PASSPORT
OPERATING MANUAL

EST-03 PROFESSIONAL
fuel transfer station
(end)

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1.BASIC INFORMATION ABOUT THE PRODUCT

This operating manual is intended to familiarize service personnel with the device, principle of operation, technical operation, and maintenance of the EST-03 PROFESSIONAL fuel transfer station (hereinafter referred to as "FTS"). Before operating the FTS, carefully read this manual. In case of non-compliance with the operating conditions of the device, measures must be taken to ensure proper operating conditions in accordance with applicable standards.

The company operating the pumps is obliged to comply with the requirements of this RE, the relevant regulatory and technical documents approved in the established manner, as well as during the operation of the pumps.

The EST-03 PROFESSIONAL fuel transfer station complies with the requirements of the Customs Union Technical Regulation TR CU 020/2011 "Electromagnetic Compatibility of Technical Means."

2. PURPOSE AND TECHNICAL CHARACTERISTICS

The EST-03 fuel transfer station (FTS) is a system based on **the EFR-01 logic controller**. The FTS allows for fully automated calibration of containers and transfer of fuel from various containers and tanks. The FTS is equipped with a mechanism for precise calibration of the filling dose. The fuel volume is entered using a matrix keyboard.

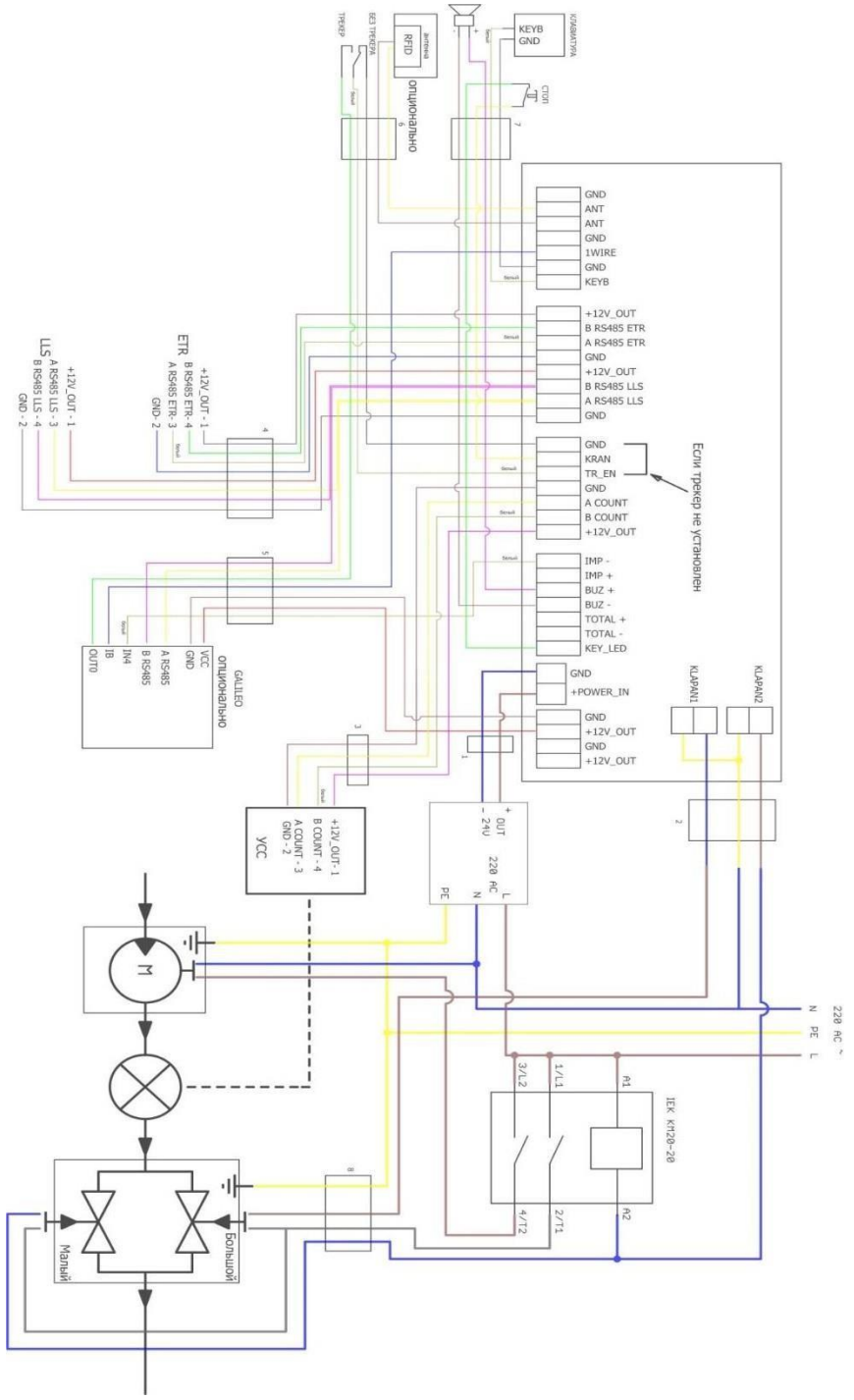
The SPT has an LED display based on seven-segment indicators to display parameters and emergency warnings, as well as LED indication of the device's operation. Data on the fuel dispensed is received from fuel flow meters with a pulse output.

The SPT controls solenoid valves and the pump motor. External fuel level sensors can be connected. The amount of fuel dispensed is transmitted via the Omnicomm protocol (RS485). Information and telemetry can be sent to a satellite monitoring server (optional).

The main parameters and technical characteristics are given in the table

Name	Parameter
Overall dimensions: height/width/depth; mm	385×330×735
Power supply; V	220/24/12
Weight; kg	40
Fuel delivery indication	Seven-segment indicator, mechanical counter (optional)
Relative error in calculation and indication of dispensed fuel volume	± 0.1%
Fuel transfer rate; l/min.	from 40 to 70
Connection diameter; mm	25
Operating temperature range; degrees	-40°C to +50°C
Dosing accuracy; grams	30
Maximum air humidity; %	85
Fuel type	diesel

PRINCIPLE DIAGRAM



Passports Free repair or replacement of faulty equipment or its components is not provided, and claims are not accepted.

In the event of product failure or discovery of a malfunction during the warranty period, the consumer must send a malfunction report to the manufacturer with the following information: serial number, date of manufacture, nature of the malfunction or defect.

All complaints submitted, their brief summary, and the measures taken must be recorded in the table below.

Date	Brief summary of complaint	Actions taken

10. TRANSPORTATION AND STORAGE

The product is transported in closed transport. Transportation conditions must comply with storage conditions 5 according to GOST 15150-69.

Storage of products in packaging for transportation at the manufacturer's and consumer's warehouse must comply with storage conditions 3 according to GOST 15150-69. The storage period of products in packaging without preservation must not exceed

2 years from the date of manufacture. The storage room must be free of conductive dust, acid and alkali vapors, as well as gases that cause corrosion and destroy insulation.

11. PERSONS RESPONSIBLE FOR THE SAFE OPERATION AND GOOD CONDITION OF THE PRODUCT

Order No.	Full name of the person responsible for safe operation	Position	Date of appointment
1	2	3	4

Connection to satellite monitoring systems. (Optional)	GPS/GLONASS/GPRS
Climate rating	UHL category 2
Maximum power consumption	1000 watts
Fuel sensor type	LLS with Omnicomm protocol

3. DEVICE AND OPERATING PRINCIPLE

The EST-03 PROFESSIONAL fuel transfer station (end) has the following main module components:

- mSF-25 double-acting valve;
- pulse sensor for the Ex volumetric meter;
- BT-60 volume meter;
- EFR digital fuel delivery controller assembly;
- PIUSI 100 micron coarse filter.

The EST-03 PROFESSIONAL **220V** fuel transfer station is equipped with the following main module components:

- ADAM PUMPS PA1 70 fuel transfer pump;

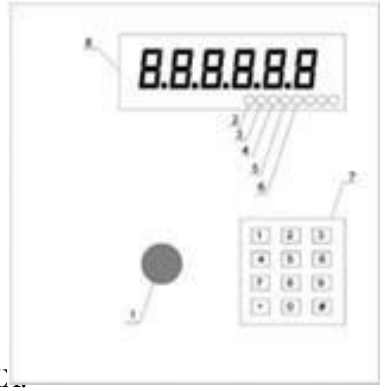
The EST-03 PROFESSIONAL **12V** fuel transfer station is equipped with the following main module components:

- Mercury 12 V fuel transfer pump, BelAK

The EST-03 PROFESSIONAL **24V** fuel transfer station has the following main module components:

- Mercury 24 V fuel transfer pump, BelAK

LOGIC CONTROLLER CONTROL AND INDICATION ELEMENTS EFR - 01.



1 - emergency reset and fuel supply shut-off button
2-6 - additional indicator LEDs
7 - Keypad
8 - main indicator Main menu

When the terminal is turned on, it automatically goes to the main menu.

When you press the number buttons, the following parameters will be displayed:

1- total counter XXXXX.
2- last successful deal XXXX.XX
3- lowest RFID card value L XXXXX
4- senior meaning of RFID card H XXXXX
5- actual dispensing value (used for calibration and configuration) XXXX.XX

To start entering the fuel dose value or to enter the settings menu, press "*".

Description of the additional indicator LED statuses:

LED number	Color	Explanation
1 Fuel delivery permission status	Green	Fuel dispensing permitted
	yellow	Issuance paused
	red	KRAN input error No permission from the column
	blue	TR_EN input error No permission from tracker
	purple (blue + red)	Error inputs KRAN and TR_EN. No permission from the speaker and tracker
	blue (blue + green)	Permission to dispense fuel has been granted, but the tracker is not giving permission. Login error TR_EN
	white (red + green + blue)	Pause due to empty fuel tank
2 RFID and master mode	green	Card is in the terminal database
	blue	The card is not in the terminal database
	red	Master mode (card or jumper)
	purple (red + blue)	Card not found in terminal database in master mode
	Yellow (red + green)	The card is in the terminal database in master mode
	Not lit	No card and not in master mode
3 Valve status	Green	High flow valve – on Low flow valve – on
	Yellow	High flow valve – off Low flow valve – on
	red	High flow valve – off Low flow valve – off
4 Counter phase A	green/not lit	Counter input status A in forward direction
	red	Counter reverse
	blue	Counter ignored
5 Counter phase B	green/not lit	Counter input status B in forward direction
	red	Counter reverse
	blue	Counter ignored
6 Reverse status from the tracker when identifying only by one card	green	The card is in the tracker database and has permission to dispense fuel.
	blue	The card is not in the tracker database.
	red	The card is in the tracker database, but it is blocked.

When working with the fuel transfer station, service personnel must comply with safety requirements in accordance with GOST 12.3.019-80. Only persons who are familiar with this document and have permission to work with equipment under voltage up to 1000 V are allowed to operate the station.

Work with the fuel transfer station should only be carried out after it has been disconnected from the power supply and measures have been taken to prevent it from being accidentally switched on.

After completion of commissioning and maintenance work, all protective devices must be set to the operating position. The connection point of the fuel transfer station to the electrical network must be protected from water ingress and isolated from direct access. The connection point and area of use of the fuel transfer station must be protected from direct exposure to moisture, dirt, and sparks.

7. ACCEPTANCE AND PACKAGING CERTIFICATE

EST-03 PROFESSIONAL fuel transfer station (end)

"_____" (model) "_____" (serial number)

Manufactured, accepted, and packaged in accordance with the mandatory requirements of state standards and current technical documentation.

Head of Technical Control M.P. _____ (personal) _____ (year, month, day)

8. DISPOSAL INFORMATION

The complete or partial disposal of components and materials that make up products is regulated by Russian legislation, which establishes the procedure for handling waste, hazardous waste, packaging materials, and packaging waste.

The provisions contained therein are fundamental principles and constitute rules that must be observed by all entities of the Russian Federation.

There are no special requirements for use and/or disposal in terms of permissible chemical, radiation, thermal, and biological effects on the environment. No additional safety measures are required for disposal.

The disposal of products is carried out in accordance with the regulations of the country of the operating company.

9. INFORMATION ABOUT COMPLAINTS

Claims regarding the quality and completeness of the product will be considered provided that the consumer complies with the rules set forth in the operating documentation and has this passport. In case of loss

- if the consumer fails to comply with the conditions and rules for storage, transportation, installation, and operation established in the operating and installation manual for the unit.

The warranty does not cover:

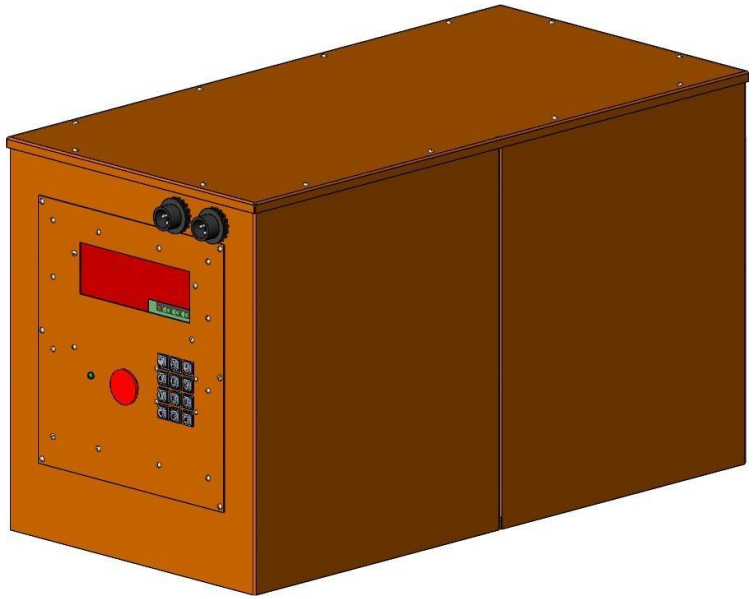
- damage caused by errors made by service personnel, the use of unsuitable spare parts, or other materially incorrect handling;
- errors caused by equipment and/or parts that are not part of the supplied module;
- damage caused to third-party equipment due to incorrect installation or operation of the supplied module; damage caused by independent changes to the design and technical documentation without prior consultation and agreement with the manufacturer.

5. COMPLETENESS

The EST-03 PROFESSIONAL fuel transfer station is delivered fully assembled. The delivery set includes:

- EST-03 PROFESSIONAL fuel transfer station (end-type);
- VSBIRS485 programmer;
- Passport / Operating manual.

A general view of the EST-03 fuel transfer station is shown below.



6. SAFETY REQUIREMENTS

In terms of protection against electric shock, the device complies with class GOST 12.2.007.0-75.

Electrical installation work, connection to the power supply, and grounding (neutralization) must be performed by a qualified specialist in strict accordance with the "Rules for the Technical Operation of Consumer Electrical Installations," the "Safety Rules for the Operation of Consumer Electrical Installations," and the "Rules for the Installation of Electrical Installations," as well as the requirements of this document.

7 Reverse status from the tracker with double identification	red	The tracker only sees the iButton tag
	blue	The tracker only sees the entered PIN code
	purple (red + blue)	The tracker sees the iButton tag and PIN code, but fuel dispensing is prohibited
	green	Fuel dispensing is permitted. The tracker sees the iButton tag and PIN code
	white (red + green + blue)	The tracker sees the iButton tag and PIN code, but this combination is not in the database.
8 Feedback status from the tracker	blue flashing	Enter PIN code
	flashing red	Enter dose
	green	Displaying the limit before entering the dose

Dose set input menu

Use the number buttons 0-9 to enter the dose value, then press "#" to start fuel delivery.

To start the "full tank" mode, immediately after entering the dose setting menu, press "#". The maximum number of liters in this mode is set by parameter "A5".

After pressing "#", the terminal switches to fuel dispensing mode.

To resume fuel dispensing that was previously paused, press the "0" key when entering the dose setting menu. After that, the pause value will be restored from memory and the terminal will switch to the fuel dispensing menu. The pause will be activated. To continue fuel dispensing, press the "#" key to cancel the pause.

To enter the settings menu, press keys 1 and 3 simultaneously while in the dose setting menu.

Fuel delivery can be performed if permission is granted – LED 1 should light up green or blue.

Fuel dispensing menu

The data is displayed in the following format: XXXX.XX, where the dot separates whole liters from hundredths of a liter.

When you press the "#" button during fuel dispensing, fuel delivery stops and pauses. At the same time, the dot of the last digit flashes, which is a pause indicator. When you press "#" again, fuel delivery resumes.

If a dispenser or tracker error occurs, the terminal will automatically switch to pause mode.

To resume fuel dispensing, press the "#" button.

To cancel fuel dispensing and return to the main menu, press "*".

If the power goes out during fuel dispensing, the terminal will remember the status and pause before turning off. After the power is restored, fuel dispensing can be resumed (see the dose input menu item).

Settings menu

To enter the settings menu, press keys 1 and 3 simultaneously while in the dose setting menu. After that, the message "PAR A" will be displayed for a short time, indicating the transition to the parameters of group "A".

To change the parameters, master mode must be activated (LED 2 must be red).

Key assignments:

1 - group A (values 0-65000)
2 - group B (values 0-255)
3 - group C (values 0-1)
4 - parameter number -
6 - parameter number +
7 - parameter value – 9 -
parameter value +
0 - set default value
* - exit to main menu
When switching between parameter groups,
"PAR X", where X is the group type.

Group A parameters

Parameter	Description	Default value
A	Number of pulses per 40 liters	400
A 2	Overflow compensation. Dispensing stops after the specified number of tens of milliliters, thereby compensating for overflow. 1 unit = 10 ml.	0
A	Compensation for underfilling. The portion is increased by a specified number of tens of milliliters. 1 unit = 10 ml.	0
A 4	1 unit = 10 ml The offset for switching off the main flow and switching to the small flow is set.	50
A 5	Number of liters that can be dispensed in "full tank" mode. This value is also the maximum for fuel dispensing. 1 unit = 1 liter	1000
A 6	Maximum value of DUT during calibration. When this value is reached, calibration stops.	4095
A 7	Fuel intake capacity 1 unit = 1 liter	190
A 8	ID TRK (used when controlling via ETR)	0
A	View firmware version. For example, 127 is version 1.27.	
A 10	Password	0
A 11	Fuel price in kopecks.	0
A 12	Service number	0

Group B parameters

Parameter	Description	Default value
B 1	Counting sensor type 0-USS 1-GERKON 2-DO10 3-EX	0
B 2	Pulse waiting time, sec	5
B 3	Value of one output pulse 0- 1L 1-0.1L 2-0.01L	1
B 4	Output pulse duration *0.2ms	20
B 5	LLS RFID address	4
B 6	LLS address of the total counter	5
B 7	LLS address of the successfully completed distribution value	10
B 8	LLS address of DUT "A". Used during calibration.	0

The spilled value will differ from the dose that was administered. Calculate the difference between the specified portion and the final value. Next, enter this difference into parameter A2 if there was an overflow (A3 must be zero in this case). If there was an underfill, enter it into parameter A3 (A2 must be zero in this case).

One unit of parameters A2 and A3 is equal to 10 ml.

Example 1: 5 liters were set. The result was 5.23 liters. We entered A2 = 23 and A3 = 0 into the parameters.

Example 2: 5 liters were specified. The result was 4.86 liters. The parameters A2 = 0 and A3 = 14 were entered.

When one parameter is set, the second must be zero.

These are preliminary values for these parameters. It is advisable to make several runs and select the values of these parameters so that the result is as close as possible to the specified dose.

Precise adjustment of the proportion coefficient.

After adjusting the overflow/underflow, we make a final adjustment of parameter A1 to the "zero" level on the measuring device.

Program update.

The program should not be updated if the TRK is functioning correctly. To update the software, connect the USB-RS485 converter to the ETR RS485.

The computer program is the same as for calibration.

http://www.der-hammer.info/terminal/hterm.zip - direct download link.

At the same time, you need to run the COM port terminal program on your computer. Next, specify the number of the emulated COM port in the program and connect it. The data transfer rate is 19200 8 bits.

Next, switch the TRK to software update mode. To do this, set the A10 parameter to the password 8934.

After setting the password, activate the software update mode using the "C 16" parameter. After that, the message Prg000 will appear.

Next, press the "Send file" button in the program, specify the file itself, and confirm the data transfer.

After the firmware file starts sending, the number of accepted blocks will increase.
Upon successful completion of the software update, all dots next to the numbers will be turned on.

If an error occurs during the download process, the message PrgErr will be displayed.

4. MANUFACTURER'S WARRANTY

The seller guarantees that the fuel dispenser complies with the requirements of the manufacturer's design and technical documentation and regulatory and technical documentation.

The seller guarantees the reliable and trouble-free operation of the fuel dispensing module, provided that the consumer complies with the rules for transportation, storage, and operation established in the installation, operation, and maintenance instructions.

The warranty period is 12 (twelve) months from the date of commissioning.

The warranty obligations shall terminate:

- upon expiration of the warranty period;
- in case of loss (misplacement) of the passport;

To cancel fuel dispensing and return to the main menu, press "*".

If the power goes out during fuel delivery, the terminal will remember the status and pause before shutting down. Once the power comes back on, fuel delivery can continue (see the calibration start menu item).

The fuel counter displayed for each portion is not reset to zero, but is added to the previous portions. Valve shutdown control is also based on the readings of this counter. Thus, the absolute error of overfilling/underfilling a portion will not accumulate throughout the entire calibration. This allows the absolute error value to be leveled out during calibration.

During calibration, the same pause response mechanism applies as for standard fuel dispensing.

For dispensing large amounts of fuel, it is most convenient to use a portion value of 200 liters and a settling time of 10 seconds.

Obtaining tare data

To obtain tare data, connect the USB-RS485 converter to the ETR RS485. At the same time, you need to run the COM port terminal program on your computer. Next, specify the number of the emulated COM port in the program and connect it. The data transfer rate is 19200 8 bits. After that, you need to run the action with parameter C5 for DUT "A", C6 for "B", C7 for "C" and C8 for "D". After setting, the value will automatically be set to "0".

Upon completion of the transfer, save in ASCII format. The data has the
following format: XXX: VVV; XXX: VVV; XXX: VVV; where XXX is the
DUT value and VVV is the number of liters.

http://www.der-hammer.info/terminal/hterm.zip - direct link to download Automatic calibration of readings

Different combinations of installed equipment can affect the accuracy of fuel portioning.

The terminal has three main parameters that affect accuracy: A1, A2, A3. For full configuration, a specialized accurate measuring container is required, preferably with a foam separator.

The terminal has automatic overflow/underfill calibration.

To activate it, set parameter (action) C9. Then dial a single dose. After it is completed, 10 seconds pass and the portion is repeated. There will be 3 repetitions. After analyzing the discrepancies in the readings, parameters A2 and A3 will be changed. After auto-calibration, C9 is reset to 0 and the terminal continues to operate in normal mode.

If necessary, you can manually adjust parameters A2 and A3. The process of precise calibration will be described below using a 10-liter measuring cylinder as an example.

Preliminary adjustment of the proportion coefficient

First, you need to set the parameters A2 and A3, which are responsible for overfilling or underfilling. To do this, pour a test portion of approximately 2-5 liters. The portion size depends on the capacity of the TRK pump.

To display the actual dose value, parameter C19 must be set to 1, or press "5" after the portion is complete.

B 9	Address of LLS DUT "B". Used for calibration.	1
B 10	LLS address of DUT "C". Used for calibration.	2
B 11	Address of LLS DUT "D". Used for calibration.	3
B 12	Time between two spills during taring, sec	40
B 13	Serving size when taring. 1 unit = 1 liter	10
B 14	Number of the DUT used to monitor the end of the tank. 0- No control based on DUT readings 1- DUT "A" 2- DUT "B" 3- DUT "C" 4- DUT "D" 5- All DUTs. Calibration will be stopped if at least one DUT exceeds the set value.	0
B 15	Waiting time for the last meter pulses, sec. This parameter is needed in cases of possible false meter pulses when fuel distribution has already been completed. completed. Value 0 – the counter will always be active.	0
B 16	Type of fuel dispensing value display 0-XXXX.XX 1-XXXXX.X 2-XXXXXX. 1 and 2 are rounded.	0
B 17	Fuel distribution start timer. This is the delay in activating the valves after fuel distribution starts. A value of zero means no delay. The unit of measurement is seconds.	0
B18	ETR control 0 - prohibited, 1 - permitted	0
B19	TRK address when controlled by ETR	0
B20	ETR line speed 0-2400, 1-4800, 2-9600, 3-19200, 4-38400, 5-57600, 6-115200	3
B21	LLS address for the identifier entered from the keyboard. 0-254 – address, 255 – prohibited.	255
B22	LLS address for additional parameter 1. 0-254 – address, 255 – prohibited.	5
B23	LLS additional parameter address 2. 0-254 – address, 255 – prohibited.	6
B24	LLS additional parameter address 3. 0-254 – address, 255 – prohibited.	7
B25	LLS additional parameter address 4. 0-254 – address, 255- prohibited.	8
B26	Service parameter for ignoring fuel delivery prohibition. +1 – ignore ID entered from the keyboard +2 – ignore permission from tracker - TR_EN	1

B27	TOTAL COUNT output mode 0-Operation with an external price indicator. 1-Operation with an external electromagnetic meter	0
B28	Filtering of TR_EN and KRAN inputs. Response time = 7 sec/ B28.	50

Group C parameters

Parameter	Description
C 1	1-Card addition mode
C 2	1-Master card installation mode
C 3	1-Card deletion mode
C 4	1-Delete all cards. Parameter A10 must be set to prevent accidental pressing - 6755
C 5	1-Sending the calibration text of the DUT "A" via the ETR RS485 channel
C 6	1-Sending the DUT "B" calibration text via the ETR RS485 channel
C 7	1-Sending the calibration text of DUT "C" via the ETR RS485 channel
C 8	1-Sending the calibration text of DUT "D" via the ETR RS485 channel
C 9	1-Auto overflow/underfill calibration resolution
C 10	
C 11	
C 12	
C 13	
C 14	
C 15	
C 16	Start terminal software update. Parameter A10 must be set to prevent accidental pressing - 8934
C 17	1-calibration mode 0 - standard mode
C 18	1-Permission to dispense if the card is in the database. Standalone mode - Fuel dispensing is permitted if permission is granted either by the tracker or by the card in the device database. 0- the card does not affect fuel dispensing permission.
C 19	1-Display the actual portion value at the end of dispensing. 0-display the planned portion value.
C 20	1-all cards will be recognized as being in the database

Parameters C 1-16 are not stored; they are used to start actions. The default value is 0, i.e., inactive state. When an action is started, it can be set to state 1 for a certain period of time, i.e., active mode.

Parameters C 17-32 are parameters that are stored.

When cards are added, LED 2 will change color to yellow (red + green), and when cards are removed, it will change to purple (red + blue).

To change the parameters and add/remove cards, you must be in master mode.

Master mode is activated when a master card is inserted. Master mode continues for 30 seconds after the master card is removed. Master mode will always be active without cards if jumper J1 is set (see Appendix 2).

Calibration

To activate this mode, set parameter "C17" to "1".

In this mode, fuel is dispensed in portions at regular intervals. There is a pause between portions to allow the fuel to settle. At the end of each pause between portions, the readings from the flow meters are recorded. There are 1-4 flow meters available, designated by the letters "A", "B", "C" and "D" respectively.

During the calibration process, it is possible to change the portion size and settling time "on the fly".

Tare start menu

To put the terminal into taring mode, set parameter "C17" to "1".

To start calibration, press the "*" key in the main menu.

The terminal will then switch to the initial tare mode.

The data is displayed in the following format: TTT.XXX. Where TTT is the settling time between portions (seconds), and XXX is the portion size. The initial values of these tare parameters are taken from parameters B 12 and B 13, respectively. These values can be changed before starting.

Tare menu

Key functions:

1- current DUT values "D" DXXXXX

2- current DUT values "A" AXXXXX

3-display of tare parameters TTT.XXX (settling time and portion size) 4-decrease in settling time TTT.XXX

5- current values of DUT "B" BXXXXX

6-increase in settling time TTT.XXX

7-decrease in fuel portion size TTT.XXX

8- current values of DUT "C" CXXXXX

9-increase in fuel portion size TTT.XXX

0-calibration restart (similar to standard mode)

"*" - return to main menu

"#" - start taring

1+3 - go to the main parameters menu (similar to standard mode)

If the fuel intake capacity is exhausted, there will be a pause and LED 1 (permission status) will light up white. To view the remaining capacity, press the "3" key. The capacity is set in parameter A 7.

If at least one DUT has a value higher than parameter A 6, calibration will be stopped at the end of the fuel settling pause.

When you press the "#" button during fuel dispensing, fuel delivery stops and pauses. At the same time, the last digit flashes, indicating that the dispenser is paused. Pressing "#" again resumes fuel delivery.

If a column or tracker error occurs, the terminal will automatically switch to pause mode.

To resume fuel dispensing, press the "#" button.