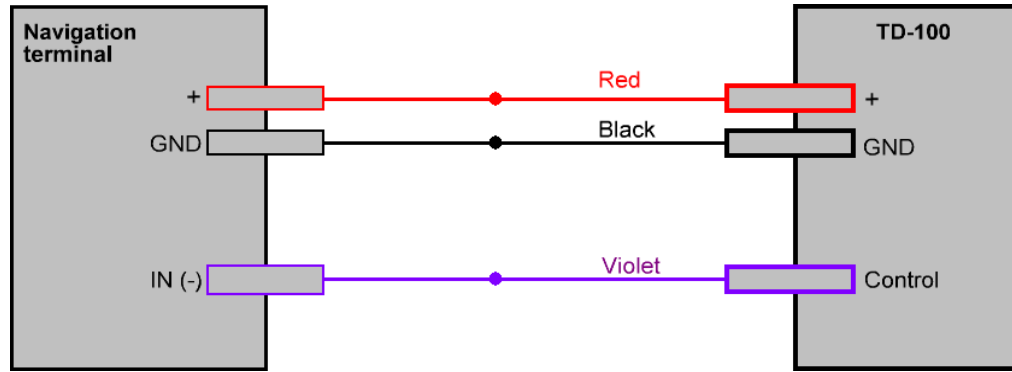
Frequency mode



Frequency mode with "pull-up" through resistor

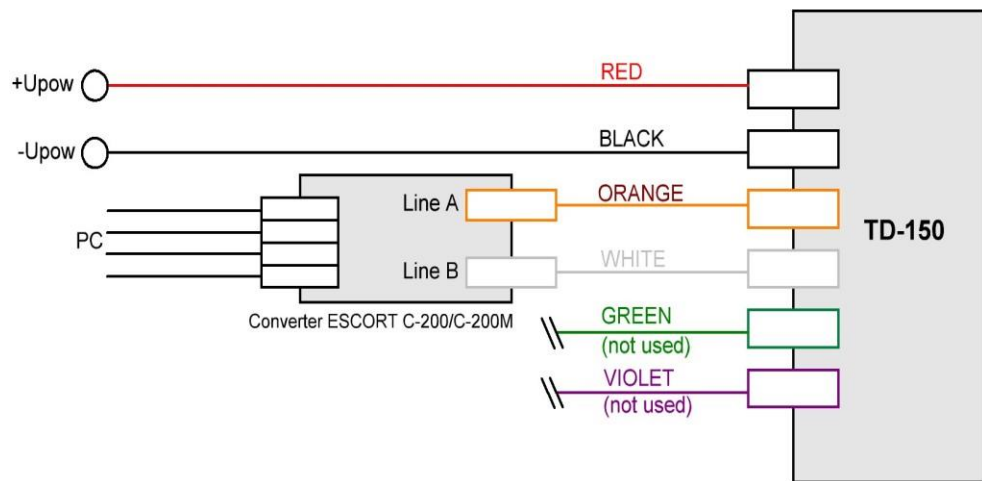


ESCORT. Capacitive fuel level sensor. Operation Manual. 2018.12-24.Страница 65 из 111
Connection diagram of TD-100 to an external device for cable disconnection alert and / or
breakage alert

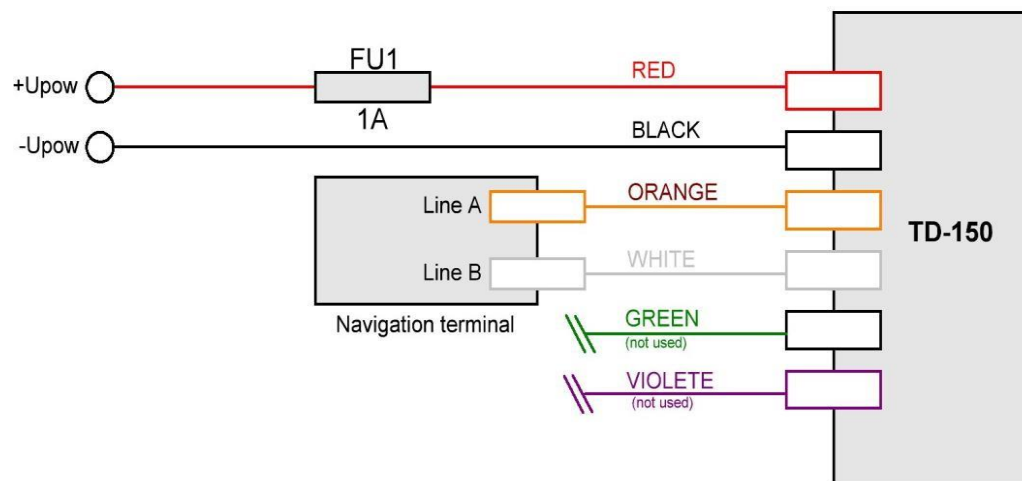


9.1.3. TD-150

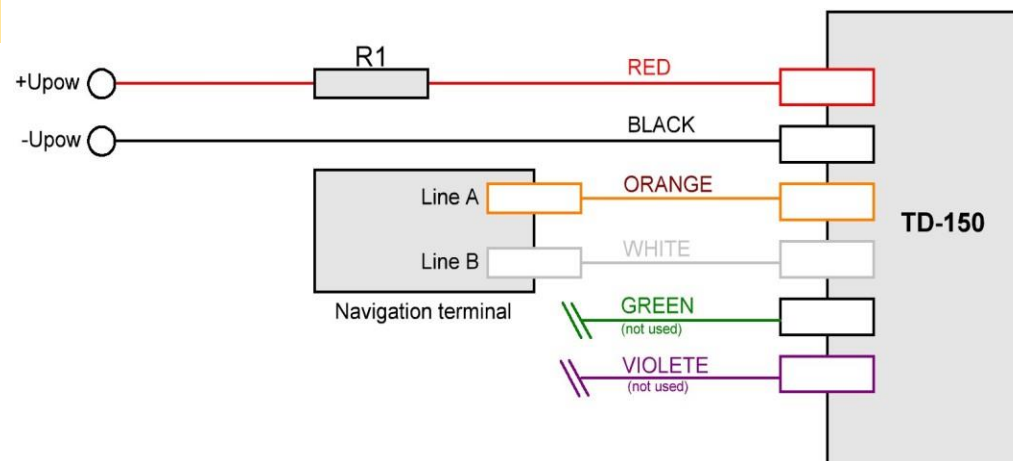
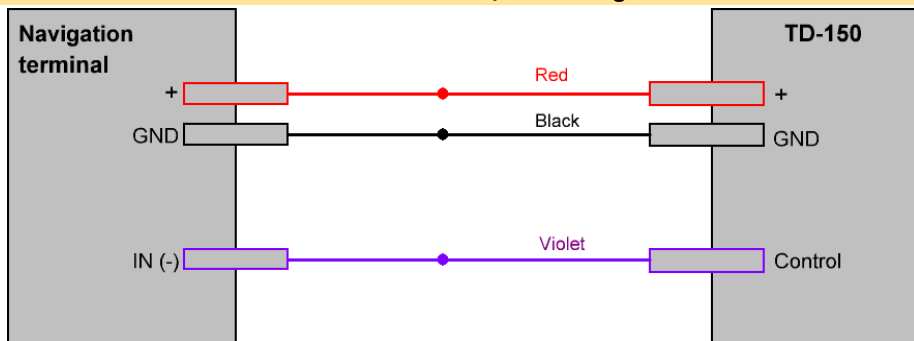
When programming



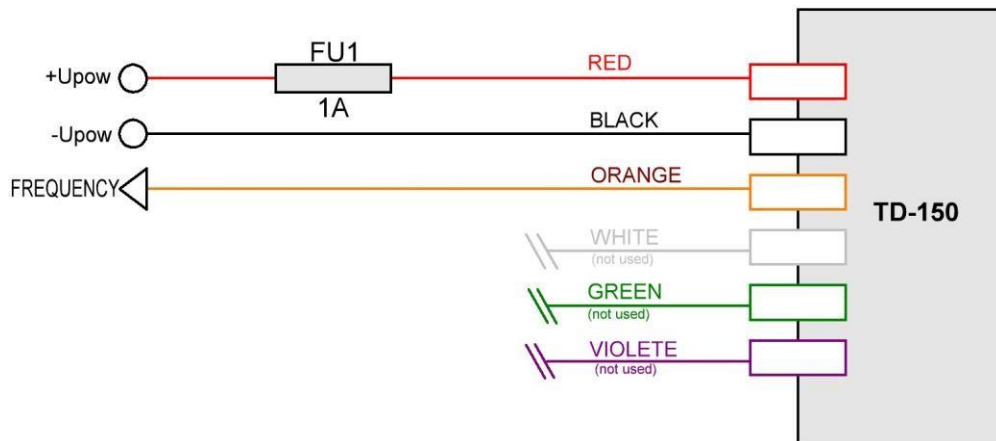
RS-485 mode



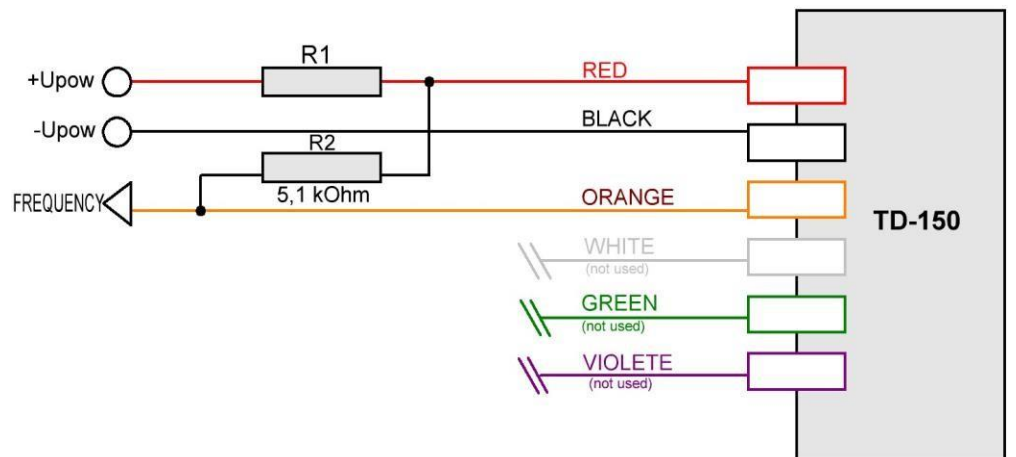
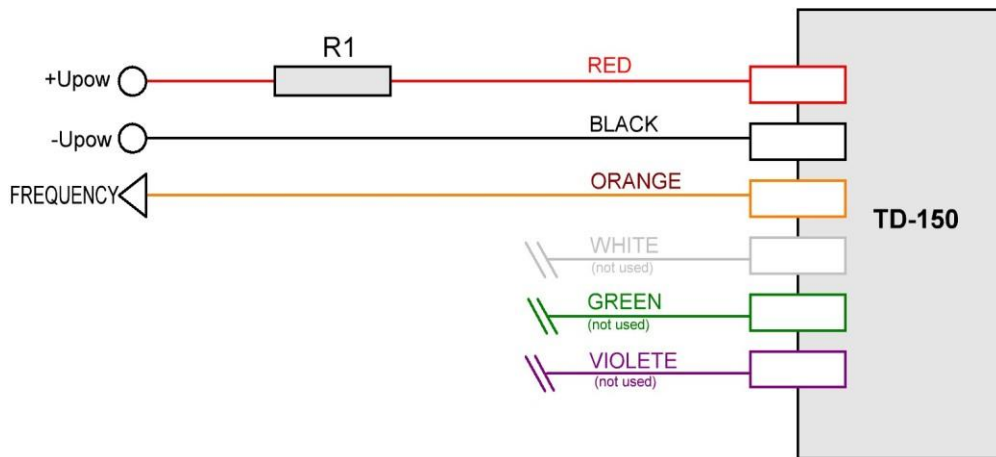
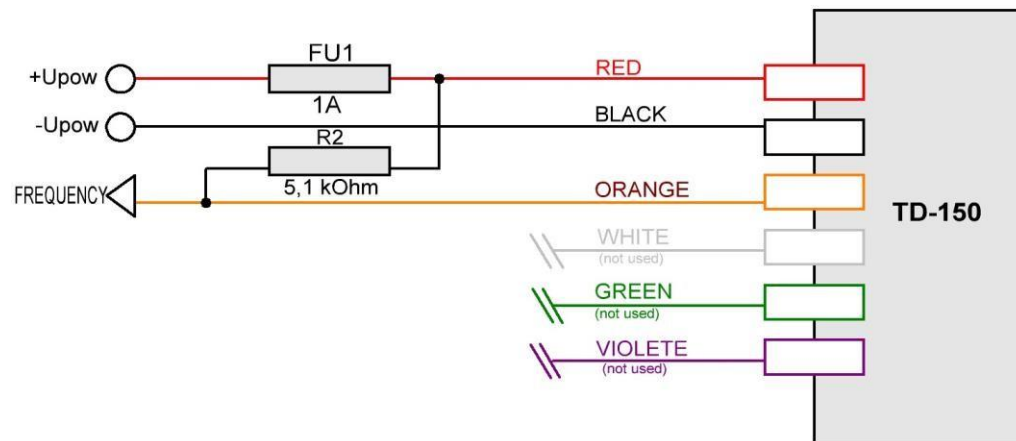
Connection diagram of TD-150 to an external device for cable disconnection alert and / or breakage alert



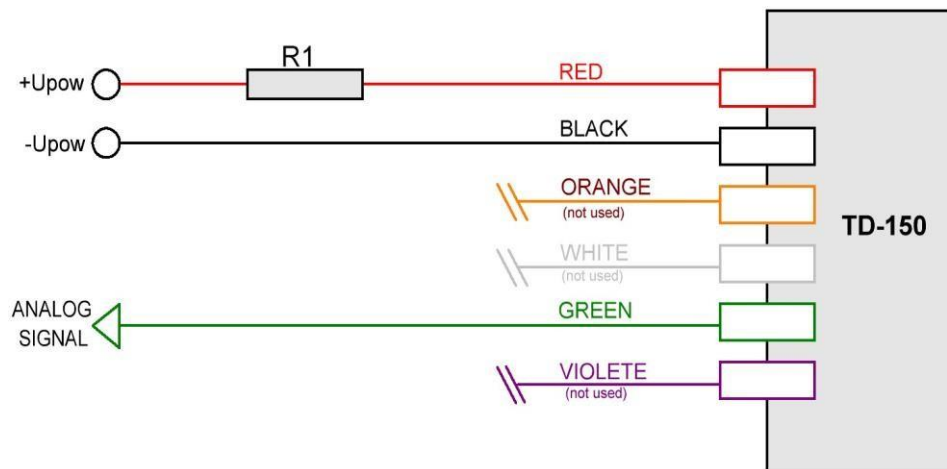
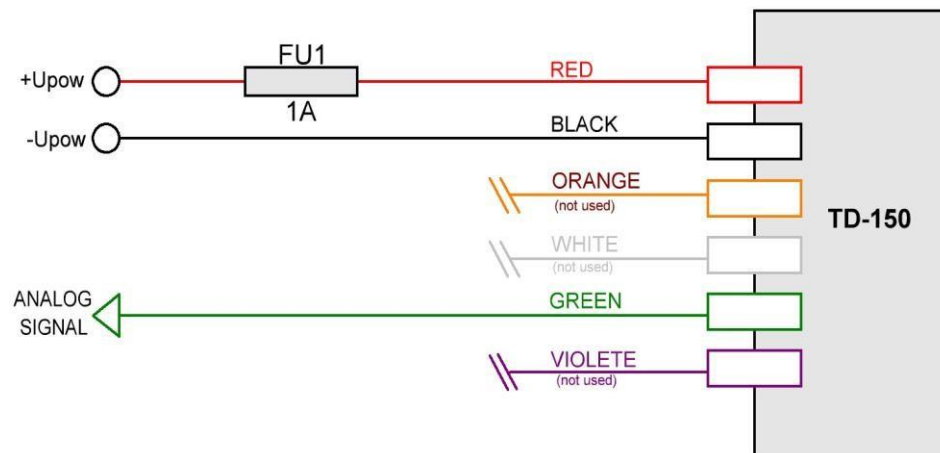
Frequency mode



Frequency with "pull-up" through resistor

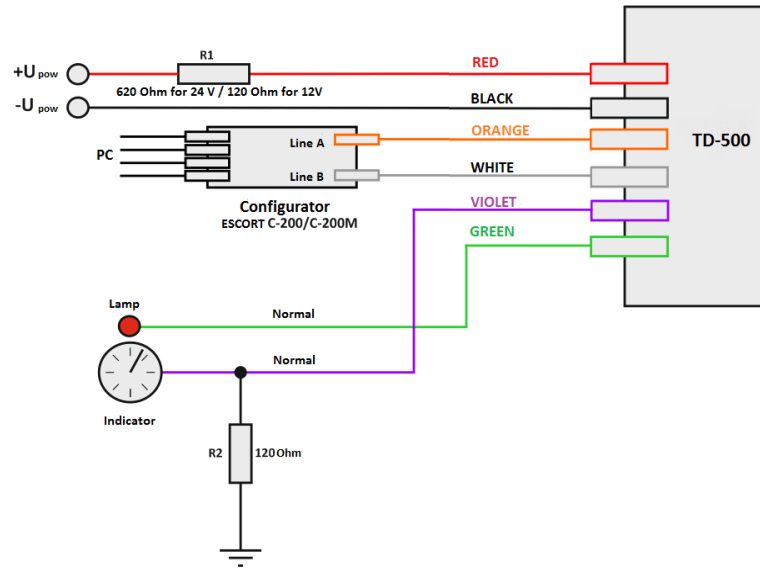


Analog mode

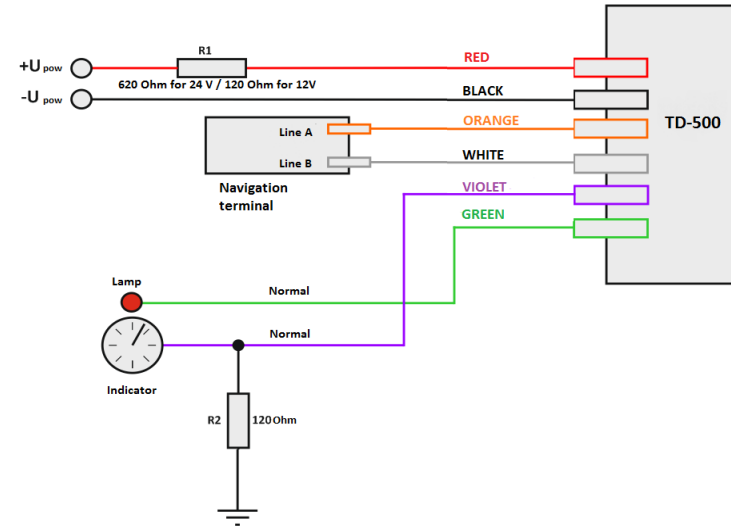


9.1.4. TD-500

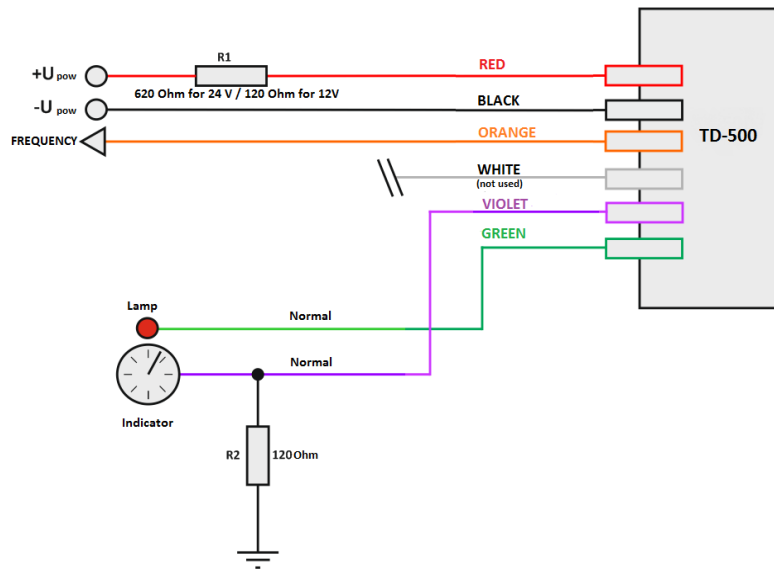
when programming



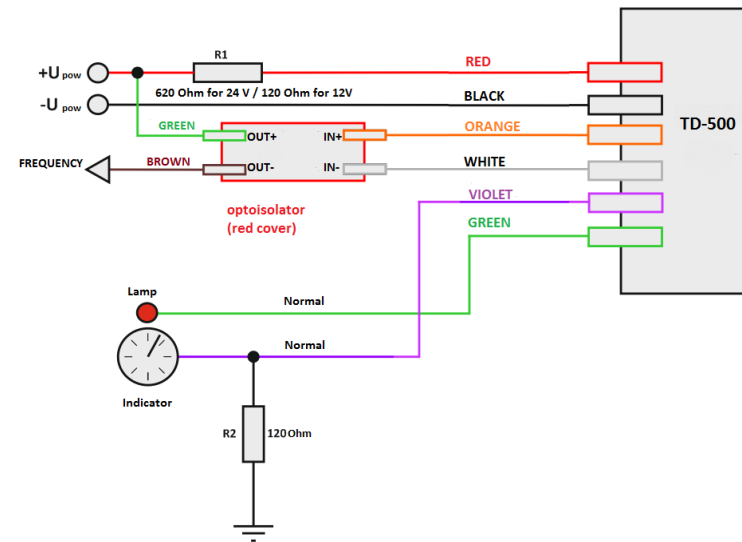
RS-485 mode



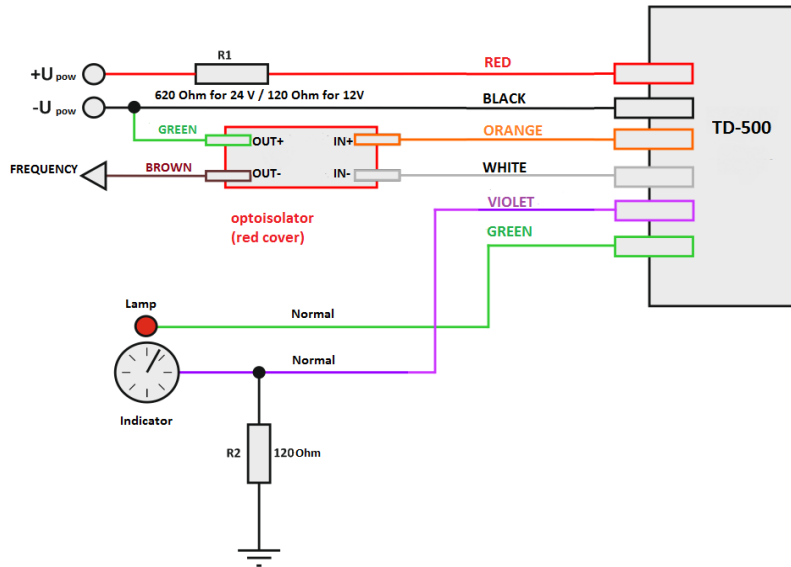
Frequency mode



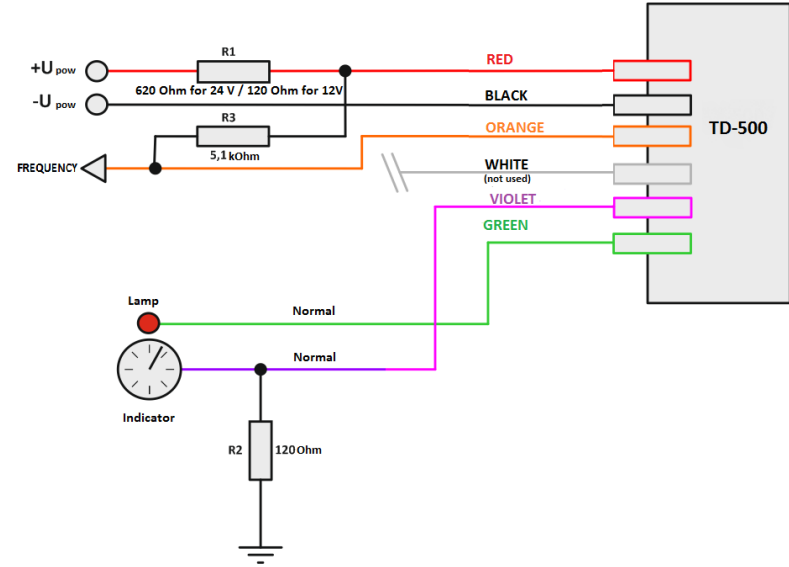
Frequency mode with short to "+"



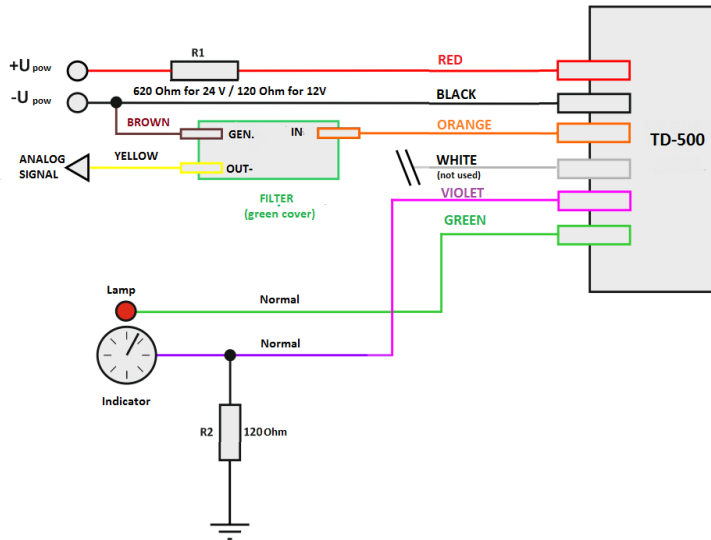
Frequency mode with short to ground



Frequency with "pull-up" through resistor

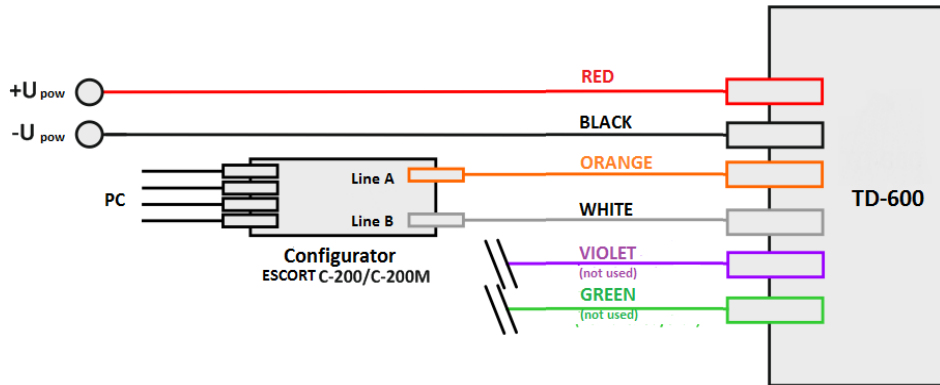


Analog mode

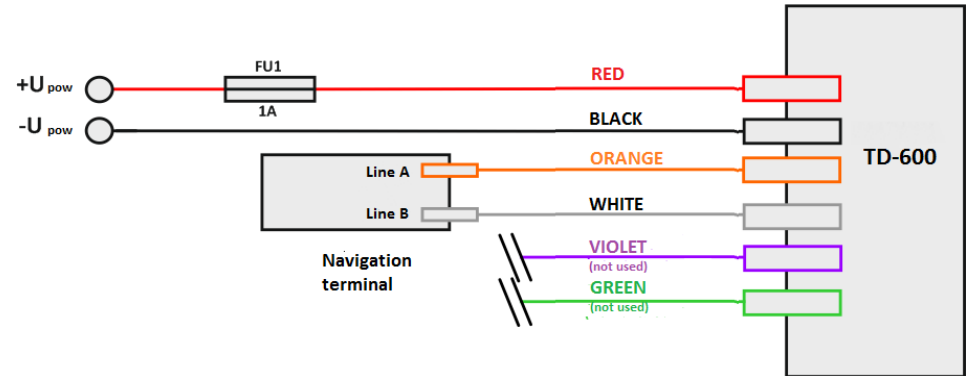


9.1.5. TD-600

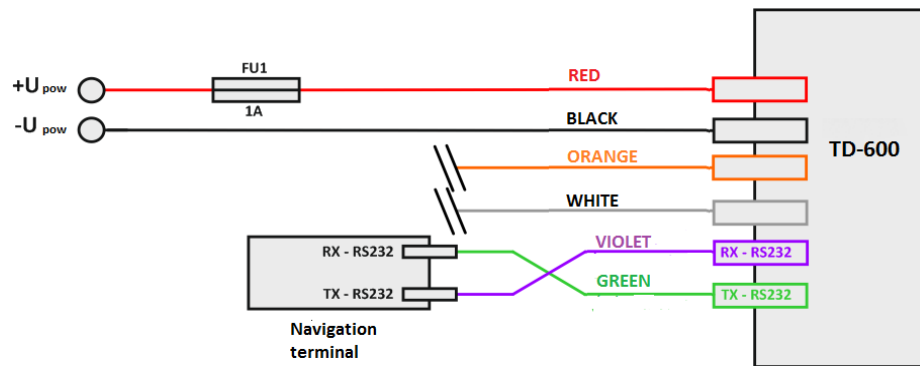
when programming



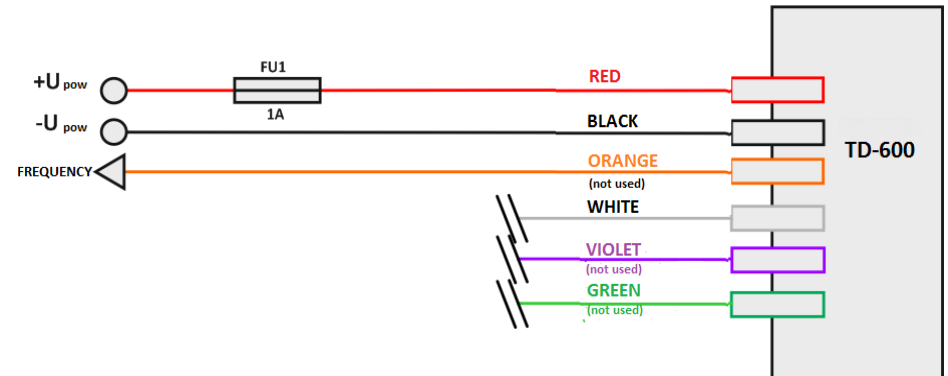
RS-485 mode



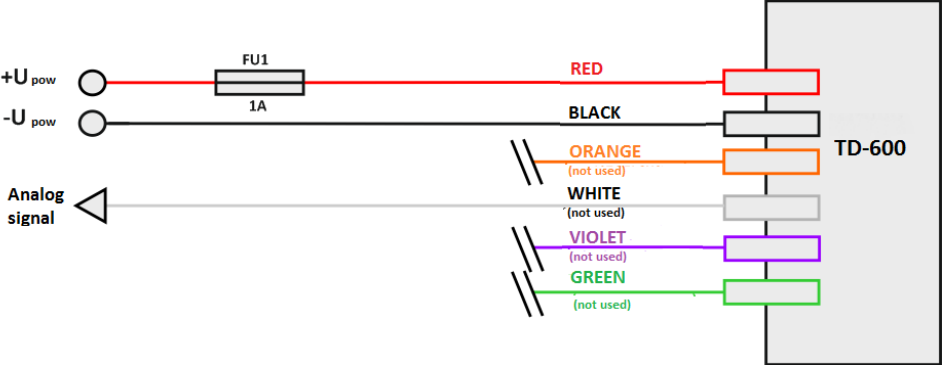
RS-232 mode



Frequency mode



Analog mode

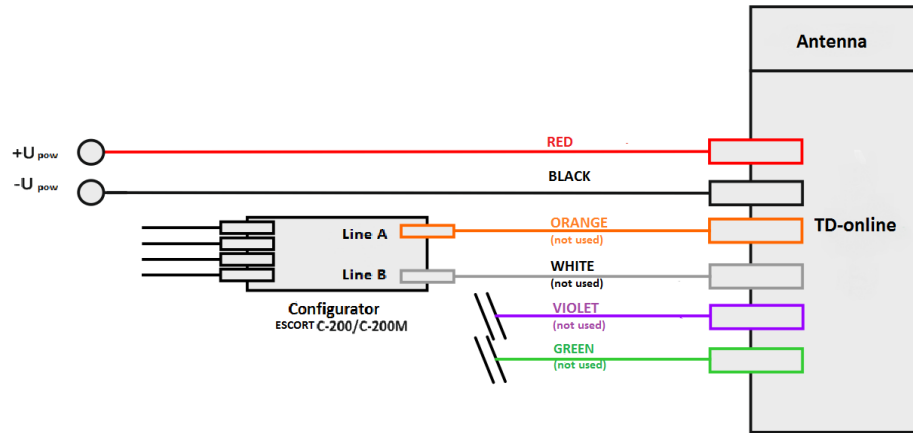


9.1.6. Combining of sensors into group

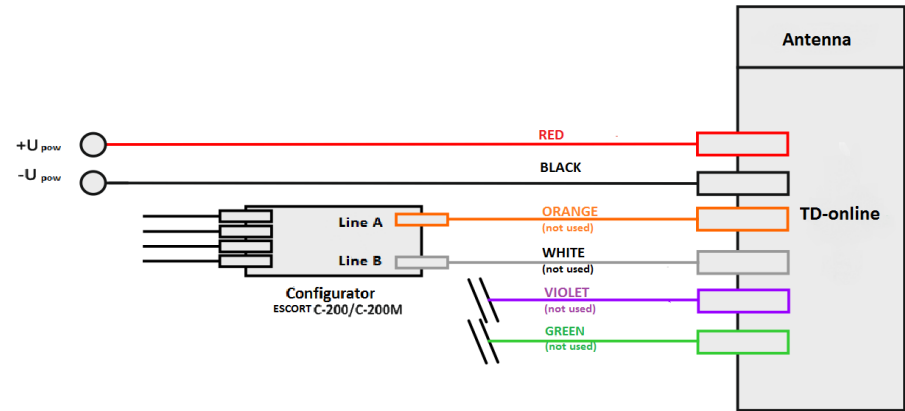
(reserved)

9.1.7. TD-online

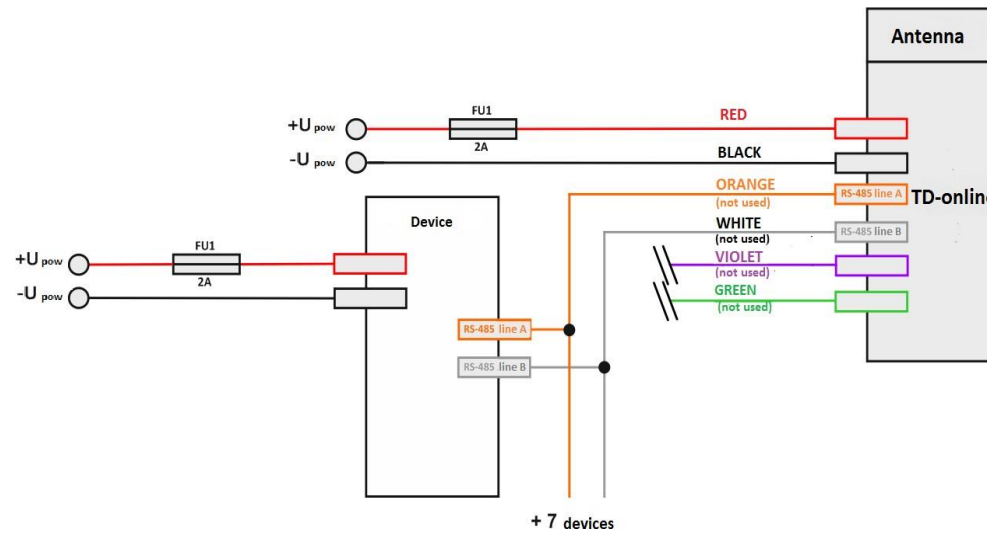
when programming



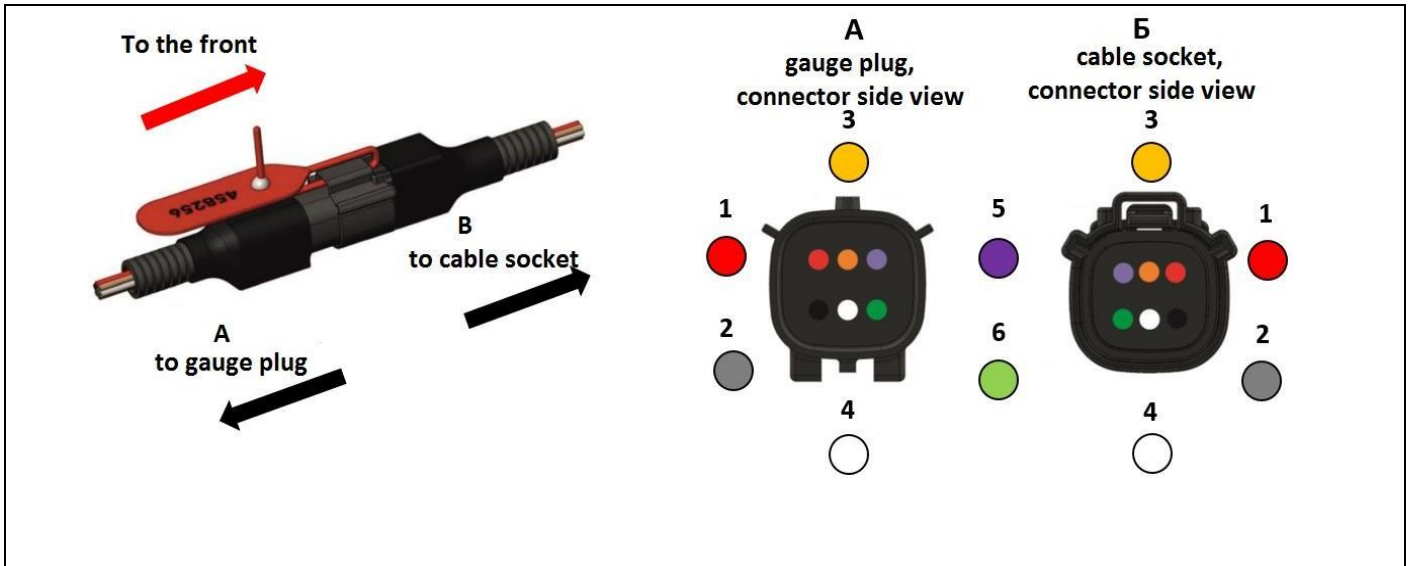
Normal mode



Normal mode with additional devices connection



9.1.8. Contacts and wires

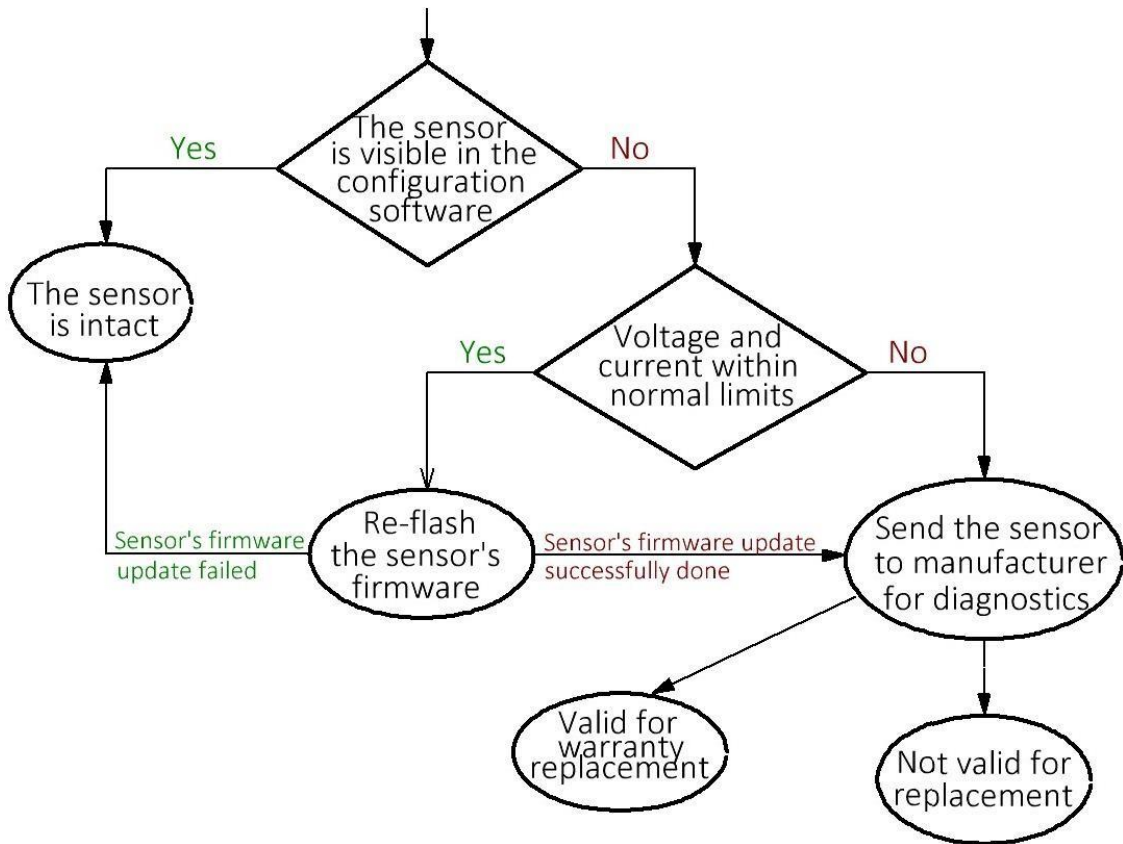


Contact		1	2	3	4	5	6	-	-	-
Wire		Red	Black	Orange	White	Violet	Green	Yellow	Brown	Green
Component		Sensor							Filter (green cover)	
TD-100	Programming	+ Upit	- Upit	Line A	Line B	Cable disconnection/ breakage alert	-	-	-	-
	Mode RS-485	+ Upit	- Upit	Line A	Line B	Cable disconnection/ breakage alert	-	-	-	-
	Frequency mode	+ Upit	- Upit	Frequency	-	Cable disconnection/ breakage alert	-	-	-	-
TD-150	Programming	+ Upit	- Upit	-	-	Cable disconnection/ breakage alert	-	-	-	-
	Mode RS-485	+ Upit	- Upit	Line A	Line B	Cable disconnection/ breakage alert	-	-	-	-
	Frequency mode	+ Upit	- Upit	Frequency	-	Cable disconnection/ breakage alert	-	-	-	-
	Analog mode	+ Upit	- Upit	-	-	Cable disconnection/ breakage alert	Analog signal	-	-	-
TD-500	Programming	+ Upit	- Upit	-	-	-	-	-	-	-
	Mode RS-485	+ Upit	- Upit	Line A	Line B	Analog signal (level indicator)	Lamp of emergency balance	-	-	-
	Frequency modes	+ Upit	- Upit	Frequency	-	Analog signal (level indicator)	Lamp of emergency balance	-	Frequency (optocouple)	- Upit (opto-couple)
	Analog modes	+ Upit	- Upit	Analog output	-	Analog signal (level indicator)	Lamp of emergency balance	Analog output (Filter)	- Upit (Filter)	-
TD-600	Programming	+ Upit	- Upit	-	-	-	-	-	-	-
	Mode RS-485	+ Upit	- Upit	Line A	Line B	-	-	-	-	-
	Mode RS-232	+ Upit	- Upit	-	-	RX-RS232	TX-RS232	-	-	-
	Frequency mode	+ Upit	- Upit	Frequency	-	-	-	-	-	-
	Analog mode	+ Upit	- Upit	-	Analog output	-	-	-	-	-
TD-online	Programming	+ Upit	- Upit	Line A	Line B	-	-	-	-	-
	Normal mode	+ Upit	- Upit	Line A	Line B	-	-	-	-	-

9.1.9. Voltage chart

The integrity of fuel level sensors is checked according to the following scheme:

The sensor is visible in the configuration software:



1. First of all, it is necessary to connect the sensor to the computer using a USB-RS-485 interface converter. The sensor must be visible in the configuration program.
Important: the sensor must be connected using a converter that allows you to connect other sensors, i.e. The operability of the interface converter must be confirmed by the possibility of connecting other working sensors.
2. If the sensor has not been determined by the configurator, measure the values of an external source consumed current, as well as the voltages on lines A and B of the RS-485 interface (orange and white wires) relative to the black wire.

On the example of TD-150

The current consumption of the sensor should be in the range of 7-15 mA.

Voltage on line A: 3.5V

Voltage on line B: 0 V

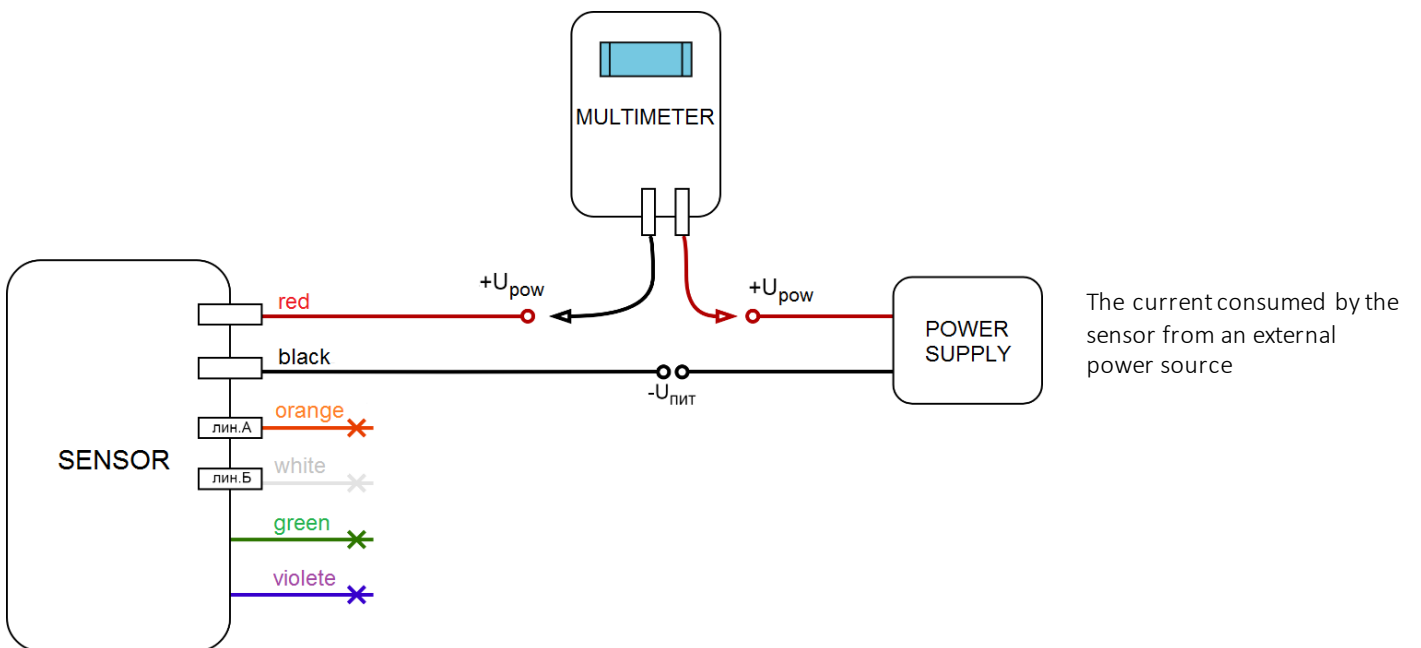
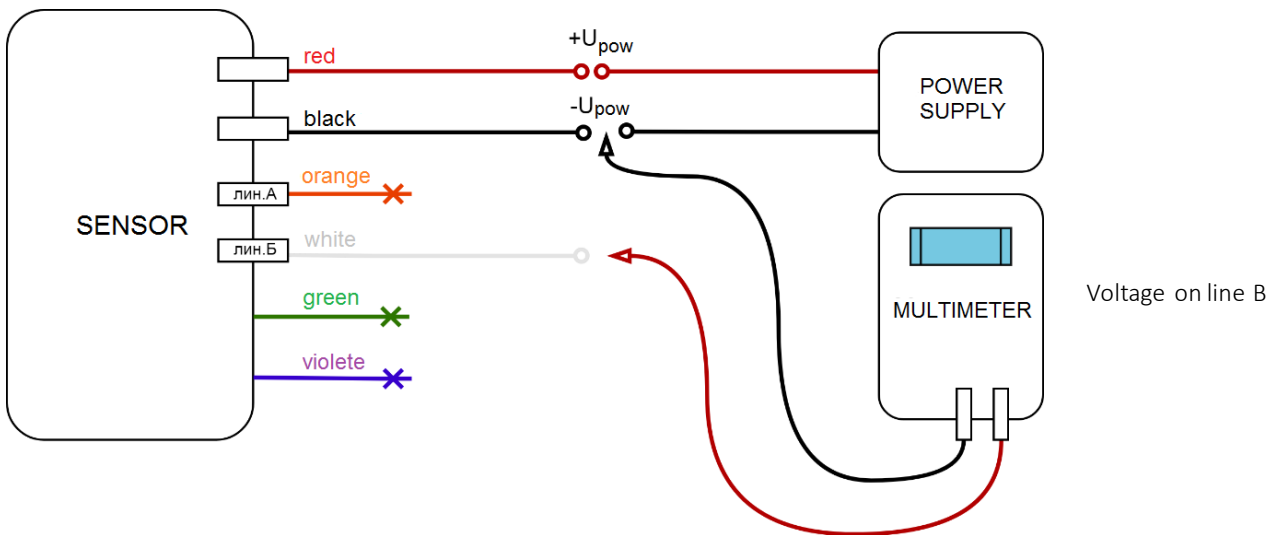
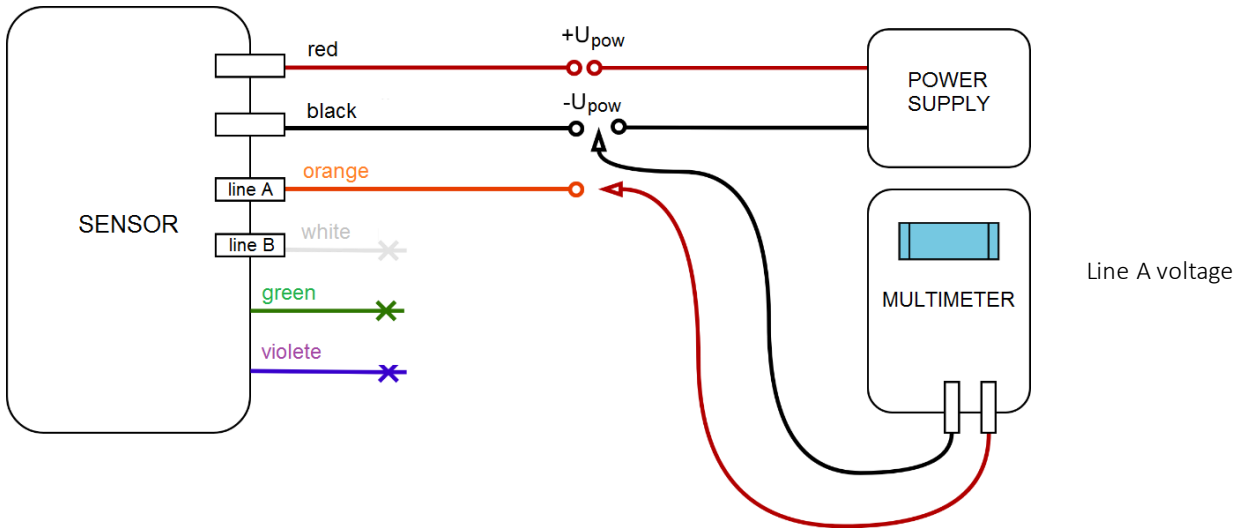
If the sensor operated in frequency mode, the voltages on lines A and B will be 2.5V each.

Table of normal operating values for FLS:

		Unit	TD-100	TD-150	TD-500	TD-600
Current consumption		mA	7 .. 15	7 .. 15	7 .. 15	7 .. 15
RS-485	line A	B	3,5	3,5	1,1	3,5
	line B	B	0	0	0,6	0
Frequency mode	line A	B	2,5	2,5	2,5	4,3
	line B	B	2,5	2,5	2,5	2,5

1. If the measured values are within the normal range, you need to re-flash the sensor.
2. If the measured values do not correspond to the norm or the sensor can't be re-flashed, it should be sent to the diagnostics.

Possible wiring diagrams used to measure electrical characteristics



9.2. Connection to servers

WialonHosting

Below is a brief information on connection and operation procedure for WIALON HOSTING server.
 For more information, see documentation
 or contact the employees of GURTAM company-developer (<https://gurtam.com/ru/wialon>)

- Visit <https://hosting.wialon.com>
- Enter user name and password.

- Create a new one or select an existing object in the MONITORING tab.
- Open the properties editing window.
- Assign an arbitrary name to the object.
- Set in the BASIC tab:
 - NAME - an arbitrary name of the object;
 - DEVICE TYPE - select EscortTDonline;
 - UNIQUE ID - same as the IMEI of the sensor;
 - server address and port - 193.193.165.165 and 21035;
 - device access password - 2211 by default, specify the password set in the sensor settings.
- Confirm the settings with the OK button.

The screenshot shows the WinlonHosting monitoring interface. On the left, the 'Show parameters as' dropdown is set to 'Raw data'. The main area displays a map with a vehicle icon and a table of data points.

	Time	Speed, km/h	Coordinates	Altitude, m	Location	Parameters
1	15.March.2018 00:00:19	0	55.84532, 49.12893 (21)	58	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
2	15.March.2018 00:02:59	0	55.84532, 49.12893 (21)	58	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
3	15.March.2018 00:05:39	0	55.84532, 49.12893 (22)	59	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
4	15.March.2018 00:08:19	0	55.84532, 49.12893 (22)	60	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
5	15.March.2018 00:11:00	0	55.84532, 49.12893 (20)	61	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
6	15.March.2018 00:13:40	0	55.84532, 49.12893 (21)	62	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
7	15.March.2018 00:16:20	0	55.84532, 49.12893 (20)	62	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a
8	15.March.2018 00:19:00	0	55.84532, 49.12893 (21)	64	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	hdop=1, a

The screenshot shows the WinlonHosting monitoring interface. On the left, the 'Show parameters as' dropdown is set to 'Sensor values'. The main area displays a map with a vehicle icon and a table of sensor status data.

	Altitude, m	Location	зажигание	ВТД
	58	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	58	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	59	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	60	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	61	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	62	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	62	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1
	64	Фатыха Амирхана пр., 105, Казань, Татарстан, Рос	Off	105.19.1

- Go to the MESSAGES tab
- Select the type of parameters:
 - initial data
 - or
 - sensor values
- You have now the opportunity to view the sensor parameters and its geographical position with the movement patterns shown on the map for the selected period of time as well as technical characteristics (fuel consumption, temperature, etc.).

The information from the sensors is recorded and sent to the server in accordance with the set polling time (in the server settings).

The movement patterns of the vehicle with the product installed on it is recorded in the form of separate points with indication of time, coordinates, speed, and direction of movement.

The waypoint is saved when the direction of movement is changed by value exceeding the angle specified in the sensor firmware, but not less frequently than in the interval of parameters sending specified in the sensor firmware settings. Thus, waypoints are saved with intervals of one second to several minutes. This system of points recording allows you to save GSM-GPRS-traffic. Also, in order to save GSM-GPRS traffic, the sensor generates a packet of several messages, as a result the message can be transmitted to the server with a delay of up to 120 seconds from the moment of registration of the event. The interval of data transfer to the server during the stop of the vehicle is 8 times as the period during the movement set by the configurator. Thus, if the parameter sending period is set to 30 seconds, then during the stop the data will be transmitted with an interval of 240 seconds.

In case of short-term absence of communication, the recorded parameters are stored in non volatile memory ("black box"), the data is transferred to the server in full upon connection reactivation.

Legend sheet of the ESCORT sensors parameters monitored on the WIALONHOSTING server when the INITIAL DATA object parameter is selected.

Designation	Parameter
hdop	object location error, meters
adc1, adc2	ADC value
I/O	engine status:
LLS1	fuel level value
Upow	system voltage value
t	sensor temperature
TR	power-on message number
V	firmware version
Q	quality of driving
N	deviation from horizontal position
FL	flag - code of the current state: 1 - processor restart; 2 - GSM restart; 4 - GPS restart; 16 - server did not accept the data; 32 - black box error. All events occurring between messages are recorded and transmitted simultaneously as a sum of individual flags: For example: processor restart (1) and GPS receiver reset (4) - the value of FL = (1 + 4) = 5 is generated; for example, black box error (32) and GSM reset (2) - the value FL = (32 + 2) = 34 is generated
AM	GSM status code: 1 - power on; 2 - power off; 3 - standby; 4 - modem disconnecting; 5 - ECHO reset; 6 - request for IMEI number; 7 - IMEI number is received, request for SIM number; 8 - SIM number is received; 9 - GSM registration; 10 - GSM connection; 11 - GPRS connection; 12 - check GPRS connection, getting the IP number; 13 - connection to Wialon Hosting; 14 - registration of login and password on Wialon Hosting server; 15 - registered in Wialon Hosting; 16 - exit the connection mode; 17 - stable registered connection (GSM, GPRS, Wialon Hosting).
OB	service identifier

10. INSTALLATION

10.1. General information

When connecting and installing the sensor on a vehicle, special equipment or storage facility, comply with the approved safety requirements (for example, evaporation of the fuel tank of the trucks prior to mounting and connecting the sensor) associated with the performance of these works in accordance with the type of facility on which the sensor should be installed.

10.2. Sealing TD-100, TD-150, TD-500, TD-600

To prevent unauthorized persons from tampering with the sensor, it must be sealed.

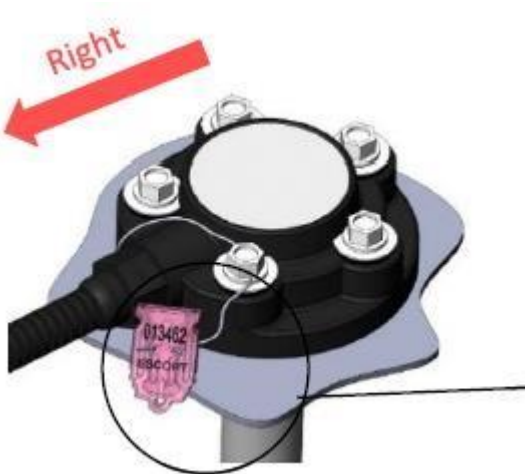
Sealing of the sensor head is performed by turning the wire around the cable gland or by threading it into its eyelet.

Sealing of the connection point of the sensor and the connecting cable is carried out by threading the seal into the common eyelet of the joined electrical connectors. The seal must pass over the disconnection lever in plug connector of the connecting cable. After proper sealing, the electrical connectors can not be separated and loss of their electrical contact is impossible.

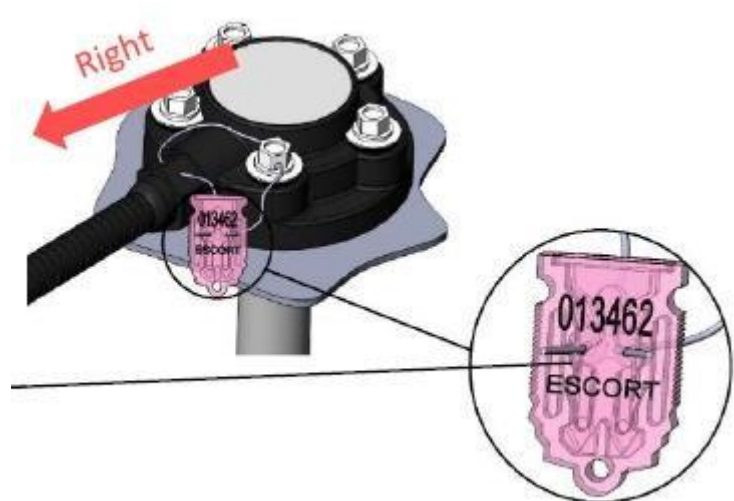
The following is used to seal the head of the sensor:

- ✓ Number plastic seal SILTECH
- ✓ Sealing wire PP-N 0,8-600

Sealing with turning the wire around the cable gland



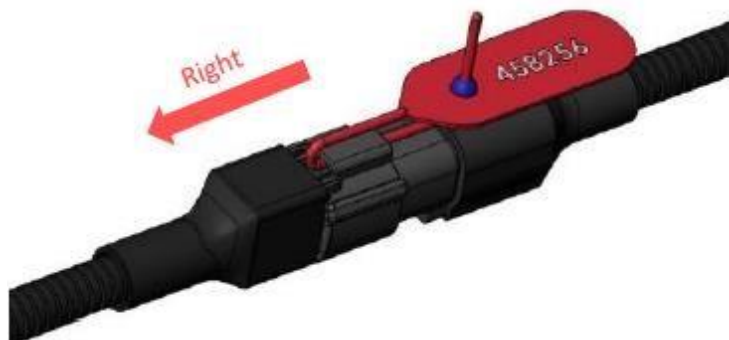
Seal with threading the wire in the eyelet of the cable gland



The following is used to seal the sensor and cable:

- ✓ Number plastic seal FAST-150

Sealing of sensor and extension cable



10.3. TD-online

10.3.1. Mounting to a tank

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

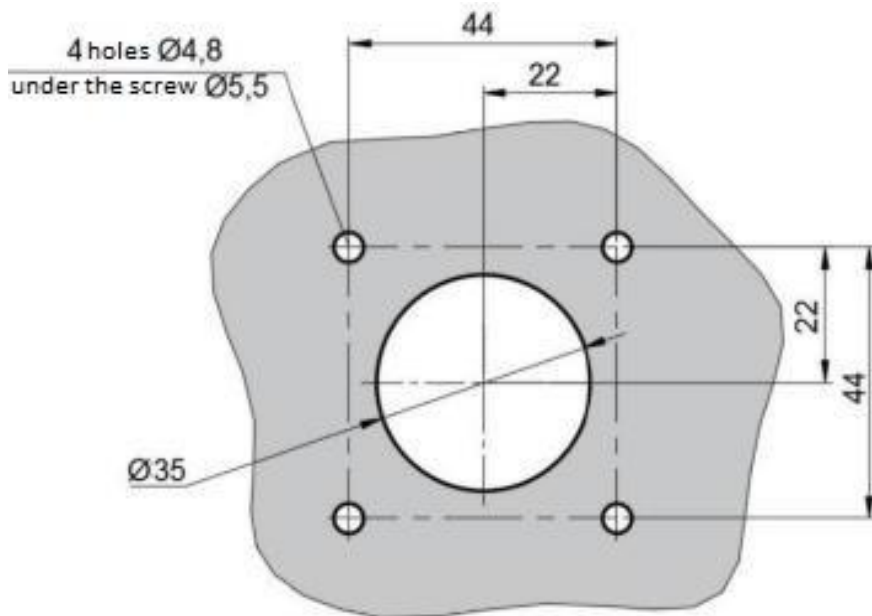
It is also possible to install sensor on threaded stover nuts, welded bushings and other structural elements. The sensor can be installed at pre-arranged locations using screws and bolts with strength classes of at least 4.8. In this case, it is necessary to ensure the tightness of the connection between 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 $\varnothing 35$ mm;
- ✓ drill of $\varnothing 4,8$ mm.

Connecting dimensions

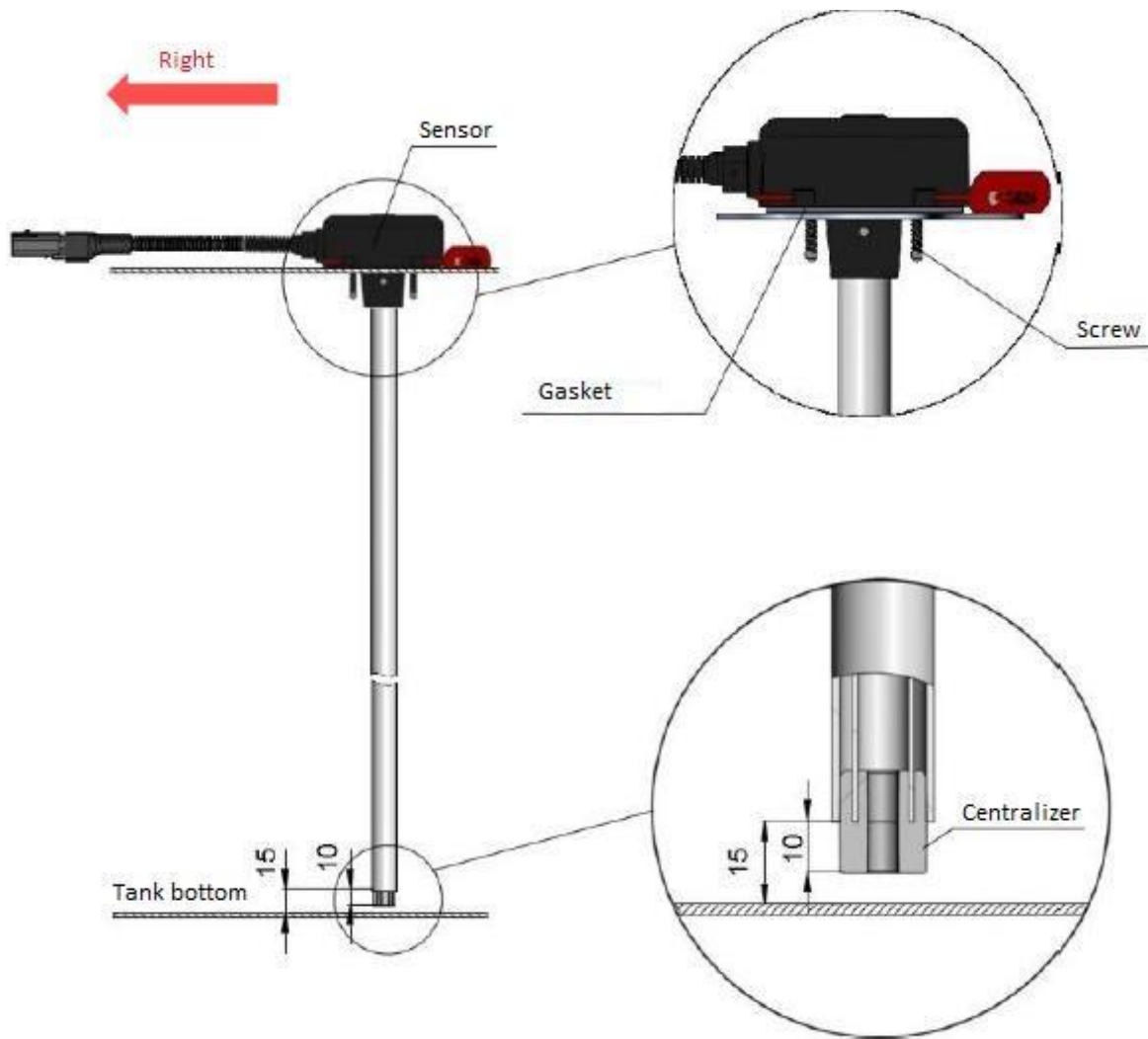


* The diameters of the holes are given for self-tapping screws, if necessary, mark places for another fastening according to the centers of specified holes

Bimetallic bit



Sensor mounting on a tank



10.3.2. Micro-SIM card installation

The following is used:

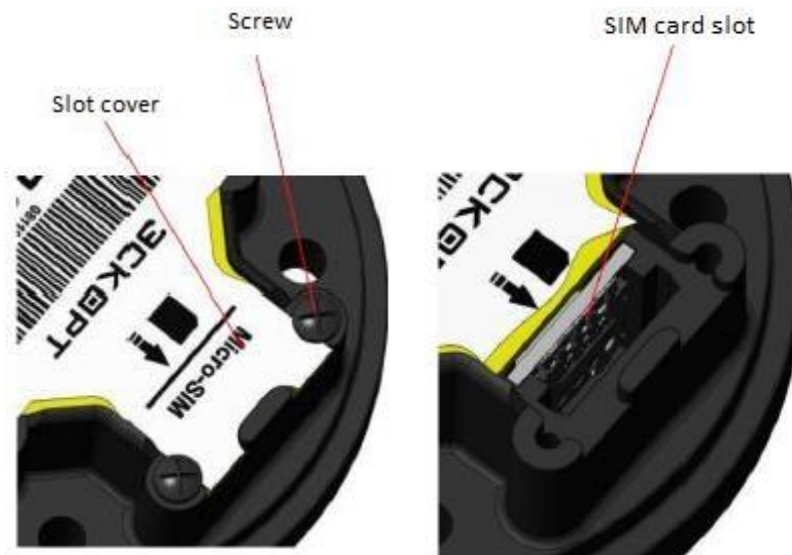
- ✓ micro SIM card;
- ✓ sealant from the installation kit.

If there is no sealant from the installation kit, it is allowed to use any neutral silicone adhesive sealant for small (up to 1 mm) clearances (for example, DOWCORNING 744)

Procedure:

- ✓ unscrew the 2 self-tapping screws on the micro-SIM card slot;
- ✓ take away the micro-SIM card slot cover;
- ✓ insert the SIM card, make sure that it works;
- ✓ apply a thin layer of sealant along the contour from the back side of the cover;
- ✓ close the cover;
- ✓ install 2 screws.

Micro-SIM card installation



10.3.3. Sealing

The following is used:

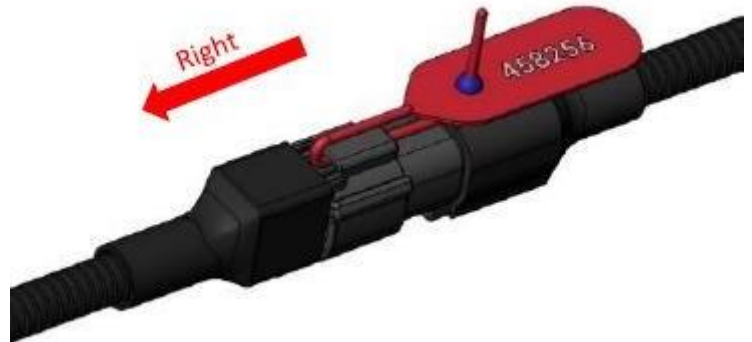
- ✓ TD-online cover;
- ✓ Seal FAST-330 - for sensor head;
- ✓ Seal FAST-330 - for electric connection;

To prevent unauthorized persons from tampering with the sensor, it must be sealed.

Fixation and sealing of the sensor head



Sealing sensor and extension cable



Sealing of the sensor head is carried out by installing the protective cover and threading the seal through the common holes of the head and the cover.

Sealing of the connection point of the sensor and the connecting cable is carried out by threading the seal into the common eyelet of the joined electrical connectors. The seal must pass over the disconnection lever in plug connector of the connecting cable. After proper sealing, the electrical connectors can not be separated and of electrical contact is impossible.

11. Possible malfunctions and ways of fixing them

If you have any questions, don't hesitate to contact our technical support service. We speak Russian, English, Spanish and Tatar. Contact details are given at the end of the manual.

11.1. Error Codes

All sensors have an internal diagnostic system. Sensor displays an encoded message for certain types of the faults:

Mode	Value	Units	Explanation
RS-485	7000	relative units	Closing of metering tubes
RS-485	6500	relative units	Breakage of external and internal metering tubes

11.2. Possible malfunctions and ways of fixing them

Mode	Effectivity	Malfunction	Possible cause	Elimination
Частотный режим	Значение рабочей частоты выше или ниже 1323 (или 4395 Гц в зависимости от настроек диапазона).	Неверно установлен верхний уровень (ПОЛНЫЙ)	Произвести новую калибровку.	
All modes	all sensors	Indicator EMPTY red color	Incorrectly defined upper and lower levels (for details see section CONFIGURATION, INDICATION)	Recalibrate/Gauging (for details see section CONFIGURATION, INDICATION)
All modes	all sensors	The sensor is connected to the configurator manager, but the network number of the sensor is not determined (serial number, firmware number, level, etc. are not displayed). The sensor setting is impossible.	The sensor is not in RS-485 mode	Switch off the sensor power or disconnect the sensor from the converter if the sensor is powered by it for 5 ... 7 seconds. Turn on the power or connect the sensor to the converter, respectively, and click on the SENSOR SEARCH SENSOR button.

12. List of equipment and programs

12.1. TD-100, TD-150, TD-500, TD-600

	Name	Description	Version	Status/Date
Soft ware	Configurator TD-500	Program for sensor configuration and firmware	2.3.6.	-
Equipment	Configurator (converter) C-200 or C-200M	Device for sensor configuration and firmware	-	-
Tools	Hack saw	For measuring section cutoff	-	-
	bimetallic drilling bit Ø35 mm	For mounting hole	-	-
	Drill Ø 4,8 mm	For spacing the holes for self-tapping screws	-	-

12.2. TD-online

	Name	Description	Version	Status/Date
Soft ware	Configurator TD-online	Sensor configuration program	OnlineCFG_52	-
	Boot Loader ESKORT	Sensor firmware program	-	-
Equipment	Configurator (converter) C-200 or C-200M	Device for sensor configuration and firmware	-	-
Tools	Hack saw	For measuring section cutoff	-	-
	bimetallic drilling bit Ø35 mm	For mounting hole	-	-
	Drill Ø 4,8 mm	For spacing the holes for self-tapping screws	-	-

13. References

Address	Description	Version	Status/Date
http://www.fmeter.ru/download/	Technical documentation (manuals, passports, instructions, etc.), firmware, drivers, programs for equipment of the ESCORT trade mark	-	-
http://www.fmeter.ru/download/#addfile	Drivers for converters C-200/C-200M	1.3.1	28.09.2017
http://www.st.com/en/development-tools/stsw-stm32102.html	STM32 Virtual COM Port Driver	1.4.0	Valid

14. Transportation and storage

The Product Is Transported Factory-Packaged By Enclosed Transport. To Be Stored In Dry Rooms With Humidity Not More Than 75% At A Temperature Of -20 To +30°C. Storage Rooms Should Not Contain Current-Conducting Dust, Aggressive Substances And Their Vapors That Cause Corrosion Of Parts And Destruction Of Electrical Insulation Of The Sensors.

15. Contact details

Manufacturer

Techavtomatica, LLC
2B Dementyev St,
Kazan 420127, Russia
+7 843 537 83 91
www.t-a-e.ru
info@t-a-e.ru



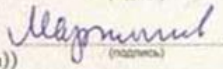
Correspondence address:
PO Box 123, city of Kazan 420036, Russia

Seller

CG «Escort»
Russia, 420036, Kazan
2B Dementyev St
www.fmeter.ru
8 800 777 16 03 (free call on Russia)
+7 495 108 68 33 (for calls from other countries)
mail@fmeter.ru (on commercial issues and offers)
support@fmeter.ru (technical support)

16. Documents

16.1. Certificates

ТАМОЖЕННЫЙ СОЮЗ	
СЕРТИФИКАТ СООТВЕТСТВИЯ	
Eurasian Conformity Eurasian Conformity	№ ТС <u>RU C-RU.ГБ06.В.00056</u>
	Серия RU № 0038599
<p>ОРГАН ПО СЕРТИФИКАЦИИ взрывозащищенных средств измерений, контроля и элементов автоматике ФГУП «ВНИИФТРИ» (ОС ВСИ «ВНИИФТРИ») Адрес: Россия, 141570, Московская область, Солнечногорский район, городское поселение Менделеево телефон/факс +7 (495)526-63-03; ilvsi@vniiftri.ru Аттестат аккредитации № РОСС RU.0001.11ГБ06 от 25 апреля 2013 г. выдан Росаккредитацией</p>	
ЗАЯВИТЕЛЬ	
<p>ООО «Сакура-Эскорт» Россия, 420036, Республика Татарстан, г. Казань, ул. Лядова, д. 5 ОГРН - 1041632204778; телефон: (843) 2-777-007; факс: (843) 2-777-007; e-rt@mail.ru</p>	
ИЗГОТОВИТЕЛЬ	
<p>ООО «Сакура-Эскорт» Россия, 420127, Республика Татарстан, г. Казань, ул. Дементьева, д. 2-Б</p>	
ПРОДУКЦИЯ	
<p>Емкостной измеритель уровня ЭСКОРТ ТД-500 ТУ 4214-001-74572019-09 Серийный выпуск</p>	
КОД ТН ВЭД ТС	9031 80 380 0
СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ	
<p>Технического регламента Таможенного союза ТР ТС 012/2011 «О безопасности оборудования для работы во взрывоопасных средах»</p>	
СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ	
<p>1 Протокол испытаний № 13.1500 от 01.07.2013 г. ИЛ ВСИ «ВНИИФТРИ» (№ РОСС RU.0001.21ИП09 от 25 апреля 2013 г.) 2 Акт о результатах анализа состояния производства от 19.06.2013 г.</p>	
ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ	
<p>Сертификат действителен с вх-приложением схема сертификации Ic</p>	
СРОК ДЕЙСТВИЯ С	30.07.2013 ПО 29.07.2018 ВКЛЮЧИТЕЛЬНО
 Руководитель (уполномоченное лицо) органа по сертификации	 Г.Е.Епихина (инициалы, фамилия)
Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы))	 А.И.Мартынов (инициалы, фамилия)
Единая аккредитация МЧС РФ/СРО, www.sro.ru, информация по СРО: 00023 ФНС РФ, тел. (495) 729-4742, Москва, 2013	

ТАМОЖЕННЫЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ



№ ТС RU C-RU.MЮ62.B.00110/18

Серия RU № 0779671

ОРГАН ПО СЕРТИФИКАЦИИ продукции Общество с ограниченной ответственностью «ПРОММАШ ТЕСТ». Место нахождения: 119530, город Москва, улица Очаковское шоссе, дом 34, помещение VII, комната 6. Адрес места осуществления деятельности: 115114, Российская Федерация, город Москва, Дербеневская набережная, дом 11, помещение 60. Телефон: +7 (495) 481-33-80, адрес электронной почты: info@prommashtest.ru. Аттестат аккредитации регистрационный № РОСС RU.0001.11МЮ62. Дата регистрации аттестата аккредитации 28.10.2013 года

ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «Техавтоматика». Основной государственный регистрационный номер: 1021603881090. Место нахождения: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева 2 «Б», корпус 4, офис 325. Телефон: 88435378391, адрес электронной почты: info@t-a-e.ru

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью «Техавтоматика». Место нахождения: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева 2 «Б», корпус 4, офис 325

ПРОДУКЦИЯ Емкостные измерители уровня ЭСКОРТ ТД-150. Маркировка взрывозащиты приведена в приложении (бланк № 0574797). Оборудование выпускается по ТУ 26.51.52-002-59320438-18 и технической документации изготовителя для работы во взрывоопасных средах. Серийный выпуск

КОД ТН ВЭД ТС 9031 80 380 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза ТР ТС 012/2011 "О безопасности оборудования для работы во взрывоопасных средах"

СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ
 - акта о результатах анализа состояния производства общества с ограниченной ответственностью «Техавтоматика» от 04.12.2018 года;
 - протокола испытаний № 2223/8ИЛПМ-2018 от 19.12.2018 года, выданного испытательным центром Общества с ограниченной ответственностью "ПРОММАШ ТЕСТ", аттестат аккредитации регистрационный номер RA.RU.21BC05.

Схема сертификации: 1с

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Срок службы, срок и условия хранения указаны в руководстве по эксплуатации. Стандарт, обеспечивающий соблюдение требований Технического регламента Таможенного союза ТР ТС 012/2011 "О безопасности оборудования для работы во взрывоопасных средах": согласно приложению (бланк № 0574797).

СРОК ДЕЙСТВИЯ С 31.12.2018 ПО 30.12.2023 **ВКЛЮЧИТЕЛЬНО**



Руководитель (уполномоченное лицо) органа по сертификации

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы))

Галина Александровна Родзивон
(подпись)
Анатолий Владимирович Ивочкин
(подпись)

Галина Александровна Родзивон
(инициалы, фамилия)

Анатолий Владимирович Ивочкин
(инициалы, фамилия)

ТАМОЖЕННЫЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № TC RU C-RU.MЮ62.B.00110/18

Серия RU № 0574797

1. Назначение и область применения

Сертификат соответствия распространяется на емкостные измерители уровня ЭСКОРТ ТД-150 (в дальнейшем – измерители), предназначенные для измерения уровня светлых нефтепродуктов в емкостях хранения.

Область применения - взрывоопасные зоны классов 0, 1 и 2 по ГОСТ IEC 60079-10-1-2011 категорий взрывоопасных смесей ПА, ПВ по ГОСТ Р МЭК 60079-20-1-2011, согласно маркировке взрывозащиты.

2. Описание оборудования и средств обеспечения взрывозащиты

Корпус измерителя выполнен в цилиндрическом цельнолитом корпусе из стеклонеполненного полиамида с металлической крышкой. Крышка и фланец имеют с корпусом неразъемное соединение (термозавальцовка). Внутри фланца установлена плата управления, залитая компаундом. Через отверстие во фланце выведены рабочие электроды, закрытые защитным кожухом. На боковой поверхности корпуса имеется герметичный ввод с постоянно присоединенным кабелем.

Подробное описание конструкции измерителей приведено в руководстве по эксплуатации.

Основные технические данные:

Маркировка взрывозащиты 0Ex ia ПВ Т6 X

Температура окружающей среды, °С от минус 45 до +50

Степень защиты от внешних воздействий по ГОСТ 14254-2015 IP67

Параметры искробезопасных цепей приведены в таблице 2.1.

Таблица 2.1

Наименование параметра	Значение		
	x3-x4 (+U _{int} и GND)	x12-x13 (А и В)	x5 (Аналоговый выход)
Максимальное входное напряжение U _i , В	40	12,5	10
Максимальный входной ток I _i , mA	100	50	10
Максимальная входная мощность P _i , Вт	0,5	0,625	0,01
Максимальная внутренняя емкость C _i , мкФ	0	0,01	0,01
Максимальная внутренняя индуктивность L _i , мГн	0	0,1	0,01

Взрывозащищенность измерителей обеспечивается выполнением их конструкции в соответствии с общими требованиями по ГОСТ 31610.0-2012 и видом взрывозащиты «искробезопасная электрическая цепь «и» по ГОСТ 31610.11-2012.

Внесение изготовителем в конструкцию и техническую документацию изменений, влияющих на взрывобезопасность и соответствие измерителей требованиям ТР ТС 012/2011, возможно только по согласованию с органом по сертификации ООО «ПРОММАШ ТЕСТ».

Данный сертификат соответствия подтверждает соответствие требованиям взрывобезопасности ТР ТС 012/2011 и не рассматривает любые другие виды безопасности измерителей.

3. Оборудование соответствует требованиям:

ТР ТС 012/2011

ГОСТ 31610.0-2012
ГОСТ 31610.11-2012

Технический регламент Таможенного союза «О безопасности оборудования для работы во взрывоопасных средах»;
Электрооборудование для взрывоопасных газовых сред. Часть 0. Общие требования;
Электрооборудование для взрывоопасных газовых сред. Часть 11. Искробезопасная электрическая цепь «и».

4. Маркировка

Маркировка, наносимая на электрооборудование, должна включать следующие данные:

- 4.1 наименование предприятия-изготовителя или его зарегистрированный товарный знак;
- 4.2 обозначение типа оборудования;
- 4.3 порядковый номер по системе нумерации предприятия-изготовителя;
- 4.4 маркировку взрывозащиты см. п. 2 «Основные технические данные»;
- 4.5 наименование или знак органа по сертификации и номер сертификата соответствия;
- 4.6 предупредительные надписи;
- 4.7 единый знак ЕАС обращения продукции на рынке государств - членов Таможенного союза;
- 4.8 специальный знак взрывобезопасности **Ex** в соответствии с ТР ТС 012/2011;
- 4.9 другие данные, которые должен отразить изготовитель, если это требуется технической документацией (диапазон температур окружающей среды, степень защиты оболочки и т.д.).

5. Специальные условия применения

Знак X, стоящий после Ex-маркировки, означает, что при эксплуатации необходимо соблюдать следующие специальные условия:

- к измерителям должны подключаться устройства, имеющие соответствующую маркировку взрывозащиты и сертификат соответствия требованиям ТР ТС 012/2011. Выходные напряжение, ток и мощность таких устройств не должны превышать соответствующих максимальных входных значений измерителей. Внешние допустимые индуктивность и электрическая емкость искробезопасных цепей таких устройств должны быть не менее максимальных значений внутренних индуктивности и электрической емкости искробезопасных цепей измерителей с учетом параметров линии связи.
- место установки измерителя, кабелей удлинительных и их электрических соединителей должно согласовываться с производителем.



Руководитель (уполномоченное
лицо) органа по сертификации
Эксперт-аудитор (эксперт)

Galina Alexandrovna Rodzikon
подпись

Галина Александровна Родзиков
инициалы, фамилия

Anatoly Vladimirovich Ivochkin
подпись

Анатолий Владимирович Ивочкин
инициалы, фамилия

ТАМОЖЕННЫЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ



№ ТС RU C-RU.MIO62.B.05902

Серия RU № 0339029

ОРГАН ПО СЕРТИФИКАЦИИ продукции Общество с ограниченной ответственностью «ПРОММАШ ТЕСТ».
 Место нахождения: 117246, город Москва, Научный проезд, дом 8, строение 1, помещение XIX, комната №14-17.
 Адрес места осуществления деятельности: 115114, Российская Федерация, город Москва, Дербеневская набережная,
 дом 11, помещение 60. Телефон: +7 (495) 481-33-80, адрес электронной почты: info@prommashtest.ru. Аттестат
 аккредитации регистрационный № РОСС RU.0001.11MIO62. Дата регистрации аттестата аккредитации 28.10.2013 года

ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «Техавтоматика».
 Основной государственный регистрационный номер: 1021603881090.
 Место нахождения: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева 2 «Б»,
 корпус 4, офис 325
 Телефон: 88435378391, адрес электронной почты: info@t-a-e.ru

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью «Техавтоматика».
 Место нахождения: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева 2 «Б»,
 корпус 4, офис 325

ПРОДУКЦИЯ Емкостной измеритель уровня ЭСКОРТ ТД-500.
 Маркировка взрывозащиты приведена в приложении (бланки №№ 0472637, 0472638).
 Оборудование выпускается по ТУ 4214-001-59320438-16 и технической документации изготовителя для работы во
 взрывоопасных средах.
 Серийный выпуск

КОД ТН ВЭД ТС 9031 80 380 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза ТР ТС 012/2011
 "О безопасности оборудования для работы во взрывоопасных средах"

СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ

- акта о результатах анализа состояния производства общества с ограниченной ответственностью «Техавтоматика» от 10.07.2018 года;
- протокола испытаний № 2128/ЗИЛПМ-2018 от 30.07.2018 года, выданного испытательным центром Общества с ограниченной ответственностью «ПРОММАШ ТЕСТ», аттестат аккредитации регистрационный номер RA.RU.21BC05.

Схема сертификации: 1с

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Срок службы, срок и условия хранения указаны в руководстве по эксплуатации. Стандарт, обеспечивающий соблюдение требований Технического регламента Таможенного союза ТР ТС 012/2011 "О безопасности оборудования для работы во взрывоопасных средах": согласно приложению (бланки №№ 0472637, 0472638).

СРОК ДЕЙСТВИЯ С 01.08.2018 ПО 31.07.2023 **ВКЛЮЧИТЕЛЬНО**

Руководитель (уполномоченное
 лицо) органа по сертификации
 М.П. _____
 Эксперт (эксперт-аудитор)
 (эксперты (эксперты-аудиторы)) _____

Handwritten signature
 (подпись)

Галина Александровна Родзивон
 (инициалы, фамилия)

Handwritten signature
 (подпись)

Анатолий Владимирович Ивочкин
 (инициалы, фамилия)



ТАМОЖЕННЫЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ №ТС RU C-RU.MIO62.B.05902

Серия RU № 0472637

1. Назначение и область применения

Сертификат соответствия распространяется на емкостные измерители уровня ЭСКОРТ ТД-500 (в дальнейшем – измерители), предназначенные для измерения уровня светлых нефтепродуктов в емкостях хранения.

Область применения - взрывоопасные зоны классов 0, 1 и 2 по ГОСТ IEC 60079-10-1-2011 категорий взрывоопасных смесей IIA, IIB по ГОСТ Р МЭК 60079-20-1-2011, согласно маркировке взрывозащиты.

2. Описание оборудования и средств обеспечения взрывозащиты

Корпус измерителя выполнен в цилиндрическом цельнолитом корпусе из стеклонаполненного полиамида с металлической крышкой. Крышка и фланец имеют с корпусом неразъемное соединение (термозавальцовка). Через отверстие в дне корпуса выведены рабочие электроды, закрытые в самом начале материалом корпуса для исключения контакта электродов с краями отверстия, в которое устанавливается измеритель.

Внутри фланца установлена плата управления, залитая компаундом.

На боковой поверхности корпуса имеется герметичный ввод с постоянно присоединенным кабелем.

Более полное описание конструкции измерителя приведено в руководстве по эксплуатации.

Основные технические данные:

Маркировка взрывозащиты 0Ex ia IIB T6 X
 Температура окружающей среды, °C от минус 45 до +50
 Степень защиты от внешних воздействий по ГОСТ 14254-2015 IP67
 Параметры искробезопасных цепей приведены в таблице 2.1.

Таблица 2.1

Наименование параметра	Значение		
	+U _{пит} и GND	A и B	SW1 и PWM
клеммы			
Максимальное входное напряжение U _i , В	30	12,5	30
Максимальный входной ток I _i , mA	50	50	100
Максимальная входная мощность P _i , Вт	0,5	0,625	0,25
Максимальная внутренняя емкость C _i , мкФ	0,12	0	0
Максимальная внутренняя индуктивность L _i , мГн	0	0	0

Взрывозащищенность измерителей обеспечивается выполнением их конструкции в соответствии с общими требованиями по ГОСТ 31610.0-2012 и видом взрывозащиты «искробезопасная электрическая цепь «i» по ГОСТ 31610.11-2012.

Внесение изготовителем в конструкцию и техническую документацию изменений, влияющих на взрывобезопасность и соответствие измерителей требованиям ТР ТС 012/2011, возможно только по согласованию с органом по сертификации ООО «ПРОММАШ ТЕСТ».

Данный сертификат соответствия подтверждает соответствие требованиям взрывобезопасности ТР ТС 012/2011 и не рассматривает любые другие виды безопасности измерителей.



Руководитель (уполномоченное
лицо) органа по сертификации
Эксперт-аудитор (эксперт)

Галина Александровна Родивон
подпись
Анатолий Владимирович Ивочкин
подпись

Галина Александровна Родивон
инициалы, фамилия

Анатолий Владимирович Ивочкин
инициалы, фамилия

ТАМОЖЕННЫЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-RU.MIO62.B.05902

Серия RU № 0472638

3. Оборудование соответствует требованиям:

ТР ТС 012/2011	Технический регламент Таможенного союза «О безопасности оборудования для работы во взрывоопасных средах»;
ГОСТ 31610.0-2012	Электрооборудование для взрывоопасных газовых сред. Часть 0. Общие требования;
ГОСТ 31610.11-2012	Электрооборудование для взрывоопасных газовых сред. Часть 11. Искробезопасная электрическая цепь «i».

4. Маркировка

Маркировка, наносимая на электрооборудование, должна включать следующие данные:

- 4.1 наименование предприятия-изготовителя или его зарегистрированный товарный знак;
- 4.2 обозначение типа оборудования;
- 4.3 порядковый номер по системе нумерации предприятия-изготовителя;
- 4.4 маркировку взрывозащиты см. п. 2 «Основные технические данные»;
- 4.5 наименование или знак органа по сертификации и номер сертификата соответствия;
- 4.6 предупредительные надписи;
- 4.7 единый знак ЕАС обращения продукции на рынке государств - членов Таможенного союза;
- 4.8 специальный знак взрывобезопасности **Ex** в соответствии с ТР ТС 012/2011;
- 4.9 другие данные, которые должен отразить изготовитель, если это требуется технической документацией (диапазон температур окружающей среды, степень защиты оболочки и т.д.).

5. Специальные условия применения

Знак X, стоящий после Ex-маркировки, означает, что при эксплуатации необходимо соблюдать следующие специальные условия:

- к измерителям должны подключаться устройства, имеющие соответствующую маркировку взрывозащиты и сертификат соответствия требованиям ТР ТС 012/2011. Выходные напряжение, ток и мощность таких устройств не должны превышать соответствующих максимальных входных значений измерителей. Внешние допустимые индуктивность и электрическая емкость искробезопасных цепей таких устройств должны быть не менее максимальных значений внутренних индуктивности и электрической емкости искробезопасных цепей измерителей с учетом параметров линии связи;
- место установки датчика, кабелей удлинительных и их электрических соединителей должно согласовываться с производителем.



Руководитель (уполномоченное
лицо) органа по сертификации
Эксперт-аудитор (эксперт)

Galina Rodziva
подпись

Галина Александровна Родзивон
инициалы, фамилия

Anatoly Ivochkin
подпись

Анатолий Владимирович Ивочкин
инициалы, фамилия

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ



СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС RU.ME04.H02326

Срок действия с 22.04.2016 по 21.04.2019

№ 1969424

ОРГАН ПО СЕРТИФИКАЦИИ рег. № РОСС RU.0001.11ME04.
 ОРГАН ПО СЕРТИФИКАЦИИ ЭЛЕКТРОТЕХНИЧЕСКИХ ИЗДЕЛИЙ ООО "НАУЧНО-ТЕХНИЧЕСКИЙ ЦЕНТР СЕРТИФИКАЦИИ ЭЛЕКТРОТЕХНИЧЕСКИХ ИЗДЕЛИЙ ДЛЯ БЫТОВЫХ ЭЛЕКТРОПРИБОРОВ И АППАРАТУРЫ"
 123007, г. Москва, ул. Шеногина, д. 4. Телефон (903) 224-58-56, (499) 259-84-42.

ПРОДУКЦИЯ Емкостной измеритель уровня, модели: ЭСКОРТ ТД-500.
 ТУ 4214-001-74572019-09.
 Серийный выпуск.

код ОК 005 (ОКП):

42 1431

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ
 ГОСТ 52230-2004, ГОСТ 50607-93, ГОСТ 28751-90

код ТН ВЭД России:

9031 80 380 0

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью "Техавтоматика".
 Адрес: 420127, Республика Татарстан, город Казань, улица Дементьева, дом 2"Б".

СЕРТИФИКАТ ВЫДАН Общество с ограниченной ответственностью "Техавтоматика".
 Адрес: 420127, Республика Татарстан, город Казань, улица Дементьева, дом 2"Б".
 Телефон 88435378391.

НА ОСНОВАНИИ
 Протокол испытаний № 298-32-11/Р от 11.04.2016 года. ИЛ ЭИ ООО НТЦС "БЭТИ", аттестат аккредитации регистрационный номер РОСС RU.0001.21ME72 от 19.05.2011 до 19.05.2016, адрес: Москва, ул. Шеногина, 4

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ
 Схема сертификации: 3.



Руководитель органа

[Handwritten signature]
 подпись

Д.С. Макарепв

инициалы, фамилия

Эксперт

[Handwritten signature]
 подпись

А.Н. Хитров

инициалы, фамилия

Сертификат не применяется при обязательной сертификации

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ



СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС RU.АГ66.Н04445

Срок действия с 22.04.2016 по 21.04.2019

№ 2111252

ОРГАН ПО СЕРТИФИКАЦИИ рег. № РОСС RU.0001.11АГ66 ООО "ЕвроТех". 117437, город Москва, улица Академика Волгина, дом 33, офис 310. Телефон 74994002237, факс 74994002237, адрес электронной почты info@eurotexmsk.ru.

ПРОДУКЦИЯ Емкостной измеритель уровня, модели: ЭСКОРТ ТД-500.
ТУ 4214-001-74572019-09. Серийный выпуск.

код ОК 005 (ОКП):

42 1431

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ
ГОСТ 14254-96, IP 67(п. 5.2 степень защиты IP6X, п.6 степень защиты IPX7)

код ТН ВЭД России:

9031 80 380 0

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью "Техавтоматика".
Адрес: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева, дом 2"Б".

СЕРТИФИКАТ ВЫДАН Общество с ограниченной ответственностью "Техавтоматика".
Адрес: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева, дом 2"Б".
Телефон +78435378391, адрес электронной почты info@t-a-c.ru.

НА ОСНОВАНИИ протокола № 1313БТ/003-16 от 21.04.2016 года, ООО "Церта" Испытательный центр "ЦЕРТА" (ИЦ "ЦЕРТА"), аттестат аккредитации регистрационный номер РОСС RU.0001ССК.0053 от 16.11.2015 до 15.11.2020

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Схема сертификации: 3.



Руководитель органа

подпись

А. А. Хромов

инициалы, фамилия

Эксперт

подпись

А. А. Тырсова

инициалы, фамилия

Сертификат не применяется при обязательной сертификации

16.2. Declarations



ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

Заявитель Общество с ограниченной ответственностью "Техавтоматика". Место нахождения (адрес юридического лица) и адрес места осуществления деятельности: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева, дом 26. Основной государственный регистрационный номер: 1021603881090, телефон: +7(843) 537-83-95, адрес электронной почты: info@t-a-e.ru

в лице Директора Резунова Павла Александровича

заявляет, что Емкостный электронный датчик уровня топлива, марка Эскаорт, модели: Эскаорт Тд-100, Эскаорт тд-150, Эскаорт тд-500, Эскаорт тд-600, ТД online SIM

Продукция изготовлена в соответствии с Техническими условиями ТУ 4214-001-74572019-09

Изготовитель Общество с ограниченной ответственностью "Техавтоматика"

Место нахождения (адрес юридического лица) и адрес места осуществления деятельности по изготовлению продукции: 420127, Российская Федерация, Республика Татарстан, город Казань, улица Дементьева, дом 26.

Код ТН ВЭД ЕАЭС 9026 10 290 0

серийный выпуск

Соответствует требованиям Технического регламента таможенного союза ТР ТС 020/2011

"Электромагнитная совместимость технических средств"

Декларация о соответствии принята на основании протокола № 04807-441-1-17/БМ от 04.10.2017 года. Испытательной лаборатории Общества с ограниченной ответственностью "Инновационные решения", аттестат аккредитации регистрационный № РОСС RU.0001.21AB90 Схема декларирования: Зд

Дополнительная информация разделы 5 и 7 ГОСТ 30804.3.2-2013 (IEC 61000-3-2:2009)

«Совместимость технических средств электромагнитная. Эмиссия гармонических составляющих тока техническими средствами с потребляемым током не более 16 А (в одной фазе). Нормы и методы испытаний», раздел 5 ГОСТ 30804.3.3-2013 (IEC 61000-3-3:2008) «Совместимость технических средств электромагнитная. Ограничение изменений напряжения, колебаний напряжения и фликера в низковольтных системах электроснабжения общего назначения. Технические средства с потребляемым током не более 16 А (в одной фазе), подключаемые к электрической сети при несоблюдении определенных условий подключения. Нормы и методы испытаний». Условия хранения продукции в соответствии с ГОСТ 15150-69. Срок хранения (службы, годности) указан в прилагаемой к продукции товаросопроводительной и/или эксплуатационной документации.

Декларация о соответствии действительна с даты регистрации по 03.10.2022 включительно



Резунов Павел Александрович

(Ф.И.О. заявителя)

Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-RU.АБ93.В.04953

Дата регистрации декларации о соответствии 04.10.2017



Vehicle Tracking and Telematics systems

Techavtomatika LLC,
Dementyeva street 2B, RU-420127,
Kazan, Russian Federation

Declaration of Conformity

№ 05/2017

We hereby declare under sole responsibility, that the following product

BRAND NAME: Escort
PRODUCT NAME: Fuel level sensor
MODEL: Escort TD-150



PRODUCTS DESCRIPTION AND TECHNICAL SPECIFICATIONS:

Power supply: 10-60 Vdc; 30 mA
Data interface: Analog output 0-9 VDC
Frequency output 300-4395 Hz
Digital output EIA-485 (RS-485)
Probe's lengths: 300-6000 mm

Is in conformity with standards harmonized with:

AUTOMOTIVE EMC:

Clauses 6.5, 6.6, 6.7, 6.9 of E/ECE REGULATION NO. 10, REVISION 5
that is affirmed by the test report T251-0337/17 of the SIQ Ljubljana,
Trpinceva ulica 37A, SI-1000 Ljubljana, Slovenia.

Date
2017/08/09

Director

A handwritten signature in blue ink, appearing to read 'P.A. Rezunov'.

Place
Russia, Kazan

P.A. Rezunov



Vehicle Tracking and Telematics systems

Techavtomatika LLC,
Dementyeva street 2B, RU-420127,
Kazan, Russian Federation

Declaration of Conformity

№ 06/2017

We hereby declare under sole responsibility, that the following product

BRAND NAME: Escort
PRODUCT NAME: Fuel level sensor
MODEL: Escort TD-500



PRODUCTS DESCRIPTION AND TECHNICAL SPECIFICATIONS:

Power supply: 10-36 Vdc; 30 mA

Data interface: Analog output 0-4,9 VDC (with electronic filter*)
Frequency output 300-4395 Hz (with opto-isolator*)
Digital output EIA-485 (RS-485)

Probe's lengths: 300-6000 mm

Is in conformity with standards harmonized with:

AUTOMOTIVE EMC:

Clauses 6.5, 6.6, 6.7, 6.9 of E/ECE REGULATION NO. 10, REVISION 5
that is affirmed by the test report T251-0337/17 of the SIQ Ljubljana,
Trpinceva ulica 37A, SI-1000 Ljubljana, Slovenia.

Date
2017/08/09

Director

A handwritten signature in blue ink, appearing to read 'P.A. Rezunov'.

Place
Russia, Kazan

P.A. Rezunov

16.3. Licences



ФЕДЕРАЛЬНОЕ АГЕНТСТВО
ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СВИДЕТЕЛЬСТВО

об утверждении типа средств измерений

RU.C.29.010.A № 46580

Срок действия до **18 мая 2017 г.**

НАИМЕНОВАНИЕ ТИПА СРЕДСТВ ИЗМЕРЕНИЙ
Измерители уровня ёмкостные "ЭСКОРТ ТД-500"

ИЗГОТОВИТЕЛЬ
ООО "Сакура-Эсорт", г. Казань

РЕГИСТРАЦИОННЫЙ № **49899-12**

ДОКУМЕНТ НА ПОВЕРКУ
МП 49899-12

ИНТЕРВАЛ МЕЖДУ ПОВЕРКАМИ **2 года**

Тип средств измерений утвержден приказом Федерального агентства по техническому регулированию и метрологии от **18 мая 2012 г. № 351**

Описание типа средств измерений является обязательным приложением к настоящему свидетельству.

Заместитель Руководителя
Федерального агентства



[Signature]
Е.Р.Петросян

"18" мая 2012 г.

Серия СИ

№ 004700

Срок действия до 21 марта 2022 г.

Продлен приказом Федерального агентства по техническому регулированию и метрологии от **21 марта 2017 г. № 590**

Заместитель Руководителя
Федерального агентства



С.С. Голубев

..... 2017 г.

JAVNA AGENCIJA REPUBLIKE SLOVENIJE
ZA VARNOST PROMETA

SLOVENIAN TRAFFIC SAFETY AGENCY



HOMOLOGACIJA
TYPE-APPROVAL

AVP, Kotnikova ulica 19a, SI-1000 Ljubljana, tel.: 01 478 8430, vozila@avp-rs.si
STSA, Kotnikova ulica 19a, SI-1000 Ljubljana, tel.: +386 1 478 8430, vozila@avp-rs.si
37141-067/2017/02

SPOROČILO O PODELJENI HOMOLOGACIJI
COMMUNICATION CONCERNING APPROVAL GRANTED

za tip elektronskega podslopa skladno s Pravilnikom št. 10 R, Amandma 05, Dodatek 01
of a type of electronic sub-assembly with regard to Regulation No. 10 R, Amendment 05, Supplement 01

Homologacijska št.: E26 10 R 05 1241
Approval No.:

Razširitev št.: 00
Extension No.:


- | | |
|---|--|
| 1. Znamka (blagovna znamka proizvajalca):
<i>Make (trade name of manufacturer):</i> | LLC "TECHAVTOMATIKA" |
| 2. Tip in splošna(e) trgovska(e) oznaka(e):
<i>Type and general commercial description(s):</i> | ESCORT TD-500, SENZOR NIVOJA GORIVA
Varianta: ESCORT TD-150
ESCORT TD-500, FUEL LEVEL SENSOR
Variant: ESCORT TD-150 |
| 3. Način identifikacije tipa, če je oznaka na vozilu sestavnem delu:
<i>Means of identification of type, if marked on the component:</i> | oznaka tipa ali variante
<i>type or variant marking</i> |
| 3.1 Mesto te oznake:
<i>Location of that marking:</i> | nalepka, na zgornji strani ohišja
<i>label, on the top of housing</i> |
| 4. Kategorija vozila:
<i>Category of vehicle:</i> | ni navedeno
<i>no specification</i> |
| 5. Ime in naslov proizvajalca:
<i>Name and address of manufacturer:</i> | Techavtomatika LLC
Demytyeva street 2B
RU420127 Kazan
Russian Federation |
| 6. Za sestavne dele in samostojne tehnične enote mesto in način namestitve oznake ECE homologacije:
<i>In the case of components and separate technical units, location and method of affixing of the ECE approval mark:</i> | nalepka, na zgornji strani ohišja
<i>label, on the top of housing</i> |
| 7. Naslov(i) proizvodne(ih) tovarne(e):
<i>Address(es) of assembly plant(s):</i> | Demytyeva street 2B
RU420127 Kazan
Russian Federation |

AVP
STSAHOMOLOGACIJA ŠT.
TYPE-APPROVAL NO.

E26 10 R 05 1241*00

- | | | |
|-----|---|--|
| 8. | Dodatni podatki (po potrebi):
<i>Additional information (where applicable):</i> | Glej dodatek
<i>See appendix</i> |
| 9. | Tehnična služba pristojna za homologacijske preskuse:
<i>Technical Service responsible for carrying out the tests:</i> | SIQ Ljubljana
TRŽAŠKA CESTA 2
1000 LJUBLJANA
Slovenia |
| 10. | Datum poročila o preskusu:
<i>Date of test report:</i> | 24.05.2017 |
| 11. | Številka poročila o preskusu:
<i>Number of test report:</i> | T251-0337/17 |
| 12. | Opombe (če so):
<i>Remarks (if any):</i> | Glej dodatek
<i>See appendix</i> |
| 13. | Kraj:
<i>Place:</i> | 1000 LJUBLJANA |
| 14. | Datum:
<i>Date:</i> | 20.07.2017 |
| 15. | Podpis:
<i>Signature:</i> | mag. Tomaž Svetina, univ.dipl.inž.
vodja sektorja za vozila |
| 16. | Temu sporočilu je priložen seznam dokumentov, ki so deponirani pri homologacijskem organu, ki je odobril to homologacijo in jih je na zahtevo mogoče dobiti:
glej kazalo opisne dokumentacije št. E1241 Rev.00
<i>The list of documents deposited with the Administrative Service which has granted approval is annexed to this communication and may be obtained on request:</i>
see index to information package No E1241 Rev.00 | |
| 17. | Razlogi za razširitev:
<i>Reasons for extension:</i> | / |



AVP
STSAHOMOLOGACIJA ŠT.
TYPE-APPROVAL NO.
 10 R 05 1241*00

Dodatek k sporočilu o homologaciji št.: E26 10 R 05 1241*00
glede homologacije električnega/elektronskega podslopa po Pravilniku ECE 10 R.
*Appendix to type-approval communication form No.: E26 10 R 05 1241*00
concerning the type-approval of an electrical/electronic sub-assembly under Regulation No. 10 R.*

- | | | |
|-------|--|---|
| 1. | Dodatne informacije
<i>Additional information</i> | |
| 1.1 | Nazivna napetost električnega sistema :
<i>Electrical system rated voltage:</i> | 9-36 V DC |
| | - Ozemljitveni priključek pozitiven/negativen:
<i>Ground positive/negative:</i> | negativni
<i>negative ground</i> |
| 1.2 | Ta EPS se lahko uporablja na katerem koli tipu vozila, ob upoštevanju naslednjih omejitev:
<i>This ESA can be used on any vehicle type with the following restrictions:</i> | ni omejitev
<i>no restrictions</i> |
| 1.2.1 | Pogoji za vgradnjo, če so:
<i>Installation conditions, if any:</i> | glej proizvajalčeva navodila za uporabo
<i>see manufacturer's instruction manual</i> |
| 1.3 | Ta EPS se lahko uporablja samo na naslednjih tipih vozil:
<i>This ESA can be used only on the following vehicle types:</i> | ni omejitev
<i>no restrictions</i> |
| 1.3.1 | Pogoji za vgradnjo, če so:
<i>Installation conditions, if any:</i> | / |
| 1.4 | Uporabljene posebne preskusne metode in frekvenčna območja pri določanju odpornosti (Navedi točno metodo po Prilogi 9):
<i>The specific test method(s) used and frequency ranges covered to determine immunity were: (Please specify precise method used from Annex 9):</i> | glej točko 4 poročila o preskusu T251-0337/17

<i>see point 4 of the test report T251-0337/17</i> |
| 1.5 | Laboratorij, akreditiran po ISO 17025 in priglašen pri homologacijskem organu, pristojen za izvajanje preskusov:
<i>Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the test:</i> | SIQ EMC
TRPINČEVA 37A
1000 LJUBLJANA
Slovenia |
| 2. | Opombe:
<i>Remarks:</i> | / |

AVP
STSAHOMOLOGACIJA ŠT.
TYPE-APPROVAL NO. 10 R 05 1241*00

Ta homologacija se uporablja za tip serijsko izdelanih električnih/elektronskih podsklopov (EPS) pod naslednjimi pogoji:

Posamezni proizvodi iz serijske proizvodnje morajo ustrezati najmanj vsem zahtevam Pravilnika št. 10 R, Amandma 05, Dodatek 01, " Enotne določbe za homologacijo vozil glede na elektromagnetno združljivost".

Priloženo poročilo o preskusu in risbe so sestavni del te homologacije.

Vsak proizvod mora biti čitljivo in trajno označen s:

- homologacijsko oznako.

Temu tipu proizvoda se dodeli naslednja homologacijska oznaka:

 10 R - 05 1241

Homologacijska oznaka na proizvodu mora po izvedbi in velikosti ustrezati zahtevam Pravilnika št. 10 R.05.

S tem homologacijskim znakom so lahko označeni samo tisti proizvodi, ki v celoti ustrezajo homologacijski dokumentaciji.

Homologacijska oznaka na proizvodu mora biti nameščena na mestu, ki je označeno v homologacijski dokumentaciji. Za oznake na električnih/elektronskih podsklopih, skladne z odstavki zgoraj, ni potrebno, da so vidne po vgradnji električnega/elektronskega podsklopa v vozilo.

Pri električnih/elektronskih sistemih, vgrajenih v vozila, ki so homologirana kot enote, oznaka ni potrebna.

Proizvod je lahko označen tudi s tujo homologacijsko ali drugo oznako, če s tem ni motena razpoznavnost in čitljivost homologacijske oznake, ki jo je dodelil slovenski homologacijski organ.

Na proizvodu ne sme biti oznak, ki bi lahko privedle do zamenjave z uradno dodeljeno oznako.

Kakršnekoli spremembe na proizvodu so dovoljene samo na podlagi posebnega dovoljenja homologacijskega organa.

Veljavnost homologacije preneha z vrnitvijo ali z odvzemom. Homologacija se odvzame, če pogoji za podelitev in obstoj homologacije ne obstajajo več, če lastnik homologacije krši obveznosti, povezane s homologacijo, oziroma če se ugotovi, da homologirani proizvod ne ustreza več veljavnim predpisom.

Proizvajalec je dolžan stalno kontrolirati kakovost homologiranega proizvoda in njegovo skladnost s homologacijsko dokumentacijo. O tej kontroli je dolžan voditi evidenco in omogočiti vpogled v zapiske nadzornemu organu, ki ga določi homologacijski organ. V primeru ugotovitve neskladnosti s homologacijsko dokumentacijo je proizvajalec dolžan o tem takoj obvestiti homologacijski organ.

Homologacijski organ lahko kadarkoli preverja pravilno izvajanje pooblastil, dodeljenih s to homologacijo, in v ta namen tudi izbira vzorce za ponovni preskus. Stroške takšnih pregledov in presoje skladnosti proizvodnje, se zaračunajo proizvajalcu.

Vsako spremembo oznake proizvajalca, naslova ali proizvodne tovame oziroma pri homologaciji imenovane pooblaščen osebe je treba takoj sporočiti homologacijskemu organu.

Pravice, podeljene s to homologacijo, so neprenosljive. Pravice tretjih s to homologacijo niso prizadete.

AVP
STSA

HOMOLOGACIJA ŠT.
TYPE-APPROVAL NO.

 10 R 05 1241*00

V primerih, da se proizvodnja ali prodaja proizvoda ne začne v roku enega leta od podelitve homologacije, da se proizvodnja ali prodaja prekine za več kot eno leto oziroma, da se predvideva taka prekinitve, je o tem treba takoj obvestiti homologacijski organ.

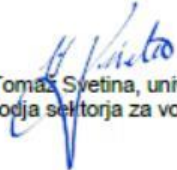
O začetku proizvodnje ali začetku prodaje oziroma njihovem ponovnem začetku je treba obvestiti homologacijski organ najkasneje v enem mesecu.


Neupoštevanje zgoraj navedenih določil lahko povzroči odvzem homologacije in se kazensko preganja.

Pravno razlago v zvezi s to homologacijo lahko daje samo homologacijski organ.

20.07.2017




mag. Tomaž Svetina, univ.dipl.inž.
vodja sektorja za vozila

AVP
STSAHOMOLOGACIJA ŠT.
TYPE-APPROVAL NO. 10 R 05 1241*00

This Approval shall apply to a type of electrical/electronic sub assemblies (ESA) from serial production under the following conditions:

Individual products from serial production shall comply at least with all requirements set out in the Regulation No. 10 R, Amendment 05, Supplement 01 "Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility".

The attached test report and drawings shall be a constituent part of this Approval.

Every product shall be marked with a readable and durable:

- approval marking.

This type of product shall be allotted the following approval marking:

 10 R - 05 1241

The design and size of the approval marking shall meet the requirements of the Regulation No. 10 R.

Only products which fully comply with the approval documentation may bear the allotted approval mark.

The approval marking on the product must be attached at the place indicated in the approval documentation. Markings on ESAs in conformity with paragraphs above need not be visible when the ESA is installed in the vehicle.

No marking is required for electrical/electronic systems built into vehicles which are approved as units.

The product may also be marked with a foreign approval or other marking, provided that the identifiability and readability of the approval marking granted by the Slovenian Type Approval Authority is not affected.

The product shall not bear any markings that may lead to confusion with the officially allotted marking.

Changes of any kind performed on the product shall be subject to special permission by the Slovenian Type Approval Authority.

The Approval will become ineffective when returned or withdrawn. The Approval shall be withdrawn: should the conditions for its granting and existence no longer exist, should the owner of the Approval break his obligations related to the Approval, or when it has been established that the approved product no longer complies with the applicable regulations.

The manufacturer shall regularly inspect the quality of the approved product as well as its conformity with the approval documentation. He shall keep record of this inspection and allow to the surveillance body appointed by the Slovenian Type Approval Authority access to the records. Should any non-conformities be found with respect to the approval documentation, the manufacturer shall immediately inform thereof the Slovenian Type Approval Authority.

Any time, the Slovenian Type Approval Authority may check the correct implementation of the authorizations appointed through this Approval, and for this purpose also select samples for a repeated test. The costs of such checks and conformity of production assessments are charged to the manufacturer.

Any changes regarding the manufacturer's marking, the address or the production plant, or the authorized person appointed through this Approval, shall be forthwith notified to the Slovenian Type Approval Authority.

The rights granted through this Approval shall be untransferrable. The rights of third persons shall not be affected through this Approval.

AVP
STSA

HOMOLOGACIJA ŠT.
TYPE-APPROVAL NO.

 10 R 05 1241*00

In the case where the production or sale of the product does not start within one year after the granting of the Approval, or the production or sale is interrupted for a period longer than one year, or such interruption is foreseen, the Slovenian Type Approval Authority shall be immediately notified.

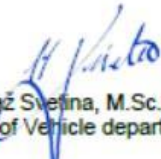
The Slovenian Type Approval Authority shall be notified of the start of production or start of sale, or its restart, within a month's time at the latest.

Non-compliance with above stated provisions may result in withdrawal of the Approval and will be prosecuted.

Legal explanations in relation with this Approval may only be given by the Slovenian Type Approval Authority.

20.07.2017




Tomaz Svetina, M.Sc.Eng.
Head of Vehicle department

17. Terms and designations

Firmware	the built-in software
Navigation terminal	GPS / GLONASS tracker
Black box	data storage device memory

Annex A. **Protocol Escort Fuel sensor**

Escort TD System commands for firmware version 1.6.4. and higher.

All commands are sent from an external device in the format:

Prefixnetwork numberCommandDataCheck sum
0x31u8(net_num)(See The list of commands)Can be absentCRC8

Prefix

0x31 request from the computer

0x3E sensor response

DataNote

Commands

0x06Issue data LLS(Omnicom) format. Missing

0xFAThe team for the installation of the lower level values Missing

0xF5The team at the top level setting value Missing

0xF0Query command all data. Missing

0xFB The command to change the network numberU8The new device number

0xF9The team on the shift of the lower level valuesS16High byte before

0xF4 The team at the top level shift valuesS16High byte before

0xF2Install the new regime (see table mode)U8

0xF7Set passwordU32High byte before

0xF8Unlock password to perform the following command. U32 The current password

0xFCThe team for the issuance of the serial number and firmware version. Missing

0xFFTeam Network survey Missing

The answer is in the format:

Prefixnetwork number CommandData Check sum
0x3Eu8(net_num) (See The list of commands) Can be absent CRC8

response command code corresponds to the code request command.

Responses to commands

0x06Issue data Omnikomm format.temperature -S8

Significance level U16-

U16 - actually reserve

0xFA The team for the installation of the lower level valuesU32 - set the level of importance.

0xF5 The team at the top level value usnanovku U32 - set the level of importance.

U16 (reobrazovaniya coefficient)

0xF0 Query command all data. S8 (temperature)

U16 (level)

U32 (raw value SE)

u32 (start frequency)

U32 (stop frequency value)

u16 (conversion factor)

U8 (mode-bitmask) 0 bit — inversion — not used for TD100

1 & 2 bit — main modes

00 -rs 485;

01-analog output — not used for TD100;

10- frequency output;

11 — periodic output

4 bit — periodic RS-485 mode

7-bit -1024/4096 mode

u8 (always zero)

u8 (mode2-bitmask) 0...3 bit — average level

7-bit -temperature compensation off

0xFB The command to change the network number The answer is not at all.

0xF9 The team on the shift of the lower level values U32 - set the level of importance.

0xF4 The team at the top level shift values U32 - set the level of importance.

0xF2 Install the new regime (see table mode) U8 - a new mode value

0xF7 Set password U32 - The value of the password The default setting is zero - not checked.

0xF8 Unlock password to perform the following configuration commands. 0xF8 - if unlocked or 0xFD - if an incorrect password.

0xFC The team for the issuance of the serial number and firmware version. U32 - serial number

U16 - firmware version.

0xFF Team Network survey (see below)

Assignment of bits in a byte mode.

least significant bit b[0] Invert arrow

b[1..2] data output mode. 00 - rs 485 mode, 01 analog, 10-frequency, 11-periodic.

B[3] averaging Inclusion

B[7] Activating 4096

network numbers set from 0 to 200 (net_num)

Setting levels

example Prefix network number Command KC

Inquiry 0x31 u8(net_num) 0xFA CRC

Prefix network number Command setting value conversion factor

answer 0x3EU8(net_num) 0xFA U32 U16 CRC

Example of data output

Inquiry 0x31u8(net_num)0x06CRC

Temperature Level the frequency

Answer 0x3Eu8(net_num)0x06 S8 U16 U16CRC

An example of network polling

Inquiry 0x31 0xFF CRC

Answer U8 net_num

Each sensor emits its own number in the time gate corresponding sensor number.

Gate time for a single room - 1 ms.

such as for example if there are two sensors with the numbers 1 and 100,

the first figure comes through 10 + 1 ms, the second at 100 + 10 ms.

Where MC-10 guard interval transmission / reception for preobrazovatelya USB-RS485 /

CRC calculation

U8 CRC8(U8 data, U8 crc)

```
{
    U8 i = data ^ crc;
    crc = 0;
    if(i & 0x01) crc ^= 0x5e;
    if(i & 0x02) crc ^= 0xbc;
    if(i & 0x04) crc ^= 0x61;
    if(i & 0x08) crc ^= 0xc2;
    if(i & 0x10) crc ^= 0x9d;
    if(i & 0x20) crc ^= 0x23;
    if(i & 0x40) crc ^= 0x46;
    if(i & 0x80) crc ^= 0x8c;
    return crc;
}
```

Protocol ESCORT TD (LLS)

Система команд TD500

префикс

0x31 запрос от компьютера

0x3E ответ датчика

команды

0x06 Выдать данные в формате Омникомм.

0xFA Команда на установку нижнего значения уровня

0xF5 Команда на уснаовку верхнего значения уровня

0xFF Команда опроса сети

сетевые номера устанавливаются от 0 до 255 (net_num)

Установки уровней

пример префикс сетевой номер Команда КС

Запрос 0x31 u8(net_num) 0xFA CRC

Префикс сетевой номер Команда Установленное значение коэффициент преобразования

ответ 0x3E U8(net_num) 0xFA U32 U16 CRC

Пример выдачи данных

Запрос 0x31 u8(net_num) 0x06 CRC

Температура Уровень значение частоты

ответ 0x3E u8(net_num) 0x06 S8 U16 U16 CRC

Пример опроса сети

Запрос 0x31 0xFF CRC

ответ U8 net_num

Каждый датчик выбрасывает свой номер во временном стробе соответствующем номеру датчика.

временной строб для одного номера — 1 мс.

Например, например если имеются 2 датчика с номерами 1 и 100,

то первая цифра придет через 1+10 мс, вторая через 100+10 мс.

Где 10 мс- защитный интервал прием/передача для преобразоавтеля USB-RS485/

вычисление CRC

U8 CRC8(U8 data, U8 crc)

```
{
  U8 i = data ^ crc;
  crc = 0;
  if(i & 0x01) crc ^= 0x5e;
  if(i & 0x02) crc ^= 0xbc;
  if(i & 0x04) crc ^= 0x61;
  if(i & 0x08) crc ^= 0xc2;
  if(i & 0x10) crc ^= 0x9d;
  if(i & 0x20) crc ^= 0x23;
  if(i & 0x40) crc ^= 0x46;
  if(i & 0x80) crc ^= 0x8c;
  return crc;
}
```