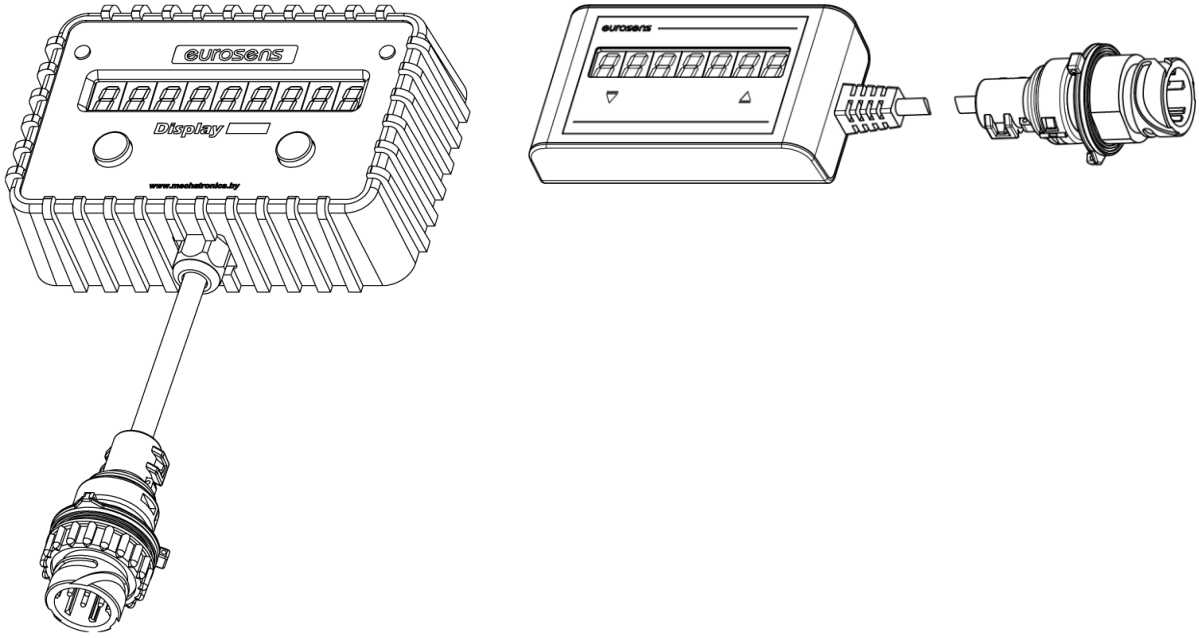
v 1.03

Onboard displays

eurosens
Display RS/CAN



Operation manual

MECHATRONICS

v 1.03

eurosens Display RS/CAN (Mini)

Operation manual

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1 General description of eurosens Display RS/CAN

1.1 Application

The multifunctional information display eurosens Display RS/CAN (hereinafter referred to as display) is used for:

- reading of information from eurosens or third-party sensors;
- conversion of sensor signals using coefficients or calibration tables;
- performing the operations of summing or subtraction between the received values;
- displaying values on the screen;
- sending values to the RS-485 external interface;
- CAN bus reading.

The eurosens Display RS/CAN is also used as a display for the onboard weighing system eurosens Difference and as a tool for calibrating the eurosens Dominator fuel level sensors during installation. The displays are identical and are shown in Fig. 1.1.

The Mini version differs by its overall dimensions and the reduced number of display digits (7 instead of 9).

Fig. 1.1. eurosens Display RS/CAN (left), Display RS/CAN Mini (right)

1.2 PRINCIPLE OF OPERATION

The display consists of several functional modules. First, the data from the connected sensors come to the input of the data reading module, consisting of a single-wire K-line interface and RS-485 serial interface. Display CAN additionally has a CAN interface or a second RS-485 interface. Then, these data are converted by means of coefficients or calibration tables, summed or subtracted from each other by the data processing module. And then displayed on the screen and in the external interface by the data output module.

1.2.1 DATA READING MODULE

Can operate in one of the following modes:

Using K-line input interface:

- Reading fuel level or axle load data from one sensor with analog output.
- Reading fuel level data from one sensor with frequency output.
- Reading data from one flow meter with pulse (counter) output.
- Reading the full set of internal counters from one flow sensor through the K-line interface.
- Reading the most important values from several eurosens flow meters or fuel level sensors via K-line.

For RS-485 interface:

- Reading information from eurosens axle load sensors in weighing system mode (not only output data, but also information about the number and location of sensors).
- Reading or listening on RS-485/MODBUS RTU interface of flow or fuel level sensors eurosens.
- Reading or listening via RS-485 interface/LLS-protocol data from fuel level sensor.

For CAN interface (only for eurosens Display CAN):

- Read axle load from the onboard CAN bus of the Wabco air suspension.
- Reading information from eurosens level, flow and axle load sensors with CAN interface.
- Reading information from the onboard CAN bus, FMS interface.

1.2.2 DATA CALCULATION MODULE

Depending on the input data performs various transformations with it:

- In the analog or frequency input mode, it calculates the value using the calibration table, which is programmed in the display memory.
- In the counter input mode it calculates the value of the fuel consumption by applying the coefficient which is programmed into the display memory.
- In the mode of connection of one counter by K-line the calculations are not performed, because the internal counters of the flowmeter do not require coefficients application.
- In the connection mode of several fuel level and/or flow sensors eurosens allows you to set coefficients to their values, as well as to perform summing or subtraction operations. For example, to sum up the fuel volume in several tanks and simultaneously calculate the fuel consumption of the engine by the difference of flow rates in the supply and return lines.

1.2.3 DATA OUTPUT MODULE

- For eurosens Display RS:

Calculation results are displayed on the display and transmitted to the GPS tracking system via the external RS-485 interface. The display either polls sensors via K-line interface and sends information via RS-485 interface, or reads information from sensors during their responses to the GPS tracker in read-only mode and sends results via the same RS-485 interface in response to direct request request from the GPS tracker.

Two output protocols are available for the RS-485 interface - Modbus RTU and LLS.

- For the Display CAN interface:

AN extra option is optionally available to send engine fuel consumption data to the CAN interface using NMEA2000 protocol. If a second RS-485 interface is installed in Display CAN instead of the CAN interface, it is possible to poll sensors by Display CAN via the RS-485 input interface and send calculation results to the

GPS tracker via the second RS-485 (output) interface. This scheme is used in on-board weighing systems.

The layout of the display screens depends on the selected operating mode.

1.3 DISPLAY DELIVERY SET

The display package includes:

- eurosens Display RS (CAN);
- Installation kit (Fig. 1.2);
- specificatoin.

To be ordered separately:

- eurosens cable.

fig. 1.2. eurosens Display installation kit

The Mini version for mounting the display contains double-sided Velcro tape instead of a bayonet plate.

To configure displays you will need service adapters eurosens Destination 02 (02 Light) or eurosens Destination CAN.

2 eurosens DISPLAY SPECIFICATION

Table 2.1. Specification.

Parameter	Value
Supply voltage, V	10-50
Temperature range, °C	-40 – +85 (operation from from -20 to +85)
Display type	9 digits seven-segment LCD (Display RS/CAN) 7 digits seven-segment (Display RS/CAN Mini)
Maximum current consumption, mA	50 (для 12В)
Interfaces	Analog input, frequency input, counter input, K-line (all - using K-line wire); RS-485 For Display CAN –extra CAN or RS-485 interface
Configuration interface	K-Line
Number of buttons	2

Overall and mounting dimensions are shown in Appendix I.

3 INSTALLATION OF eurosens DISPLAY

The Display RS/CAN is mounted in a visible location and secured with a bayonet mount (fig. 3.1). The Display RS/CAN Mini version is attached using double-sided Velcro tape (fig. 3.2).

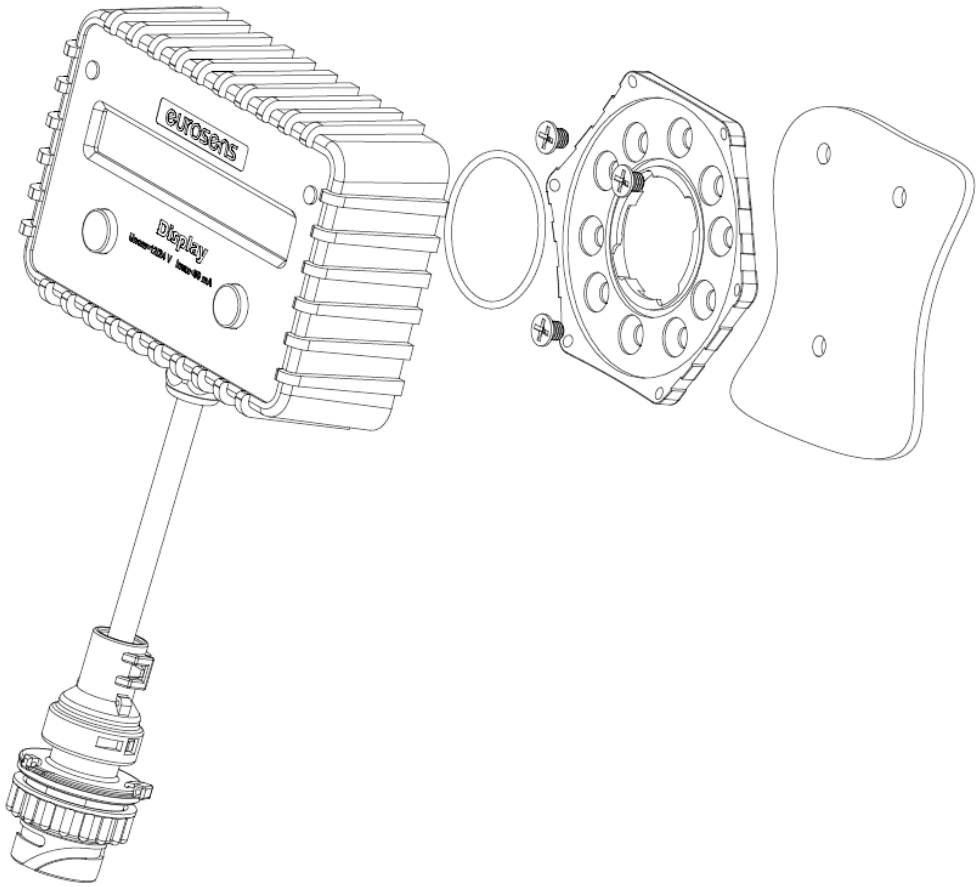


fig.3.1. eurosens Display RS/CAN mount

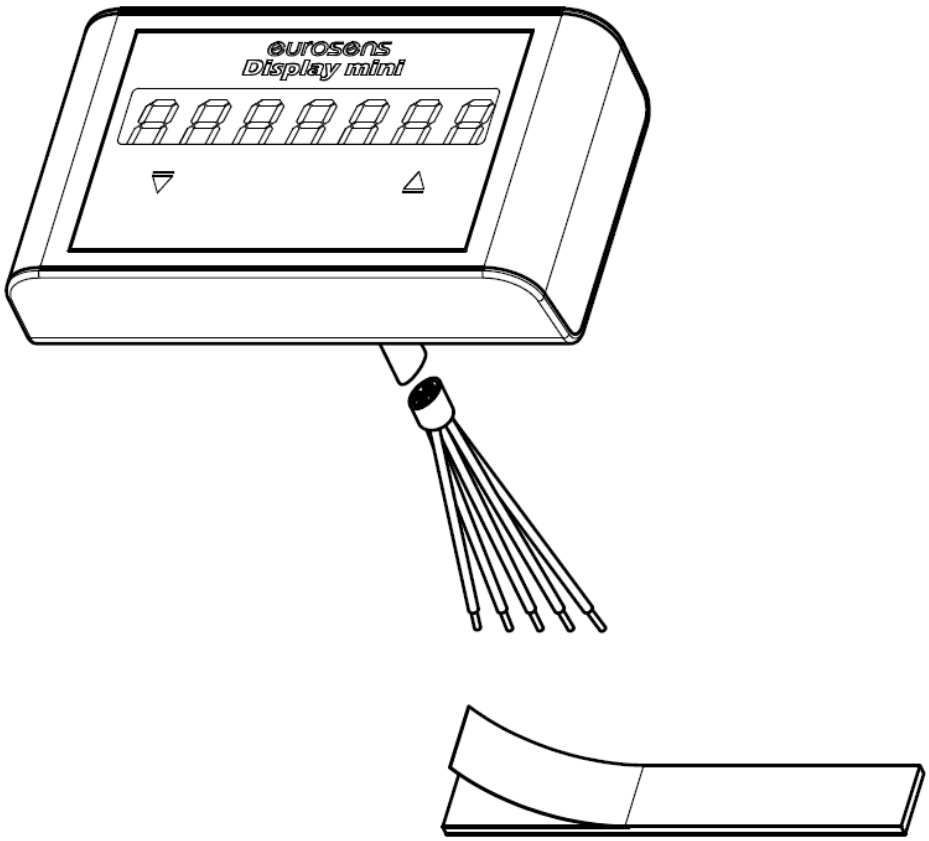


fig.3.2. eurosens Display RS/CAN Mini mount

The display has an IP52 degree of protection against moisture and dust, so if you want to install it outdoors, you must install it in a protective box.

The electrical connection of the display is made with a cable. The required cable variant must be selected when ordering the display. The connection to the eurosens sensors can be made with T-cable (fig. 3.3).

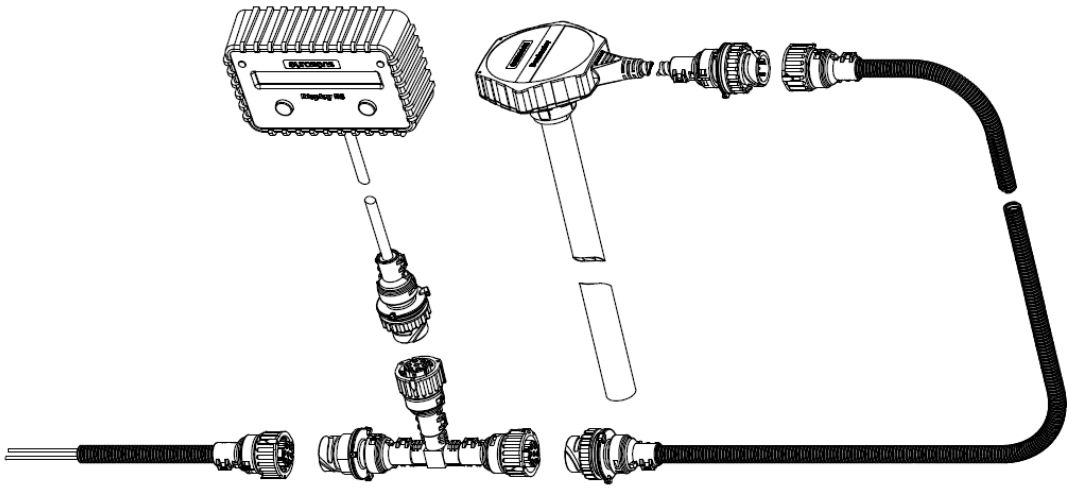
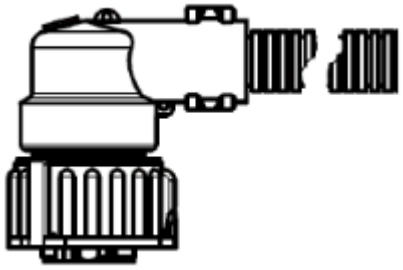
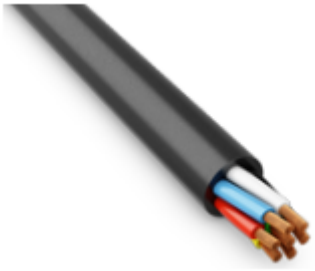


рис.3.3. Display connection with sensors using T-cable

It is also possible to use a direct connection between the wires using universal cables (Table 3.1).

Table 3.1 Connection with universal cables.

To display	To GPS tracker	Marking
		75F-0-1-0: 5-core cable of 1 meter length; 77F-0-1-0: 7-core cable of 1 meter length; 75F-0-3-0: 5-core cable of 3 meter length.

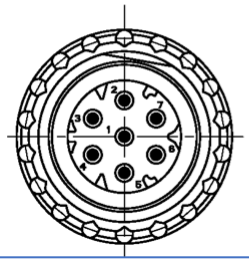
Interface / Тип интерфейса	RS	CAN	
	1 – VBAT	1 – VBAT	red/красный
	2 – GND	2 – GND	brown/коричнев.
	3 – K-line (AIN, DIN)	3 – K-line (AIN, DIN)	blue/голубой
	4 – ---	4 – RS-485 (A)	black/черный
	5 – ---	5 – RS-485 (B)	white/белый
	6 – RS-485 (A)	6 – CAN (H) / RS-485 (A)	yellow/желтый
	7 – RS-485 (B)	7 – CAN (L) / RS-485 (B)	green/зеленый

fig.3.3. Universal cable pinout

4 CONFIGURATION OF eurosens DISPLAY

4.1 SOFTWARE eurosens DISPLAY USER CONFIGURATOR

Hardware and software requirements:

- Operation system : Windows 7 and above, screen resolition no less than 1024 x 768, 16 bit.
- Microsoft .NET Framework 4.5 and above.
- eurosens Destination 02 (CAN): STM32 Virtual COM Port Driver or GD32 COM driver.
- Service adapter eurosens Destination.
- Eurosens Display User Configurator you can download here: https://files.eurosenstelematics.com/files/eurosens-display-rs-can-configurator

Connection steps:

1) Connect adapter to laptop (USB interface);
2) Run configurator;
3) Using button on the adapter choose the ISO 9141 interface if not set;
4) Connect display to adapter using short cable from Destination package.

4.2 MODE "CALIBRATOR LLS"

In this mode we can use the display to calibrate the eurosens Dominator fuel level sensor after trimming and for the fuel tank calibration. So we don't have to use laptop for fuel level sensor installation.

Using the display you can perform the following operations:

1) Send the "Calibrate Empty" command to the sensor.
2) Send the "Calibrate Full" command to the sensor.
3) View the current output values on the display screen:

- for Dominator RS sensors - N value (regardless of the selected interface);

- For Dominator AF sensors - frequency or voltage value depending on the mode of the sensor.

It is not possible to change the sensor settings using Display RS. The sensor must be properly configured before going outside with the eurosens Configurator software before installation. Display RS does not replace the configuration software, it only allows you to calibrate the sensor and calibrate the fuel tank.

Using configurator you can turn display into FLS calibration mode (fig. 4.1):

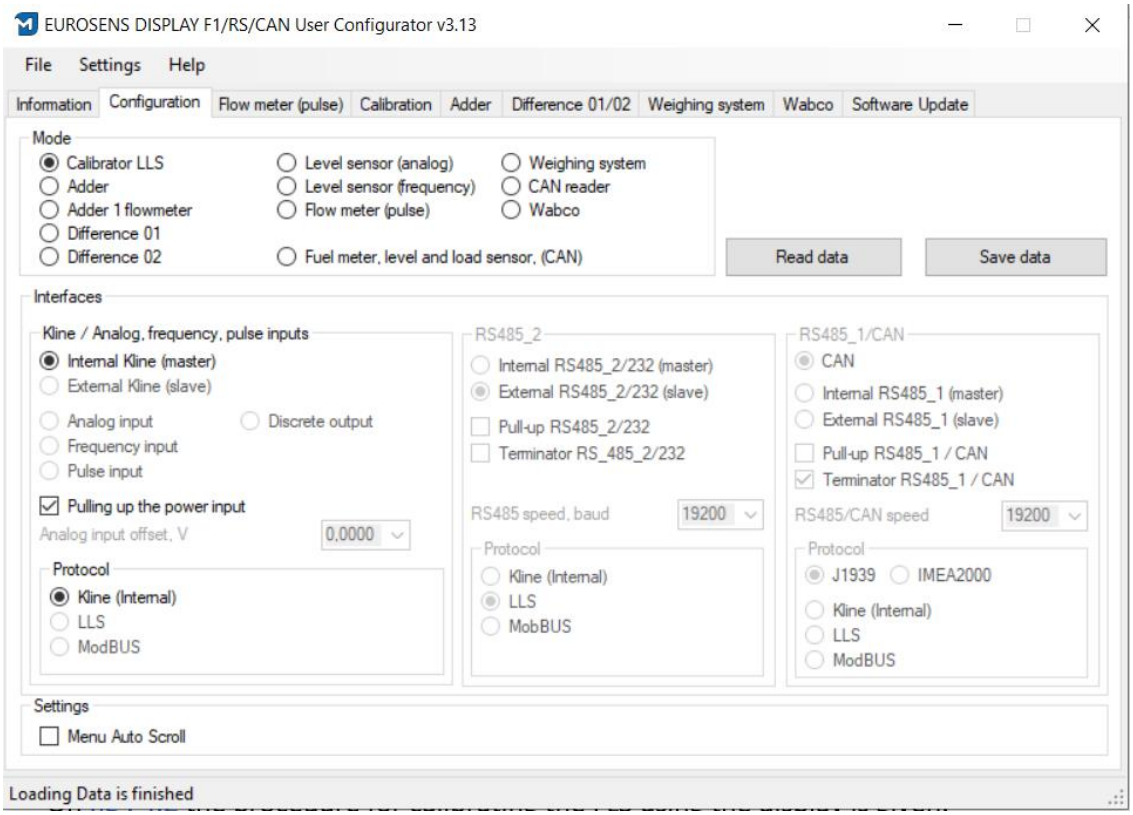


fig. 4.1. Mode “Calibrator LLS”

On fig . 4.2 the procedure for calibrating the FLS using the display is given.

Step 1. Disconnect sensor cable	
Step 2. Connect first T-Cable connector to the cable, connect the display to the second T-Cable connector.	
Step 3: Connect the free T-Cable connector to the fuel level sensor.	
Step 4: Press the right button, thus calibrating the FLS "empty	
Step 5: Press the left button, thus calibrating the FLS "full	

fig. 4.2. Mode “FLS Calibrator”

4.3 Mode “Adder”

In the Adder mode eurosens Display polls flow meters, fuel level sensors or axle load sensors over the selected interface (internal network RS485_1 or K-line) and protocol (ModBUS, LLS or others), and display sensor readings, their sum and other parameters to the display as well as to the GPS tracker terminal by selected interface and protocol (external network RS485_1, RS485_2 (for Display CAN), K-line).

Let's consider setting in the "Adder" mode of the display (fig. 4.3), working together with a single flow meter eurosens and two fuel level sensors eurosens Dominator.

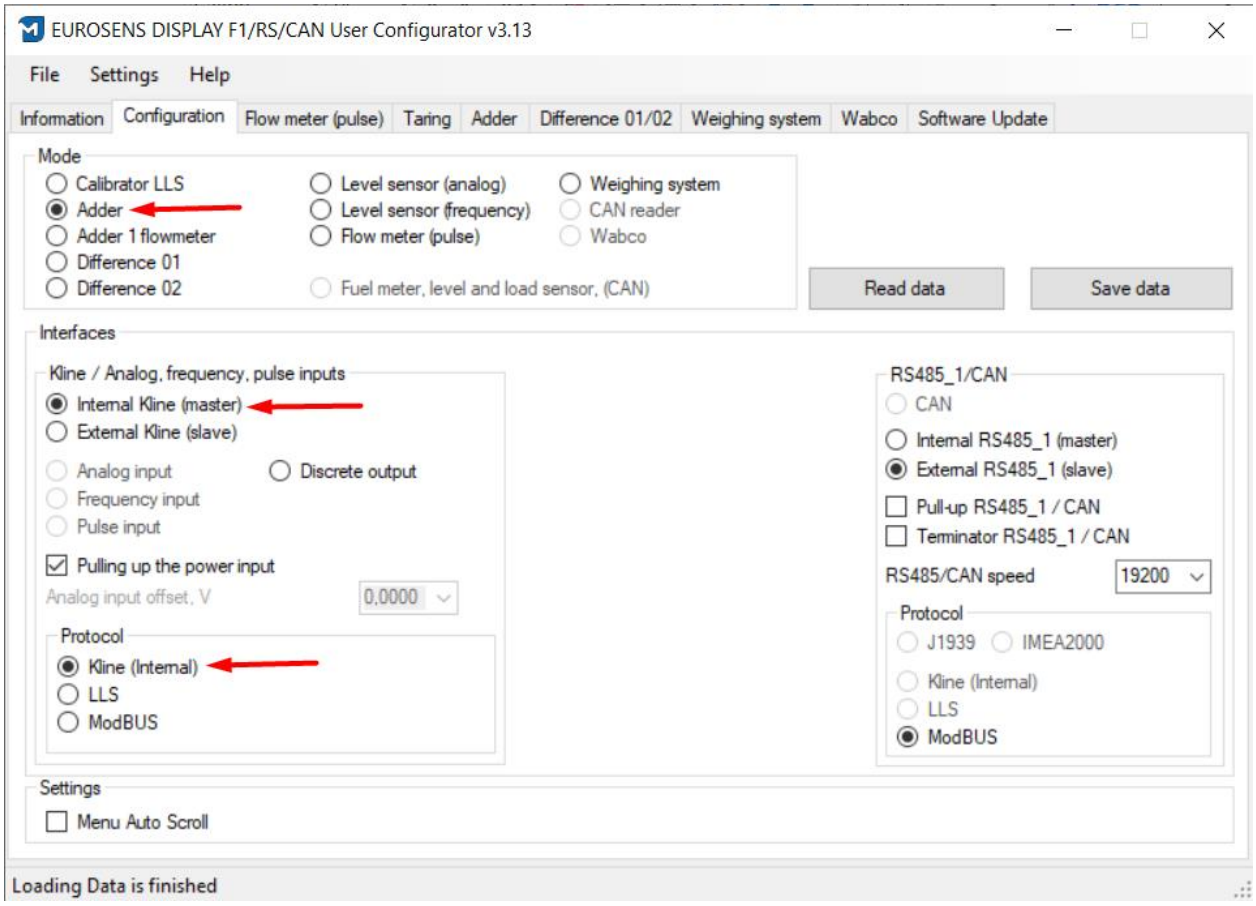


fig.4.3. “Adder” mode

Select the "Adder" mode, the interface and protocol of the internal network K-line and enable pull-up of the K-line interface to the power supply. In this case the resulting dataset will be available via the RS-485 interface "External", via MODBUS RTU protocol. The display registers are given in Appendix II.

In the "Adder" mode the display can poll up to 10 instruments simultaneously. You can configure the type and addresses of the polled devices on the "Adder" tab of the configuration software (fig. 4.4).

- All sensors must be configured to operate on the same interface and protocol that is selected in the "**internal network**" display setting.

- If it is necessary to subtract the flow meter readings of one of the flowmeters from the sum of the readings of other flowmeters, it is necessary to select ”**Direct Delta –**“ in the device type column.

- If Dominator is selected, the values of volume, minimum and maximum values must be the same with fuel level sensor settings.

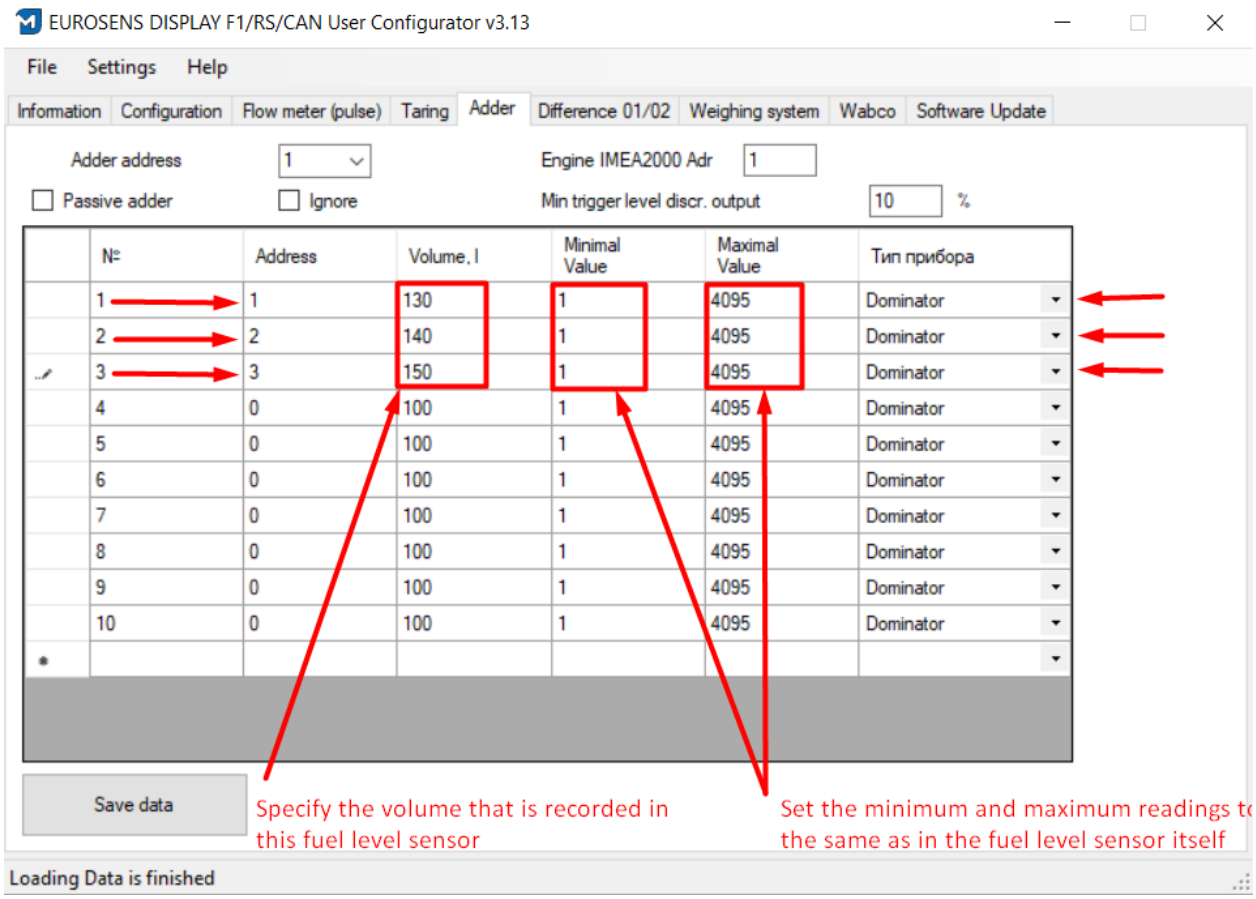


fig. 4.4. Setting device types, addresses and sensor settings

- For flow meters only the address is relevant in the settings. A zero address means that the device is not connected.

- The summing result will be available to an external device when the adder address is polled. If the "**Ignore**" option is enabled, the display ignores its own address and responds to the external device at any of the addresses (0 - 255).
- Mode "**Passive adder**" is set if the external device directly polls flow meters or fuel level sensors. In this case the display works in “read-only” mode and receives responses from the sensors without sending queries (to avoid two masters on the line).

Consider an example of configuring eurosens Display RS/CAN to work in the passive adder mode, when the display analyzes the exchange between the external data logger and eurosens sensors via RS-485/MODBUS interface:

1) On the "**Configuration**" tab (fig. 4.5) select the RS-485 internal network (master) and MODBUS internal network protocol.

2) Select the RS-485 interface speed corresponding to the already existing RS-485 network.

3) On the Adder tab set the same settings, but additionally enable the **Passive Adder** option (fig.4.6). With these settings, Display will scan the RS-485 interface for requests and responses via MODBUS protocol, which are made by the external device to the sensors. The responses are registered by the Display and then the summing and display operations are performed with them.

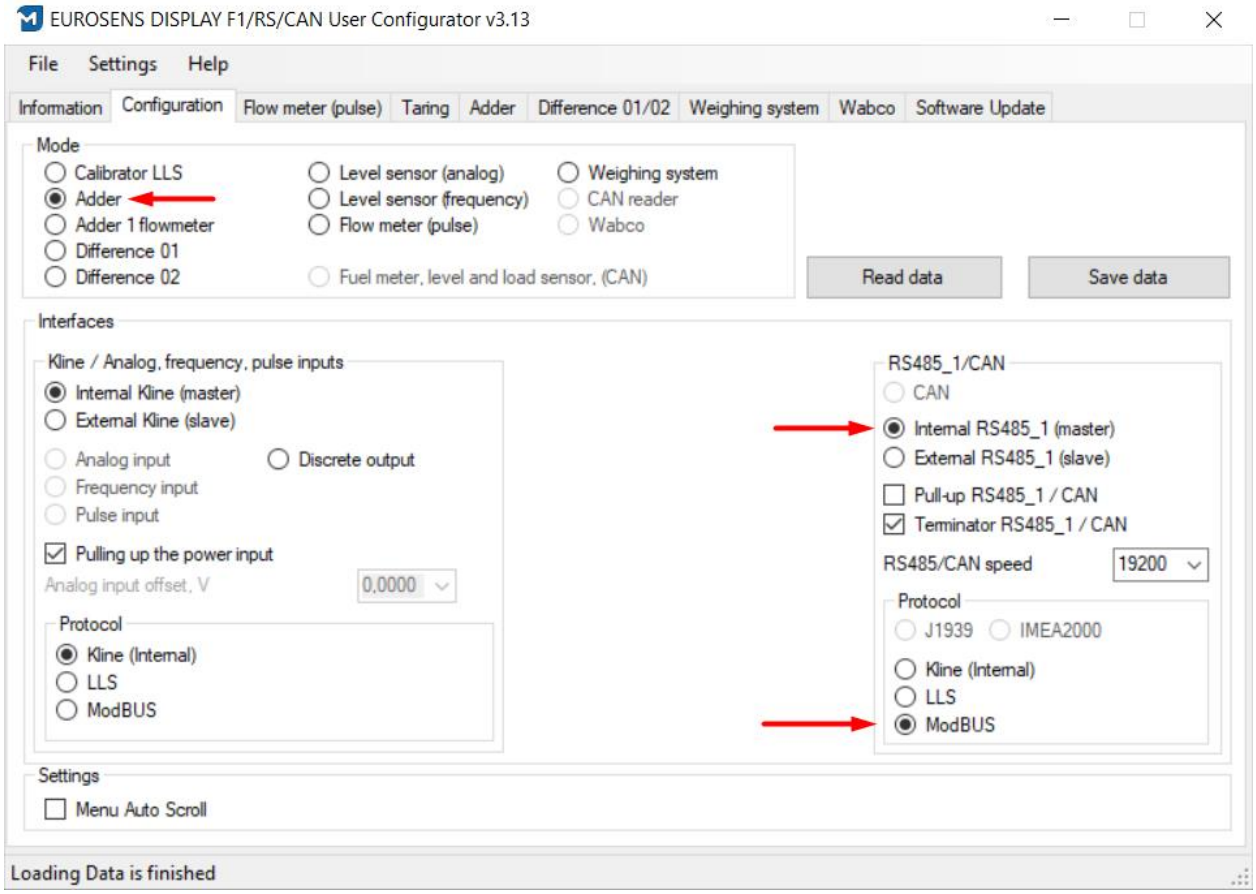


fig.4.5. “Configuration” tab

In this configuration "**RS485/CAN Terminator**" option is ON in the display and in the last device of the RS485 network, "**RS485/CAN pull-up**" is On in one of the devices.

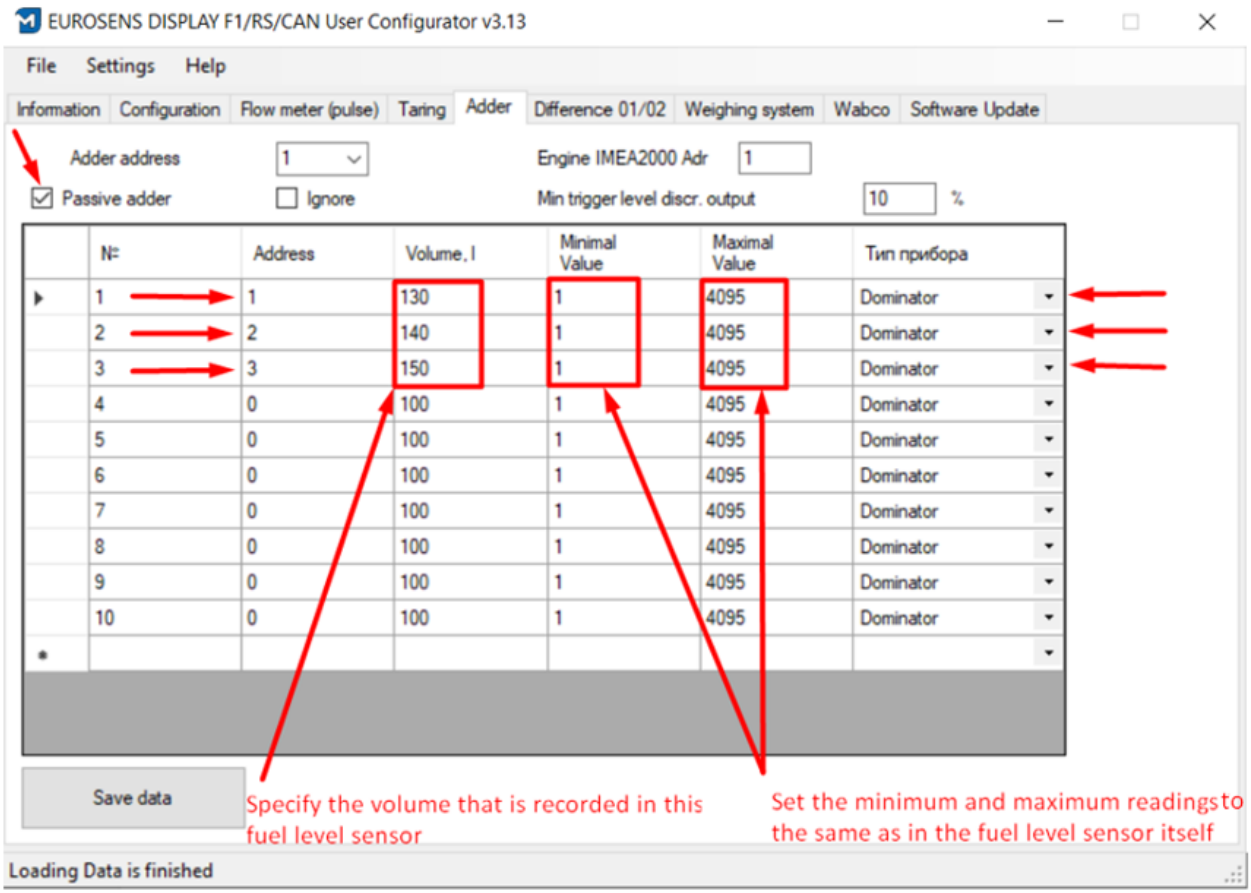


Fig.4.6. “Passive adder” settings

The scheme of the display screens in the "Summator" mode is shown in Table 4.1.

This list is complete and includes 10 possible device addresses. If only 3 devices are selected in the totalizer settings, unused devices will not appear in the screen layout.

Table 4.1. Structure of the display screens in the "Adder" mode

Screen №	Displayed parameter		
	Fuel level sensors (FLS)	Fuel consumption meters (FCS)	Axle load sensors
1	Total fuel volume, l	-	-
2	-	Total fuel consumption, l	-
3	-	-	Total weight, t
4	Fuel volume, FLS №1,l	Fuel consumption, FCS №1, l	Weight №1, t
5	Temperature FLS №1, ºC	Instant fuel flow, FCS №1,l/h	Sensor output №1
6	Fuel volume, FLS №2, l /	Fuel consumption, FCS №2, l	Weight №2, t
7	Temperature FLS №2 ºC	Instant fuel flow, FCS №2,l/h	Sensor output №2
8	Fuel volume, FLS №3, l	Fuel consumption, FCS №3, l	Weight №3, t
9	Temperature FLS №3, ºC	Instant fuel flow, FCS №3,l/h	Sensor output №3
10	Fuel volume, FLS №4, l	Fuel consumption, FCS №4, l	Weight №4, t
11	Temperature FLS №4, ºC	Instant fuel flow, FCS №4,l/h	Sensor output №4
12	Fuel volume, FLS №5, l /	Fuel consumption, FCS №5, l	Weight №5, t
13	Temperature FLS №5, ºC	Instant fuel flow, FCS №5,l/h	Sensor output №5
14	Fuel volume, FLS №6, l /	Fuel consumption, FCS №6, l	Weight №6, t
15	Temperature FLS №6, ºC	Instant fuel flow, FCS №6,l/h	Sensor output №6
16	Fuel volume, FLS №7, l	Fuel consumption, FCS №7, l	Weight №7, t
17	Temperature FLS №7, ºC	Instant fuel flow, FCS №7,l/h	Sensor output №7
18	Fuel volume, FLS №8, l	Fuel consumption, FCS №8, l	Weight №8, t
19	Temperature FLS №8, ºC	Instant fuel flow, FCS №8,l/h	Sensor output №8
20	Fuel volume, FLS №9, l	Fuel consumption, FCS №9, l	Weight №9, t
21	Temperature FLS №9, ºC	Instant fuel flow, FCS №9,l/h	Sensor output №9
22	Fuel volume, FLS №10, l	Fuel consumption, FCS №10, l	Weight №10, t
23	Temperature FLS №10, ºC	Instant fuel flow, FCS №10,l/h	Sensor output №10
24	Firmware version	Firmware version	Firmware version

If the sensor at one of the addresses does not respond to the display, or in the passive mode the terminal does not poll the sensor - the display will show **Err** instead of its readings, and in the field of the sum that includes the sensor. If the external datalogger polls only a part of MODBUS-registers of the sensor when working in passive mode, the values that are not received by the display will be equal to zero.

- The "**Engine NMEA2000 Addr**" setting refers to Display CAN and assigns the engine number for the NMEA2000 fuel consumption output.
- "**Min trigger level discr. output**" – allows you to set the minimum fuel volume in percent for each of the tanks (sensors) when the discrete output of Display RS/CAN is triggered. The discrete output option is enabled on the "**Configuration**" tab.

Let's consider an example of connection in Adder mode of 3 fuel level sensors via RS-485 interface and LLS protocol. "**Terminator RS-485/CAN**" is ON in the display and on the last device of the network, "**Pull-up RS-485/CAN**" is ON in one of the devices (fig.4.7).

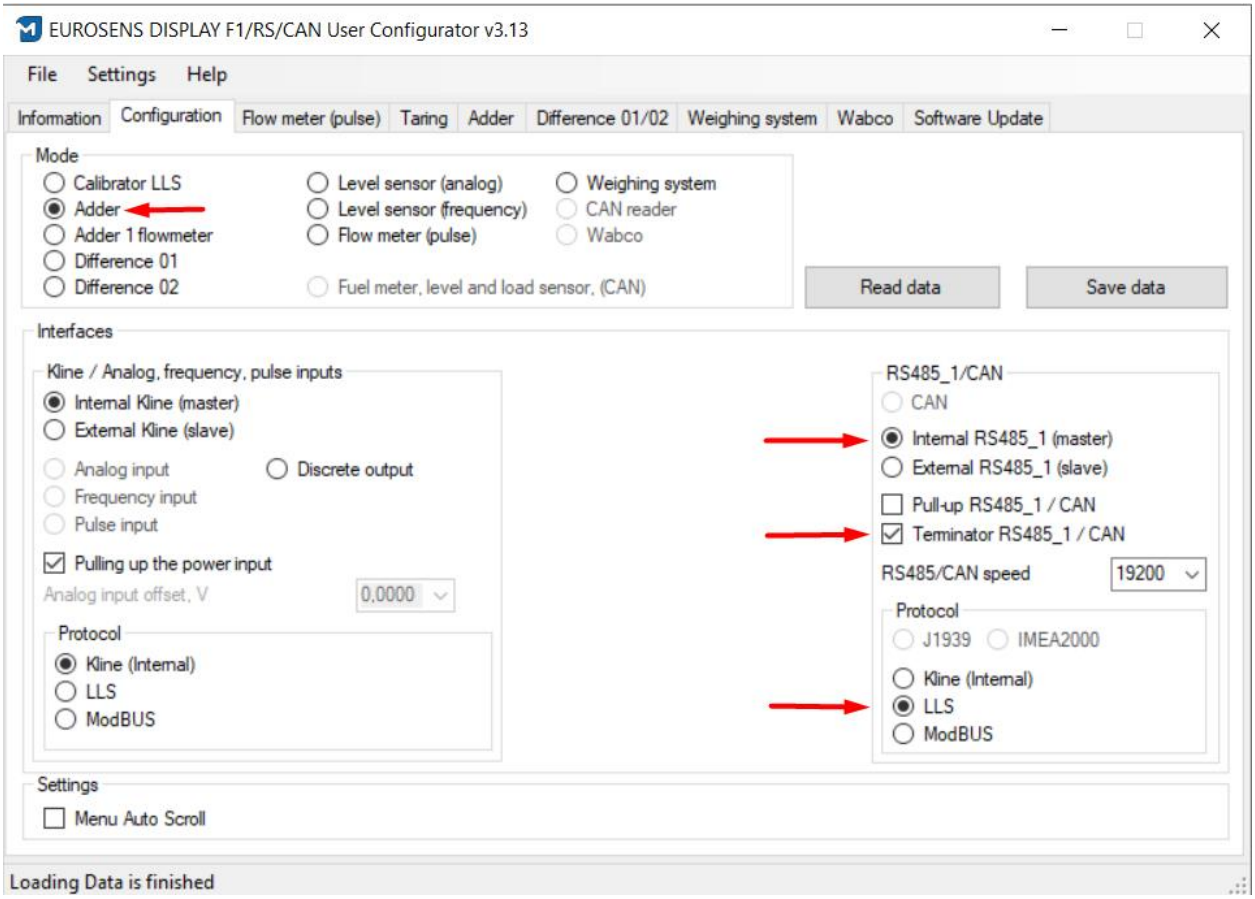


fig.4.7. “Configuration” tab

The settings of the tab "Adder" in this mode are similar to those shown in fig.4.6. Since the external datalogger is a "master" on the RS-485 bus, the display must be a passive adder.

4.4 MODE “ADDER 1 FLOWMETER”

In the "**Adder 1 flowmeter**" mode the display polls one flowmeter by the configured interface (internal network RS-485_1, RS-485_2 or K-line) and protocol (MODBUS, LLS or other), and provide sensor readings to the display as well as to the GPS tracker, according to selected interface and protocol (external network RS-485_1, RS4-85_2 - for Display CAN). This mode is designed for detailed information output to the display and external datalogger of the measured parameters of one flowmeter.

fig. 4.8. The connection of Display RS and one fuel meter. Mode “Adder 1 flowmeter”

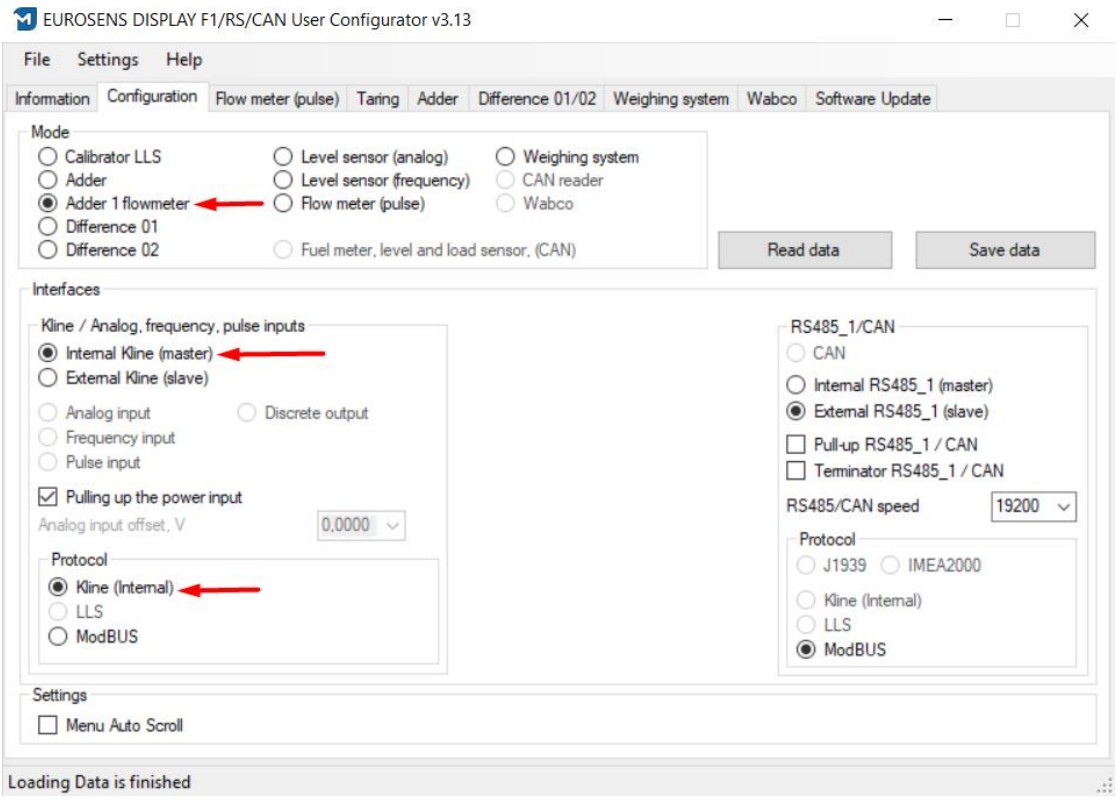


fig. 4.9. Choosing mode “Adder 1 meter”

After choosing the mode "Adder 1 flowmeter" you must select the device type "Direct Delta +" and specify the address of the flowmeter (fig. 4.10) in the first line of the tab "Adder". Addresses of all other lines must be set to 0.

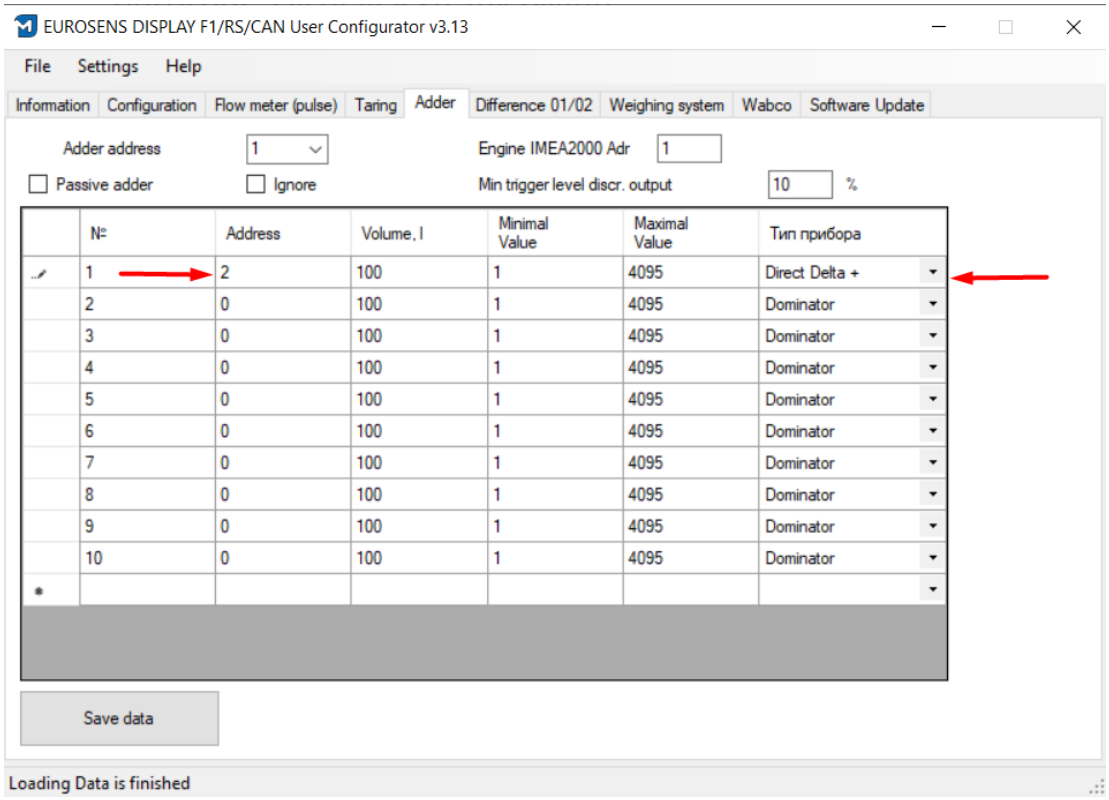


fig. 4.10. Setting of “Adder 1 flowmeter” mode

- The flowmeter must be configured to use the same interface and protocol as the display (internal network).
- If set to "**Ignore**" to adder address, the display will respond to an external device at any of the addresses (0 - 255).
- The "**Passive adder**" mode is set if an external device directly polls the flowmeter, in which case the display connects to the interface and receives responses from devices without sending queries (to avoid two masters on the line).

Table 4.2. Structure of display screens in "Adder 1 flowmeter" mode

Screen №	Displayed parameter
1	Total volume, l
2	Volume of idle, l
3	Volume of nominal mode, l
4	Volume of overload, l
5	Cheat volume, l
6	Negative mode volume, l
7	Consumption flow rate,l/h
8	Flow rate in the direct chamber, l/h
9	Supply chamber temperature, ºC
10	Flow rate in the return chamber, l/h
11	Return chamber temperature, ºC
12	Firmware version

4.5 Mode “Difference 01”

In "Difference 01" mode, the display acts as an analog-to-digital converter for an analog pressure sensor (eurosens DPS A). The display shows the pressure sensor output voltage, the pressure in MPa and the weight calculated by the calibration table (stored in the display), also sends this data to external interface.

Fig. 4.11. Display connection with analog pressure sensor. Mode “Difference 01”

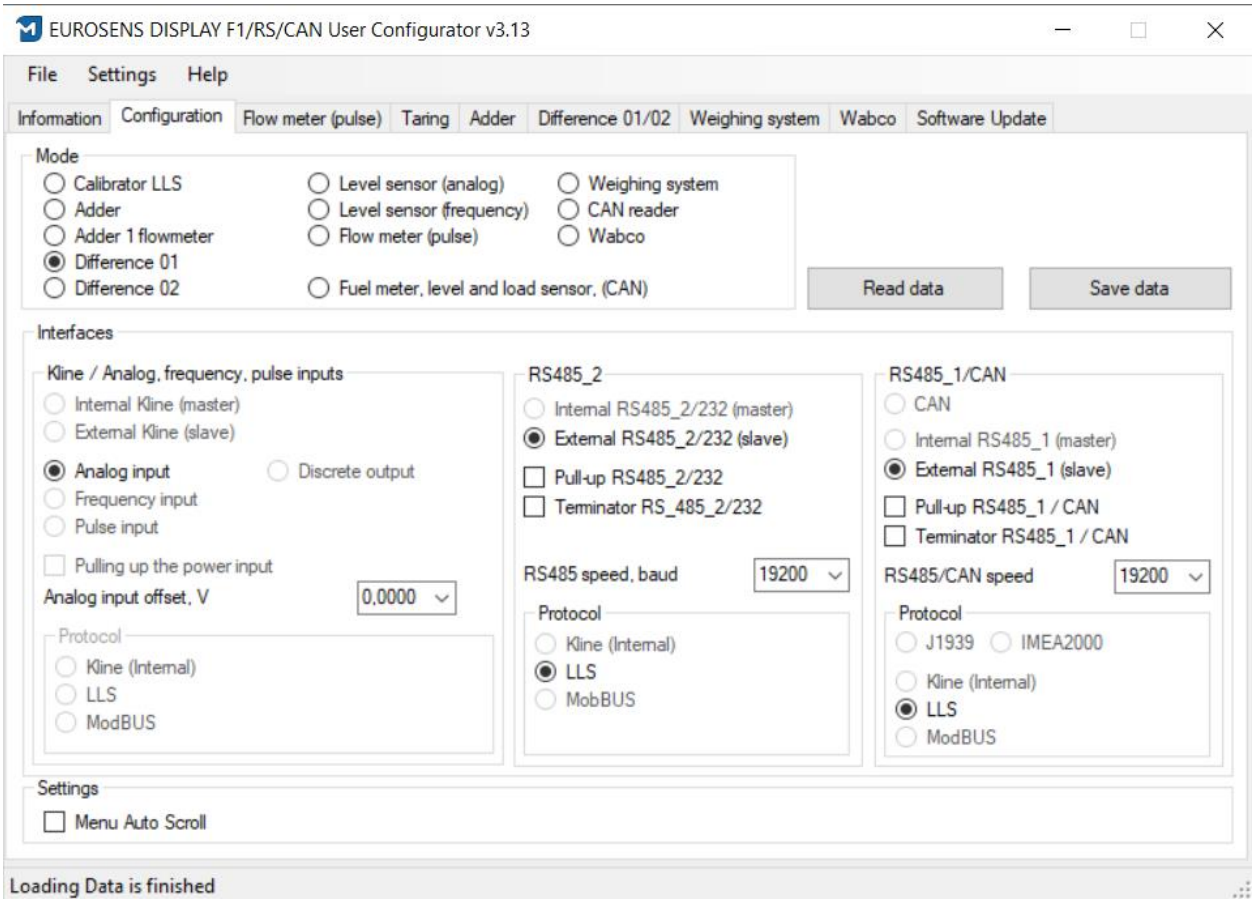


fig. 4.12. Choosing “Difference 01” mode

pressure sensor and obtain a load in tons, a number of steps must be taken:

1) Install the DPS A pressure sensor in the pneumatic circuit.
2) Connect the display and the DPS A sensor.
3) Apply external power.
4) Record the voltage value on the pressure sensor displayed when the machine is empty.
5) Record the pressure sensor voltage value on the display and the weight (look at the scale) when the machine is loaded.
6) Based on the data obtained, complete the calibration table (fig. 4.13).

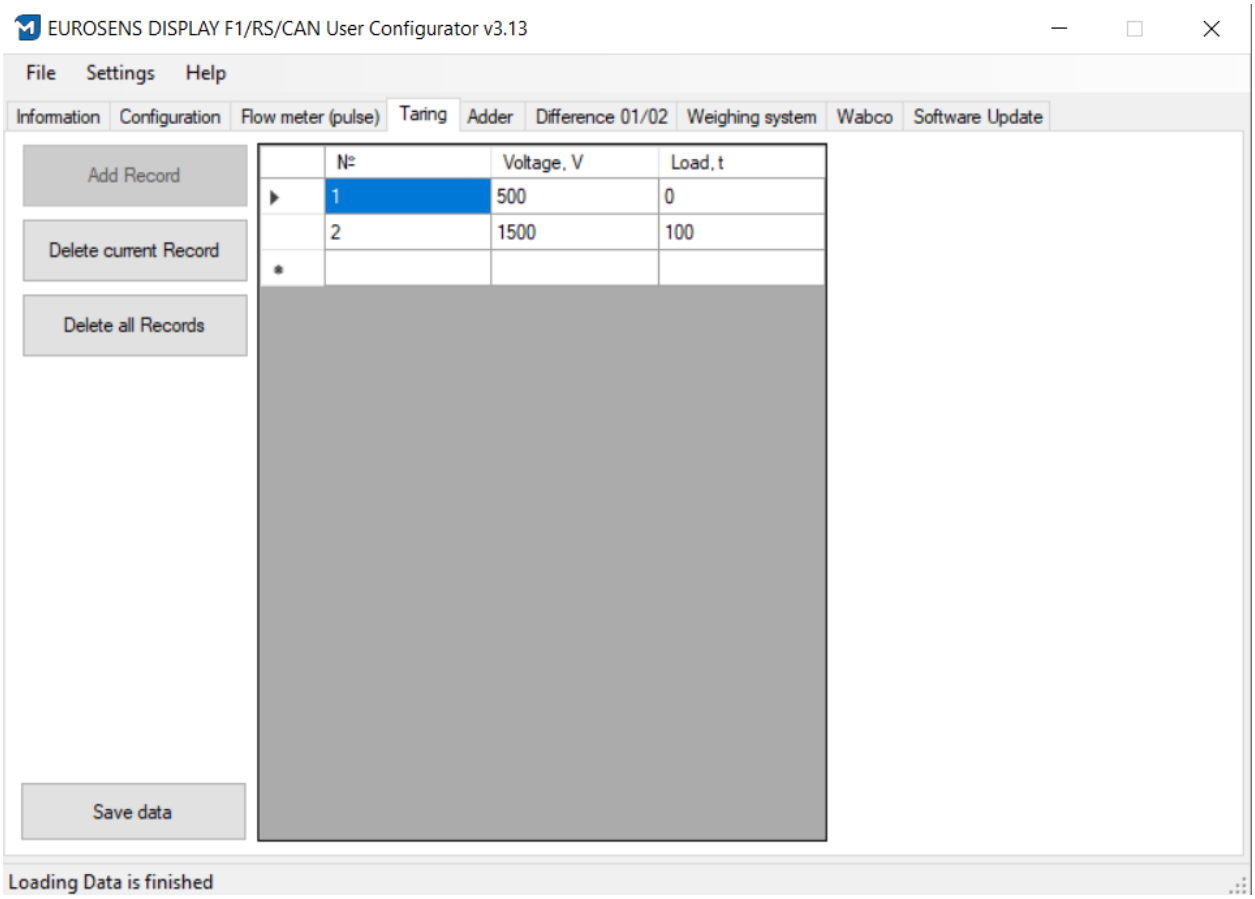


fig. 4.13. Calibration table, “Difference 01” mode

- In the first line of the table you must record the voltage coming from the sensor with an empty vehicle, the field "Load, t" must be 0. The second line records the voltage when the vehicle is loaded, and the field "Load, t" records the weight of the load.
- There can be up to 128 lines in the table. If additional loading was made several times, in the field "Load, t" you must not enter the actual weight of the cargo, but the difference (increment) in the weight of the cargo between the current load and the previous load.

The voltage and weight data can be obtained digitally by configuring the external network and protocol according to the selected interface and protocol in the GPS tracking system. The display address and alarm threshold can be set on the "Difference 01/02" tab (fig. 4.14).

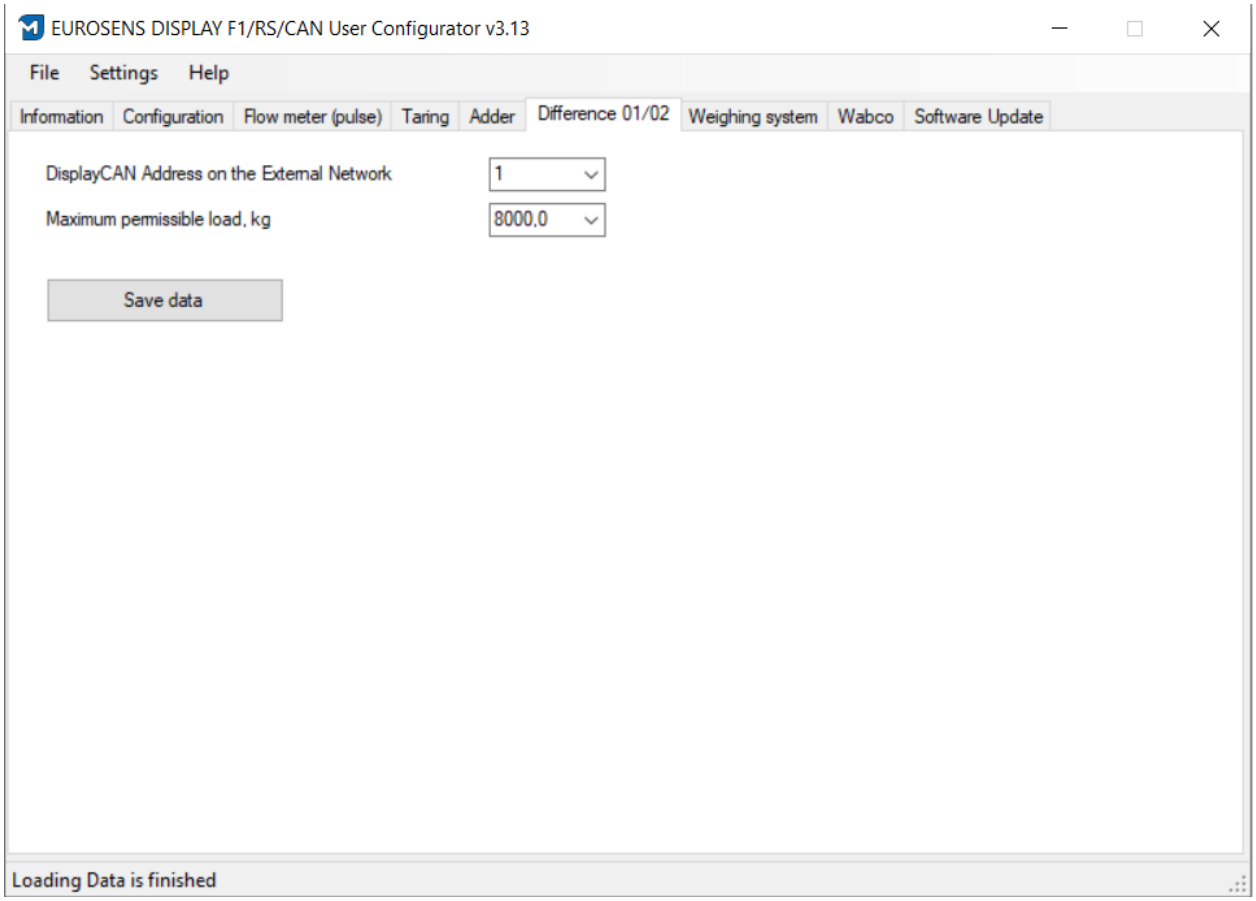


Fig. 4.14. Setting the address and alarm threshold

Table 4.3. Display screens in "Difference 01" mode

Screen №	Displayed parameter
1 2 3 4	Load, t Pressure, MPa Input signal, V Firmware version

4.6 Mode “Difference 02”

В режиме “Difference 02” eurosens Display RS/CAN выступает в роли АЦП для аналогового датчика перемещения. Дисплей выдает на индикатор и систему мониторинга значения напряжения на выходе датчика перемещения, угол поворота рычага и вес, рассчитанный с помощью калибровочной таблицы (сохраняется в дисплей). In "Difference 02" mode, the eurosens Display RS/CAN

acts as an analog-digital conveter for the analog displacement sensor. The display shows and sends to the GPS tracking system the voltage values of the displacement sensor output, the arm angle and the weight calculated by the calibration table (stored in the display).

fig. 4.15. Display connection with Eurosens DDS A sensor. Mode “Difference 02”

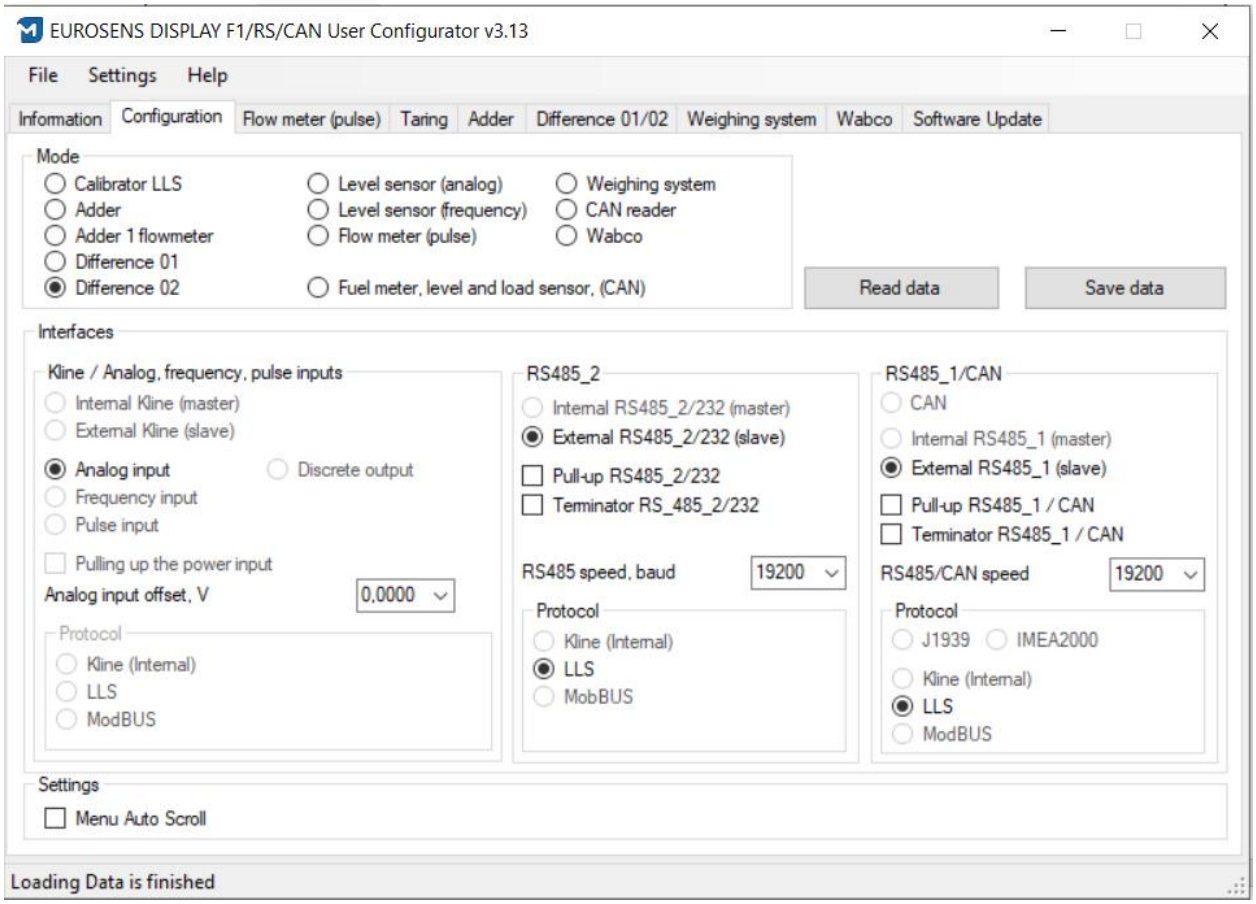


fig. 4.16. Choosing “Difference 02” mode

In order to calibrate the displacement sensor and obtain a load in tons, a number of steps must be followed:

1) Install the DDS A displacement sensor.
2) Connect the display and the DDS A sensor.
3) Apply external power.
4) Record the voltage value on the displacement sensor displayed when the machine is empty.
5) Record the voltage value on the displacement sensor on the display and the weight (as seen on the scale) when the machine is loaded.
6) Based on the data obtained, complete the calibration table.

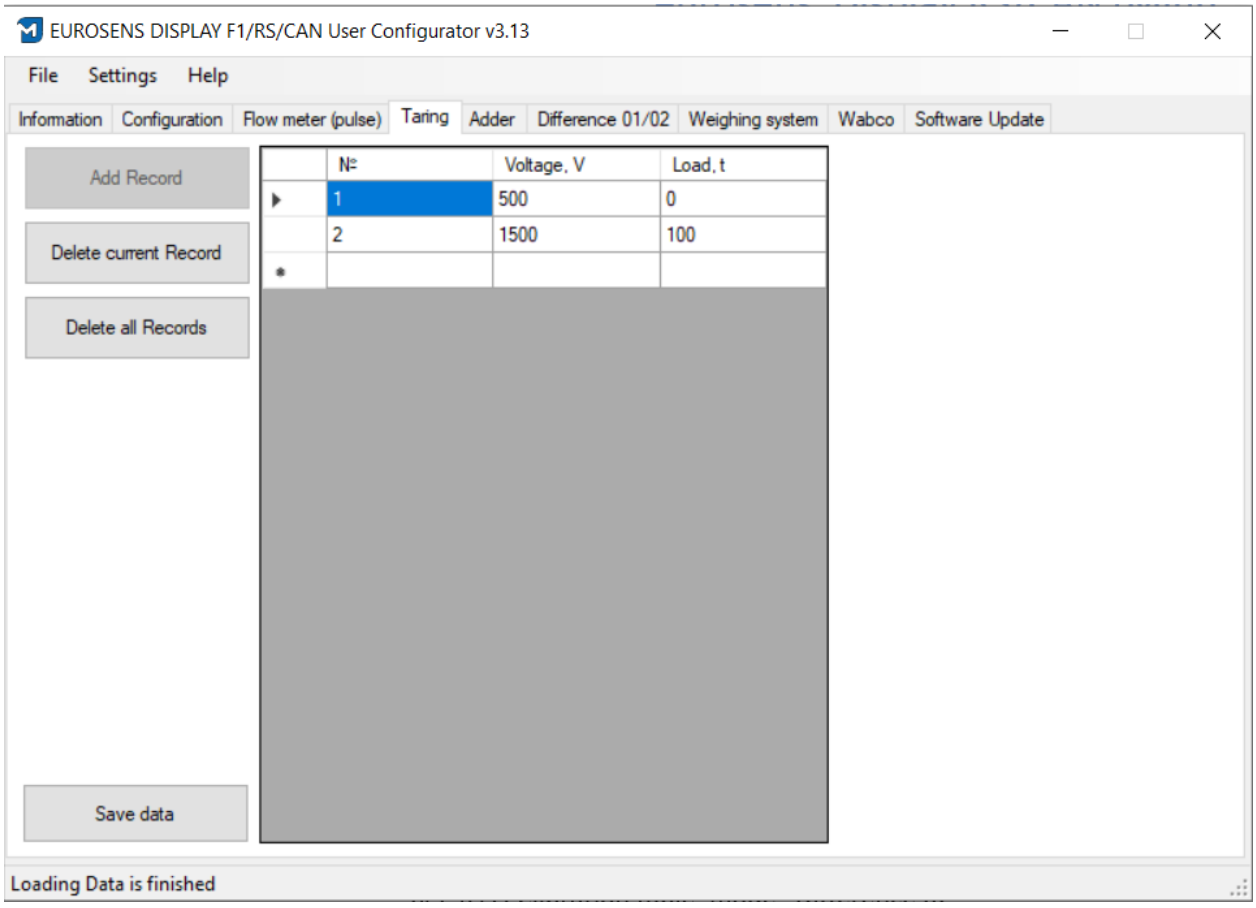


fig. 4.17. Clibration table, mode “Difference 02”

There can be up to 128 rows in the table. If calibration loading was made several times, in the field "Load, tons" you should not specify the actual weight of cargo, but the difference (increment) in the weight of cargo between the current load and the previous load.

Voltage and weight data can be obtained digitally (RS-485/ CAN) by configuring the external network and protocol according to the selected interface and protocol in the GPS tracker. The display address and alarm threshold can be set on the "Difference 01/02" tab.

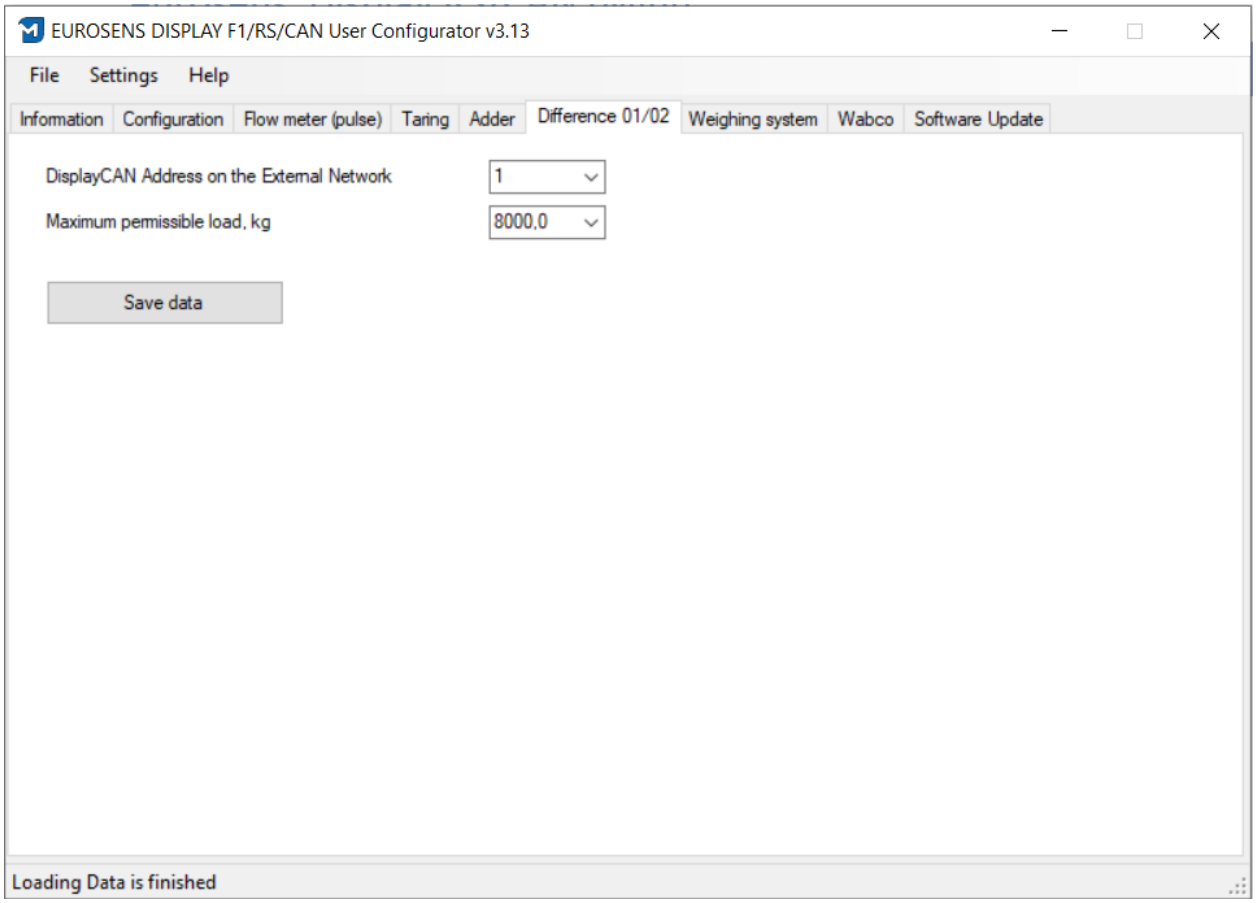


fig. 4.18. Setting the address and alarm threshold

Table 4.4. Display screens in "Difference 01" mode

Screen №	Displayed parameter
1	Load, t
2	Angle of shaft, degrees
3	Input signal, V
4	Firmware version

4.7 MODE "LEVEL SENSOR (ANALOG)"

In the "Analog Sensor" mode, the display acts as an ADC for the analog fuel level sensor. The display shows the signal voltage at the input and the value of the fuel volume calculated with the calibration table (stored in the display).

fig. 4.19. Display connected with fuel level sensor by analog interface

In order to calibrate the fuel level sensor and get the volume in liters, it is necessary to perform a number of actions:

1) Install the FLS in the tank and calibrate the tank.
2) Connect the display and the FLS.
3) Apply external power.
4) Record the voltage value on the fuel level sensor displayed on Display RS when the tank is empty.
5) Record the voltage value on the fuel level sensor, displayed on Display RS, and the volume of fuel filled.
6) On the basis of the received data fill in the calibration table (fig. 4.21).

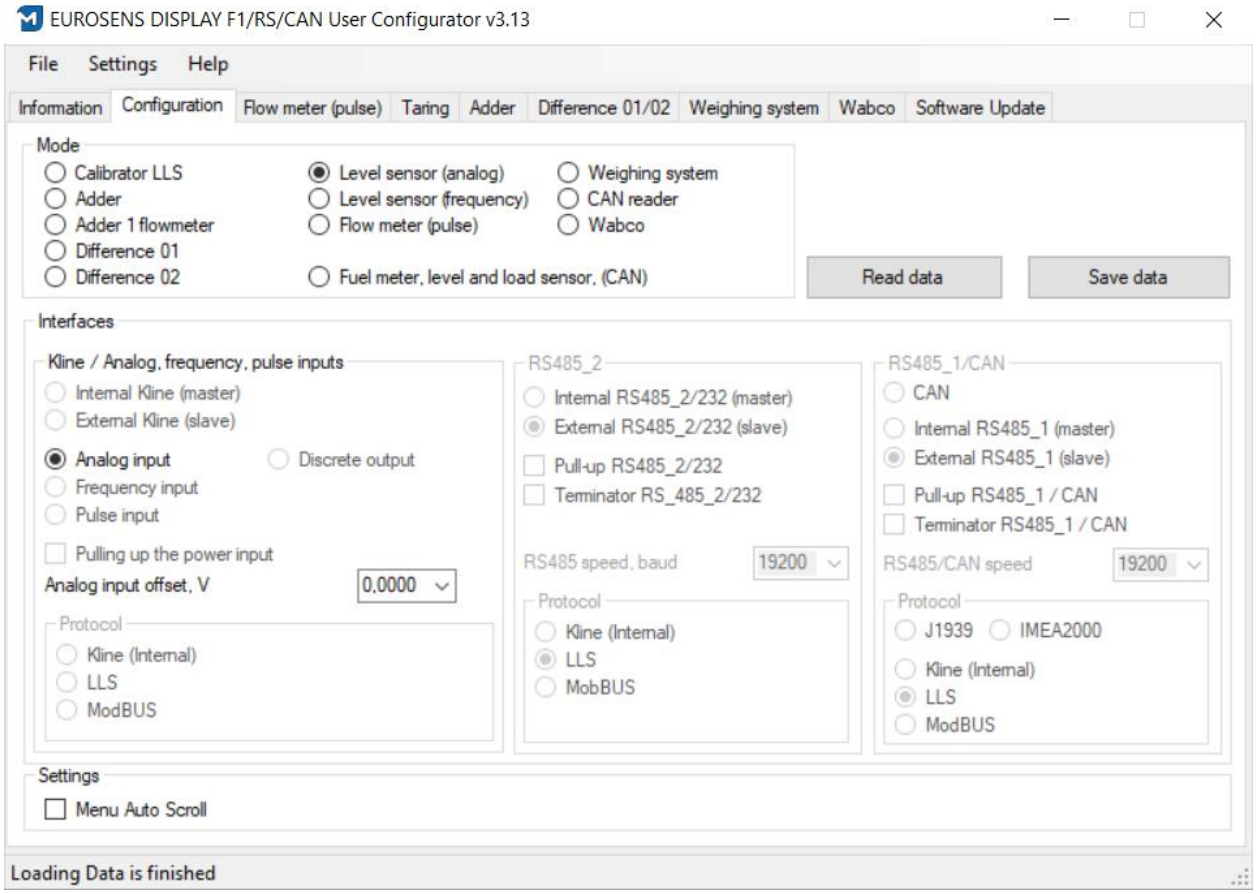


fig. 4.20. Choosing the mode “Level sensor (analog)”

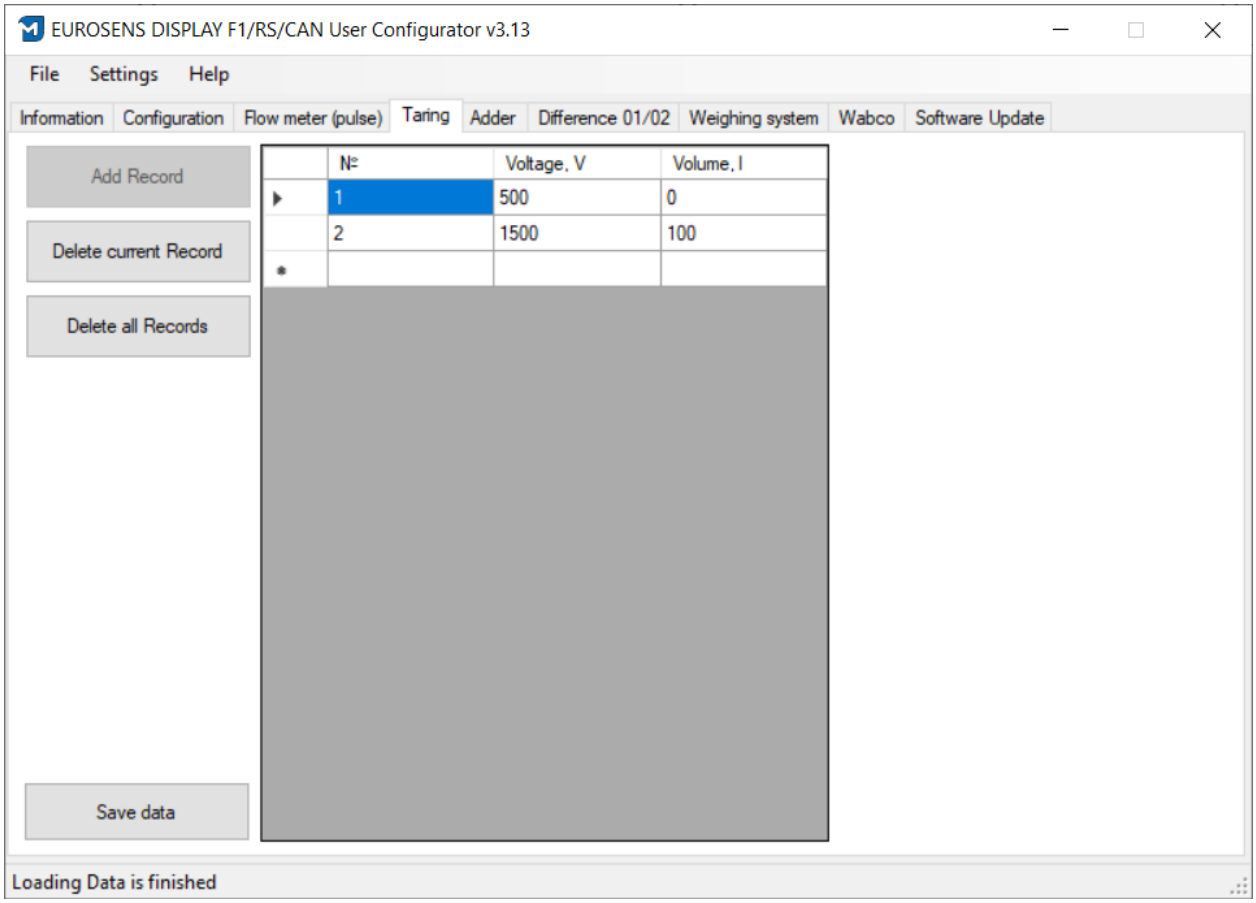


Fig. 4.21. Calibration table, mode “Level sensor (analog)”

In the first line of the table you must record the voltage on the sensor with an empty tank, the field "Volume, l" must be 0. The second line records the voltage at a full tank, and in the "Volume, l" field records the volume of a full tank.

Table 4.5. Diagram of the display screens in the "Level sensor (analog)" mode

Screen №	Displayed parameter
1	Fuel volume
2	Input signal, V
3	Firmware version

4.8 Mode “Level sensor (Frequency)”

In this mode the display measures the frequency of the fuel level sensor signal with frequency output. The display shows the input signal frequency and the fuel volume value calculated with the calibration table (stored in the display).

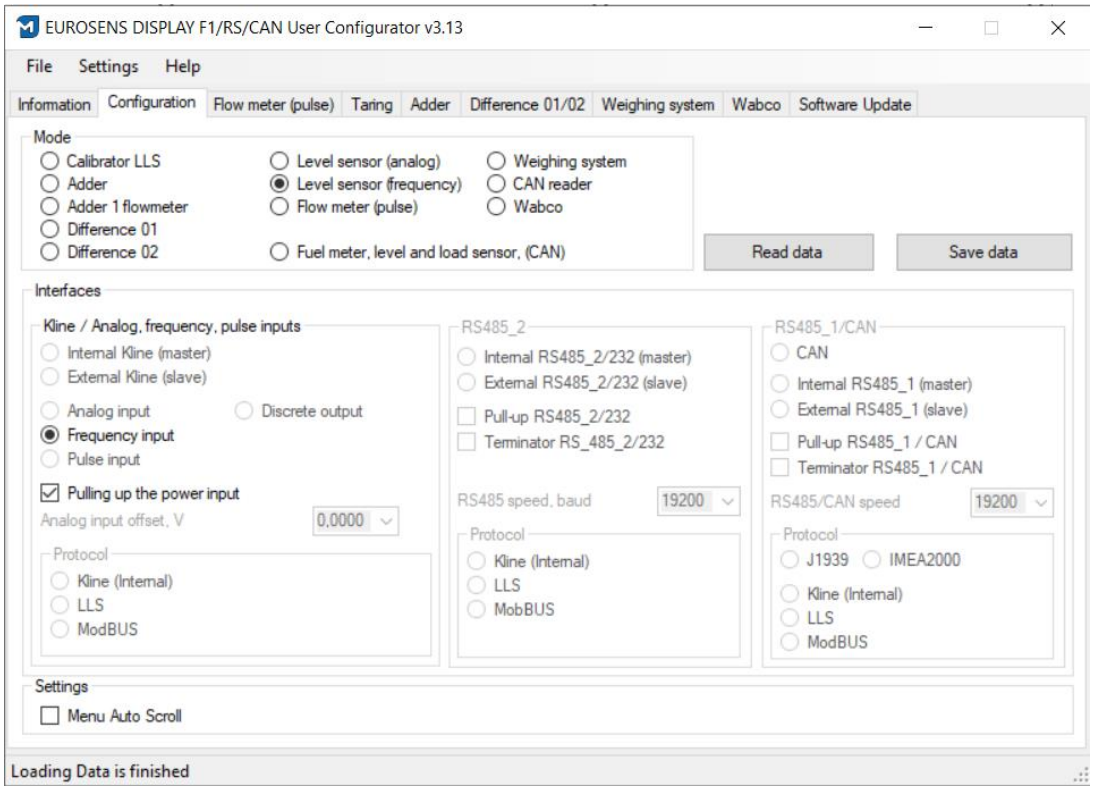


fig. 4.22. Choosing the “Level sensor (Frequency)” mode

In order to get the volume in liters, it is necessary to perform a number of actions:

1) Install the FLS in the tank and calibrate the tank.
2) Connect the display and the FLS.
3) Apply external power.
4) Record the frequency value on the fuel level sensor displayed on Display RS when the tank is empty.
5) Record the frequency value on the fuel level sensor, displayed on Display RS, and the volume of fuel.
6) On the basis of the received data fill in the calibration table (fig. 4.23).

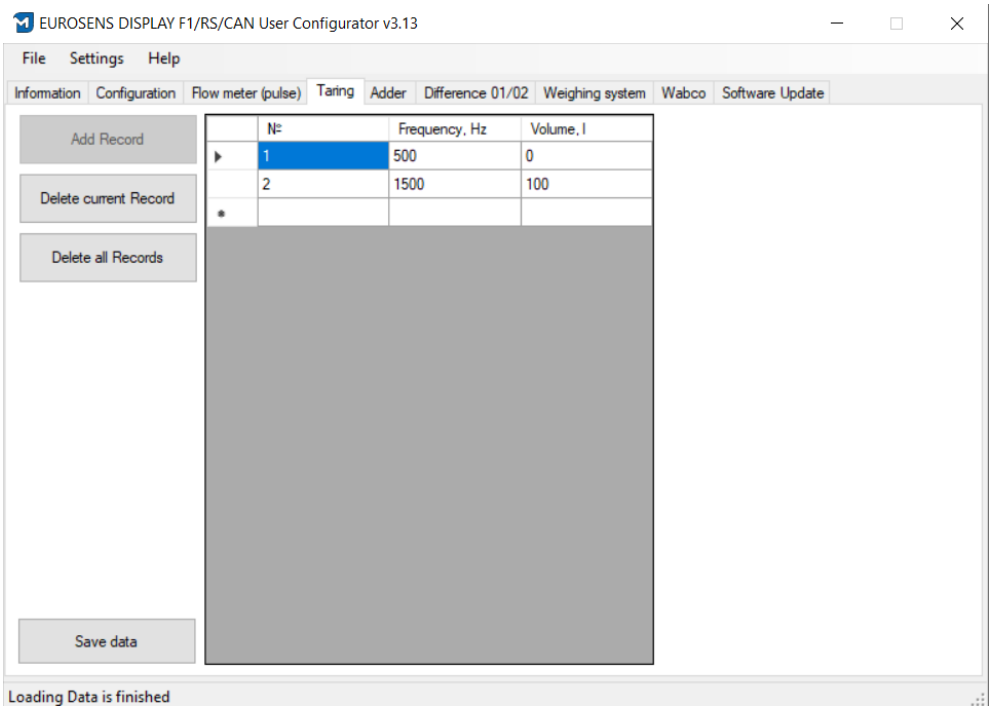


fig. 4.23. Calibration table, mode “Level sensor (frequency)”

In the first line of the table you must record the frequency with an empty tank, the field "Volume, l" must be 0. The second line records the frequency of the signal with a full tank, and in the "Volume, l" field records the volume of a full tank.

Table 4.6. Diagram of the display screens in the "Level sensor (frequency)" mode

Screen №	Displayed parameter
1	Fuel volume
2	Input signal, Hz
3	Firmware version

4.9 Mode “Flow meter (pulse)”

In the "Pulse Sensor" mode the display can work with one flow meter with a pulse output.

fig. 4.24. Pulse meter connected to display

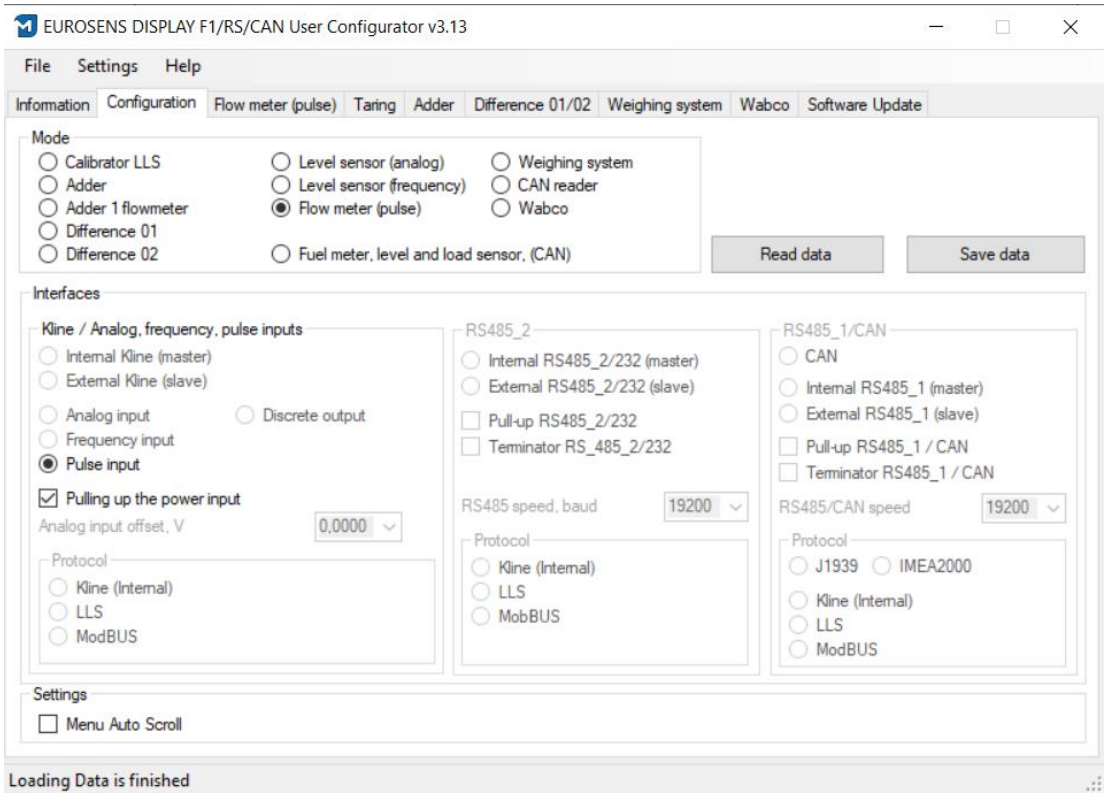


fig. 4.25. Mode “Flow meter (pulse)”

To configure the "Pulse sensor" mode you must go to the tab "**Flow meter (pulse)**".

- In the "**Volume of normalized impulse**" tab sets the volume of the each pulse from flow meter specification.
- The mode thresholds determine which of the counters to add the flow rate values to when the flow rate exceeds the specified threshold.
- In the "**Counters**" area you can view the accumulated flow rate and operating time data in different operating modes of the flowmeter.

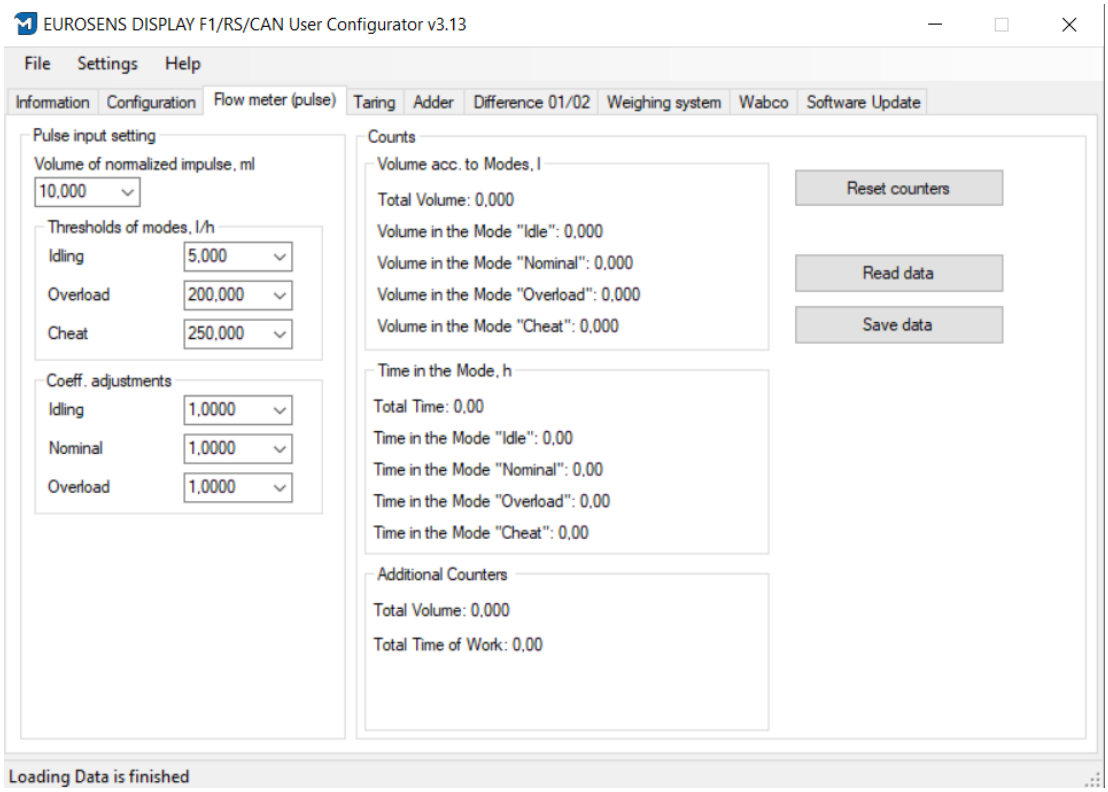


fig. 4.26. Setting up the pulse meter mode

Counters by mode are stored in the non-volatile memory of the display. The counters are recorded at intervals of 1 min.

Table 4.7. Diagram of the display screens in the pulse flow meter mode

screen №	Displayed parameter
1	Total volume, l
2	Volume of idle, l
3	Volume of nominal mode, l
4	Volume of overload, l
5	Volume of cheat, l
6	Supply volume, l

7	Flow rate, l/h
8	Total engine run time, hour
9	Idle time, hour
10	Nominal mode operating time, hour
11	Overload time, hour
12	Cheat time, hour
13	Total running time, hr
14	Firmware version

4.10 MODE "FUEL METER, LEVEL, LOAD SENSOR CAN"

The data and structure of the screens in this mode depend on the equipment connected to the network. Each of the connected devices is a source of data:

- fuel level sensor - volume in the tank and temperature;
- fuel consumption sensor - total fuel consumption meter (liters) and instantaneous fuel consumption (liters per hour);
- axle load sensor - axle load according to the calibration table of the sensor and the signal of the internal sensor (voltage).

For example, if 2 eurosens Dominator CAN fuel level sensors are connected to the CAN bus, the screen layout consists of 5 screens: total fuel volume + fuel volume and temperature for each of the sensors.

4.11 Mode “Weighing system”

This mode of operation is used when the display is used as part of the weighing control system Eurosens Difference.

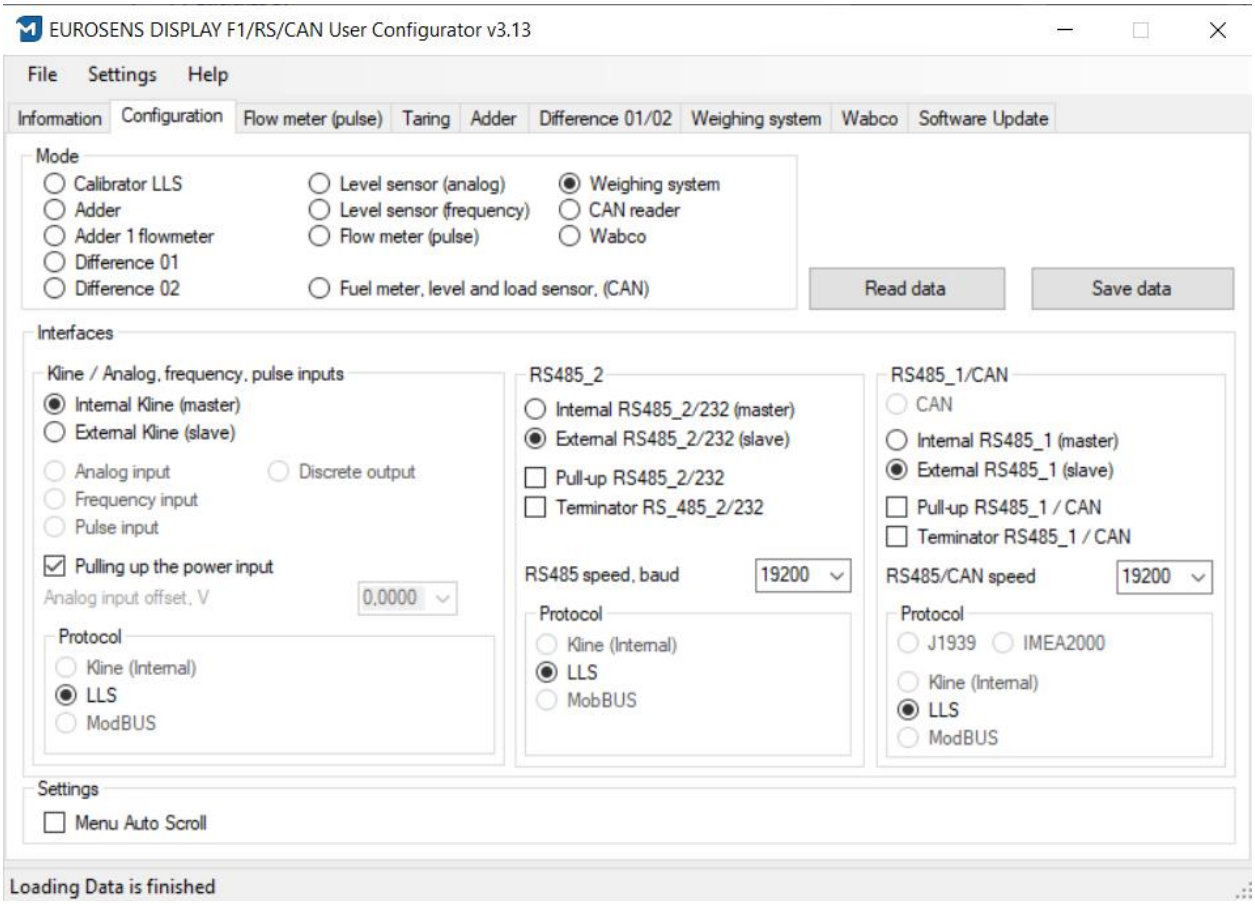


fig. 4.27. Mode “Onboard weighing”

In this mode the user can configure the addresses of calculated parameters to be polled by RS485 interface and LLS protocol, the thresholds of overload and the period of sending messages in auto-sending mode.

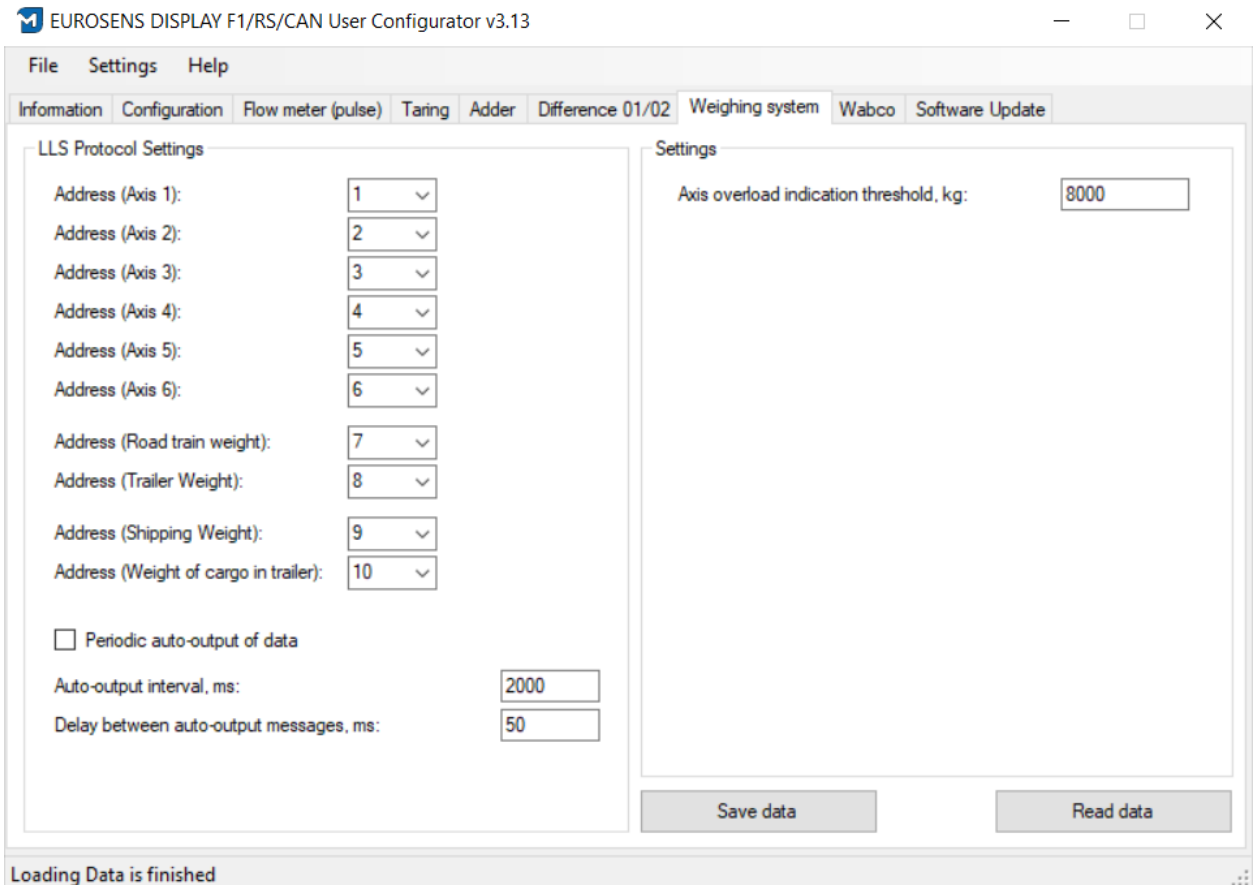


Fig. 4.28. Setting of addressing, auto-sending and period of output

If the address field is set to 0, no output will be performed for this parameter.

The on-board weighing system works only through the internal RS-485 interface and delivers measurement results through the external RS-485 interface.

4.12 Mode “CAN-reader”

In this mode (fig. 4.29) the display is connected to the vehicle's CAN bus and tries to read data via the J1939 protocol.

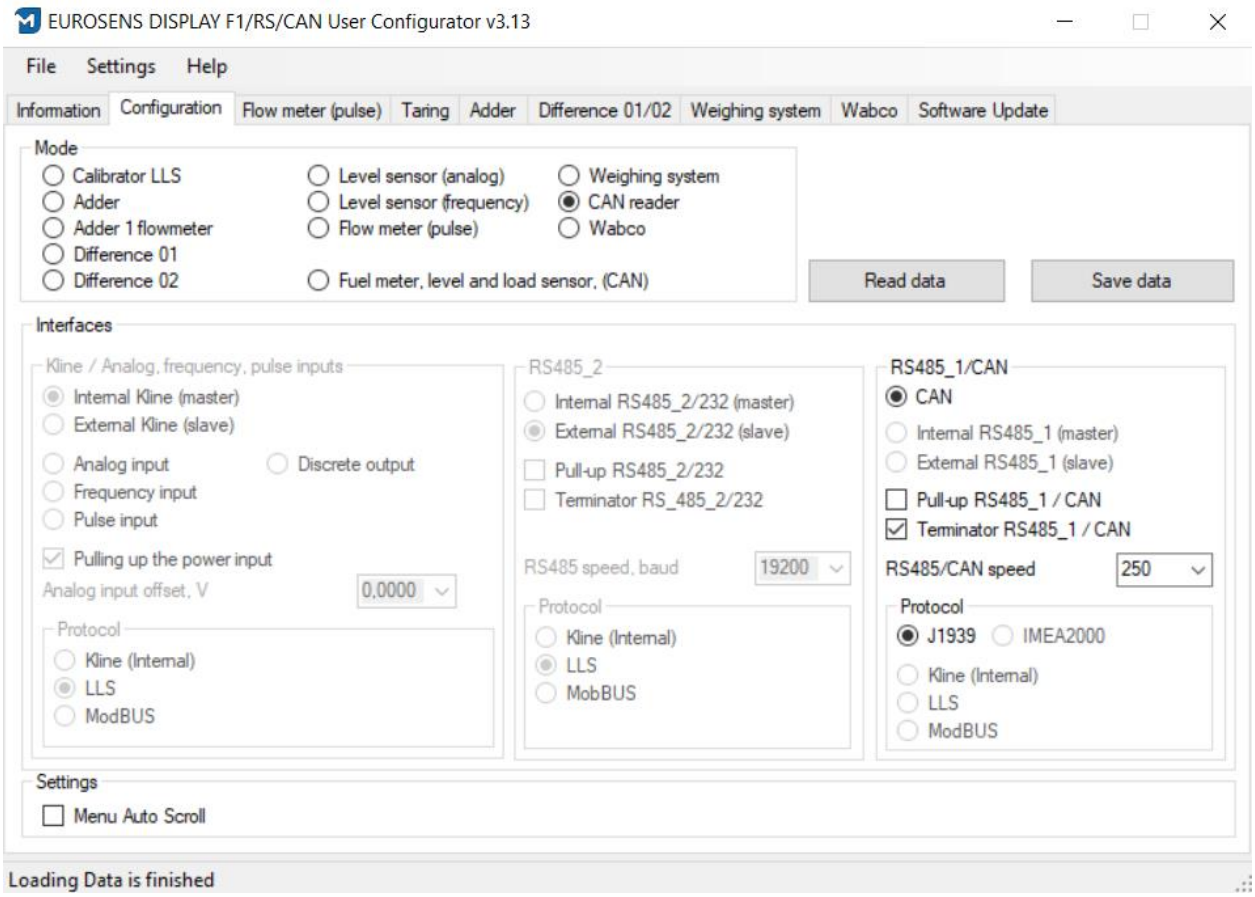


fig. 4.29. Mode “CAN-reader”

The list of readable parameters is shown in Table 4.8. In case a parameter is missing in the CAN bus, it is not present in the screen layout.

Table 4.8. Parameters readable via J1939 protocol

Номер параметра	SPN по SAE J1939	Data
1	SPN 182 Engine Trip Fuel	Fuel consumption since power ON, L
2	SPN 250 Engine Total Fuel Used	Total fuel consumption, L
3	SPN 183 Engine Fuel Rate	Instant fuel consumption, L/hour
4	SPN 5053 High Resolution Engine Trip Fuel	Fuel consumption since power ON, L (in high resolution)
5	SPN 5054 High Resolution Engine Total Fuel Used	Fuel consumption, L (in high resolution)
6	SPN1624 Tachograph Speed	Speed, km/h

4.13 FIRMWARE UPDATE

To update the display firmware, go to "**Software Update**" tab and select the firmware file.

Actual firmware versions can be downloaded from

https://drive.google.com/drive/folders/16AMnEqe3EiHrbVmEanvshdXF1pcWxosH?usp=share_link

Choose firmware according to the hardware version of the display, which is listed in the "**Information**" section.

5 ADDITIONAL INFORMATION

5.1 STORAGE

It is recommended to store eurosens Display RS/CAN in dry enclosed areas.

Displays may only be stored in its original packaging at temperature range from -50 to + 40 °C and relative humidity up to 100% at +25 °C.

Do not store displays with substances that cause metal corrosion and/or contain aggressive impurities.

The storage period of displays should not exceed 12 months.

5.2 TRANSPORTATION

Display RS/CAN are transported in any type of closed transport that provides protection against mechanical damage and prevents the package from being exposed to atmospheric precipitation.

The air in vehicles must not contain acidic, alkaline and other aggressive impurities.

The transport container with the packaged Display RS/CAN should be sealed.

5.3 DISPOSAL

Displays do not contain any substances or components that could be hazardous to health and the environment during and after the service life and disposal.

Displays do not contain precious metals in amount mandatory for accounting.

5.4 TECHNICAL SUPPORT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APPENDIX I. OVERALL AND MOUNTING DIMENSIONS

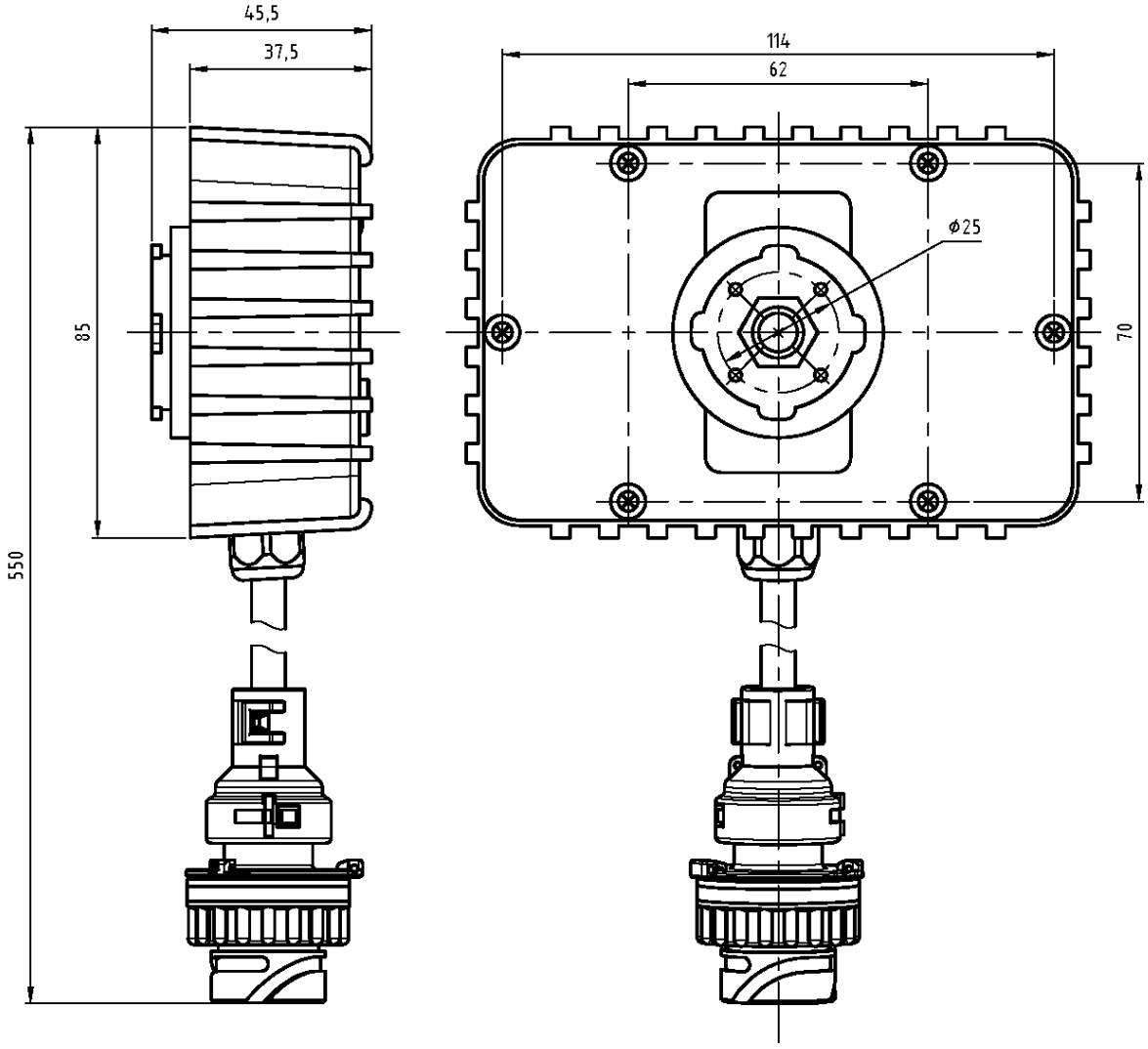

fig. I. 1. Display RS/CAN dimensions

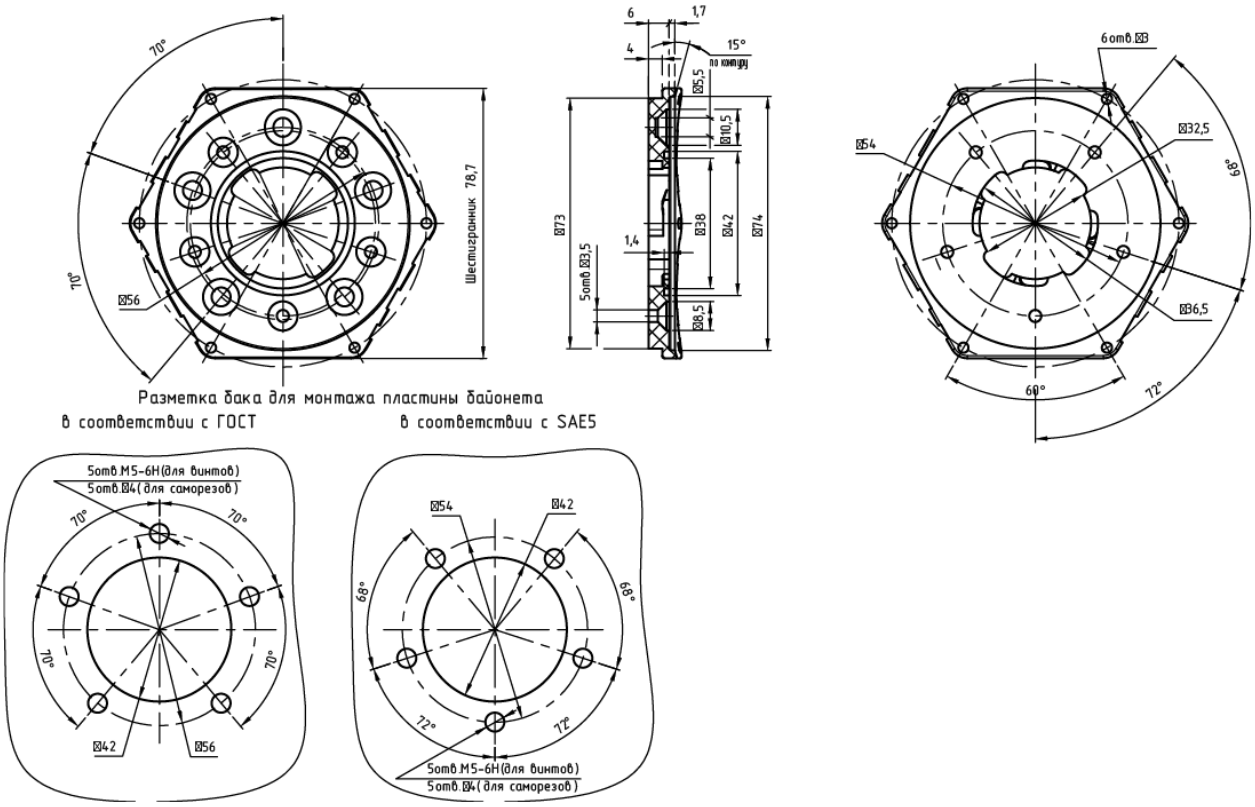

fig. I. 2. Mounting dimensions

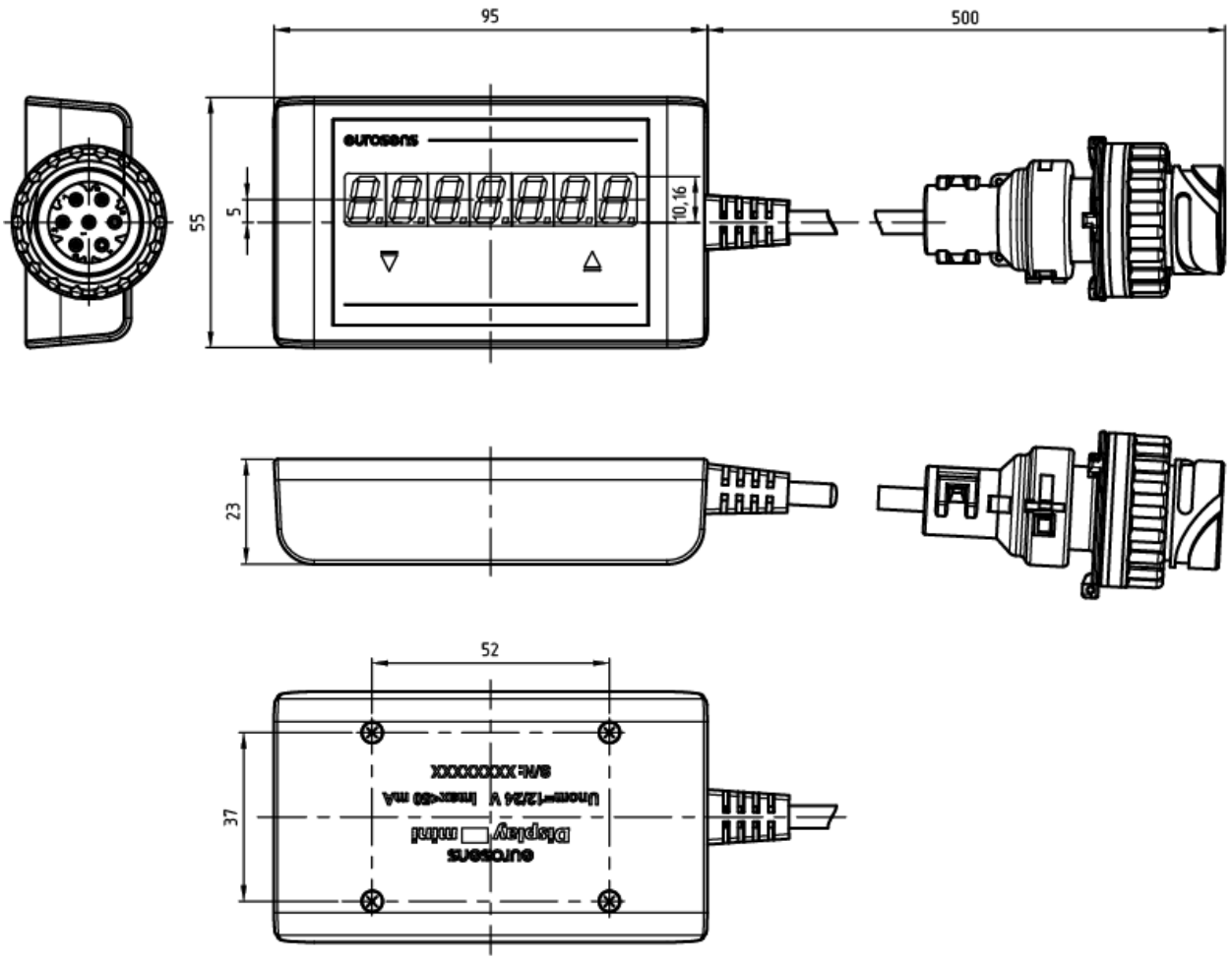

Fig. I. 3. Overal dimensions of Display RS/CAN Mini

APPENDIX II. MODBUS RTU REGISTERS

Sensor operation data is written to Input Registers and Holding Registers. The following functions are used to read data:

1) 03 (0x03) - reading values from several storage registers (Read Holding Registers).

2) 04 (0x04) - reading values from several input registers (Read Input Registers).

3) 70 (0x70) - user command.

The query consists of the address of the first table element, which value is to be read, and the number of elements to be read. The address and number of data are specified by 16-bit numbers, the high byte of each of them is transmitted first.

The response transmits the requested data. The number of data bytes depends on the number of requested elements. One byte is transmitted before the data, the value of which is equal to the number of data bytes.

The values of storage registers and input registers are transmitted starting from the specified address, two bytes per register, the most significant byte of each register is transmitted first.

The structure of the protocol address space is described in Table II.1

Табл.II.1 MODBUS address table

№	Modbus address	Storage location	Data type	Comments	№
1	0000	Input register (High 16-bit)	unsigned 32 bit		Fuel level sensors total volume (в 0,01 L)
2	0001	Input register (Low 16-bit)			
3	0002	Input register (High 16-bit)	unsigned 32 bit		Fuel meters total volume (в 0,01 L)
4	0003	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
5	0004	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 1	Fuel level sensor volume (in 0,01 L)
6	0005	Input register (Low 16-bit)			
7	0006	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
8	0007	Input register	signed 16 bit		Temperature FLS ºC
9	0008	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 2	Fuel level sensor volume (in 0,01 L)
10	0009	Input register (Low 16-bit)			
11	0010	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
12	0011	Input register	signed 16 bit		Temperature FLS ºC
13	0012	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 3	Fuel level sensor volume (in 0,01 L)
14	0013	Input register (Low 16-bit)			
15	0014	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
16	0015	Input register	signed 16 bit		Temperature FLS ºC
17	0016	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 4	Fuel level sensor volume (in 0,01 L)
18	0017	Input register (Low 16-bit)			
19	0018	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
20	0019	Input register	signed 16 bit		Temperature FLS ºC

№	Modbus address	Storage location	Data type	Comments	№
21	0020	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 5	Fuel level sensor volume (in 0,01 L)
22	0021	Input register (Low 16-bit)			
23	0022	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
24	0023	Input register	signed 16 bit		Temperature FLS ºC
25	0024	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 6	Fuel level sensor volume (in 0,01 L)
26	0025	Input register (Low 16-bit)			
27	0026	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
28	0027	Input register	signed 16 bit		Temperature FLS ºC
29	0028	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 7	Fuel level sensor volume (in 0,01 L)
30	0029	Input register (Low 16-bit)			
31	0030	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
32	0031	Input register	signed 16 bit		Temperature FLS ºC
33	0032	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 8	Fuel level sensor volume (in 0,01 L)
34	0033	Input register (Low 16-bit)			
35	0034	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
36	0035	Input register	signed 16 bit		Temperature FLS ºC

№	Modbus address	Storage location	Data type	Comments	№
37	0036	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 9	Fuel level sensor volume (in 0,01 L)
38	0037	Input register (Low 16-bit)			
39	0038	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
40	0039	Input register	signed 16 bit		Temperature FLS ºC
41	0040	Input register (High 16-bit)	unsigned 32 bit	Fuel level sensor 10	Fuel level sensor volume (in 0,01 L)
42	0041	Input register (Low 16-bit)			
43	0042	Input register	unsigned 16 bit		Fuel level sensor volume (in 0,01 %)
44	0043	Input register	signed 16 bit		Temperature FLS ºC
45	0044	Input register (High 16-bit)	signed 32 bit	Fuel meter 1	Fuel meter fuel consumption (in 0,01 L)
46	0045	Input register (Low 16-bit)			
47	0046	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
48	0047	Input register (Low 16-bit)			
49	0048	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
50	0049	Input register (Low 16-bit)			
51	0050	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
52	0051	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
53	0052	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
54	0053	Input register (Low 16-bit)			
55	0054	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
56	0055	Input register (Low 16-bit)			
57	0056	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
58	0057	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
59	0058	Input register (Low 16-bit)			
60	0059	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
61	0060	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
62	0061	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
63	0062	Input register (Low 16-bit)			
64	0063	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
65	0064	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
66*	0065	Input register	unsigned 16 bit		Fuel meter status
67	0066	Input register (High 16-bit)	signed 32 bit	Fuel meter 2	Fuel meter fuel consumption (in 0,01 L)
68	0067	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
69	0068	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
70	0069	Input register (Low 16-bit)			
71	0070	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
72	0071	Input register (Low 16-bit)			
73	0072	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
74	0073	Input register (Low 16-bit)			
75	0074	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
76	0075	Input register (Low 16-bit)			
77	0076	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
78	0077	Input register (Low 16-bit)			
79	0078	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
80	0079	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
81	0080	Input register (Low 16-bit)			
82	0081	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
83	0082	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
84	0083	Input register (High 16-bit)	signed		Fuel return volume (in 0,01 L)

№	Modbus address	Storage location	Data type	Comments	№
85	0084	Input register (Low 16-bit)	32 bit		
86	0085	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
87	0086	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
88*	0087	Input register	unsigned 16 bit		Fuel meter status
89	0088	Input register (High 16-bit)	signed 32 bit	Fuel meter 3	Fuel meter fuel consumption (in 0,01 L)
90	0089	Input register (Low 16-bit)			
91	0090	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
92	0091	Input register (Low 16-bit)			
93	0092	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
94	0093	Input register (Low 16-bit)			
95	0094	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
96	0095	Input register (Low 16-bit)			
97	0096	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
98	0097	Input register (Low 16-bit)			
99	0098	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
100	0099	Input register (Low 16-bit)			
101	0100	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)

№	Modbus address	Storage location	Data type	Comments	№
102	0101	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
103	0102	Input register (Low 16-bit)			
104	0103	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
105	0104	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
106	0105	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
107	0106	Input register (Low 16-bit)			
108	0107	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
109	0108	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
110*	0109	Input register	unsigned 16 bit		Fuel meter status
111	0110	Input register (High 16-bit)	signed 32 bit	Fuel meter 4	Fuel meter fuel consumption (in 0,01 L)
112	0111	Input register (Low 16-bit)			
113	0112	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
114	0113	Input register (Low 16-bit)			
115	0114	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
116	0115	Input register (Low 16-bit)			
117	0116	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
118	0117	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
119	0118	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
120	0119	Input register (Low 16-bit)			
121	0120	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
122	0121	Input register (Low 16-bit)			
123	0122	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
124	0123	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
125	0124	Input register (Low 16-bit)			
126	0125	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
127	0126	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
128	0127	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
129	0128	Input register (Low 16-bit)			
130	0129	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
131	0130	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
132*	0131	Input register	unsigned 16 bit		Fuel meter status
133	0132	Input register (High 16-bit)	signed 32 bit	Fuel meter 5	Fuel meter fuel consumption (in 0,01 L)
134	0133	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
135	0134	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
136	0135	Input register (Low 16-bit)			
137	0136	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
138	0137	Input register (Low 16-bit)			
139	0138	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
140	0139	Input register (Low 16-bit)			
141	0140	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
142	0141	Input register (Low 16-bit)			
143	0142	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
144	0143	Input register (Low 16-bit)			
145	0144	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
146	0145	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
147	0146	Input register (Low 16-bit)			
148	0147	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
149	0148	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
150	0149	Input register (High 16-bit)	signed		Fuel return volume (in 0,01 L)

№	Modbus address	Storage location	Data type	Comments	№
151	0150	Input register (Low 16-bit)	32 bit		
152	0151	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
153	0152	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
154*	0153	Input register	unsigned 16 bit		Fuel meter status
155	0154	Input register (High 16-bit)	signed 32 bit	Fuel meter 6	Fuel meter fuel consumption (in 0,01 L)
156	0155	Input register (Low 16-bit)			
157	0156	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
158	0157	Input register (Low 16-bit)			
159	0158	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
160	0159	Input register (Low 16-bit)			
161	0160	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
162	0161	Input register (Low 16-bit)			
163	0162	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
164	0163	Input register (Low 16-bit)			
165	0164	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
166	0165	Input register (Low 16-bit)			
167	0166	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)

№	Modbus address	Storage location	Data type	Comments	№
168	0167	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
169	0168	Input register (Low 16-bit)			
170	0169	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
171	0170	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
172	0171	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
173	0172	Input register (Low 16-bit)			
174	0173	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
175	0174	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
176*	0175	Input register	unsigned 16 bit		Fuel meter status
177	0176	Input register (High 16-bit)	signed 32 bit	Fuel meter 7	Fuel meter fuel consumption (in 0,01 L)
178	0177	Input register (Low 16-bit)			
179	0178	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
180	0179	Input register (Low 16-bit)			
181	0180	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
182	0181	Input register (Low 16-bit)			
183	0182	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
184	0183	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
185	0184	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
186	0185	Input register (Low 16-bit)			
187	0186	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
188	0187	Input register (Low 16-bit)			
189	0188	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
190	0189	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
191	0190	Input register (Low 16-bit)			
192	0191	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
193	0192	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
194	0193	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
195	0194	Input register (Low 16-bit)			
196	0195	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
197	0196	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
198*	0197	Input register	unsigned 16 bit		Fuel meter status
199	0198	Input register (High 16-bit)	signed 32 bit	Fuel meter 8	Fuel meter fuel consumption (in 0,01 L)
200	0199	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
201	0200	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
202	0201	Input register (Low 16-bit)			
203	0202	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
204	0203	Input register (Low 16-bit)			
205	0204	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
206	0205	Input register (Low 16-bit)			
207	0206	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
208	0207	Input register (Low 16-bit)			
209	0208	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
210	0209	Input register (Low 16-bit)			
211	0210	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
212	0211	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
213	0212	Input register (Low 16-bit)			
214	0213	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
215	0214	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
216	0215	Input register (High 16-bit)	signed		Fuel return volume (in 0,01 L)

№	Modbus address	Storage location	Data type	Comments	№
217	0216	Input register (Low 16-bit)	32 bit		
218	0217	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
219	0218	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
220*	0219	Input register	unsigned 16 bit		Fuel meter status
221	0220	Input register (High 16-bit)	signed 32 bit	Fuel meter 9	Fuel meter fuel consumption (in 0,01 L)
222	0221	Input register (Low 16-bit)			
223	0222	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
224	0223	Input register (Low 16-bit)			
225	0224	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
226	0225	Input register (Low 16-bit)			
227	0226	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
228	0227	Input register (Low 16-bit)			
229	0228	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
230	0229	Input register (Low 16-bit)			
231	0230	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
232	0231	Input register (Low 16-bit)			
233	0232	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)

№	Modbus address	Storage location	Data type	Comments	№
234	0233	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
235	0234	Input register (Low 16-bit)			
236	0235	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
237	0236	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
238	0237	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
239	0238	Input register (Low 16-bit)			
240	0239	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
241	0240	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
242*	0241	Input register	unsigned 16 bit		Fuel meter status
243	0242	Input register (High 16-bit)	signed 32 bit	Fuel meter 10	Fuel meter fuel consumption (in 0,01 L)
244	0243	Input register (Low 16-bit)			
245	0244	Input register (High 16-bit)	signed 32 bit		Idle mode fuel consumption (in 0,01 L)
246	0245	Input register (Low 16-bit)			
247	0246	Input register (High 16-bit)	signed 32 bit		Nominal mode fuel consumption (in 0,01 L)
248	0247	Input register (Low 16-bit)			
249	0248	Input register (High 16-bit)	signed 32 bit		Overload mode fuel consumption (in 0,01 L)
250	0249	Input register (Low 16-bit)			

№	Modbus address	Storage location	Data type	Comments	№
251	0250	Input register (High 16-bit)	signed 32 bit		Cheat volume (in 0,01 L)
252	0251	Input register (Low 16-bit)			
253	0252	Input register (High 16-bit)	signed 32 bit		Negative volume (in 0,01 L)
254	0253	Input register (Low 16-bit)			
255	0254	Input register	signed 16 bit		Instant fuel consumption (in 0,1 L/hour)
256	0255	Input register (High 16-bit)	signed 32 bit		Fuel supply volume (in 0,01 L)
257	0256	Input register (Low 16-bit)			
258	0257	Input register	signed 16 bit		Instant flow rate in supply line (in 0,1 l/hour)
259	0258	Input register	signed 16 bit		Supply line temperature (in 0,1 ºC)
260	0259	Input register (High 16-bit)	signed 32 bit		Fuel return volume (in 0,01 L)
261	0260	Input register (Low 16-bit)			
262	0261	Input register	signed 16 bit		Instant flow rate in return line (in 0,1 l/hour)
263	0262	Input register	signed 16 bit		Return line temperature (in 0,1 ºC)
264*	0263	Input register	unsigned 16 bit		Fuel meter status
265	0264	Input register (High 16-bit)	unsigned 32 bit		Серийный номер дисплея
266	0265	Input register (Low 16-bit)			
267	0266	Input register	unsigned 16 bit		Display type

№	Modbus address	Storage location	Data type	Comments	№
268	0267	Input register	unsigned 16 bit		Firmware version

* – the structure of the status field is shown below:

Table.II.2 Status field

Bit position	Meaning
0	Current mode : idling
1	Current mode : nominal
2	Current mode : overload
3	Current mode : cheating
4	Current mode : negative
5	Magnetic cheat
6-15	Not used

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