ГЛОНАССSoft

Operation manual

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ТНВЭД 8526 91 800 0

Version 3.3

GPS trackers

UMKa300

UMKa301
UMKa302
UMKa302.v2

www.glonasssoft.ru

2021

TABLE OF CONTENTS

1 INTRODUCTION

This Operating Manual (subsequently referred to as the manual, OM) covers instructions for installation and connection of the Automotive Tracker UMKa301 and UMKa302 (subsequently referred to as the tracker, device, and product), as well as tracker operation and configuring descriptions.

The manual is designed for technicians understanding vehicle repair and maintenance procedures, with expertise in electrical and electronic equipment for various vehicles.

In order to ensure proper operation, only skilled technicians should perform installation and setting of the tracker. For the tracker use to be successful, one should get acquainted with the operating principle of navigation system and grasp the purpose of all its components. Therefore, before starting, it is strongly recommended to learn the operating fundamentals of GPS/GLONASS navigation systems and GSM networks, and the peculiarities of data transmission via GPRS as well.

This manual describes the operation of the product equipped with the versions of firmware and configurator listed in the Table 1.1.

Table 1.1 Software version

Software	Version
Tracker firmware	3.06
Configurator	1.21.0
Mobile configurator	1.21.0

The product meets these technical specifications: ТУ 26.30.11-001-29608716-2018.

The manufacturer reserves the right to modify design, technical characteristics and software without notice. Contact this address to get information on the latest changes:

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1 PURPOSE AND USE CONDITIONS

1.1 General information

The tracker is designed to be installed in vehicles as auxiliary equipment for tracking vehicle location, speed and movement direction.

An extra range of parameters is logged as well, e.g.: analog input status, digital input status and sensor readings. The tracker also provides peripheral control for equipment connected to the discrete output.

Event and status logs are stored in the non-volatile memory. Accumulated data is transmitted over GSM mobile network using GPRS technology to dedicated servers with static IP addresses or domain names. The data on servers is accessible via the Internet for further processing and analysis on a dispatcher console.

The tracker is configured either directly via the USB-interface or remotely: either via the remote control server or with GPRS/SMS commands; configuration can be performed via Bluetooth as well.

Data transmission is only possible when the selected GSM 850/900/1800/1900 mobile network supporting GPRS is available. To ensure data integrity in case of an external power loss or GSM signal loss the tracker is provided with the internal non-volatile memory storage.

Figure 1.1 Tracker overview

Vehicle traffic route is logged as discrete spots containing all the data from internal sensors and auxiliary equipment. A route spot is recorded even if one of listed events occurs: vehicle-course angle exceeds set value, straight-line driving distance exceeds set values, acceleration exceeds set values, time lapse in motion (stop) spotting, equipment status change, and occurrence of the analog/digital input events.

Therefore, traffic route spots can be recorded within the intervals ranging from one second to several minutes rendering high-quality track tracing possible without redundant packets in GPRS traffic.

1. 2 Technical characteristics

The main technical characteristics are listed in Table 1.2.

Figure 1.2 Main technical characteristics

Feature	Value
Power supply, V	8…40
Consumption current (at a voltage of 13,8 V), mA	average – 70, max. – 200
Operational mode timeout (cold start), sec Время выхода в рабочий режим (холодный старт), сек	22
Positional accuracy, CEP, m	<2.5
Velocity accuracy, CEP, m/s	0.1
Main data transmission channel	GSM 850/900/1800/1900
Number of SIM card slots, form factor	2, mini-SIM (2FF)
Antenna type	Internal and external
PC gateway	USB, Bluetooth
Number of spots in the tracker memory	up to 100 000[1]
Number of spots on micro-SD card	up to 100 000 000[2]
Number od digital inputs	2
Input impendance of digital input VDC, kiloohm	140
GND, megaohm	6,3
Maximum frequency for digital input, khz	50
Number of analog inputs	2
Range of analog input voltages[2], V	0…40
Input impendance of analog input VDC, kiloohm	13
AD converter capacity on analog input, bit	12
Number of discrete outputs	1
Maximum voltage of discrete output, V	40
Maximum current of discrete output, A	0,5
Built-in accelerometer	Yes
RS-485 interface	Yes
1-Wire interface	Yes
Bluetooth interface	Optionally[3]
RS-232 interface	Optionally[4]
CAN interface	Optionally
Case opening button	Optionally
Installing microSD card	Optionally
Installing SIM-chip	Optionally

[1] Number of spots is specified for minimum set of transmitted parameters.
[2] Analog inputs can operate in discrete mode with set limits of logical low and unit.A
[3] "Optionally" means that что наличие this function availability depends on the tracker model and version according to Table 2.1.
[4] Can be installed either CAN or RS-232 interface.

Battery	Optionally
Dimensions, mm	90x71x26
Weight not more than	120
Operational temperature range, °C	-40…+85
Case protection rating	IP54

1.3 Device marking

On the label on the front casing side the following device information is provided:

- Name;
- Serial number;
- Number IMEI DevEUI;
- QR-code where the link to the device page is ciphered on https://qr-service.ru/. where the full information about the tracker is available. Also there is an opportunity to download this manual, configurator and tracker passport on the page.

The information is duplicated in device passport.

Figure 1.3 Page qr-service.ru

1.4 Tracker blog diagram

Block diagram of the tracker is given in Figure 1.3.

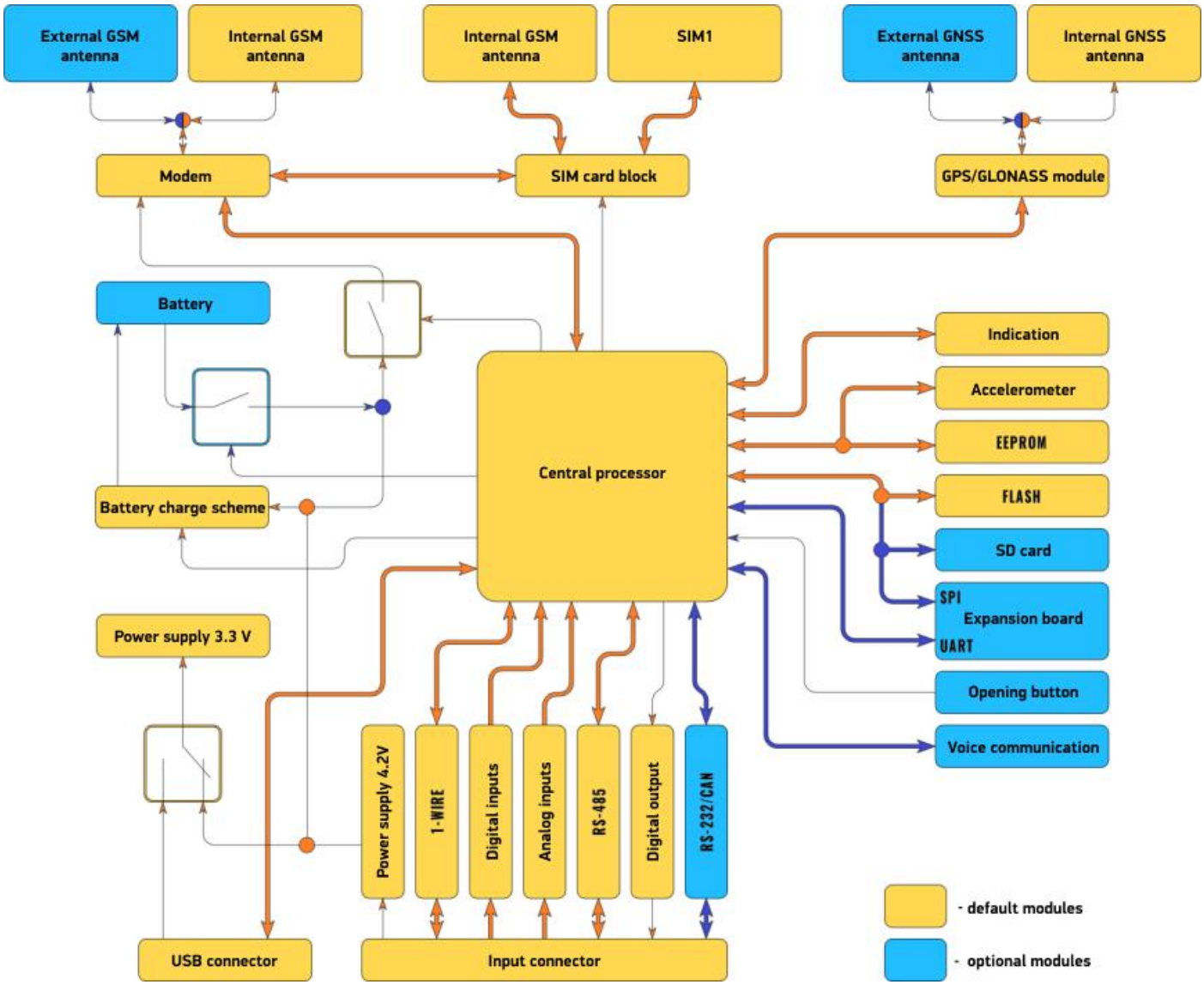


Figure 1.Block diagram of the navigation tracker

2 INSTALLATION

2.1 **Tracker description**

Basic elements are presented in Figure 2.5.

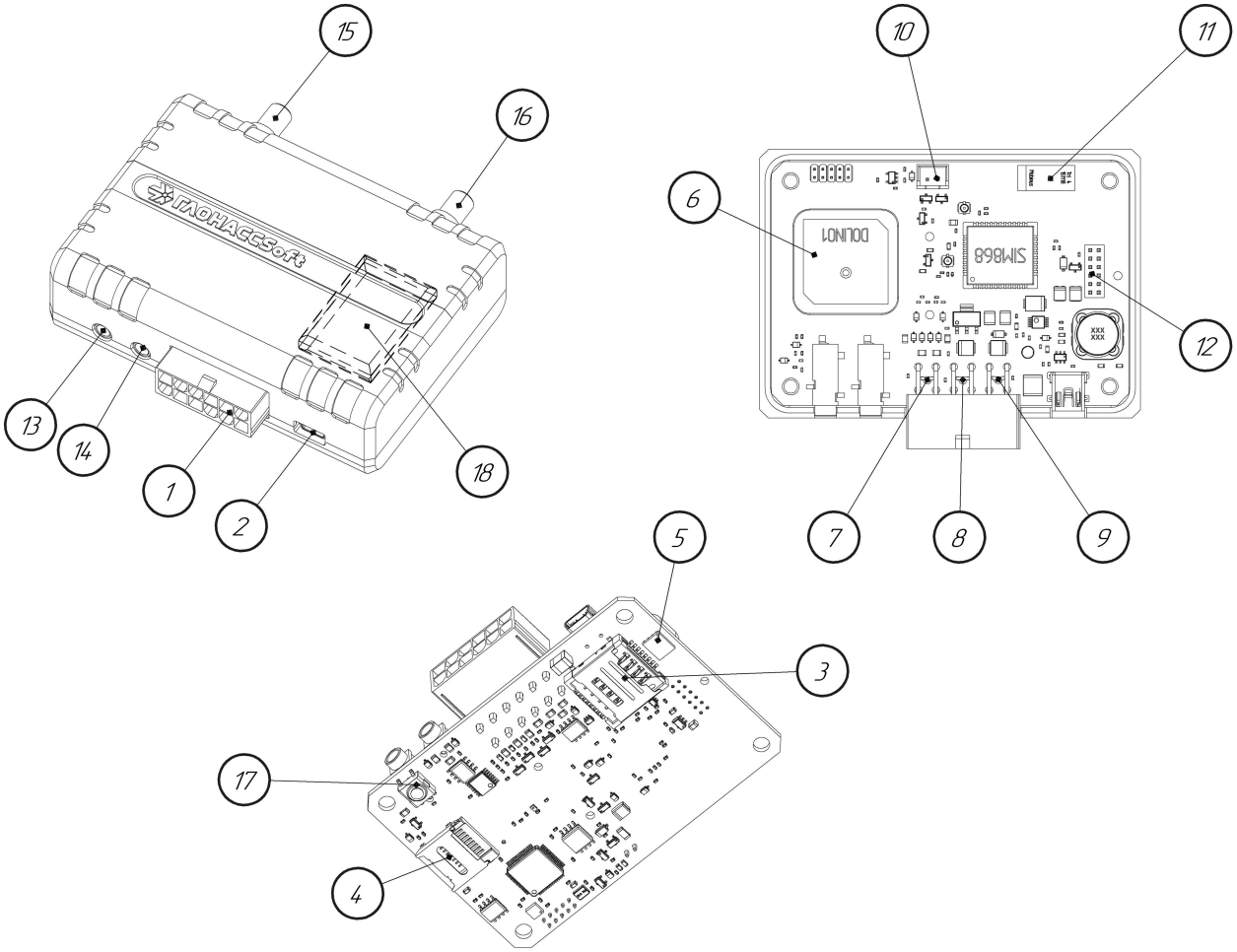


Figure 2.1 Basic elements

1. Connecting slot;
2. USB-interface slot of mini-B type;
3. Installing slot for SIM card;
4. Installing slot for SD card;
5. Installation spot for SIM-chip;
6. GNSS-antenna;
7. Red LED of GNSS status;
8. Yellow LED of GSM status
9. Green LED of power supply;
10. Slot for battery connection;

11. GSM antenna;
12. Slot for expansion board connection;
13. Headphones slot;
14. Microphone slot;
15. GNSS external antenna;
16. GSM external antenna;
17. Opening button;
18. Battery.

Attention! It is allowed to connect the tracker to PC without main voltage supply in order to configurate it. When connecting this way the supply voltage is not sent to GSM modem and current positioning dtat transmission is not implemented. In UMKa301 and UMKa302 GNSS module is also operating.

Signalling LEDs that indicate the tracker status are behind the connecting slot so that it is illuminated during operation.

2.2 Tracker versions

For the trackers UMKa301 and UMKa302 there is a range of versions represented in Table 2.1.

Additionally to the ones given in the Table 2.1 there are also versions with “H” letter in version field that specifies “Hosting protection”. More details about hosting protection is represented in Table2.26.

Table 2.1 Tracker versions

Option / Model	RS-232	CAN	RS-485	Casing opening button	MicroSD slot	Battery	Voice communication	External antennas	Bluetooth
UMKa301.B	-	-	+	-	-	-	-	-	+, 3.0
UMKa301.B2	-	-	+	-	-	+	-	-	+, 3.0
UMKa301.BA2	-	-	+	-	-	+	-	+	+, 3.0
UMKa301.BAR2	+	-	+	-	-	+	-	+	+, 3.0
UMKa301.BR2	+	-	+	-	-	+	-	-	+, 3.0
UMKa301.M2	-	-	+	+	-	+	+	-	+, 3.0
UMKa302.B*	-	-	+	-	-	-	-	-	+, 4.0
UMKa302.B2*	-	-	+	-	-	+	-	-	+, 4.0
UMKa302.BC2*	-	+	+	-	-	+	-	-	+, 4.0
UMKa302.BR2*	+	-	+	-	-	+	-	-	+, 4.0
UMKa302.BA2*	-	-	+	-	-	+	-	+	+, 4.0
UMKa302.BAR2*	+	-	+	-	-	+	-	+	+, 4.0
UMKa302.BAC2*	-	+	+	-	-	+	-	+	+, 4.0
UMKa302.M*	-	-	+	-	-	-	+	-	+, 4.0
UMKa302.M2*	-	-	+	-	-	+	+	-	+, 4.0
UMKa302.MC2*	-	+	+	-	-	+	+	-	+, 4.0
UMKa302.FC2*	-	+	+	+	+	+	+	-	+, 4.0
UMKa302.FR2*	+	-	+	+	+	+	+	-	+, 4.0
UMKa302.FIC2	-	+	+	+	+	+	+	-	+, 4.0
UMKa302.MAC2*	-	+	+	+	-	+	+	+	+, 4.0
UMKa302v2.BCC2	-	+, 2	-	-	-	+	-	-	+, 4.0

*for UMKa302v2 too

2.3 Pinout

Pinout numeration of the tracker connecting slot is represented in table 2.6. Pin assignment is given in table 2.2.

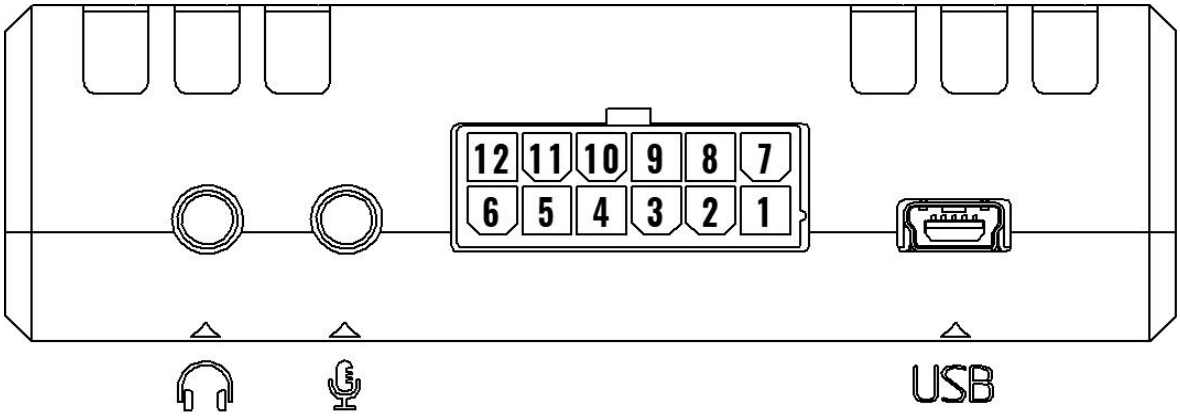


Figure 2.2 Pin numeration

Table 2.1 Pin assignment

Pin number	Assignment
1	Power supply (+)
2	RS-485 (A)/CAN1-H (For UMKa302v2.BCC2)
3	RS-485 (B)/CAN1-L (For UMKa302v2.BCC2)
4	Input 0. Analog 0. IN0 (AIN0)
5	Input 1. Analog 1. IN1 (AIN1)
6	No / TxD for RS-232 / CAN0-H for CAN
7	GND (-)
8	1-Wire interface
9	Output 0. “Open drain”. OUT (OUT0)
10	Input 2. Digital 0. IN2 (DIN0)
11	Input 3. Digital 1. IN3 (DIN1)
12	No / RxD for RS-232 / CAN0-L for CAN

2.4 Device firmware updating

There are two ways to update the built-in tracker software: updating via configurator or by command “UPDATE”.

To update via configurator press “Update tracker firmware” on the toolbar or in “Cosole” tab enter the command “UPDATE”. If the tracker cannot detect firmware on the toolbar, press “Check for update” button.

One can also update firmware by sending SMS command “UPDATE” to the tracker phone number.

It is possible to update the tracker manually. To this effect, close the configurator and put the required firmware file into the folder “C:\Program Files (x86)\UMKa3XX\firmware”.

Then open the configurator, wait for the loading to end until the suggestion to update the tracker appears.

If necessary, it is possible to update to the test version of firmware. In order to do that, perform manual updating described above or send SMS command “UPDATE VER=X.Y.Z” (command description ref. app. A) to the tracker telephone number.

2.5 **Installing SIM card**

In order to install a SIM card, open tracker casing with beforehand unscrewing of fixing screws with PH 1 cross-head driver (Figure 2.7) and take the board out.

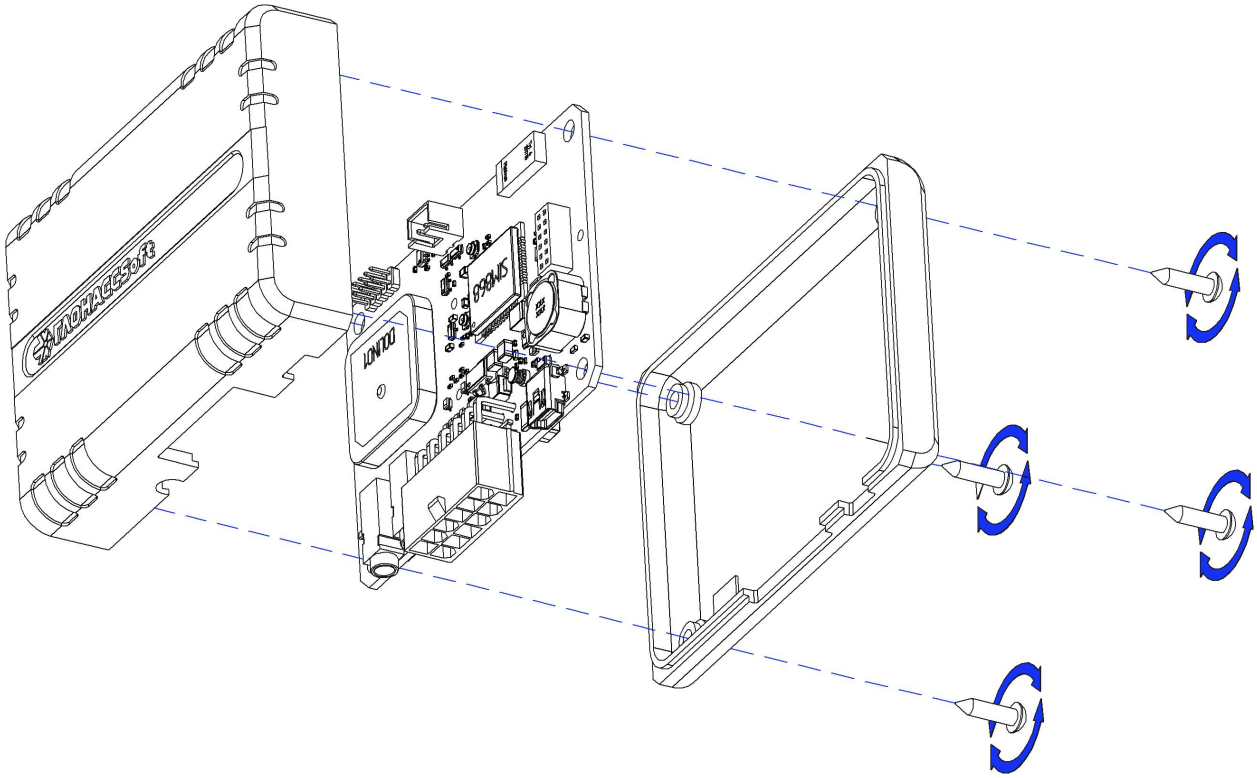


Figure 2.7 Opening tracker casing

On the board flipside there is a SIM card slot. Install the SIM card according to Figure2.8.

After SIM cards installation assemble the device in reverse order.

Attention! A SIM card connector has 2 slots for installing SIM cards (when installing only the upper SIM chip is available). The lower slot is for installing SIM0. The upper slot - for SIM1. By default only a SIM0 is active and SIM1 is disabled. SIM cards are installed with the contacts down and the key upwards. Tracker is designed for work with SIM cards of mini-SIM (2FF) form factor.

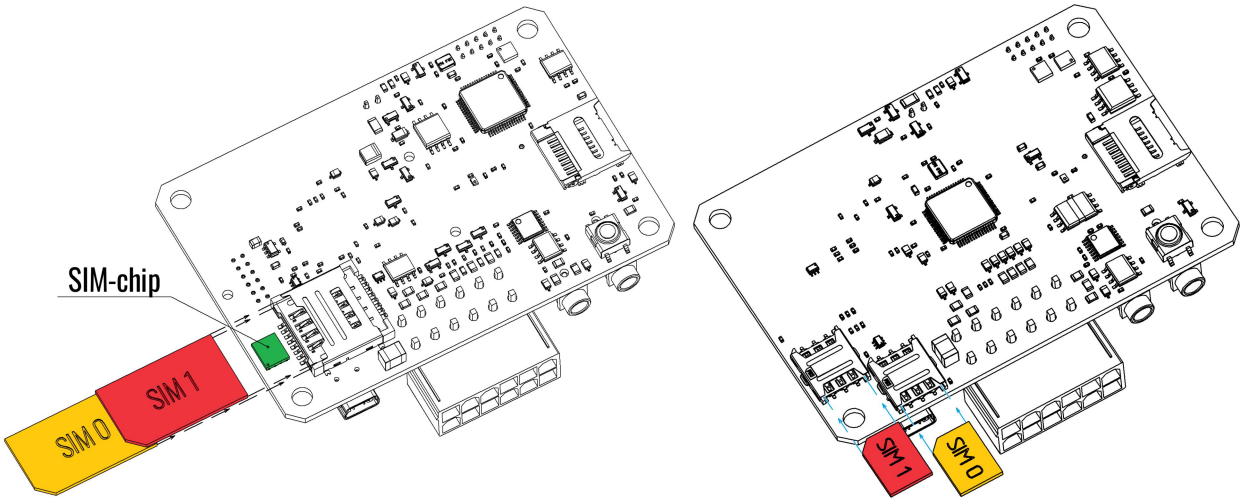


Figure 2.8 Installing SIM cards (on the right for UMKa302v2)

2.6 Installing the battery

For recording and transmitting the cut-off of external power supply and also for quick-start navigation module after starting the power supply, tracker can be equipped with internal battery. Also it is recommended to install the battery for providing dtat integrity and mitigating the risk of data loss.

For battery installation open the tracker casing and take the board out (ref. Installing SIM card). Then connect the battery to correspondent connector as is shown in the picture (Figure 2.9).

The battery itself is fixed to the upper casing part with hot adhesive or double-sided adhesive tape. In this case the battery is located in the manner so that GPS and GNSS antennas are not blocked as soon as the terminal is assembled. In Figure 2.9 the optimum spot for placing the battery is represented.

Attention! The battery is pre-installed by manufacturer in certain versions of device. If there is no battery in the given versions, it can be purchased additionally from device manufacturer.

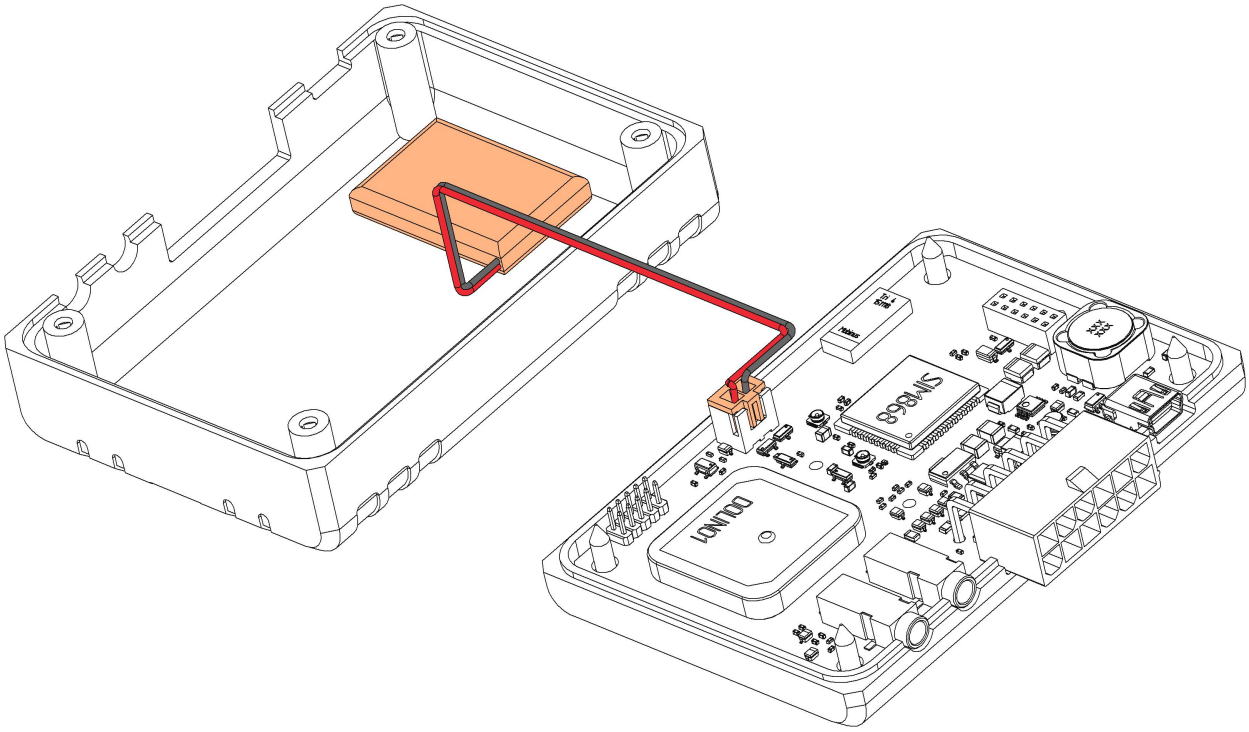


Figure 2.9 Installing the battery

2.7 Installing microSD card

In versions with memory cards support the tracker allows to use a microSD for storing the black box. The tracker supports microSD memory cards form 2 to 32 GB

When installing the microSD card open tracker casing and take the board out (ref. “Installing SIM card” section”). Next move the card carriage to the board center till the crack occurs (Figure 2.10). Now open the carriage and insert a microSD card into its place.

Then close the carriage and click in reverse direction (from the board centre).

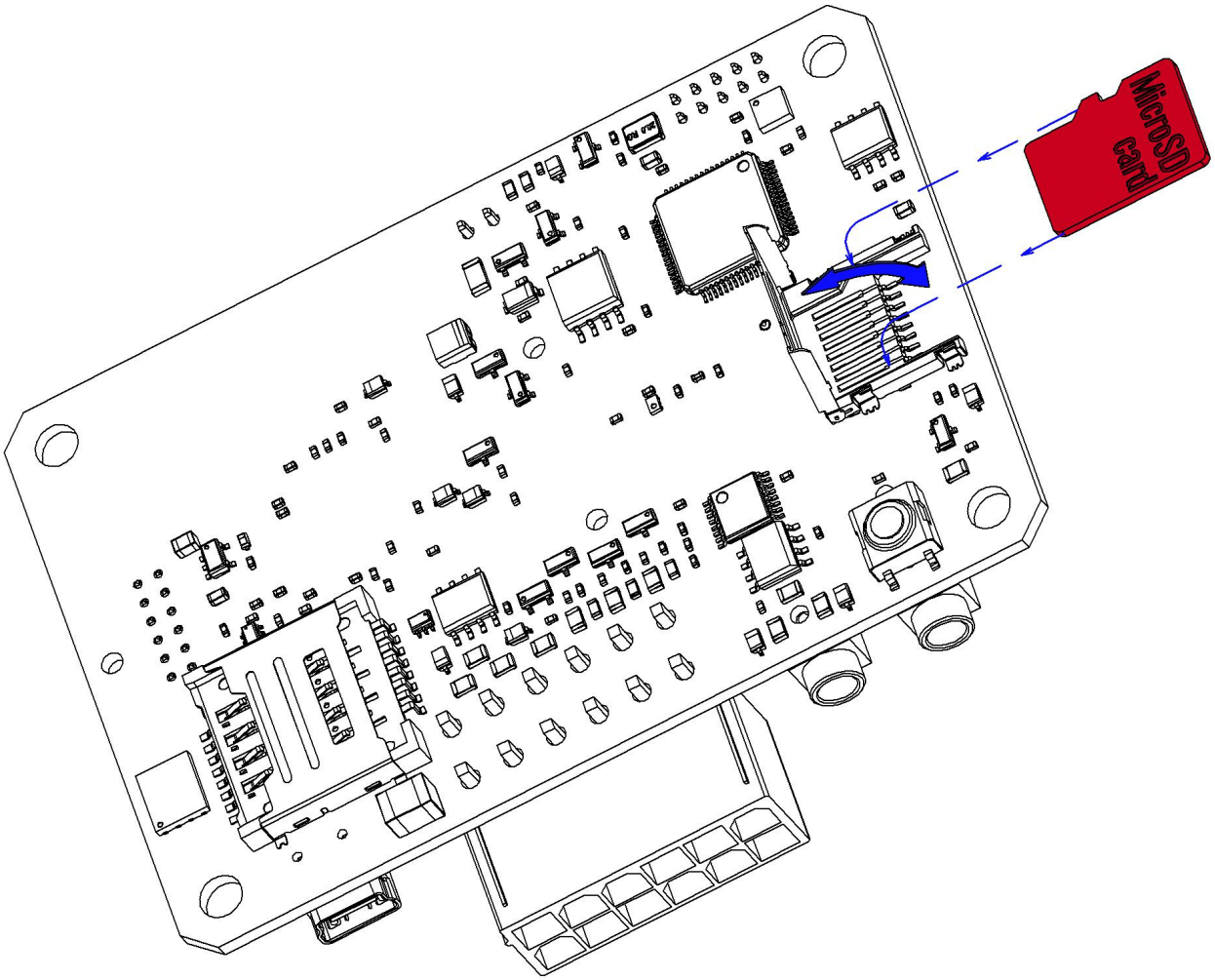


Figure 2.10 Installing microSD card

Attention! The microSD card support is optional and must be specified when placing an order at the manufacturer. A microSD card is not included into the supply kit and is purchased separately.

2.8 Installing the tracker in a vehicle

When mounting the tracker, take into consideration that the GLONASS/GPS antenna should be oriented in space in such manner sas to pint the peak of the radiation pattern to the sky zenith. Radiation pattern of the flat ceramic antenna installed inside the tracker is hemisperical, and it is therefore recommended to install the tracker horizontally. In other positions, the main source is a re-reflected signal, which considerably impairs the positioning accuracy and affects navigation task time.

Presence of metal objects near antenna, especially in the direction of the main beam, markedly impairs signal reception.

The tracker should be installed as far as possible from the RF interference sources (interrupters, transmitters, etc.)

It is recommended to place the power wire and other wiring into corrugated protection pipe. And try to avoid the cable sagging, as it can cause the cable cuts. In order to fasten the cable use some special fasteners (e.g. nylon ties).

Do not install the tracker near any heat sources (such as exhaust manifolds, radiators, etc.).

The tracker itself and all the connected cables should be securely fastened and do not interfere with the proper operation of the vehicle machinery.

It is recommended to use either special clamping wire connectors otr the mating cable connectors for hooking-up (e.g. hooking-up to the CAN bus via special socket).

2.9 Connecting power supply

Cables seated on the device board are used for connecting the navigation tracker to power supply. In order to protect the power wires from short curcuit failures, it is strongly recommended to install a fuse with a rated current of 1 A as close as possible to the power source.

When connecting the tracker, the safety regulations for vehicle maintenance must be strictly observed. All the connections must have reliable contacts be entirely insulated. If the length of an available wire is insufficient, the wire can be extended with another wire (cross-section at least 0.35 $mm^{2)}$.

The power inlet of controller is rated for the on-board vehicle network voltage of 8 to 40 V. In order to provide power supply to the tracker, one can connect it either directly to the battery or to the on-board vehicle network (Figure 2.11).

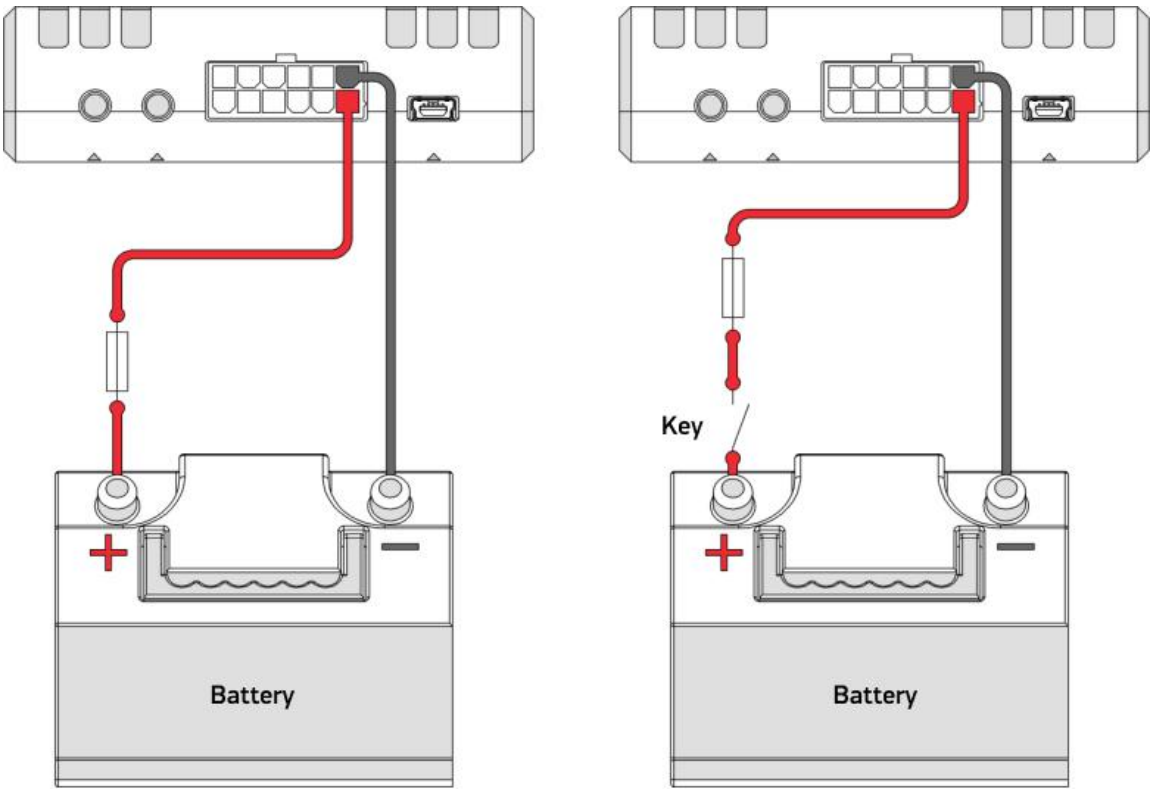


Figure 2.1 Connecting power supply

Attention! The tracker has built-in protection from short- circuits, power supply polarity reversals and pulse overvoltage. However, due to the naturally limited resource of the protection installed, it is strongly recommended to use an external fuse with a rated current of 1 A.

2.10 Connecting analog input

To control the vehicle parameters on the basis of their analog data (e.g. analog fuel level sensor, analog thermometer, etc.) the analog inputs of navigation tracker are used.

Also analog inouts are able to work in discrete mode with regulated levels of logical low and units voltage (ref. To “Configurator” section).

The tracker has two channels of measuring external input voltages (AIN0 и AIN1) and two internal channels (AIN2 и AIN3) for measuring the voltage of the on-board network and internal battery. Channels AIN0, AIN1 and AIN2 can measure within the range from 0 to 40 V, and the channel AIN3 within the range from 0 to 6,6 V.

When connecting simple analog sources refer to the Table 2.12.

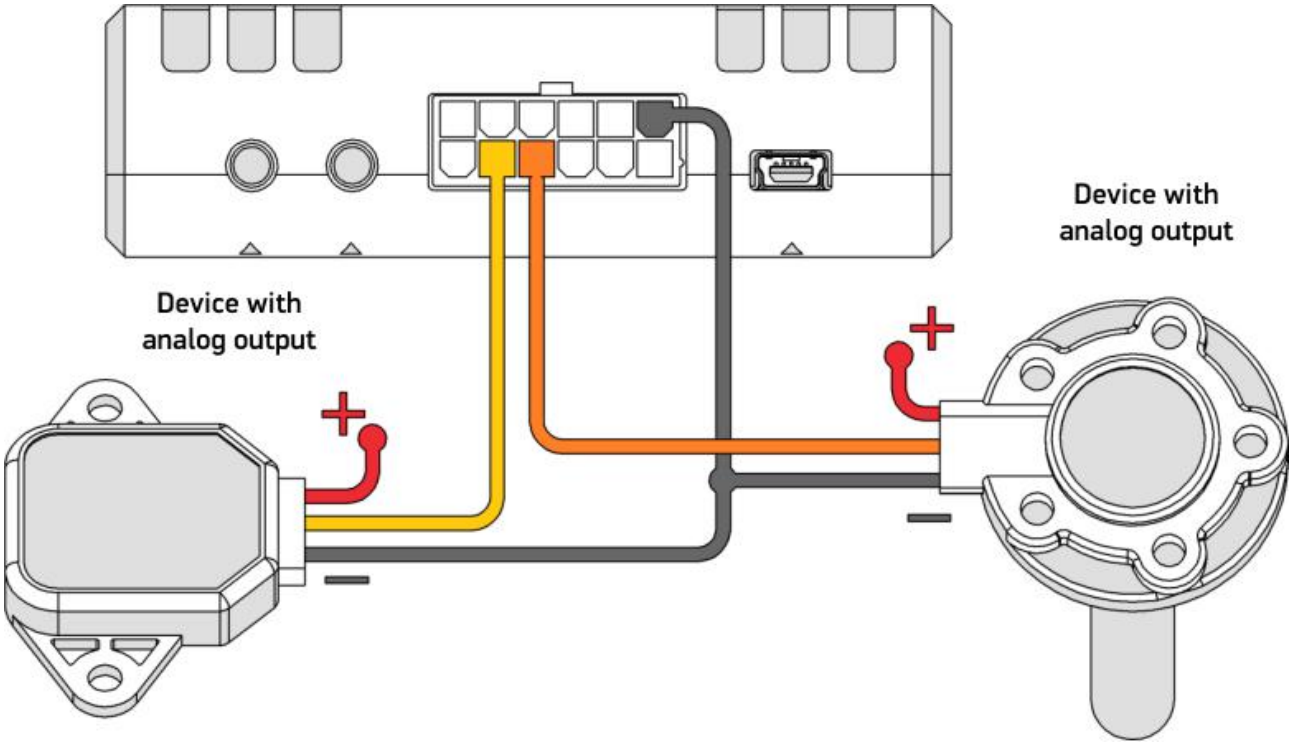


Figure 2.12 Connecting analog sources

To connect the analog input in discrete mode with a pull-up to VDC(+) refer to the Table 2.13 and along with it use auxiliary resistor for a pull-up of 3,9 kiloohm and dissipated power of not less than 0,5 Watt.

The contacts of any relay, reed relay and other devices with “clean contact” or “open drain” collector output can be used as a key.

To connect the analog input in discrete mode with a pull-up to GND(-) refer to Figure 2.14.

After connection set up the input modes in configurator (ref. To “Configurator” section).

The conversion of input analog signal into the discrete one is implemented according to Schmitt trigger principle.

The switching levels are set with the help of configurator or the command “SETLIMn” where “n” is the number of input. For instance, the following levels are set by default: for logical low the voltage is 5 V (5000 mV), for logical high the voltage is 6V (6000 mV). The input signal of 5V voltage is converted into logical low and if it is higher than 6V, into logical high. It keeps the previous fixed value within the range from 5 to 6 (Figure 2.15).

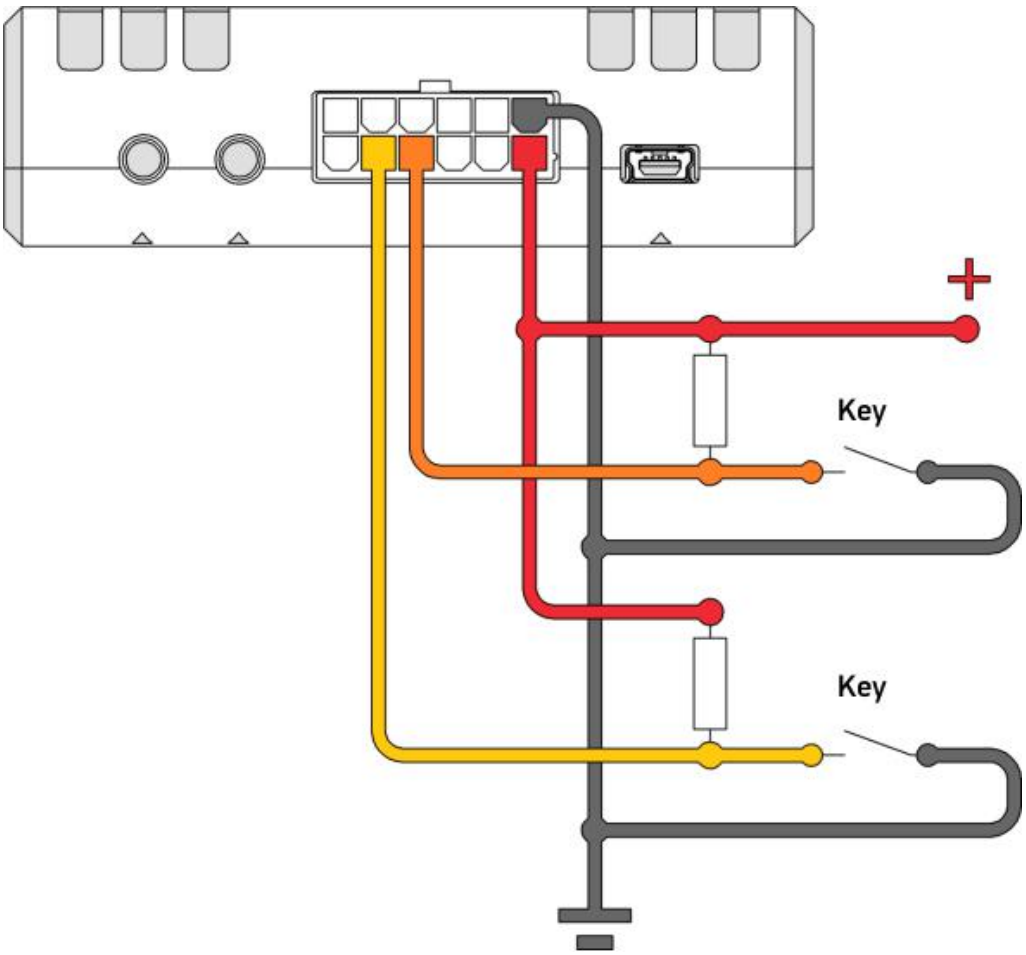


Figure 2.13 Pull-up to VDC(+)

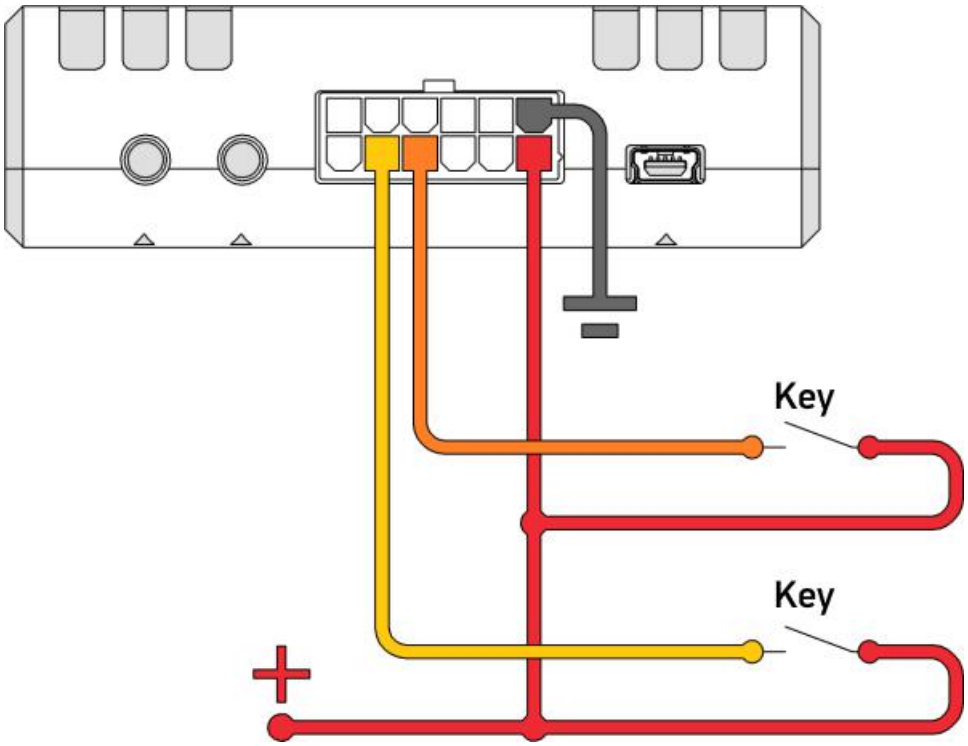


Figure 2.14 Pull-up to GND(-)

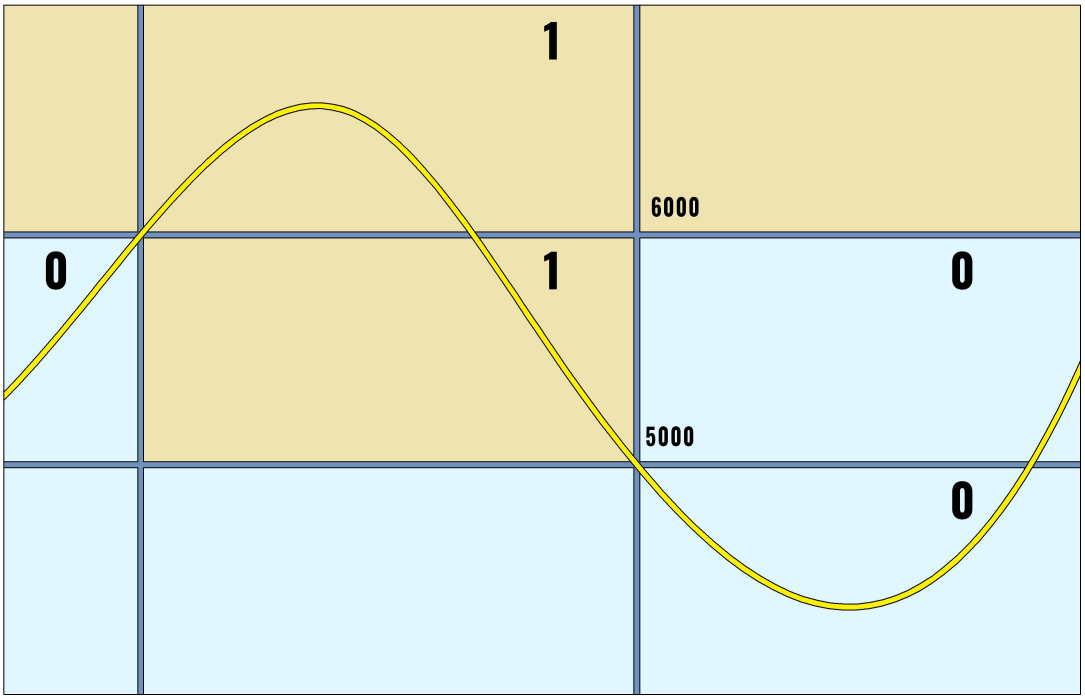


Figure 2.15 Conversion of analog signal into discrete

For the information about setup via configurator refer to section 3.9.

2.11 Connecting digital inputs

To connect digital devices (frequency FLSs, flowmeters) and discrete sensors use two digital inputs of the tracker. The operational modes of these inputs can be correspondingly set with the help of configurator.

Digital inputs are able to pull up to GND(-) and VDC(+), therefore any devices with “clean contact” or “open drain” collector output that are connected both to VDC(+) and GND(-) (Figure 2.16) can function as signal sources. The Figure 2.17 demonstrates an example of connecting two flowmeters in differential mode.

In Figure 2.18 the example of connecting the differential flowmeter with encoder is represented.

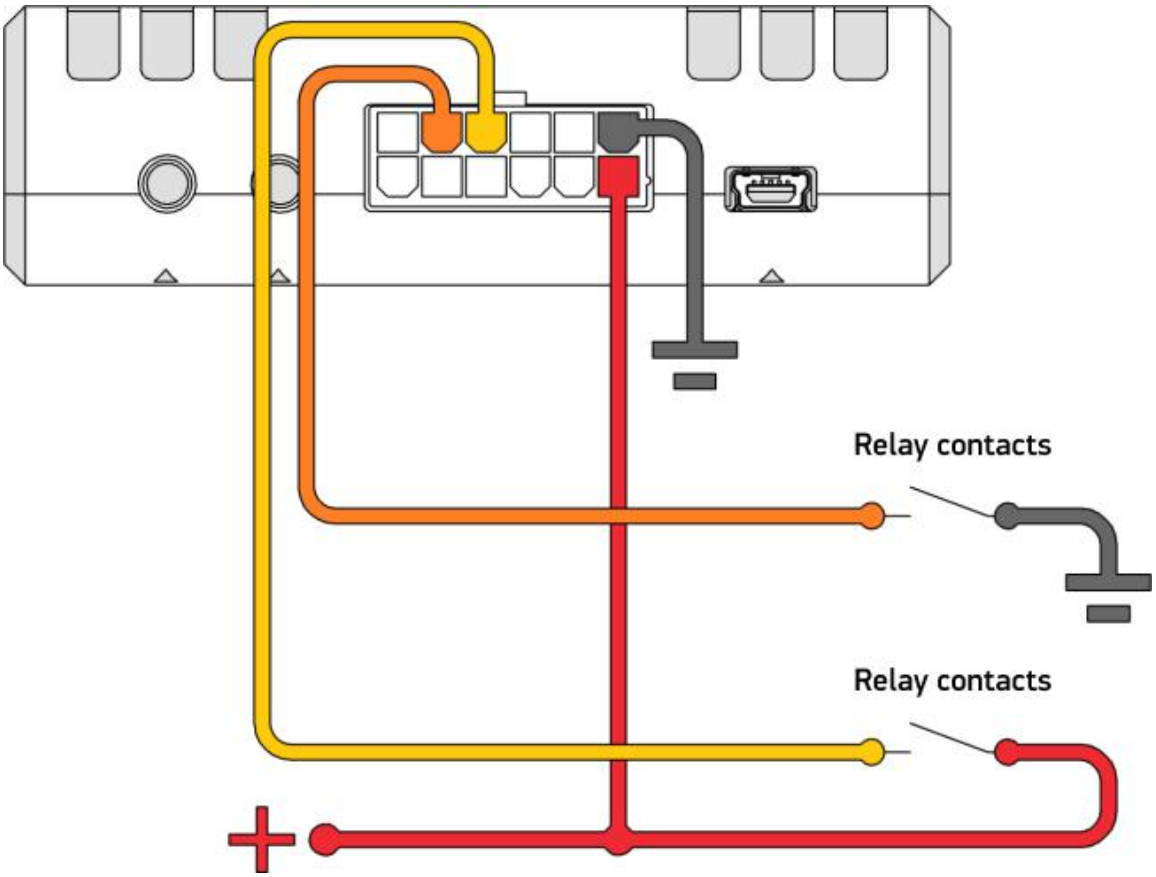


Figure 2.18 Options of discrete sensors connection

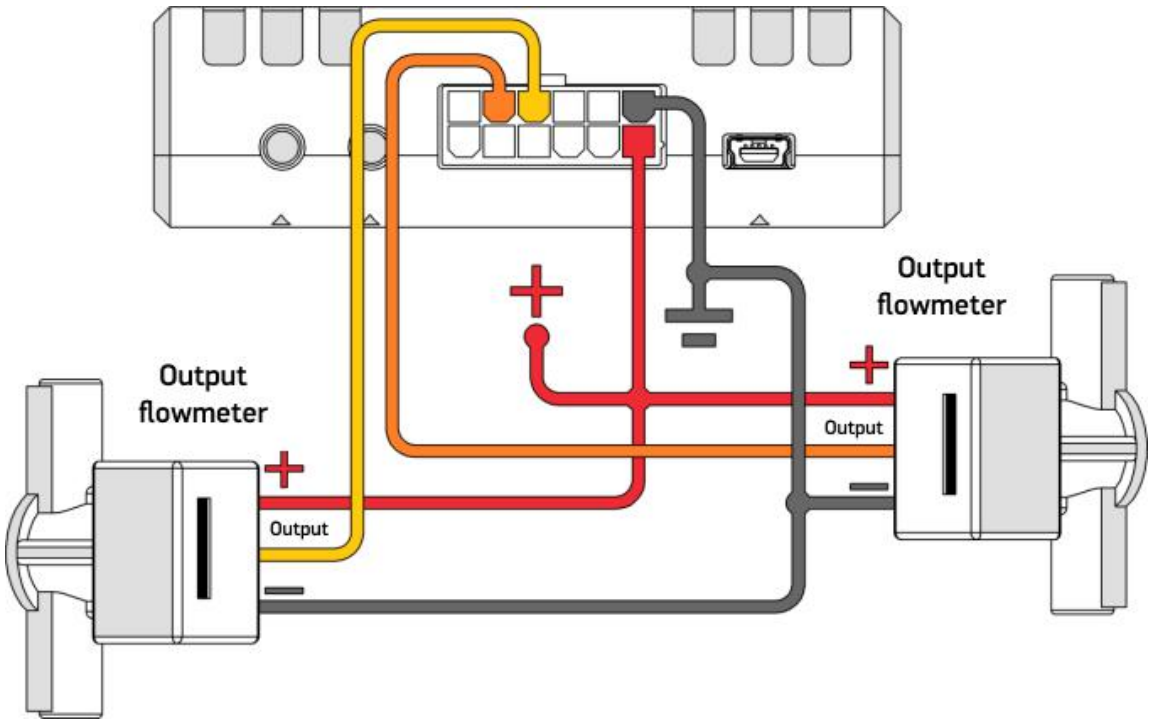


Figure 2.17 Example of connecting the flowmeter in differential mode

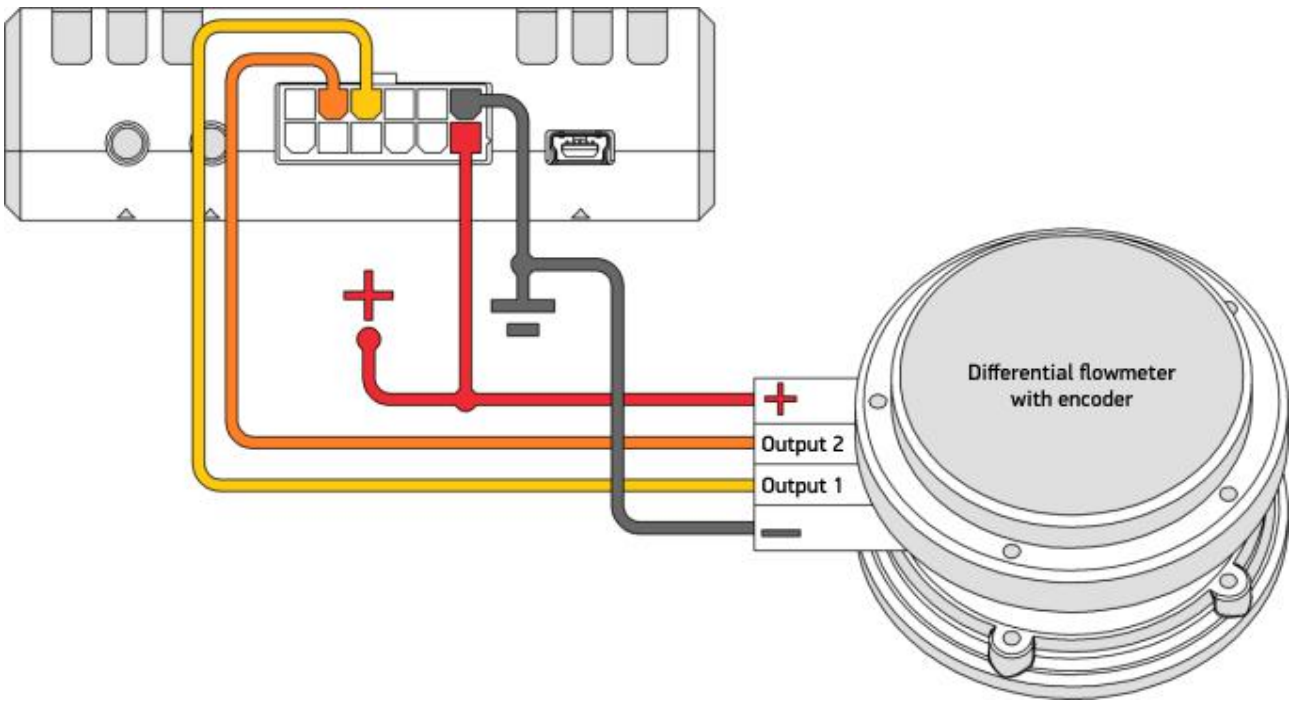


Figure 2.18 Example of connecting the differential flowmeter with encoder

For the information about the setup via configurator refer to section 3.9.

2.12 Connecting “open drain” collector

The tracker has the “open drain” collector output type that can be used for external load control.

If the load that is to control consumes more than 0.5 A, use the table 2.19 to connect it.

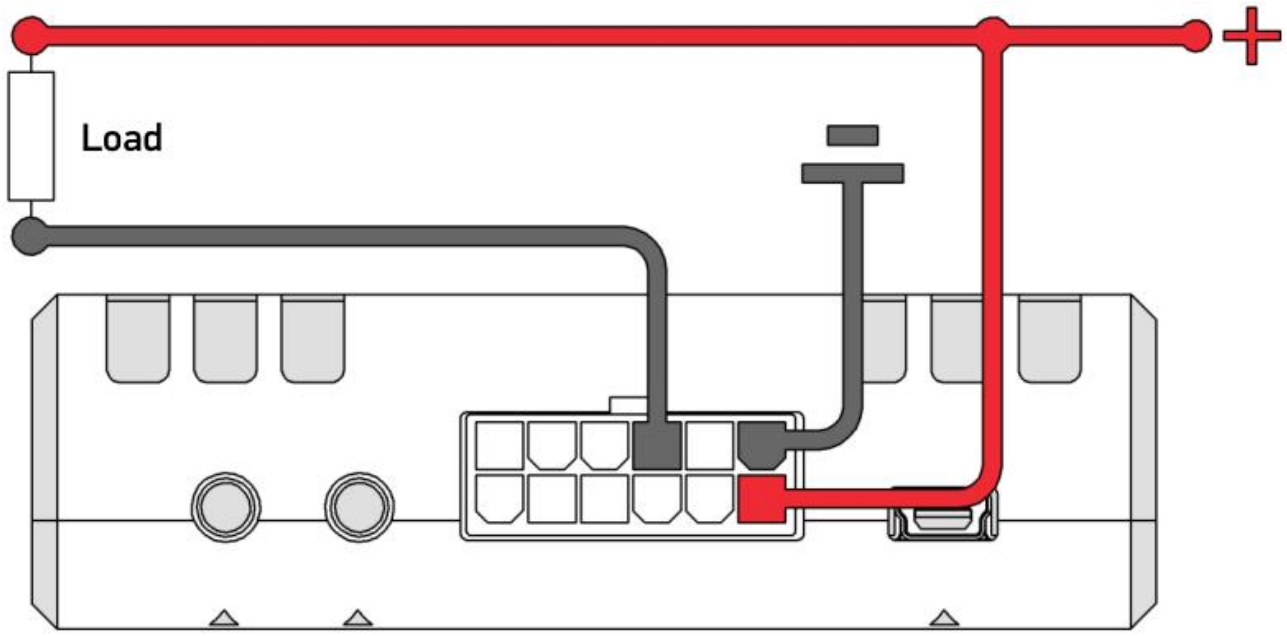


Figure 2.19 Connecting low-power load

For connection that require the current of more than 0.5A use additional relay (Figure 2.20).

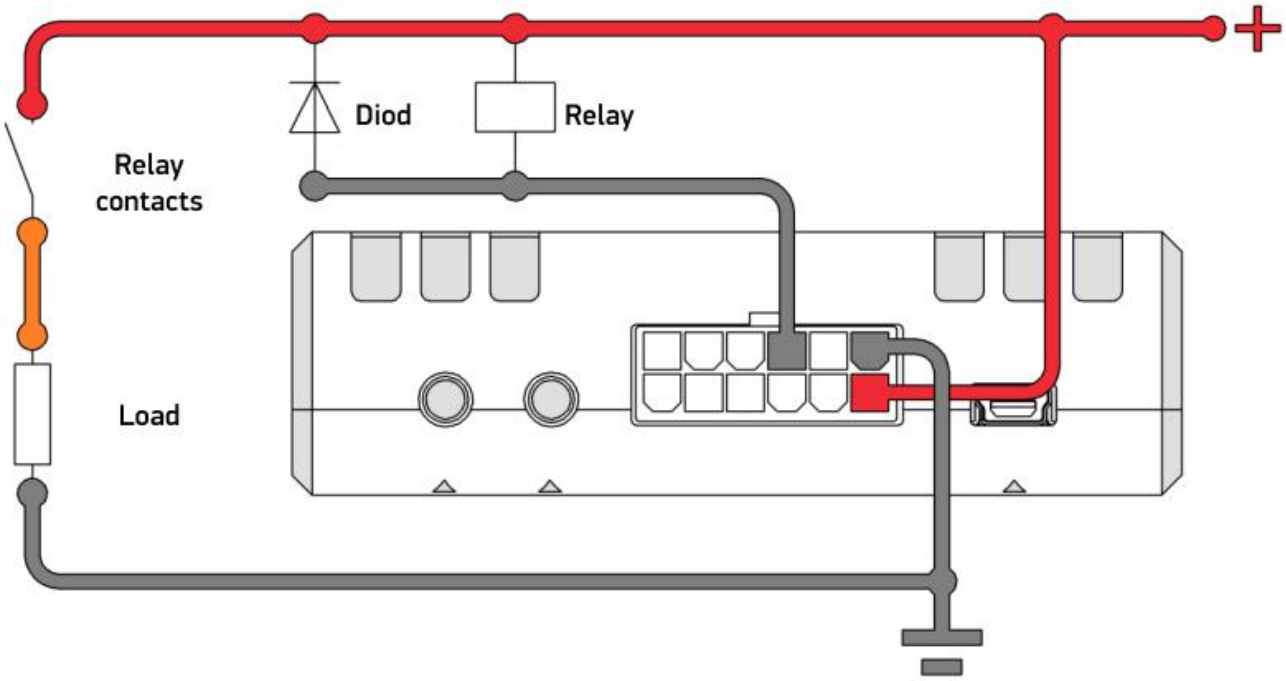


Figure 2.20 Connecting power load

Attention! To protect the tracker output from the self-inductance EMF, which occurs at switching inductive loads (for example, a relay coil), use a fly-back diode. This diode must have the peak inverse voltage higher than the load supply voltage and a forward current higher than the current consumed by the load.

2.13 Connecting RS-485 (FLS/RFID)

Up to 7 LLS fuel level sensors (FLS) and up to 4 RFID readers can be simultaneously connected to the trecker.

In figure 2.21 an example of connecting fuel level sensors is represented. The resistanve at the end of the bus is install to match the impendance and is equal to 120 Ω. For the RS-485 bus, the recommended cable type is “twisted pair”. RFID readers are connected similarly.

RS-485 bus stubs should be as short as possible to match bus impendance. In order to prevent bus collisions, assign each device a unique address in advance.

Attention! While working with fuel level sensors, one must strictly adhere to the requirements of the relevant maintenance manuals.

For the informationabout Rs-485 setup via configurator refer to section 3.13.

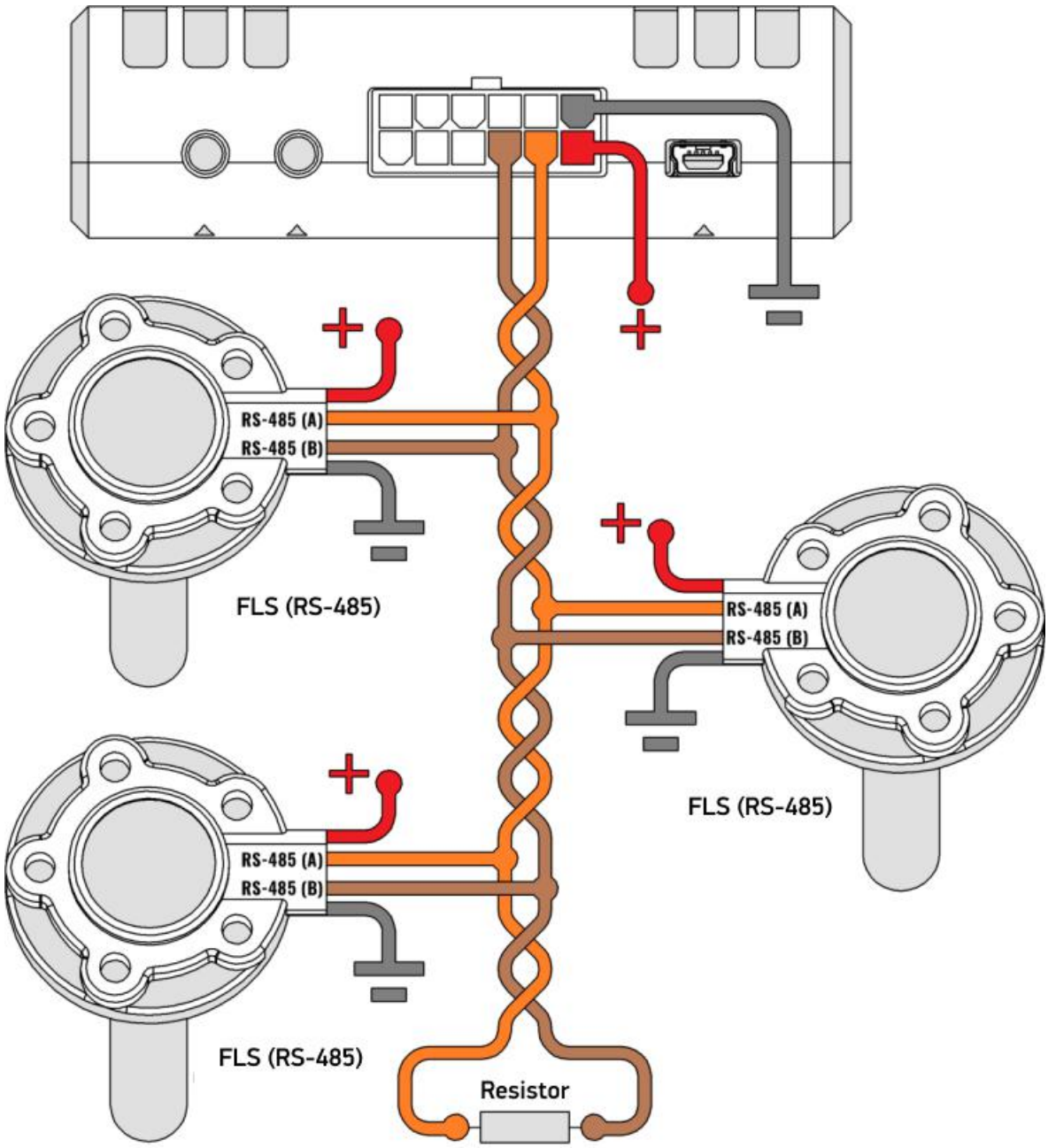


Figure 2.21 Connecting FLS via RS-485 interface

2.14 Connecting BLE sensors

As an addition up to 8 wireless BLE sensors can be connected to the tracker UMKa302(v2). The list of supported sensors is represented in Appendix D.

To start work with BLE sensors go to “System” tab in configurator and in parameter group “Bluetooth parameters” in dropdown menu choose “BLE sensors” (BLEMODE 2) and “Configuration and BLE sensors” (BLEMODE 3). Then enter configuration in the tracker.

In “BLE sensors” tab choose the type of BLE sensor and enter its MAC address into corresponding field or use command “LLSBLEn”.

It is possible to specify tha mAC address of the sensor with the help of BLE scanner. Press “Search devices” button in “BLE scanner” tab. In a few minutes the tracker will detect all available BLE devices. Rightclick on the needed device and the pop-up window choose the sensor number (Figure 2.23).

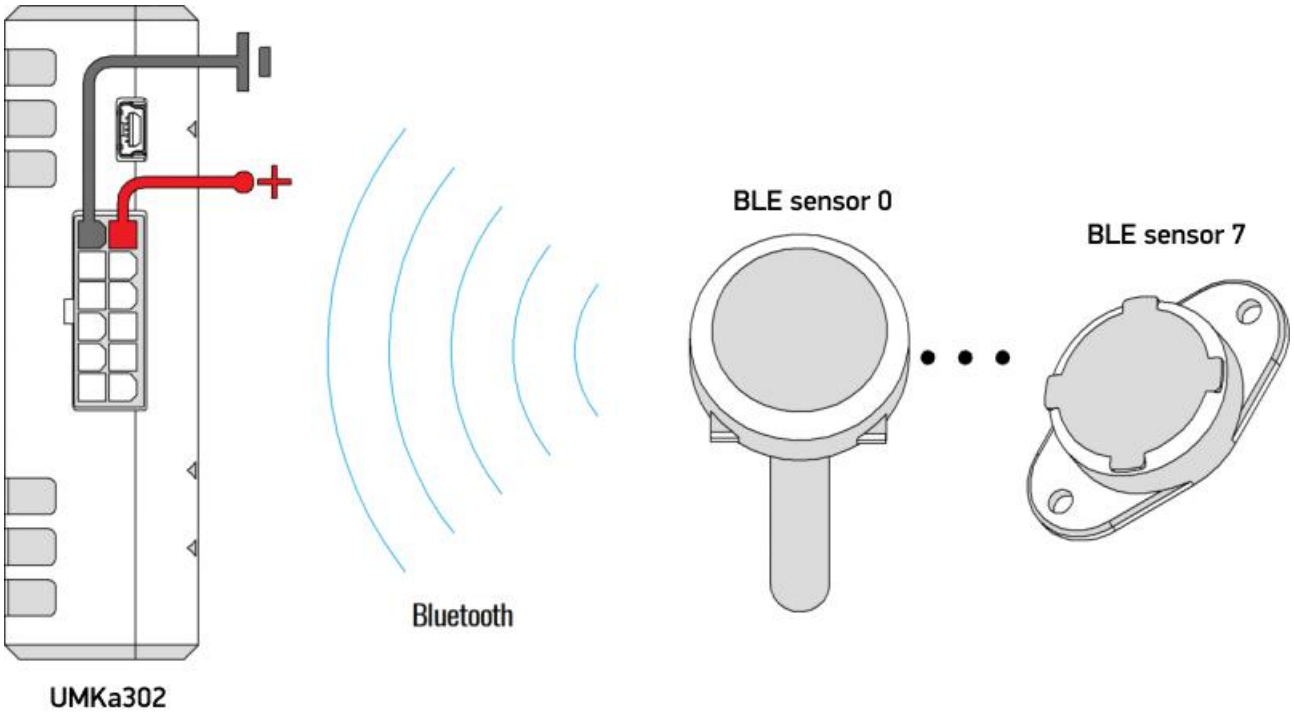


Figure 2.23 Connecting BLE sensors

For each wireless sensor one fuel level parameter, one temperature parameter and up to 8 arbitrary parameters can be transmitted.

The list of transmitted parameters depends on the chosen sensor and is reperesented in APPENDIX E.

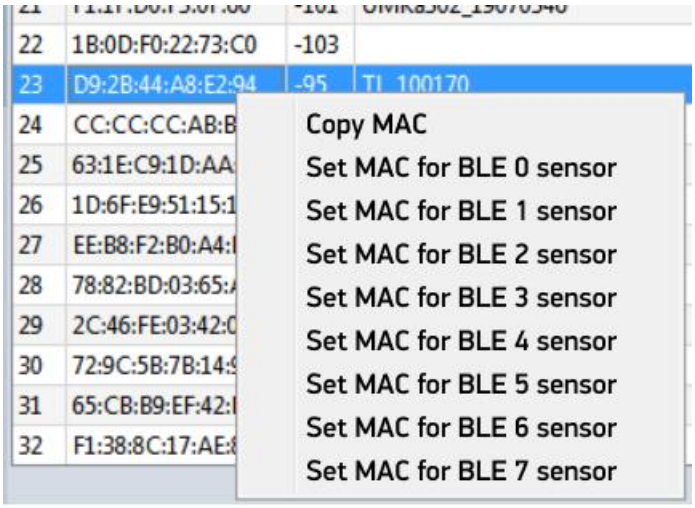


Figure 2.23 Task of sensor MAC address from BLE scanner

2.15 Connecting to CAN bus

In Figure 2.24 the general scheme of connecting the tracker to CAN bus is given. For proper work with CAN one must set the speed and operation mode of the interface (“Interfaces” tab).

For UMKa302v2.BCC2 there is an opportunity to connect the second CAN(CAN1).

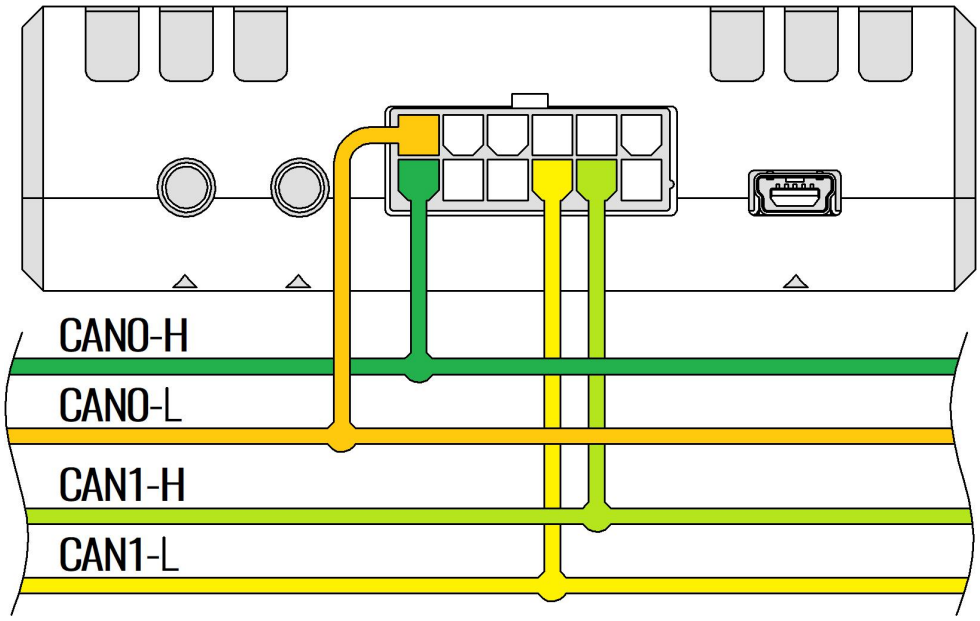


Figure 2.24 Connecting to CAN bus

Attention! CAN interface support is optional and must be specified when placing an order at manufacturer.

The list of supported vehicles find on the websit https://glonasssoft.ru/ru/equipment/umka302, in the instructions section, document “The list of supported vehicles”.в

2.16 Connecting RS-232

To connect the device via RS-232 the tracker is provided with corresponding outputs. In Figure 2.25 an example of connectimg via RS-232 is represented. Interface supports NMEA (Trimble - https://www.trimblegnss.ru), LLS (FLS), and also CAN-LOG protocols.

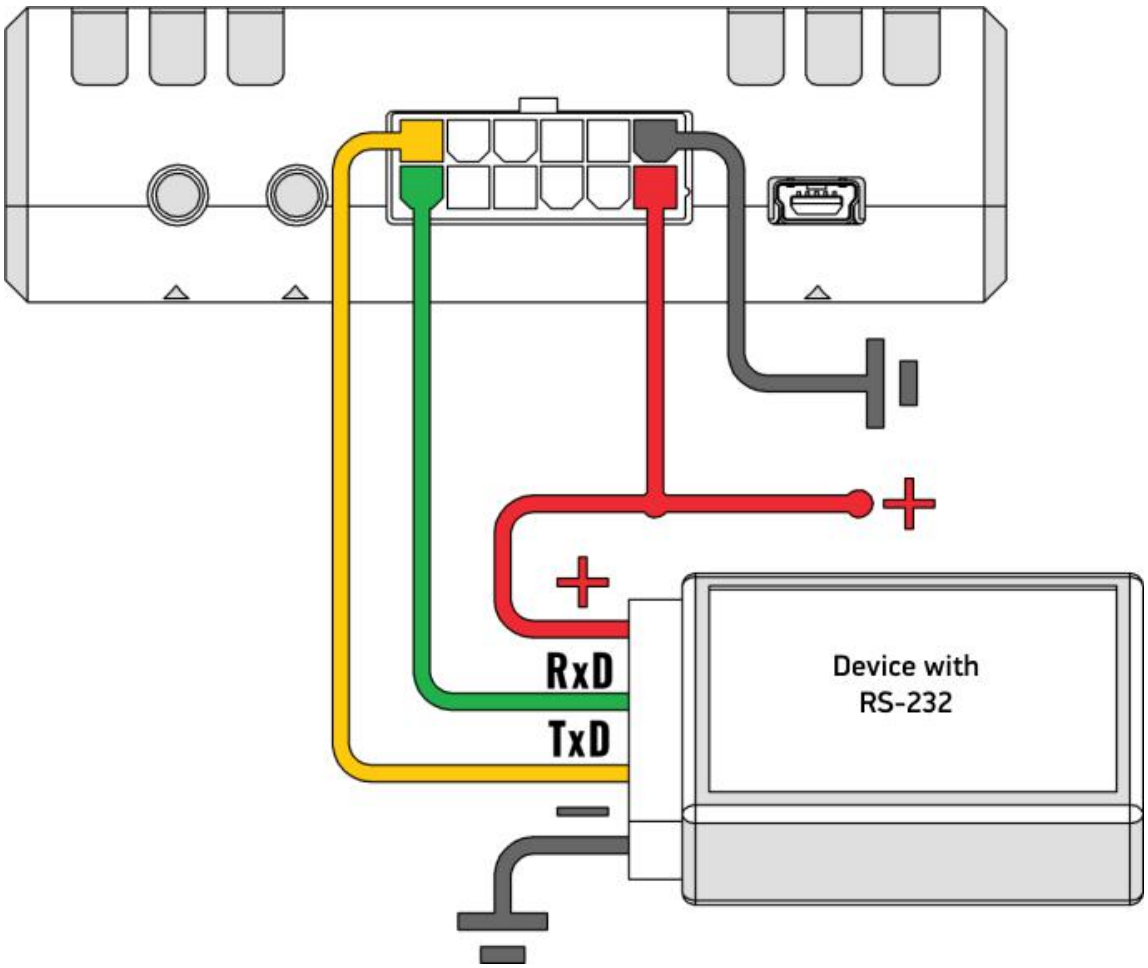


Figure 2.25 Connecting RS-232

Attention! The support of RS-232 interface is optional and must be specified when placing an order at manufacturer.

For information about RS-232 setup fere to section 3.13.

2.17 Connecting 1-Wire

Up to 4 thermometers of DS18B20, DS1822, DS18S20 (thereafter DS18) type and 1 access control sensor of iButton type can be connected to the tracker. The generalized scheme of connecting via 1-Wire is represented in Figure 2.26.

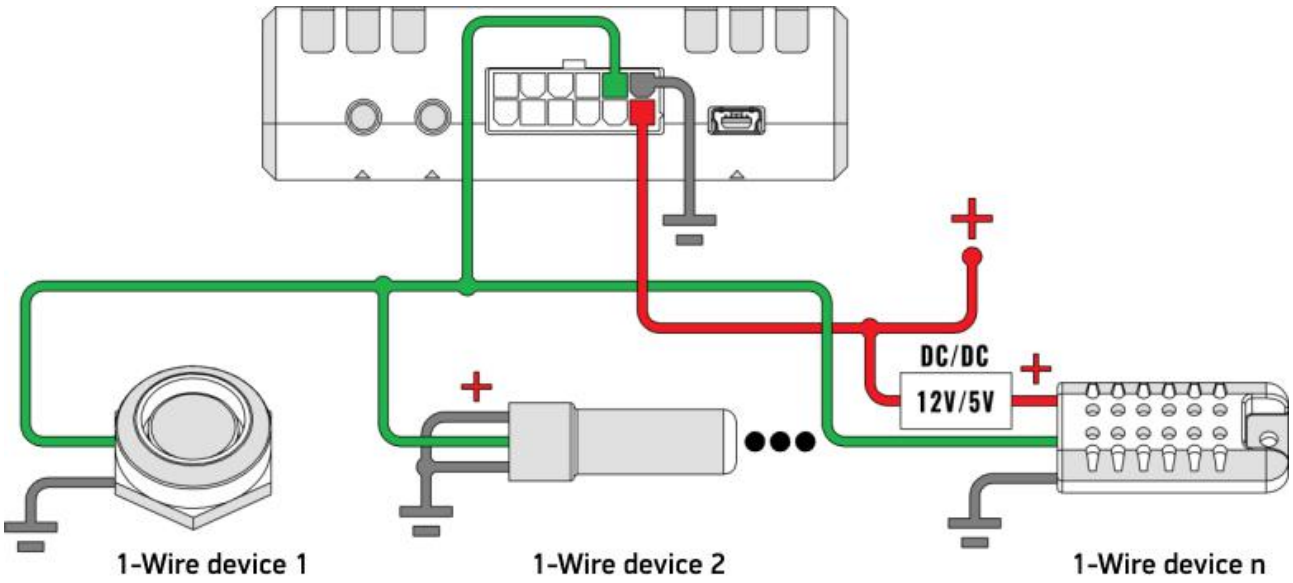


Figure 2.26 Connecting via 1-Wire

Pay attention to the fact that the devices can have either other levels of power supply voltage rather than the tracker or not to have them at all (power supply is from 1-Wire directly). The more detailed data on setup of similar devices can be found in correspondent manuals.

The sensor address is attached to parameter number in automatic or manual mode.

On the first stage after connection the automatic attachment of already connected sensors to corresponding parameters in ascending order of sensor addresses takes place.

Next, when connecting the new sensors they will be automatically attached to free parameters in connecting order. When switching off, the displacement in addressing does not take place.

Sensor addresses can be set or edited manually with the command “OWFIXED” or in corresponding tab of configurator.

Command without arguments “OWFIXED” returns the sensor address that are attached to parameters. For instance, the reply of “OWFIXED=0,130868614,0,0” type says that for parameters 0, 2 and 3 the sensors are not attached (address 0 is used as a sign of attachment absence), and to parameter 1 sensor with address 130868614 is attached. With the command “OWFIXED” one can compare the sensor addresses to parameters and clear the existing attachment by setting values 0 in all fields.

For information about setting 1-Wire refer to section 3.12.

2.18 Connecting CAN-LOG

The tracker supports data transmission that are received from CAN-LOG controller of P and B or compatible series (more information on http://farvater-can.ru). Controller is connected directly to the tracker via (Figure 2.27) or via adpter via RS-485 (Figure 2.28).

Connecting the vehicle and CAN-Log setup is implemented according to the operating manual. The tracker setup is performed according to section 3.19 of this manual.

Attention! Interface RS-232 support is optional and must be specified when placing an order at manufacturer.

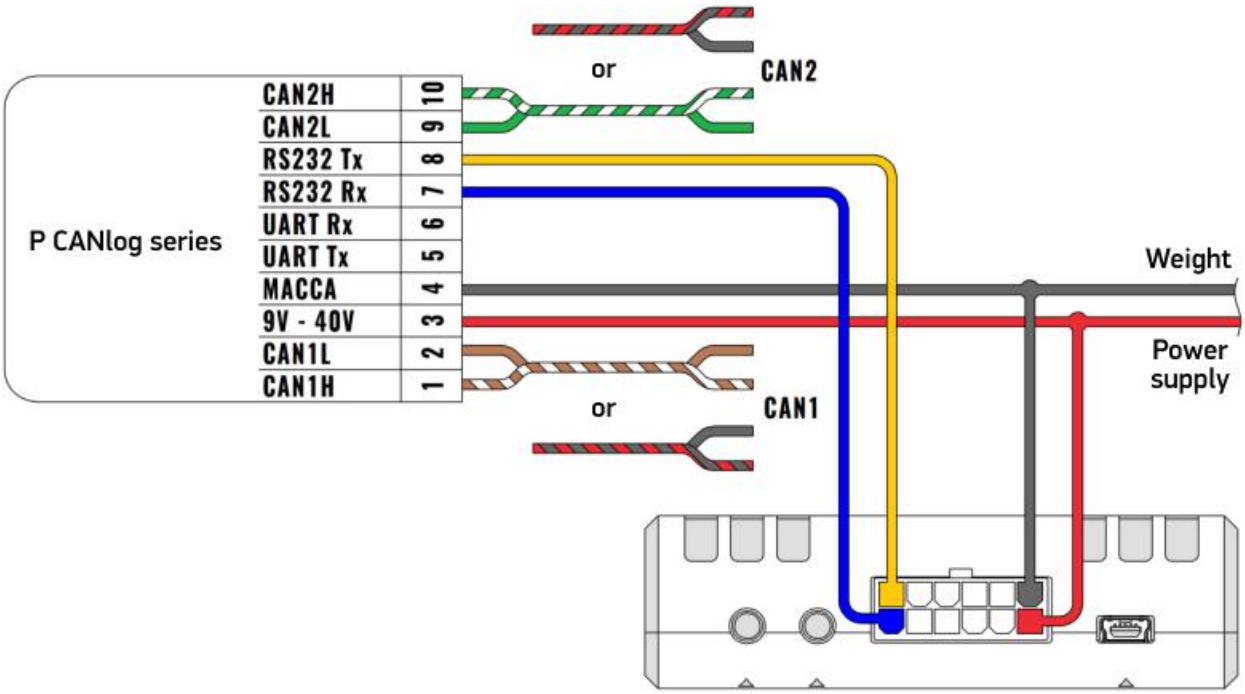


Figure 2.27 Connecting CAN-LOG via RS-232

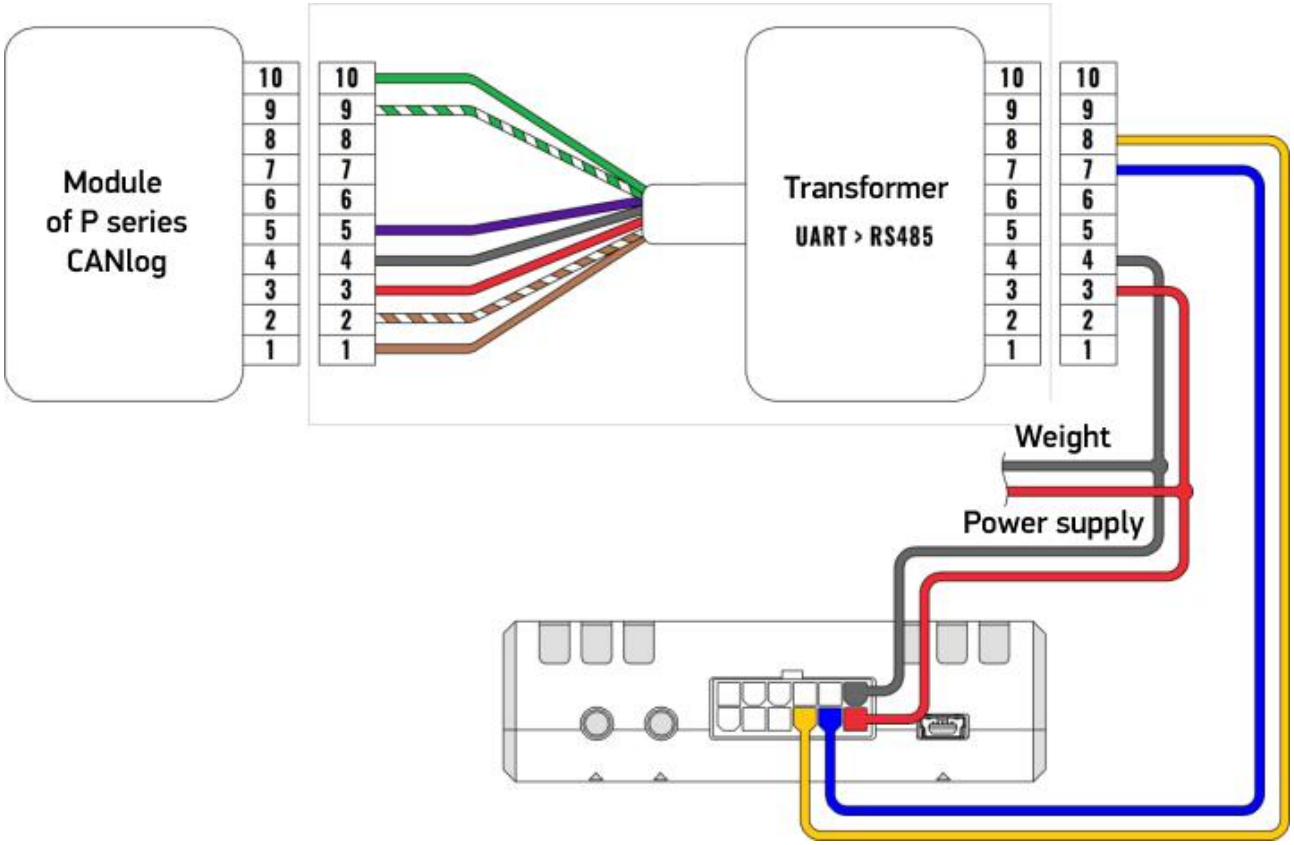


Figure 2.28 Connecting CAN-LOG via adapter UART-RS485

For information about CAN-LOG setup via configurator refer to section 3.19.

2.19 Voice communication

Tracker UMKa30X has voice communication support in some versions. The tracker can accept the incoming calls and perform outgoing voice connections. The tracker works with “GLONASSSoft” voice headset and similar ones that work by the unsoldering chart represented in Figure 2.29.

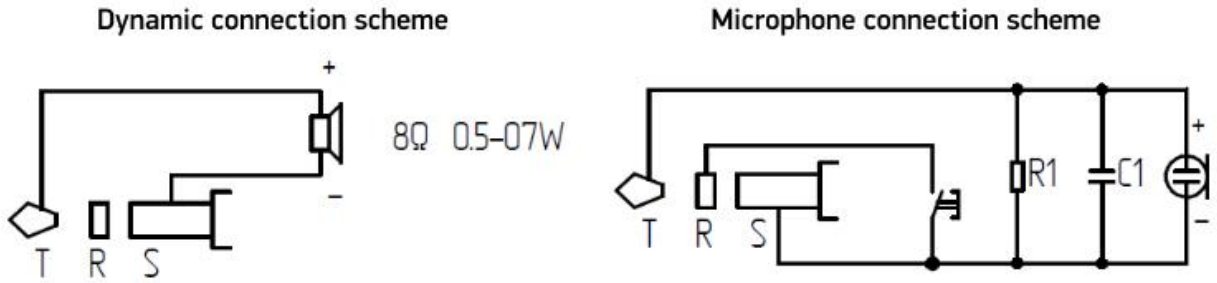


Figure 2.29 Chart of voice headset unsoldering

The dynamic must comply with the following parameters:

– rated impendance not less than 8 ohm;

– rated power not less than 0.5 Watt.

– frequency range not worse than 300 hz…4 khz

Microphone must comply with the following parameters:

– electret microphone;

– operational voltage not less than 2 V;

– sensitivity not worse than 42 dB;

– frequency range not worse than300 hz…4 khz

Typical impedance of R1 resistor is 3.3 kiloohm.

Typical capacity of C1 condenser is 0.1 ufd.

Attention! During the voice call the data transmission is not available. During long telephone calls the connection with server can be lost.

Command “VOICE” can set the dynamics volume and microphone sensitivity.

For setting the characteristics of the incoming connection the command “RINGS” is used. It specifies the number of beeps before automatic headset pick-up (or disables the automatic pick-up), volume and ringtone.

By default the incoming call is accepted from any number. The numbers from which one can make an outgoing call, can be limited by the command “WHITELIST” where it is possible to set up to 5 numbers. By the outgoing call from the number that is not in the allowed list the automatic ring off will occur.

To control some functions of voice communication during the usage the voice headset button is used. It helps: accept the incoming call, finish conversation, dial one of pre-entered numbers, send signal “SOS” to the server.

In table 2.3 the possible ways of actions with the voice headset button are represented.

Table 2.3 Actions with voice headset button

Action	Description
Click	Short pressing on the voice headset button for not less than 0,5 seconds
Number of clicks	From 1 and more clicks in a row with a pause between them not less than 0.5 seconds. Number of clicks is finished by the pause 0.5 seconds.
Short pressing	Holding the voice headset button for more than 0.5 sec but not longer than 5 sec
Long pressing	Holding the voice headset button for more than 5 sec

"Short pressing" performs one of the functions given in Table 2.4 depending on the context.

Table 2.4 Action on the short pressing of voice headset button

Context	Action
Incoming call	Pick up the headset
Conversation	Hang up the headset
Idle	Dial the number
Outgoing call	Hang up the headset

In order to perform the outgoing calls it is necessary to preliminary set from 1 to 5 telephone numbers with the command "DIALLIST". After it, the needed number from the list is chosen with the "number of clicks": 1 click - the first number, …, 5 clicks - the fifth number. For another dialing of the last dialed number it is not needed to choose the number from the list. The first number in the list is set by default.

"Long pressing" of the voice headset button changes the 15th bit parameter "status". This bit can be attached to "SOS" function on the telemetry server if necessary.

For information about the voice headset setup via configurator refer to section 3.30.

2.20 Power supply manager

Power supply manager is designed for optimization of the battery charge modes and the tracker energy saving.

While operating the tracker can be in one of power saving modes represented in Table 2.5.

Table 2.5 Power saving modes

Mode	Switch conditions	Tracker behaviour
Run mode (RUN)	- The conditions for switching to other power saving modes are not met.	-The tracker is fully functional.
Idle mode (IDLE)	-The tracker works from the battery for the period longer than specified (DISCHARGE Y); - The tracker is in the static navigation mode for the period longer than specified (POWERSAVE Y); -The voltage on the analog input is lower than the specified by the command (VOLTSAVE Z).	- The modem is disconnected from the server (OFFLINE). In OFFLINE mode, the modem stays registered in the cellular network and processes incoming SMS and voice calls. - LED indication is turned off. Consumption at a voltage of 12 V– 30 mA.
Standby mode (STANDBY)	- The tracker is in the static navigation mode for the period longer than specified (POWERSAVE X). - The voltage on the analog input is lower than the specified by the second parameter of “VOLTSAVE Y” command.	- The modem is completely disconnected (SLEEP). - LED indication is turned off (except for green LED indicator) - Navigational receiver is turned off. - No by-time recordings in the black box. - The rest of the operations function in a normal mode.
Activity window (WINDOW)	In this mode, the terminal switches to the RUN mode from any other power saving mode.	On UTC start time and duration of the activity window is set by “ACTIVEWIN” command. When the window ends, the terminal switches to a power saving mode.

While operating the tracker can be in one of power saving modes represented in Table 2.6.

Table 2.6 Power supply modes

Mode	Switch condition	Tracker behaviour
Power supply from USB	- after starting the system the main supply voltage is off	-modem is not functiona (in UMKa301 and GNSS); - battery charge and discharge do not occur; - data is not enetered in black box; - the switch into battery recovery or slow charge mode may occur if there is main supply voltage.
Battery recovery mode	- battery is completely discharged or not connected	- Removal of the battery from deep discharge - After complete charge (more than 3.3V) the tracker switches into slow charging mode
Battery slow charge mode	-It is characterized by the possibility of switching to battery work on condition of turned off power voltage	- The maximum voltage of charged batterty in this mode is about 4.0 – 4.1 V that corresponds to 80 – 90 % charge; - From this mode it is possible to switch to fast battery charge mode.
Battery fast charge mode	- In this mode charge current depends on duration of the battery connection to 4.2B line.	- The battery charges to 4.2V that correponds to 100% charge.
Battery protection mode	- Short circuit failure on battery terminals is detected	- All charge circuits turn off to prevent tracker and battery damage
Battery discharge mode	-If power voltage disappears, the tracker switches to the battery power in case it is connected and in good order (DISCHARGE X,Y).	- The purpose of battery discharge mode is to prolong tracker work and save the battery.
Battery turn-off mode	-In EEPROM и FLASH memory the entries are completed. After	-All tasks implemented by the tracker are finished in the most

Mode	Switch condition	Tracker behaviour
	that the tracker reboot takes place during which the terminal is turned off from the battery.	correct manner. -The switch to backup mode is possible from this mode.
Backup mode.	- Tracker switches to it after proper cut off on condition of power voltage absence	-The battery voltage goes only on backup circuits of CPU and GNSS modules. - Detects the opening button disconnecting; - GNSS backup circuit power supply allows to implement «warm start» and provides the work of other technologies that reduces the time until receiving the first valid coordinates.

In power supply manager the power saving function is implemented by the reduction of suppy voltage on external and internal analog channels. The setup is performed with the command “VOLTSAVE”.

Also one can set the activity window. This setup removes the tracker from power saving mode in specified time and duration. In combination with other power manager commands it implements the beacon function. The setup is performed with “ACTIVEWIN” command.

2.21 Data transmission on 3 servers

The tracker is able to transmit data on 3 different telematic servers and at the same time it is updated and configurated.

Black box provides independent data storage on each of three possible telematic servers. The tracker always records tha black box for all servers regardless of whether their transmission is enabled in the settings or not. At the same time only one data copy is stored in black box.

To transmit the data on the server enter its address, port and choose the communicarion protocol with the help of configurator or the commands “SETSERV” and

“SETPROTOCOL”. Other settings such as “Upload order”, “Online mode” and “Auxiliary parameters” function simultaneoulsy for all servers

To disable data transmission on the server clear the server name in tracker settings. At the same time there is a restriction in the order of choosing the server for transmission. One cannot set transmission concurrently on the first and the third server or on the second and the third one. It is possible to set transmission only on the first (primary) server, or on the first (primary) and the second (alternate), or on all three servers concurrently.

Attention! You should not set two similar servers, as this leads to the device malfunction and increases traffic! Also, adhere to the following server selecting order: Primary server → Alternate server → Auxiliary server, if the servers are set out of order, for example, primary and auxiliary servers are set, and the alternate one is skipped, then the settings of the auxiliary one will be ignored.

At logging the exchange between the tracker and the servers, the [Connection ID] field has been added to the messages about receiving and transmitting data packets. The possible connection IDs and their values are given in Table 2.7.

Table 2.7 Connection ID

Connection ID	Description
[0]	The first (primary) server
[1]	The second (alternate) server
[2]	The third (auxiliary) server
[3]	Remote update server
[4]	Remote configuration server

2.22 Remote configuration

In the remote configuration mode, it is possible to operate remote tracker practically the same way, as if it were connected via configurator or USB.

In the remote configuration mode, the remote control server acts as an intermediary between the configurator and the tracker. The configurator and the tracker are connected to it.

There are two possible ways of connecting the tracker to remote control server: permanent and session.

In the permanent mode, the tracker keeps the connection to the remote control server as long as the tracker is in the “ONLINE” state. By default, the permanent mode is disabled. Tp enable it, use command “REMCFG ENABLE”, to disable - command “REMCFG DISABLE”. To check the current configuration status use command “REMCFG STATUS”.

In the session mode, one should send command “REMCFG START” via any available communication channel just before starting configuration session. At this, the tracker will stay connected to the remote control server for 30 minutes. If configuration requires more or less time, one can also specify the duration of the session in the parameters of command “REMCFG START”.

Switching from the session mode occurs upon the session timeout, at the tracker reboot, upon the receiving of "REMCFG STOP" command or when the tracker is switched to the power saving mode.

After the tracker has been connected to the remote control server, it becomes possible to connect the configurator to it. To do so, click  on the toolbar. In the opened "Connecting to server" window, enter the tracker IMEI and password for accessing it, and then press the "Connect" button. Further work with the configurator is described in Section 3.3 and later.

It is important to understand that remote configuration is realized via the GPRS channel,which has considerable limitations in both the bandwidth capacity and transmission delay and in the connection stability as well. These features of the data channel impose limitations on the configurator performance and the implementation of some additional functions, such as debugging mode and the like.

Attention! By default, the permanent connection mode is disabled in the settings and only the session mode is available.

2.23 High priority events

A high priority event is an event (message, spot) that must be sent on telematic server with minimum delay. The “SOS” signal also refers to high priority events.

A high priority event can be formed when changing the values of discrete inputs or any bits of “Status” parameter. For this purpose the mode “Discrete priority (+)” or “Discrete priority (-)” is set, and the mask of high priority events is set for the status by the second parameter of command “SETMASK” or by configurator in the status calculator via “Priority” column.

Balck box stores up to 16 high priority spots. For each telematic server a single list of high priority events is used.

A high priority spot acknowledged by the server is deleted from the corresponding list. At the tracker power turn off or restart, lists of high priority spots are cleared.

When the “From old to new” spot uploading order has been selected, the rule “Group records by” is canceled if there are any high priority spots in the queue. The spot uploading order is not changed. A packet containing the maximum possible amount of spots at current settings is sent to a server. In this case, the first record in the packet will be the oldest one among the not acknowledged. The "Group records by" rule will come into effect again as soon as the last high-priority spot from the list of high-priority ones is acknowledged.

When the “Current first” spot uploading order has been selected, the rule “Group records by” is also canceled if there are any high priority spots in the queue.

The spot uploading order is changed this way: at first all the high priority spots are sent in the order they are received in the queue, then the current spot is added to the packet with the last high priority spot, not acknowledged spots are added last.

A packet containing the maximum possible amount of spots at current settings is sent to a server. The "Group records by" rule will come into effect again as soon as the last high-priority spot is acknowledged.

When setting the high priority messages it is recommended to set the parameters “Operation time from the battery”, “Switching time to IDLE mode from the battery”, “Switching time to STANDBY mode”, “Switching time to IDLE mode” on “0” value.

2.24 Connecting iQFreeze

iQFreeze can be connected to the tracker via RS-485 or RS-232 interfaces at its physical presence in the tracker. Both ways allow to obtain the same parameters, still RS-485 is more preferable as iQFreeze via RS-232 transmits data in JSON format as well without any requests from the tracker. Due to this a slight number of exchange failures may take place. iQFreeze also operates at the fixed velocity 9600.

Via RS-485 iQFreeze is connected to the tracker via XP6 connector (ref. To iQFreeze passport) contacts 4(A) and 3(B).

iQFreeze RS-485 connector XP6	UMKa301
Contact 4 (A)	Contact 2 (A)
Contact3 (B)	Contact 3 (B)

To enable iQFreeze send the following commands:

1) «SETIQFREEZE 1» -enable iQFreeze;
2) «RS485 6,9600» - iQFreeze works via RS-485;
3) «RELOAD» - apply the settings.

Via RS-232 iQFreeze is connected to the tracker via XP5 connector (ref. To iQFreeze passport) contacts 3 (TxD) and 4 (RxD) and 5 (General).

iQFreeze RS-485 connector XP5	UMKa301.R
Contact 3 (TxD)	Contact 12 (RxD)
Contact 4 (RxD)	Contact 6 (TxD)
Contact 5 (General)	Contact 7 (General)

To enable iQFreeze send the following commands:

1) «SETIQFREEZE 1» - enable iQFreeze;
2) «RS232 6,9600» - iQFreeze works via RS-232;
3) «RELOAD» - aplly the settings.

For information about iQFreeze setup via configuration refer to section 3.20.

2.25 LBS positioning

LBS positioning function is integrated. To enable data transmission that is necessary for LBS positioning use command “SETLBS 1”. With this, the list of transmitted data onto the server of parameters will be complemented with such parameters as "mcc" - mobile country code, "mnc" - mobile network code, "lac" - local area code, "cell_id" - cell identificator. Read about Wialon setup on the website https://gurtam.com/ru/blog/no-satellites-lbs-service

2.26 Hosting protection

In "H" version trackers hosting protection is enabled. In this version the tracker is bound to certain telematic address without change possibility.

In configurator in "Server" tab one can find data of connected server without edit possibility.

2.27 Inclinometer

Inclinometer is a tool designed for measuring the tilt angle of various objects relating the Earth’s gravity field.

The inclinometer function has first appeared in UMKa302 firmware version 2.8.1. The The current tilt angles request is Implemented in the console by command “INCLINE”. The reply for a horizontally installed UMKa302 is “INCLINE X=0,Y=0,Z=90”.

Inclinometer data are always available, data transmission on the server is disabled by default. To enable dtat transmission, use command “SETINCLINE 1”. After that the inclinometer readings will appear in “History” tab (3.7) as parameters IncX, IncY and IncZ.

2.28 Reader MATRIX-II

Matrix-II and similar readers emulate iButton protocol in an extremely cut off form.

Reader Matrix-II supports command Read ROM [33h]. This command can be used only when it is reliably known that there is no other device on a CAN bus.

To enable the simplified mode of 1-Wire bus, it is enough to disable parameter “1-Wire temperature” in “1’-Wire” tab”(3.12).

2.29 Modbus protocol support

For UMKa302 the support of Modbus RTU protocol is realized. For further information refer to https://glonasssoft.ru/ru/equipment/umka302, in instructions section, document “Modbus protocol support”.

2.30 BLE identification

For UMKa302 the support of BLE identification is realized. For further information refer to https://glonasssoft.ru/ru/equipment/umka302, in instructions section, document “BLE identification system”.

2.31 Photocameras support

In UMKa302 the photocameras support that are connected via RS-232 and RS-485 is implemented. Work efficiency is checked with two models of photocameras:

1) JC029F-Y01 with RS-232;
2) JC426F-Q01 with RS-485.

Attention! For the cameras power supply a separate external source of power supply with the output voltage 5V and output curre nt not less than 300 mA is needed.

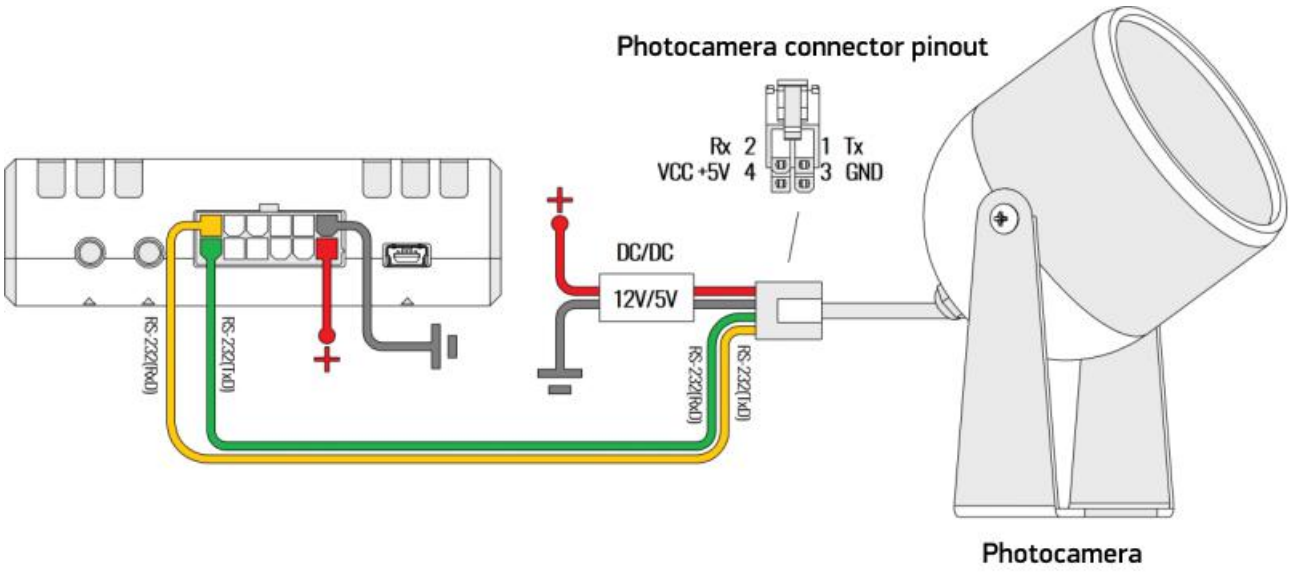


Figure 2.30 Connecting the photo camera JC029F-Y01 with RS-232

The camera T JC029F-Y01 with RS-232 is installed according to Figure 2.30.

The set up interface RS-232 of tracker UMKa302.R is designed to work with photocameras by commands “RS232 10,115200” and “CAMCONFIG 0”.

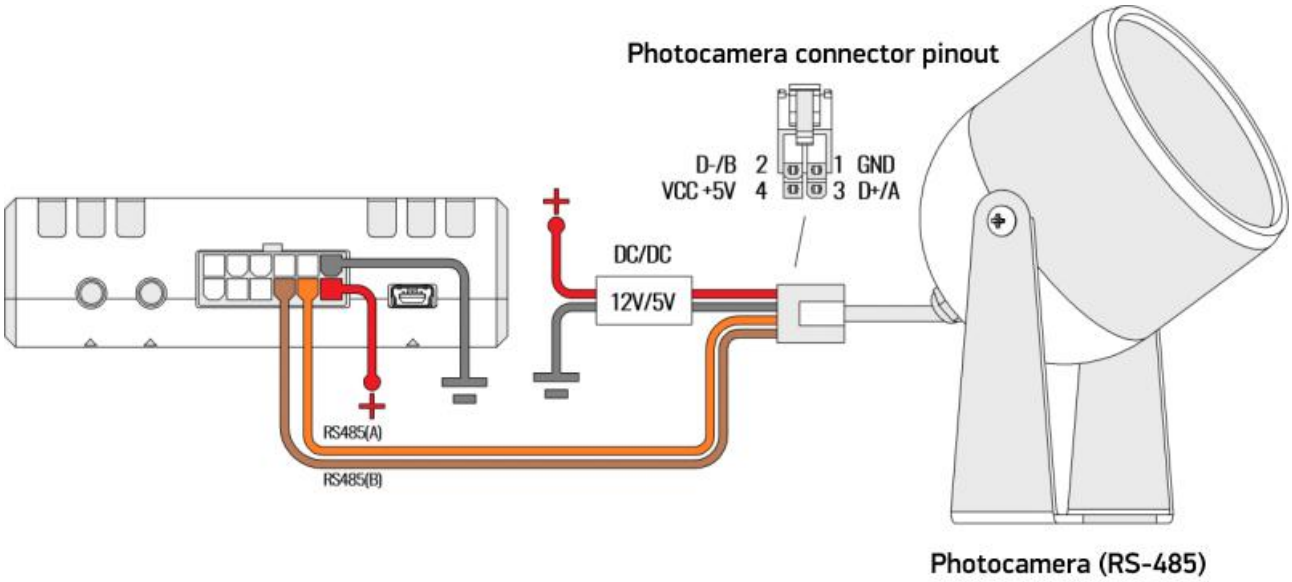


Figure 2.31 Connecting photocameras JC426F-Q01 c RS-485

The camera JC426F-Q01 c RS-485 is connected according to Figure 2.31.

The set up interface RS-485 of the tracker UMKa302 is designed to work with photocameras by commands “RS485 10,38400” and “CAMCONFIG 1”.

To check the connection with the camera, use command “CAMSNAPSHOT -1”. In case everything is performed properly after some time the tracker will return the reply “CAMSNAPSHOT=1”. At this in the tracker file system “/flash/CAMERA” a photoshot will appear with “ .JPG” resolution.

The transmission of photos on the server is supported via protocol Wialon Combine. To choose a server on which the transmission by the command “CAMSNAPSHOT X” will be implemented, it is recommended to specify its number.

For X the following values are supported:

X=0 – primary server;

X =1 – auxiliary server;

X =2 – alternate server;

X = –1 – do not transmit on the server. Save in the tracker memory.C

A fine adjustment of a photocamera is implemented by the command “CAMCONFIG X,Y,Z”, where X is the camera address on the bus. For RS-232 the address on the bus is 0, for RS-485 it is specified on the camera casing. Y is the shot resolution. If Y=0, the resolution will always be QVGA (320x240), if Y=1, it will be VGA (640x480). VGA resolution

is not supported by all cameras. Z is the level of JPG contraction within the range from 0 to 255. The picture quality is specified by the camera itself according to Z value.

2.32 Opening button

In the trackers UMKa300, UMKa301 and UMKa302(v2) is realized the support of opening sensor(button).

For the proper finish of function work one needs the following:

1) Battery that is connected and in due order.

2) The button will be installed and locked with the closed casing, and the button must be specified in the plant options when manufacturing.

3) The loader must be updated to the version 1.0.0 or higher.

When all conditions are fulfilled “tamper” the opening sensor with a special command “TAMPER X", where X is the access password to the tracker. The tracker will switch to state “NO OPENING”. By any even short button disconnection or the battery cut-off the tracker will switch to the state “OPENED”. The cut-off of main power supply and reboot do not affect the work of the opening sensor.

The current sensor status is also possible to eceive by the command “TAMPER" without arguments.

The following replies may occur:

"TAMPER=0" - no opening

"TAMPER=1" - opening is not detected

"TAMPER=OK" - opening flag is cleared, the opening sensor is “tampered”.

"TAMPER=NOKEY" - no button (not specified in the plant options)

"TAMPER=BADBOOT" - the loader needs reboot

3 OPERATING INSTRUCTIONS

3.1 Indication

To determine the current status of navigation tracker the three LEDs are installed on its board. They are situated behind the main connector and illuminate it during operation (Figure 3.1):

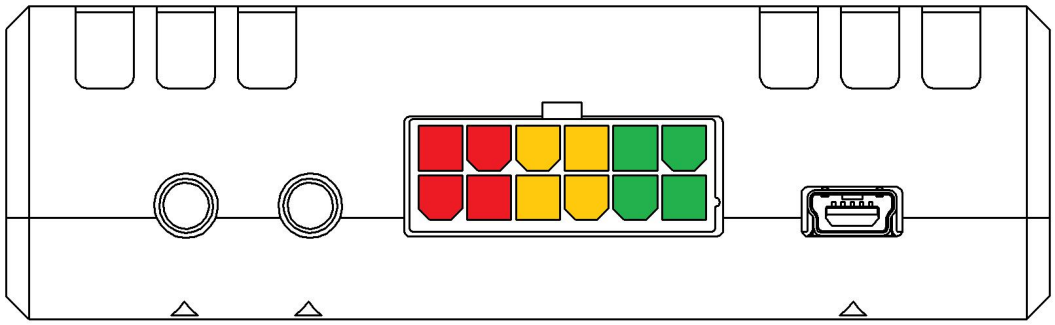


Figure 3.1 Placement of indicating LEDs

Each LED is responsible for the status of separate tracker modules:

Table 3.1 LEDs

LED	Status
Green – indicates the tracker power supply	
on	Power supply is availiable
off	Power supply is not availiable
Yellow – indicates GSM module status:	
off	“Sleep” mode. The modem is off, or a modem or SIM error has occurred.
1 short flash	GSM module initialization
2 short flashes	GSM logging in.
3 short flashes	“Offline” mode. The modem only receives SMS and voice calls
4 short flashes	GPRS logging in. GPRS logging out
3 short pauses	“Online” mode. No connection to both servers
2 short pauses	“Online” mode. No connection to the alternate server
1 short pause	“Online” mode. No connection to the primary server
Steady on	“Online” mode. Both the primary and the alternate servers

	are connected.
Red – indicates GNSS module status:	
off	GNSS module is out of order
Flashes once	Invalid coordinates. Satellites search
Flashes 2 times	2D-coordinates are detected
Flashes 3 times	3D-coordinates are detected

Attention! Remote update and remote configuration have no LED indication as they are background or auxiliary.

3.2 Preparing a PC for the tracker configuration

To set up the tracker use a personal computes use a PC running Windows 7 or higher. Download the «UMKa3XX Configurator» installer from the manufacturer official website at https://glonasssoft.ru/equipment/umka301 .

To start the installation run the downloaded file and allow changes (Figure 3.1)

Figure 3.1 Allowing changes

Select the installation language (Figure 3.2) and click "OK".

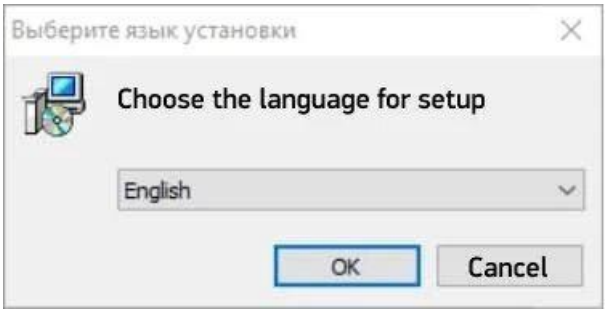


Figure 3.2 Selecting installation language

Select the installation path (Figure 3.4) and click OK.

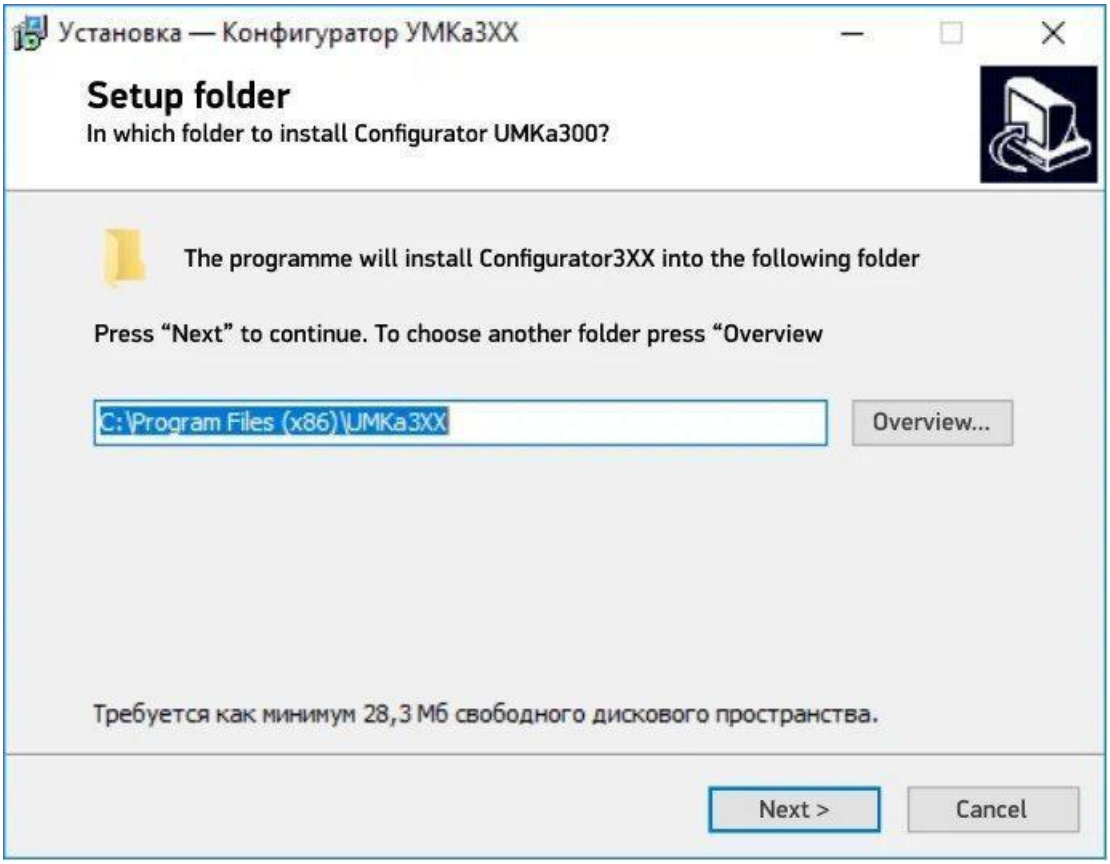


Figure 3.4 Setting instalation path

When installing for the first time, select the option "Install the tracker driver" (Figure 3.5) and click "Next".

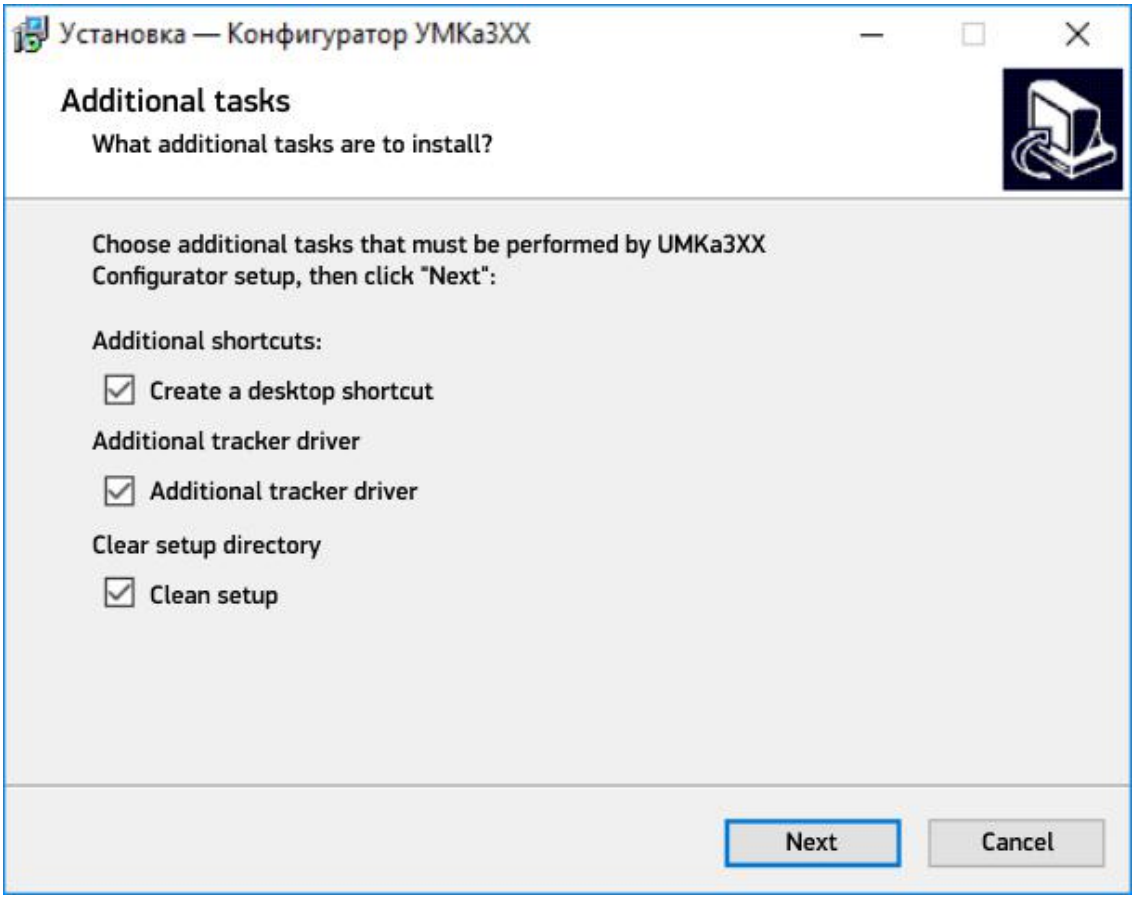


Figure 3.5 Selecting installation options

The programme is ready for installation, click the “Install button” (Figure 3.7).

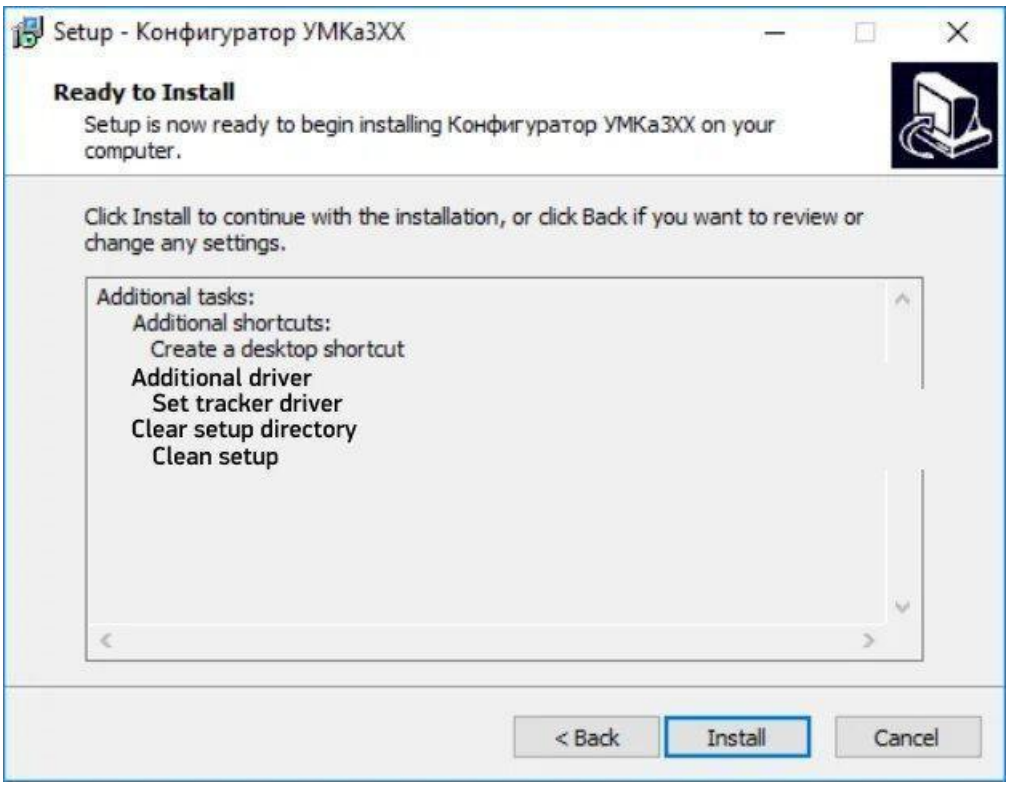


Figure 3.7 Ready to install

After the installation is completed, you can immediately start the configurator by selecting the option “Start Configurator UMKa3XX” (Figure 3.7).

Figure 3.7 Starting application

3.3 Configurator

Connect the tracker to PC with a USB A - mini-B. The cable is not included in the package and is purchased seperately.

To start the application, go "Start" → "All Programs" → "Configurator UMKa3XX." The startup window of the configurator (Figure 3.8) opens, it can be conventionally divided into four zones: Status panel (1), Toolbar (2), Settings tree (3) and Data display window (4).

At startup, the configurator connects to the update server and checks for updates for the configurator and the tracker firmware.

If there is an available configurator update, a window with the information about the version of the update will appear (Figure 3.9). Click "Yes" to download the update. The update will be downloaded and installed automatically, and then the program will be restarted.

Figure 3.8 Startup window “Status”

You can also check for updates manually, by clicking the Check for updates" icon on the toolbar.

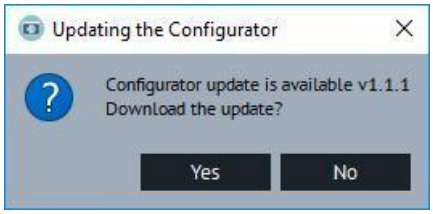


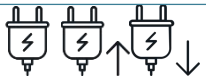
Figure 3.9 Updating configurator

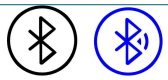
Attention! To ensure steady operation of the tracker, one should always update the tracker to the latest firmware version.

Attention! If any problems with the configurator auto-update occur, try running the configurator as an administrator. To do so, right-click the "UMKa3XX Configurator" shortcut and select "Run as administrator" in the opened context menu.

Table 3.2 represents the functions of the toolbar and status icons .

Table 3.2 Toolbar and status icons

Button	Status
	Open a configuration file
	Save a configuration file
	Remote configuration
	Read a configuration from the tracker
	Write a configuration into the tracker
	Reconnect the tracker
	Update the tracker firmware. When updates are available, icon gets darker
	Cleaning the tracker memory. Enables erasing of the user settings and the “black box”
	Reboot the tracker
	Status calculator
	MyLogic script editor
	Check for updates
	Help (operating manual)
	About program
	Power supply voltage (Norm/High/Low)
	Battery voltage (Low/High)
	Number of sctive SIM card (SIM0/SIM1)
	Roaming (Guest Network/Home Network)
	Connection to the primary server (Link up/Link down)
	Connection to the alternate server (Link up/Link down)

Button	Status
	Connection to the auxiliary server (Link up/Link down)
	Connecting to update server
	Coordinates (Not valid / Fixed / Valid)
	Connecting to configuration server
	Bluetooth (Off/On)

To view and edit tracker settings, use the settings tabs (Figure 3.9). When clicking a tab in the data display window, one can view the corresponding values and settings and edit them.

For remote configuration, click  “Remote configuration” icon in the upper left of the configurator, enter the tracker password and IMEI in the popup window, then click "Connect" button. Further, operating the configurator does not differ from configuring via USB.

To write the changed settings into the tracker, use  “Write a configuration into the tracker” icon.

When configuring several trackers, to speed the procedure up one can save the configuration of the first tracker to the file by clicking  “Save a configuration file” icon;

and then load the settings into the next trackers by clicking  “Open a configuration file”

And  “Write a configuration into the tracker”.

For help information click  “Help” icon on the toolbar.

To view information about the configurator, click  "About Program" icon on the toolbar.

3.4 Mobile configurator

In order to operate the mobile configurator, download the “UMKa3XX Configurator” from the “Play Market” (https://play.google.com/store/apps/details?id=ru.glonasssoft.configurator3xx) and install it on an Android phone with OS version 4.1 or higher.

Open the application and in the window appeared click “Tracker search via Bluetooth”. The application will automatically turn the Bluetooth on and show the list of available trackers. Select the tracker you need in the list appeared (Figure 3.10).

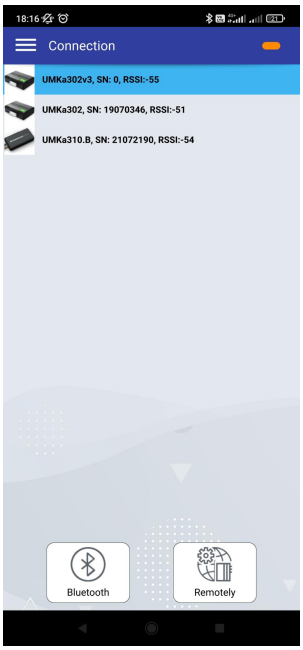


Figure 3.10 List of available trackers

After the configuration has been read, you will get to the status window displaying tracker general information, status of inputs/outputs, external and internal sensors.

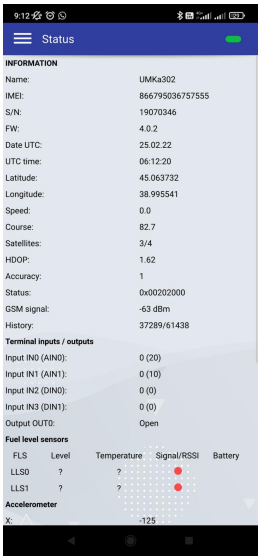


Figure 3.11 “Status” window

By clicking the button in the left upper corner, you can call the tab selecting bar (Figure 3.12).

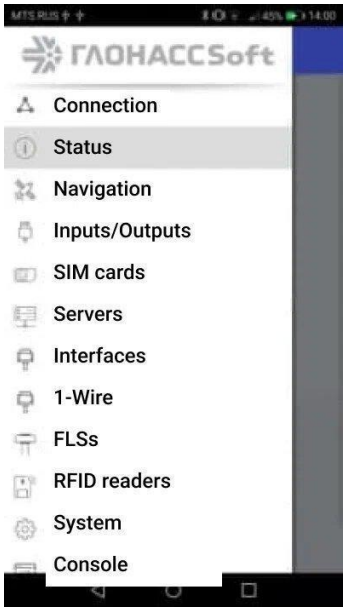


Figure 3.12 Tab selecting bar

When selecting the tracker control bar, you can call the bar corresponding to the toolbar from Windows configurator version described in Section 3.3.

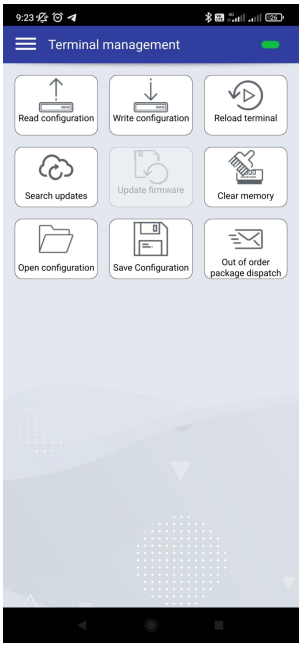


Figure 3.13 "Tracker control" bar

In other respects, operating the mobile configurator does not differ from operating the Windows configurator.

3.5 “Status” tab

Tracker general information, status of inputs/outputs, external and internal sensors are displayed in the "Status" tab (Figure 3.14).

Tracker general information is at the top of the data display window. Here one can see the tracker serial number, its name and IMEI, the current firmware version and navigation information. In the "Validity of coordinates" line two values can be displayed: 0 - coordinates are not valid, and 1 - coordinates are valid.

By clicking on the value displayed in the "Status" line, one can open the "Status calculator" window (Figure 3.15) displaying explanation of the tracker status (active SIM card number, coordinate fixation status, “black box” status, battery status, etc.). The column “Event” sets for which parameters another spot on each change will be added in black box. Column “Priority” makes the tracker send another spot on the server as soon as possible. You can also call the status calculatorby clicking on the “Status calculator” icon on the toolbar.

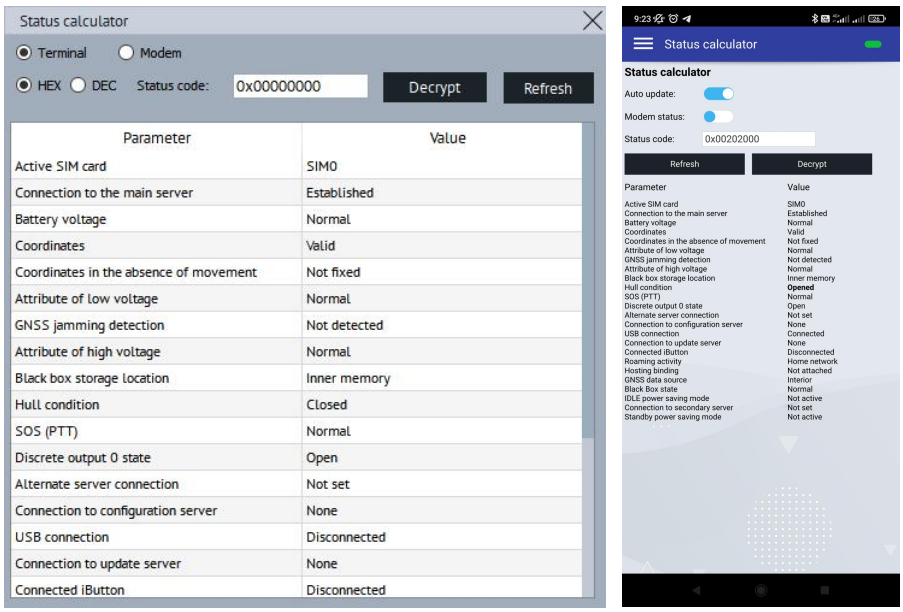


Figure 3.14 Calculator status

3.6 “GNSS monitor” tab

In "GNSS-monitor" tab the information on satellites, their location and quality of signal is represented. It is used for control over mounting and debugging of the tracker.

Satellites are represented in pictures with columns. The completeness of a column and figures above mean the level of satellite signal. The figures below mean the number of satellite. Handwriting in bold mean the satellites that are being estimated. Colour of column: satellite type. Blue - GPS; Red - GLONASS; Green - WAAS.

On satellite map in the sky the location of satellites in relation to the tracker is represented in pictures. Straight lines refer to location of satellite horizontally to the north from above. Circles refer to satellite altitude: the farther from the center, the lower.

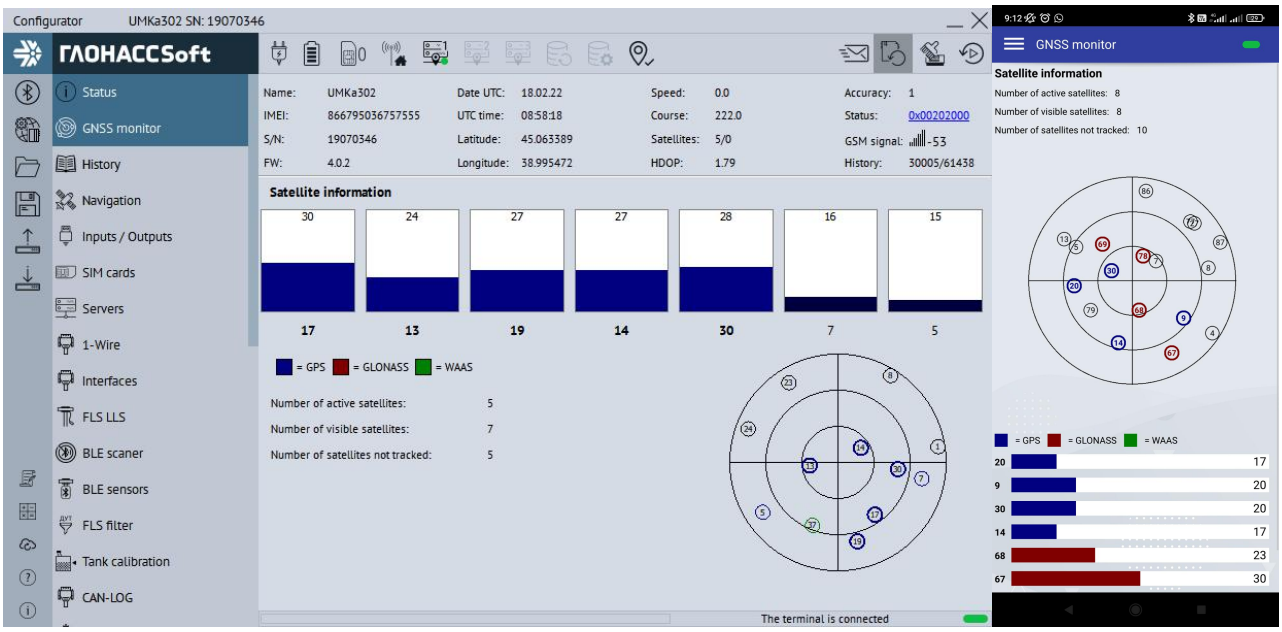


Figure 3.15 "GNSS monitor” tab

3.7 “History” tab

In the “History” tab (Figure 3.16), the history stored in the black box is displayed. Use a mouse or a scroll bar to scroll the history. New records are added to the end of the table, the old ones – to the beginning. By double-clicking the parameter cell, open the status calculator with the parameter explanation. By clicking the “Export to CSV” button, you can save the history to the CSV file.

Function of history reading is supported by the tracker starting from the firmware version 1.4.27.

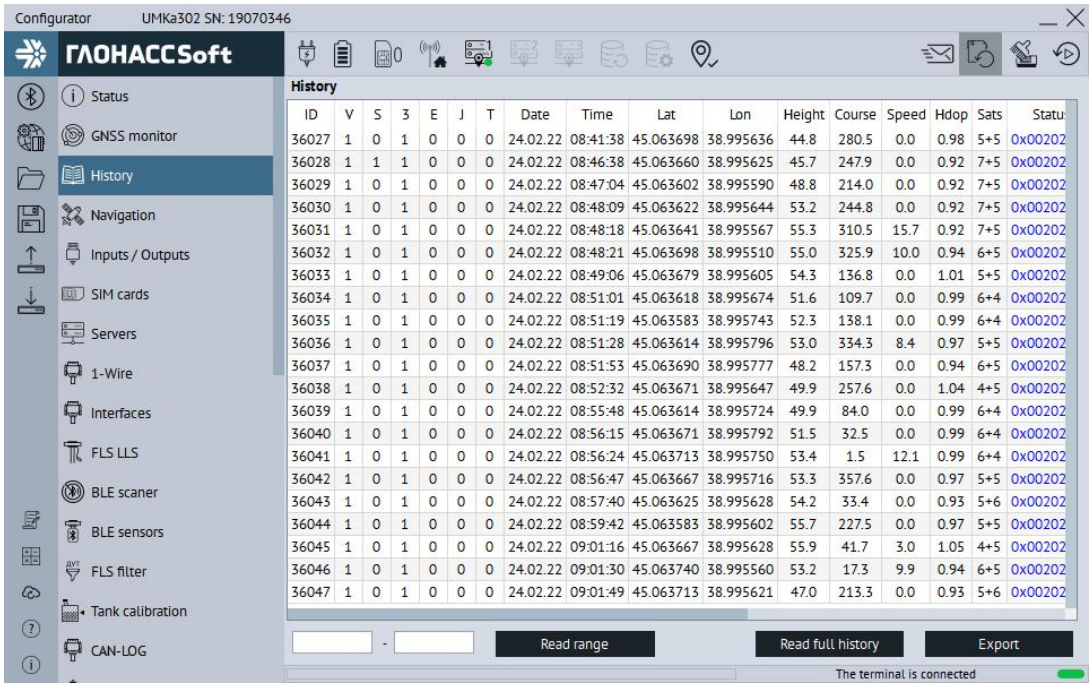


Figure 3.16 "History" tab

3.8 “Navigation” tab

To set the route drawing quality and the spot recording periods, use the "Route drawing quality" option group in the “Navigation” tab (Figure 3.17). Please note, that the higher the drawing quality gets, the more GPRS-traffic increases. This may entail additional communication costs (in accordance with the operator tariffs).

The "Minimum speed" option is for setting the speed value, exceeding of which assumes the vehicle is in motion.

The "Angle in degrees" option is for setting the value of the steering angle, exceeding of which leads to recording the next track spot.

The "Distance" option is for setting the value of the maximum straight-line driving distance between track spots, exceeding of which leads to recording the next track spot.

The "Acceleration" option is for setting the value of the acceleration, exceeding of which leads to recording the next track spot.

The “Minimum between spots, m” is for setting the minimum space between spots in metres, exceeding of which leads to recording the next track

spot. It is used for traffic optimization.

In the tracker the estimation of minimum distance between the spots taking into account their HDOP is implemented. For each spot on the basis threshold value is calculated. For HDOP < 1 coefficient 2.5*HDOP is used, in other cases coefficient 5.0*HDOP is applied. The sum of HDOP spots with coefficient defines the distance between them. The setup of minimum distance between the spots specified by parameter "B" of "TRACK" command in the same manner keeps on functioning. The tracker automatically chooses the biggest value between the specified command and calculated on the basis of HDOP.

The "Dinamic angle" option is for setting the maximum auxilliary angle in degrees that functions by low speed of the vehicle. It helps reduce track evasion connected to gaging error of coordinates, and also reduce the number of transmitted spots. The figure of dependency of dinamic angle on speed is represented in Figure 3.18. Be default, "Dinamic angle" is disabled.

The option "Recording period setting" is for setting the maximum period between spot recordings in the moving and parked vehicle.

Option group "Static Navigation" allows positioning of the vehicle at stops. This helps to filter the "coordinates crowding" or "stars" arising out of navigational errors of the GNSS module, and eliminate redundant GPRS traffic.

The vehicle stop can be detected in two ways: using built-in accelerometer or reading the discrete input status.

The "Positioning by accelerometer" option enables the mode wherein positioning is performed using the accelerometer. When the option is checked, the "Vibration threshold" and "Mode switching timeout, sec" options become available.

The "Vibration threshold" option is for setting the vibration level, which can be a guaranteed sign of the vehicle engine operation. 1000 units correspond to the vibrational acceleration of 1g.

The "Mode switching timeout, sec" option specifies the time of switching to the positioning mode after the vibration level is reduced below the set threshold.

The "Activation for input from static mode" setting the number of threshold elevation activation that must occur during 60 seconds for returning into static navigation mode.

The "Positioning by the input" option enables the mode of positioning by the logical level on one of the inputs. When the option is checked, the options "Input for static navigation" and "Logical level of input" become available.

The "Input for static navigation" option is for setting the number of the

input used for detection of the vehicle engine operation.

The "Logical level of input" option is for setting the logical level of the signal that the input receives when the vehicle engine is stopped.

Attention! If the “Positioning by the input” option is on, then the input selected in the “Input for static navigation” option should be set as a “Discrete” one in the “Inputs/Outputs” tab!

When the static navigation mode is configured by the digital input and the static navigation by accelerometer is enabled, the positioning is performed only if both channels register the parking mode. Thus, positioning is not performed if the ignition is off and the vibration level is higher than the set one, and vice versa.

The "Validity of coordinates" option group is for setting the validity of the coordinates. The validity (i.e., reliability of coordinates) is determined on the basis of the number of visible satellites and the HDOP level (horizontal dilution of precision depending on the location of the satellites in the sky).

The "Maximum HDOP" option is used for setting the maximum HDOP value. When it is exceeded, the coordinates will be transmitted as invalid regardless of the number of visible satellites.

The "Max. HDOP at min. satellites" option is for setting the maximum HDOP value; when exceeded, the coordinates will be transmitted as invalid if the number of satellites is less than the one set in the" Minimum number of satellites "option.

The "Minimum number of satellites" option is for setting the minimum number of satellites, below which the coordinates will be transmitted as invalid if the HDOP level is higher than the one set in the "Max. HDOP at min. satellites".

Group of options "Track smoothing» has a parameter "Filtration coefficient" that detect track smoothing with Kalmar filter. Parameter is from 1 to 100. By 0 filter is turned off. Real coefficient of smoothing is multiplied on parameter HDOP. Thus with good HDOP smooting reduces, and vice versa, with bad one it increases. Coefficient of smoothing should be chosen regarding of the vehicle. With big values wider going outs from driveway at turnings at high speed start to appear.

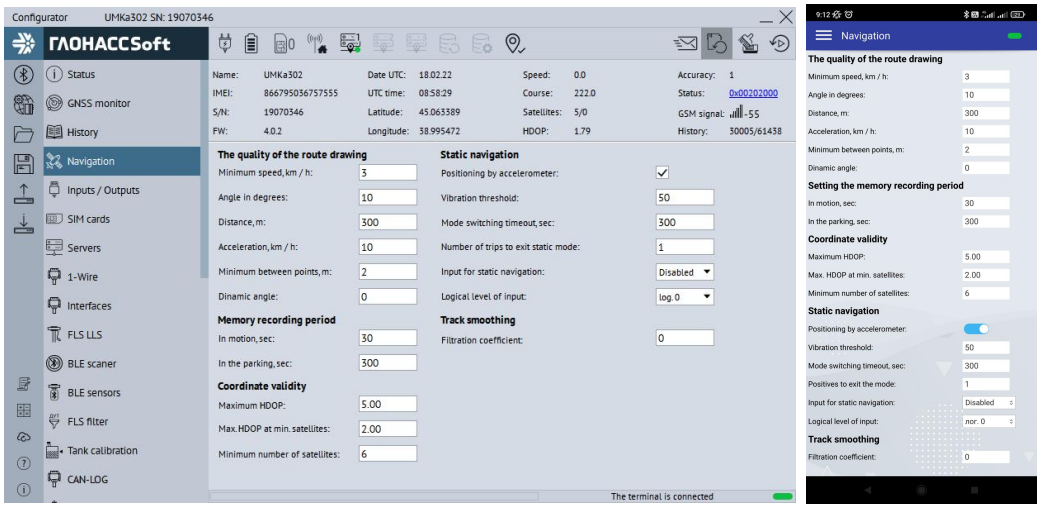


Figure 3.17 “Navigation” tab

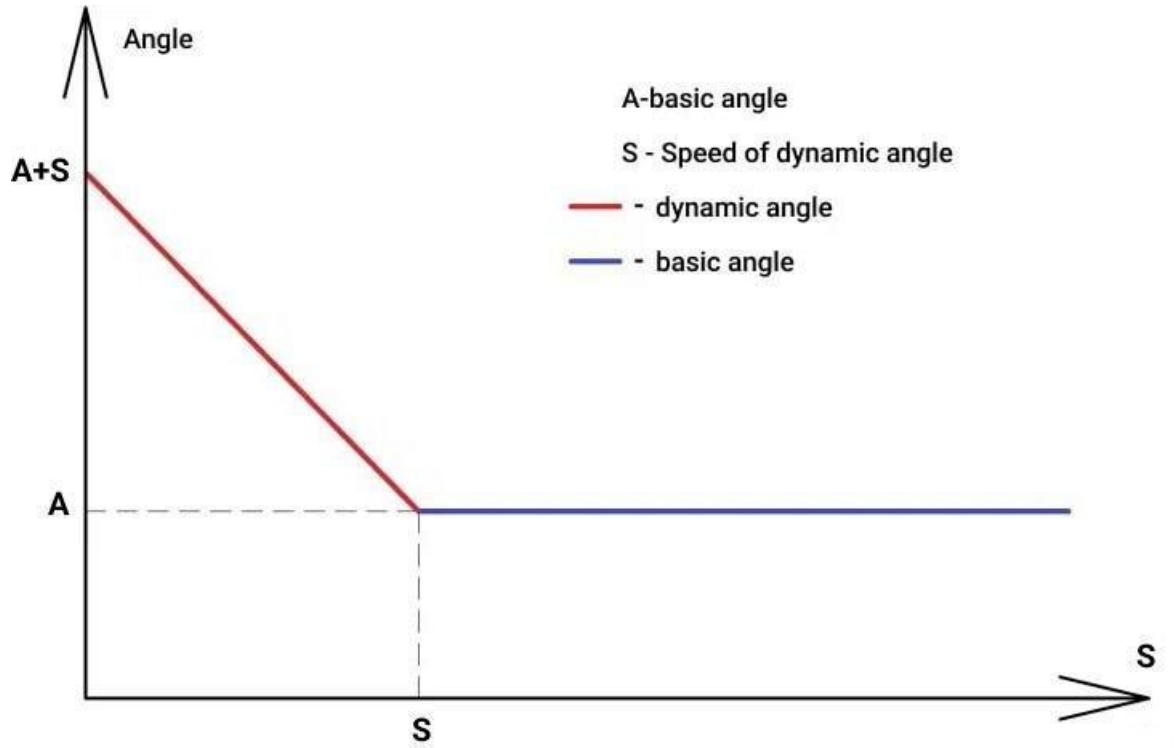


Figure 3.18 Graphic of dinamic angle dependency on the speed

3.9 “Inputs/Outputs” tab

The “Inputs/Outputs” tab is used for configuring the inputs (Figure 3.19) The modes “Discrete +”, “Analog” and “Analog FLS”, “Discrete without events(+)” are available for analog inputs. In “Discrete+” mode the levels of logical low and logical high are set(ref. To section 2.10) within the range from 0 to 40000 mV. The level of logical low cannot be higher than the logical high. In “Priority discrete(+)” another event is recorded by enabling discrete input that is configured in this manner into black box and the server. When choosing “Analog FLS” there is an oppotrunity to configure filtration parameters, set the

minimum and maximum filtration range of the FLS input signal. “Discrete without events(+)” is similar to “Discrete +” but without forming another spot.

For digital inputs the modes “Discrete +”, “Discrete -”, “ DFM flowmeter +”, “DFM differential flowmeter +”, “Differential flowmeter with encoder (-)”, “Frequent (+)”, “VZP flowmeter (–)”, “VZP differential flowmeter (–)”, “Priority discrete(+)”, “Priority discrete(-)”, “Frequent FLS (+)” and “Frequent FLS (-)”, “Discrete without events(+)”, “Discrete without events(-)”, etc. are available. Next to each parameter there is a (+) or (–) sign that represents the voltage on which the input reacts.

If the input (+), one can change its status only by sending the VDC to it; if it is (-), - by locking it on thr ground.

The difference between the DFM and VZP flowmeters is in neccessity to enable the input pull-up to the power supply. There is no such need for DFM sensors, and when choosing a VZP sensor, the internal pull-up (in the tracker) of the input to power supply enables. Differential flowmeters VZP and DFM have the same particularities.

The options “Tracker outputs” allow to enable the output OUT0 for UMKa30X and additionally the output OUT1 for UMKa302v2.

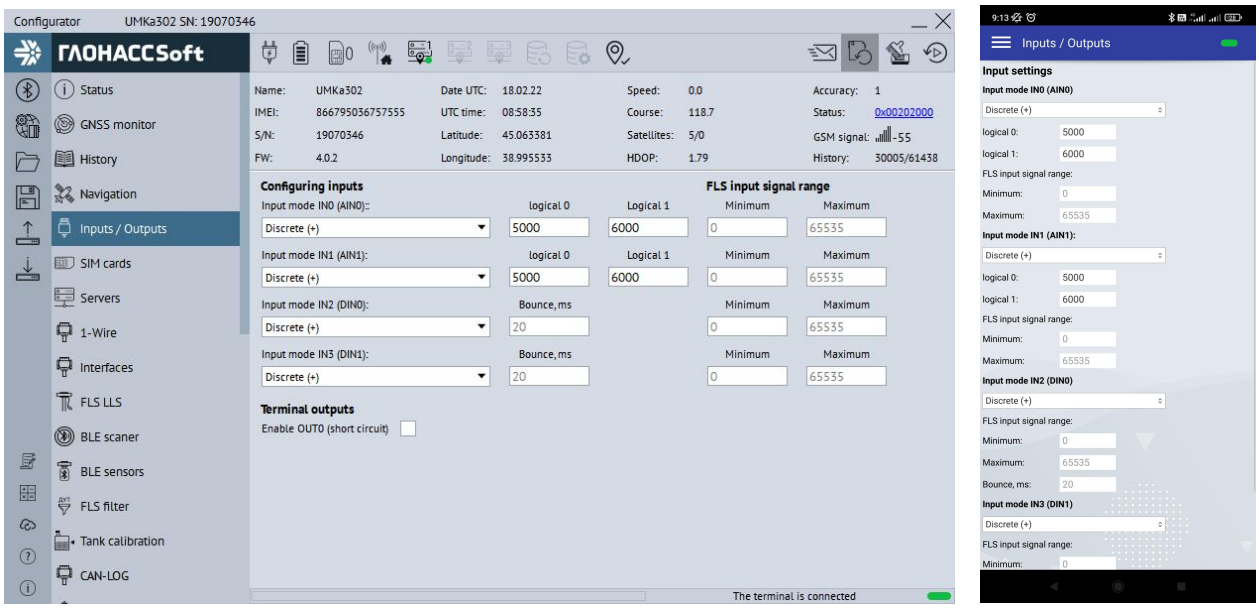


Figure 3.19 “Inputs/Outputs” tab

3.10 “SIM cards” tab

In the tracker there is an opportunity to install 2 SIM cards (either a SIM-CHIP instead of SIM0 or the second SIM card). To set up the access to them (PIN) and configure GPRS connections, use the “SIM cards” tab (Figure 3.20).

All the Internet access information (APN, login, password) can be obtained from the mobile operator. For the widespread operators, one can select a fitting profile, which settings are automatically loaded.

When choosing the “Auto” settings from dropdowm menu “Profiles”, the login and password are assigned automatically. With the whole list one can get familiar in APPENDIX H of this manual.

If there is a need to use a SIM card in roaming mode, enable the option “Allow roaming on SIM card”.

Attention! For virtual operators it is necessary to allow the option “Allow roaming on SIM card”

Attention! Tracker operation in roaming can entail additional expenditures according to the tariff of the operator!

There is also an opportunity to configure priorities of using 2 SIM cards with the option “SIM card operation mode”. In this case the tracker uses the coverage of prioritized operator and if there is none, it switches to the coverage of less prioritized operator. Later, if the network of prioritized operator is detected again, the tracker is switched back to it.

In options group “SIM cards switch” there is an opportunity of configuring the SIM card priority with the help of “Mode” and “Interval” parameters. In the “Mode” tab a priority SIM card is chosen. In the “Interval” tab the time of switching to priority map within the range from 10 minutes to 24 hours is chosen. The switching time is calculated from the moment of map choice on the stage of modem initialization.

One can configure the SIM card priority by “SimMode” command the second parameter of which is responsible for the time of switching to the priority card. The time of switching to priority map can range from 10 minutes to 24 hours on the stage of modem initialization.

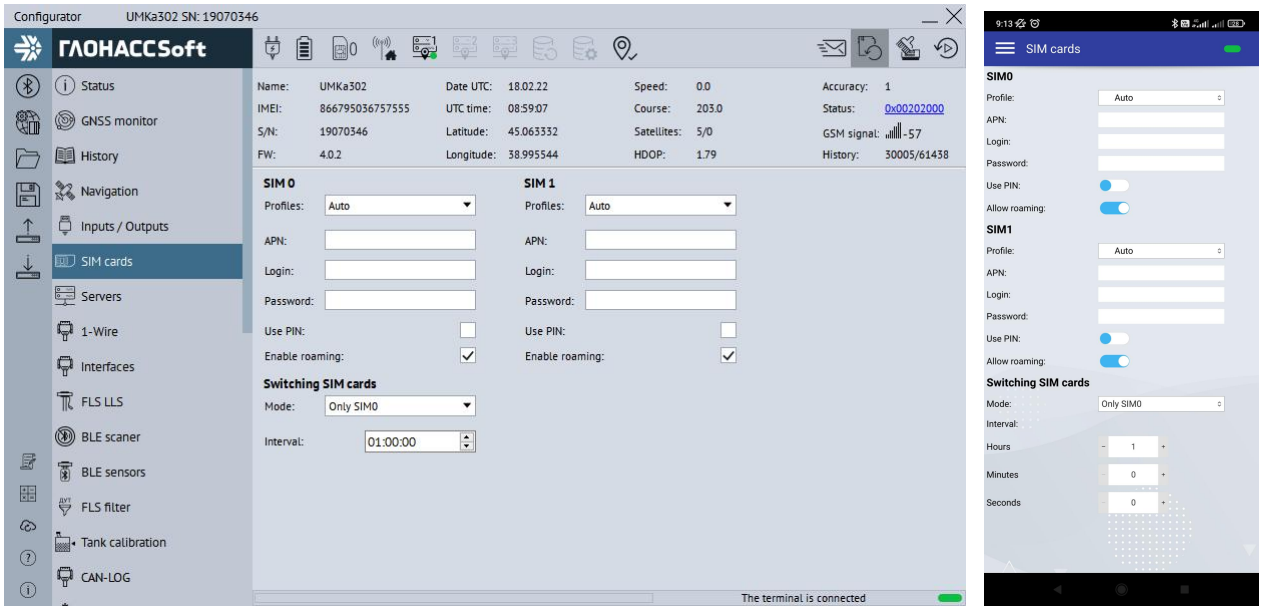


Figure 3.20 “SIM cards” tab

The following combinations for SIM cards are possible:

Code	Mode	Description
0	SIM0 only	The tracker works with a SIM0 only.
1	Priority SIM0	The tracker starts working with SIM0. The switch to SIM1 occurs only if the SIM0 fails. Return to SIM0 occurs after specified time.
2	Priority SIM1	The tracker starts working with SIM1. The switch to SIM0 occurs only if the SIM1 fails. Return to SIM1 occurs after a specified time.
3	Without priority	The tracker starts working with SIM0. SIM0. The switch to SIM1 occurs only if the SIM0 fails. The return to SIM0 occurs only if the SIM1 fails.
4	Circle	The tracker starts working with SIM0. The switch to SIM1 occurs at specified time. The return to SIM0 occurs in a specified time.
5	SIM1 only	The tracker works with SIM1 only.

3.11 “Servers” tab

To configure the connection to the server, the “Server” tab is used (Figure 3.21) where the IP address, domain and port of the monitoring system server is given.

There is an opportunity to specify the alternate and auxiliary monitoring servers in the fields “Alternate server” and “Auxiliary server”.

Attention! You should not set two similar servers, as this leads to the device malfunction and increases traffic! Also, adhere to the following server selecting order: Primary server → Alternate server→ Auxiliary server, if the servers are set out of order, for example, primary and auxiliary servers are set, and the alternate one is skipped, then the settings of the auxiliary one will be ignored.

The “Auxiliary parameters” group controls the storage and transmit the data on the server from the external and internal sensors. If there is no need to transmit these parameters, clear the corresponding ticks. It will reduce the transmitted traffic and increase the black box capacity.

The “Protocol” option allows to choose the communication protocol.

The “Upload order” option determines in which order the data will be uploaded to the server when successfully connected. There are two available options: "From old to new" or "Current first" .

The "Online mode" option group configures the grouping of several spots into one packet, the time interval between packet transmissions, and it also allows to set the maximum size of the transmitted packet.

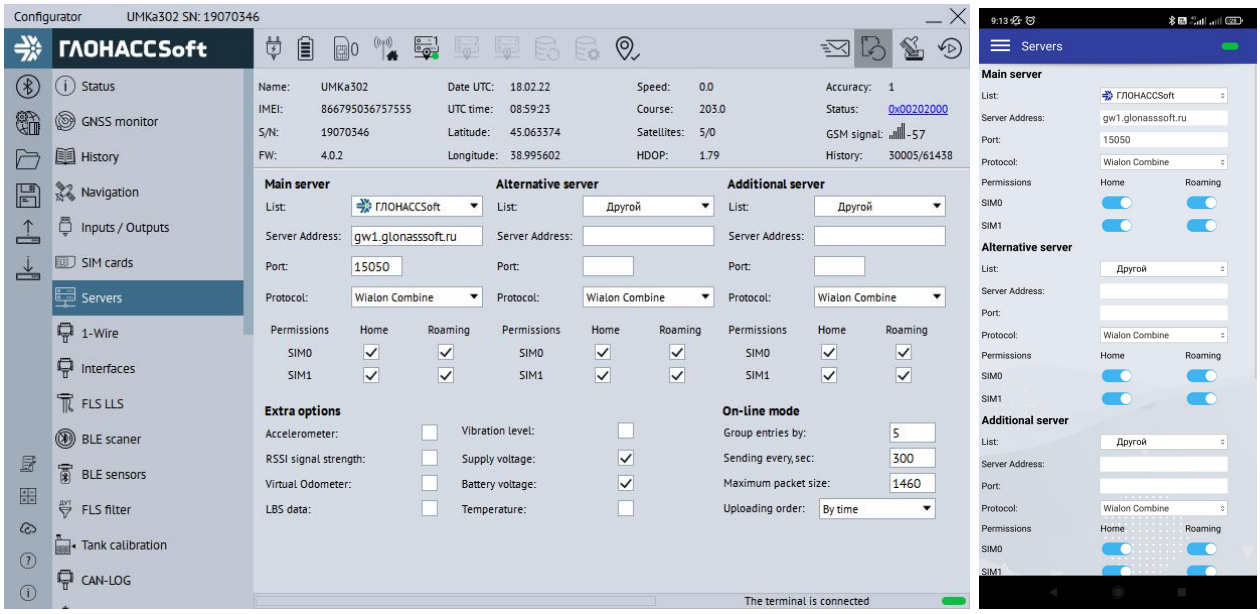


Figure 3.21 “Servers” tab

3.12 “1-Wire” tab

To configure 1-Wire thermosensors the “1-Wire” tab is used (Figure 3.22).

To specify the recorded addresses of thermosensors of DS18B20 type for the tracker, it is enough to enter them into the “1-Wire sensors Configuration” field and upload the configuration on the tracker. Configurator automatically shows the connected sensors and the transmitted parameters.

With the set tick of “iButton parameters” option with “Transmit 0 without a key” parameter the device will transmit 0 without iButton key.

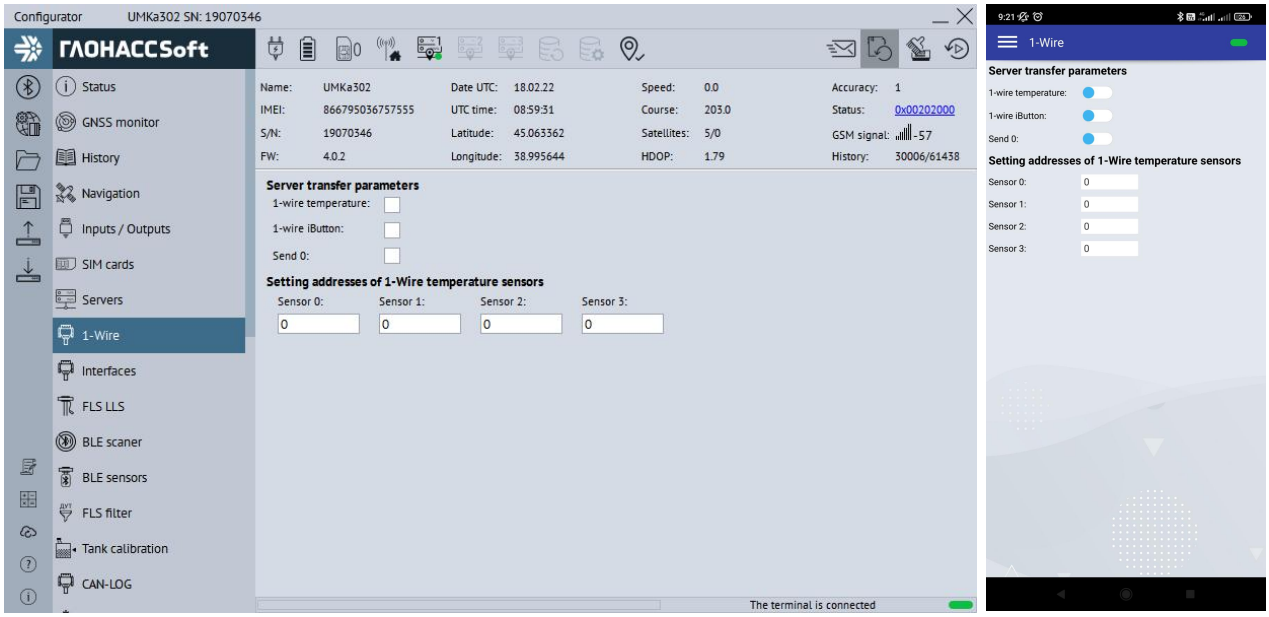


Figure 3.22 “1-Wire” tab

3.13 “Interfaces” tab

In order to connect RS-485, RS-232 or CAN devices, the “Interfaces” tab is used (Figure 3.23). If your tracker does not have either RS-232 or CAN, the corresponding fields will not be available for edit.

In this tab one can choose the device type that is connected to that or another interface or interaction protocol (for instance, FLS, CAN-Log, J1939B, etc.). In order to do it, choose the necessary operation mode in the “Mode” dropdown menu, and in the “Velocity” menu specify the operation interface speed. Pay attention that an active mode is available for CAN interface that is used for working with the protocols of “request-reply” type. This mode is used in rare cases when it is impossible to receive data from CAN interface without request. Therefore it is not recommended to use the active mode as it may lead to failures in the module work that uses the bus.

“Transparent mode” option group allows to set connection directly with the device and the tracker module via console or exterior utilities by using the tracker as USB-RS232/485 adapter.

“Source” option allows to choose the interface from the dropdown menu.

“Velocity” option allows to specify the operation speed of the interface from the dropdown menu. For the tracker UMKa302(v2) there is an opportunity to automatically set the CAN bus velocity. In order to do it, press the “Set” button.

For UMKa 302v2.BCC2 there is an opportunity to configure CAN1. For the rest of versions with a “C” letter only CAN0 is available.

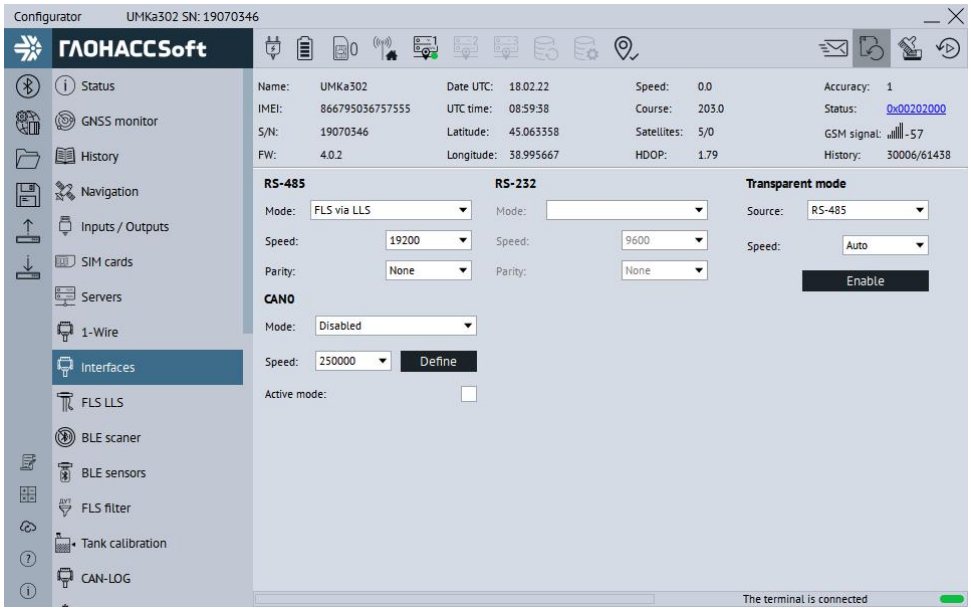


Figure 3.23 “Interfaces” tab

Attention! In transparent mode the tracker does not reply on the commands but retransmits them in the interface. To disable “transparent mode” disconnect the USB port from the PC.

3.14 “LLS FLSs” tab

To configure and receive the information from fuel level sensors that use RS-485 interface, go to “FLSs” tab (Figure 3.24). Beforehand assign the address to each sensor using corresponding configurator. To specify the tracker addresses it is enough to enter them in “RS-485 FLSs address configuration” field and upload configuration in the tracker. The configurator automatically shows the connected sensors and transmitted parameters.

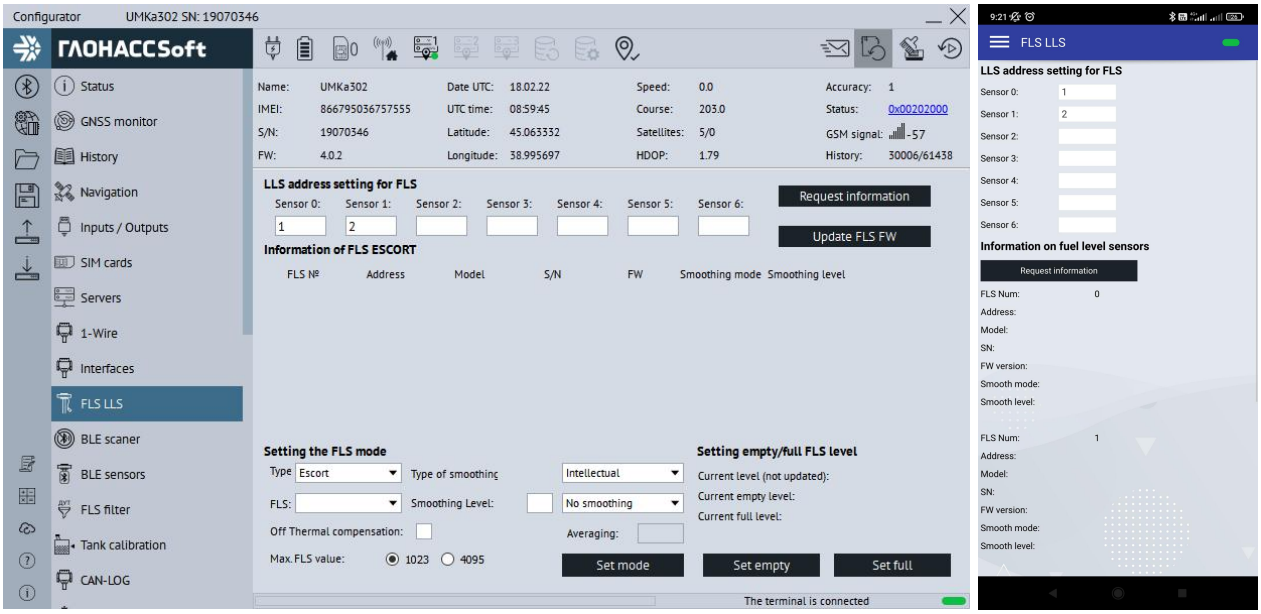


Figure 3.24 “FLSs” tab

Attention! Beforehand, switch one of the available interfaces into the "FLS via LLS" mode in the “Interfaces” tab, set the "Speed" option to "19200" and write the configuration into the tracker.

One can get data about connected fuel level sensors by pressing the “Query information” button. It is also possible to change the FLS operation mode. In order to do so, choose a FLS from the list and set the parameters . Next apply the settings with “Apply mode” button. It is recommended to set levels empty and full.

For the remote update of “ESCORT” FLS connect to the FLSs and press “Update FLS FW”. In the pop-up window (Figure 3.25) choose the address and FLS version as well as the firmware file. Then press “Update” button and wait for the installation end.

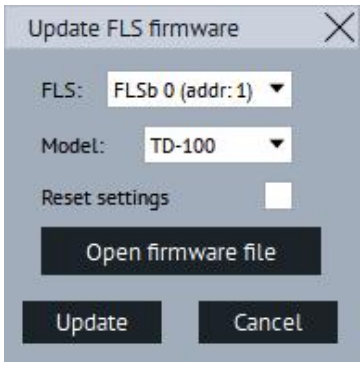


Figure 3.25 FLS update

3.15 “BLE scanner” tab

The tab is available only for UMKa302 and UMKa302v2.

To detect the actually visible BLE devices the “BLE scanner” tab is used. In the scanner the BLE devices, their number, MAC address, signal level and names are represented.

To start working with BLE FLSs go to “System” tab in configurator and in the “Bluetooth parameters” choose “BLE sensors” (BLEMODE 2) from dropdown menu or “Configuration and BLE sensors” (BLEMODE 3). Next enter configuration into the tracker.

With the rightclick on the needed BLE sensor choose its number from the pop-up list.

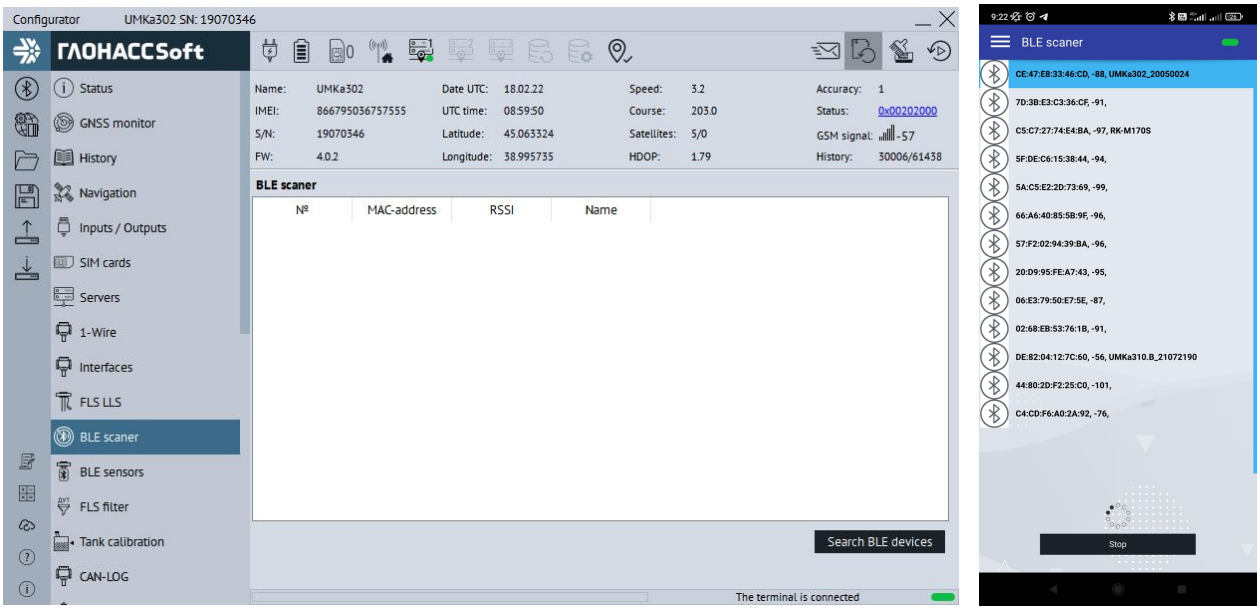


Figure 3.26 “BLE scanner” tab

3.16 “BLE sensors” tab

The tab is available only in the versions UMKa302.FC2, UMKa302.FR2, UMKa302.FIC2, UMKa302v2.FC2,UMKa302v2.FR2.

To configure and receive information from BLE sensors use the “BLE sensors” tab (Figure 3.27) and choose the device type from the dropdown menu, then enter MAC address into the corresponding field. Next upload configuration ito the tracker.

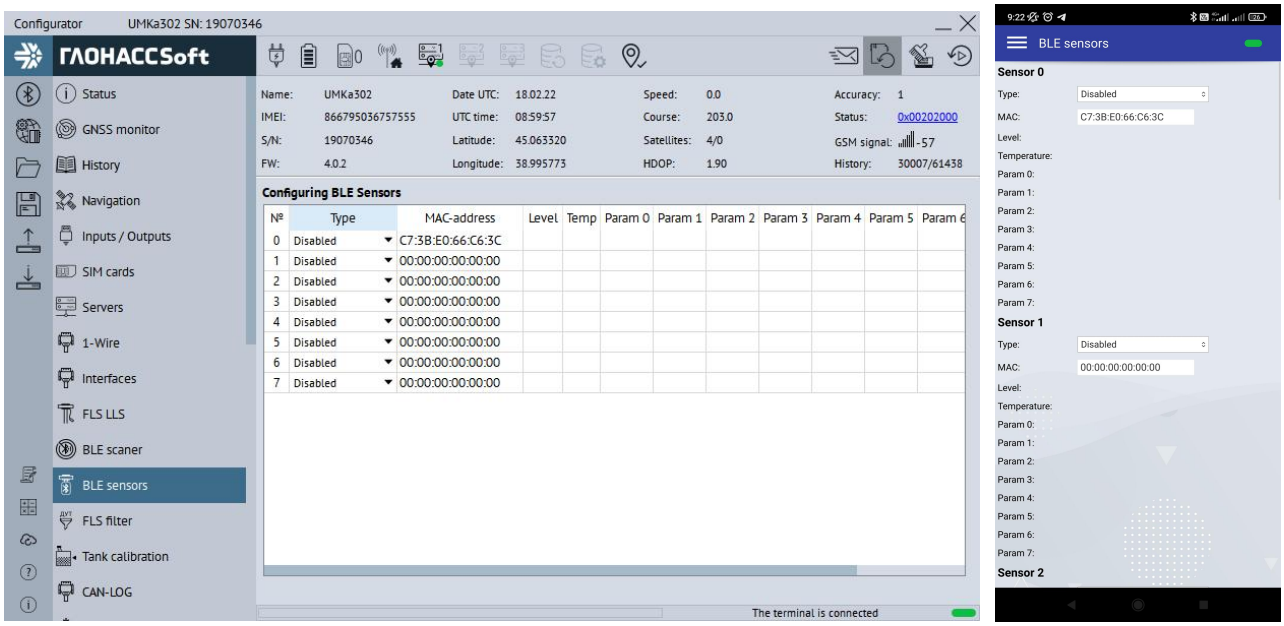


Figure 3.27 “BLE sensors” tab

3.17 “FLS filters” tab

To configure filtration of fuel level and also of drain/fill-up control use the “FLS filters” tab.

In the tab the configuration of 18 FLSs is available. From 1 to 6 - wired FLSs. From 7 to 14 -wireless FLSs. 15 and 16 - analog FLSs. 17 and 18 - frequency FLSs. 20 - data on FMS protocol from the first tank. 21 - data on FMS protocol from the second tank. 2 and 23 - data from the CAN filter. The data from 20-23 are transmitted only on condition that the transmission of FMS or CAN filter primary (raw) parameters is allowed, and the mode of corresponding filter is “Empty” or “Composite”.

For each sensor it is possible to configure “Filtration mode”, “Level”, “Step change”, “Fill-up time” and “Drain time” in the corresponding field.

Filtration mode can be configured both as a “simple filter” (of the lower LFF) and a “composite filter” (median + LFF). The simple filter is good for filtrating the noise around the mean value. The composite median is good for filtrating rapid short emissions. Filtration type should be picked in terms of the object peculiarities starting from LFF.

Filtration level can be set within the range from 1 to 20. This is the time in minutes during which the output filter signal is changed by 95% compared to the input signal change.

The change step is configured regarding the operation range of FLS measurements. By value 0 generation of events is disabled.

The fill-up time specifies the time afetr which the filter is off on condition of permanent fuel level increase. 10 seconds are set by default.

The drain time specifies the time after which the filter is off on condition of the permanent fuel level dicrease. 30 seconds are set by default.

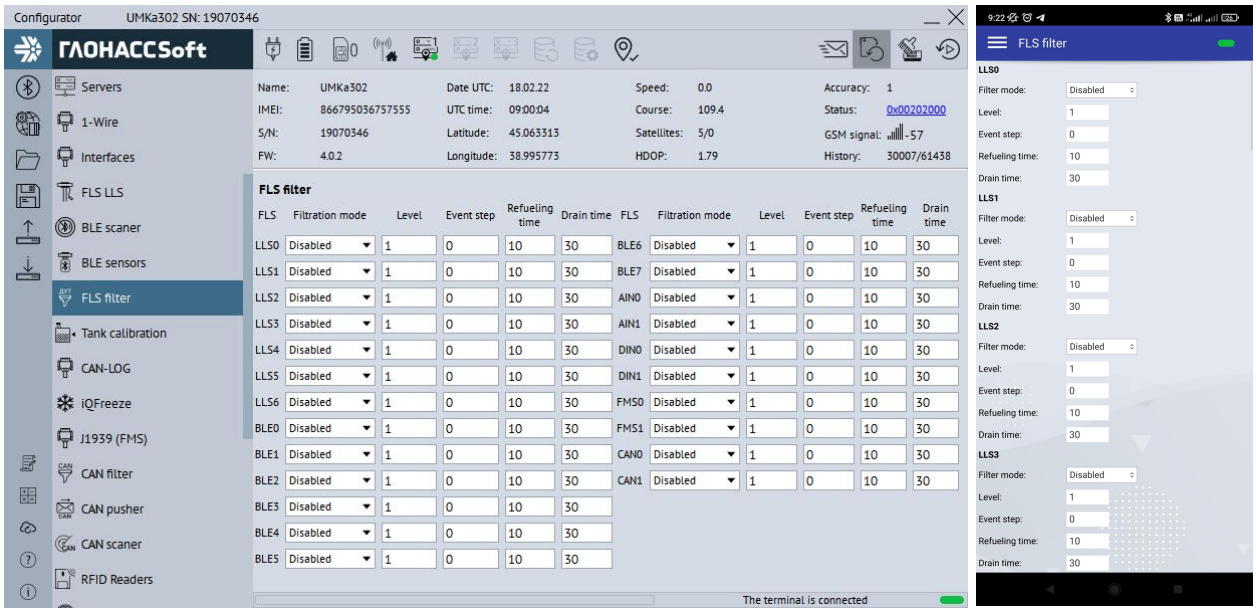


Figure 3.28 “FLS filters” tab

3.18 “Tank calibration” tab

To calibrate the tank use “Tank calibration” tab. The full description is on the website with the document tab “Calibration master”: http://qr-service.ru/301/sistem-tarirovaniya.pdf .

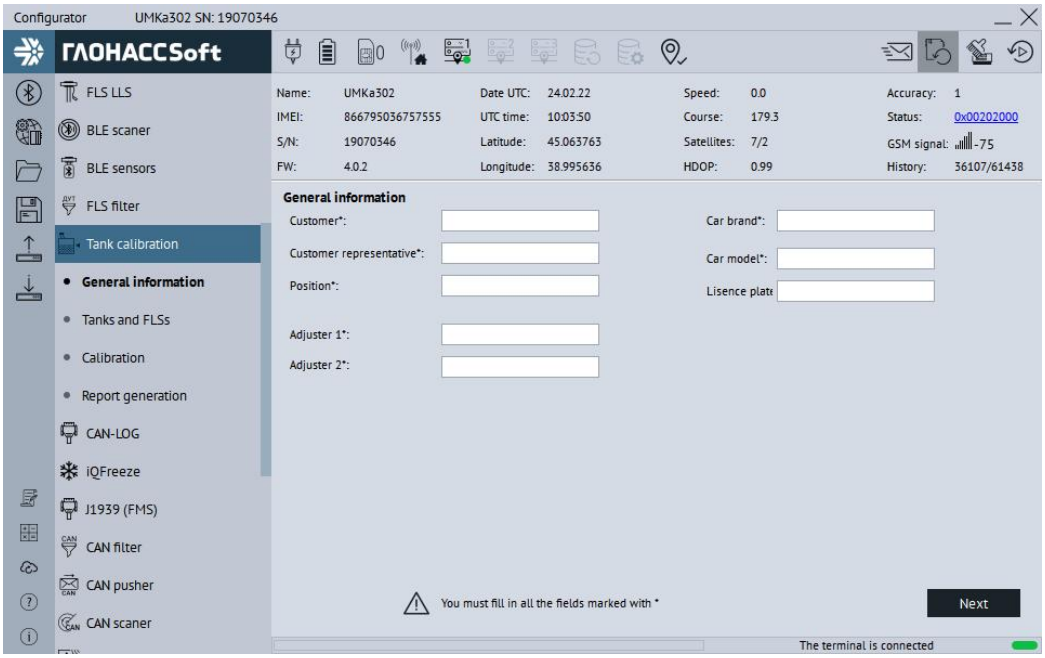


Figure 3.29 “Tank calibration”

3.19 “CAN-LOG” tab

The tracker supports data transmission that are received from the CAN-LOG controller or compatible (ref. section 2.18). To configure the settings of the data transmitted on the server use the “CAN-LOG” tab (Figure 3.30).

Attention! Preliminary in the “Interfaces” tab switch one of the available interfaces into “CAN-LOG” mode and set the options “Velocity” value “9600” and enter into the tracker.

Install the “Poll CAN-LOG” option and after that the currents values that are transmitted via CAN bus will be represented opposite corresponding parameters.

Parameters “Safety system”, “Accidents controller”, “Farming machinery state” have the type “bit field”. To decipher the values of these parameters press the button “Decipher machinery state”, and after that additional window will open (Figure 3.31).

In the window “Machinery state” the vehicle statuses are represented as white-and-black icons for non-active parameters and as coloured - for active ones. By mousing on the icon a pop-up prompt will appear together with its assignment decipher.

Each of the parameters has the option “Transmit on the server”. Choose necessary parameters for transmitting on the server considering the fact that the more parameters are picked, the more traffic consumption there will be and the less black box capacity will be available.

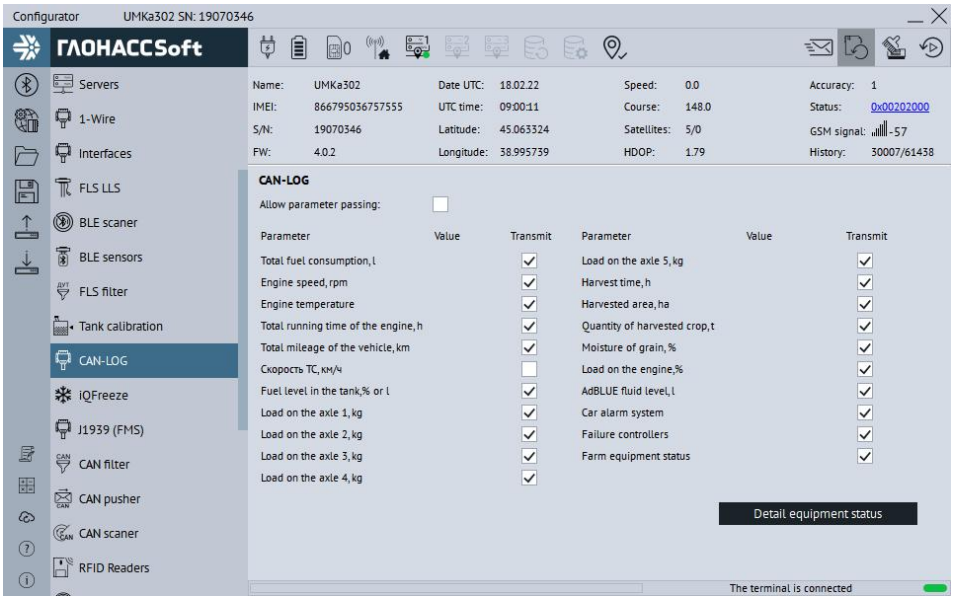


Figure 3.30 “CAN-LOG” tab

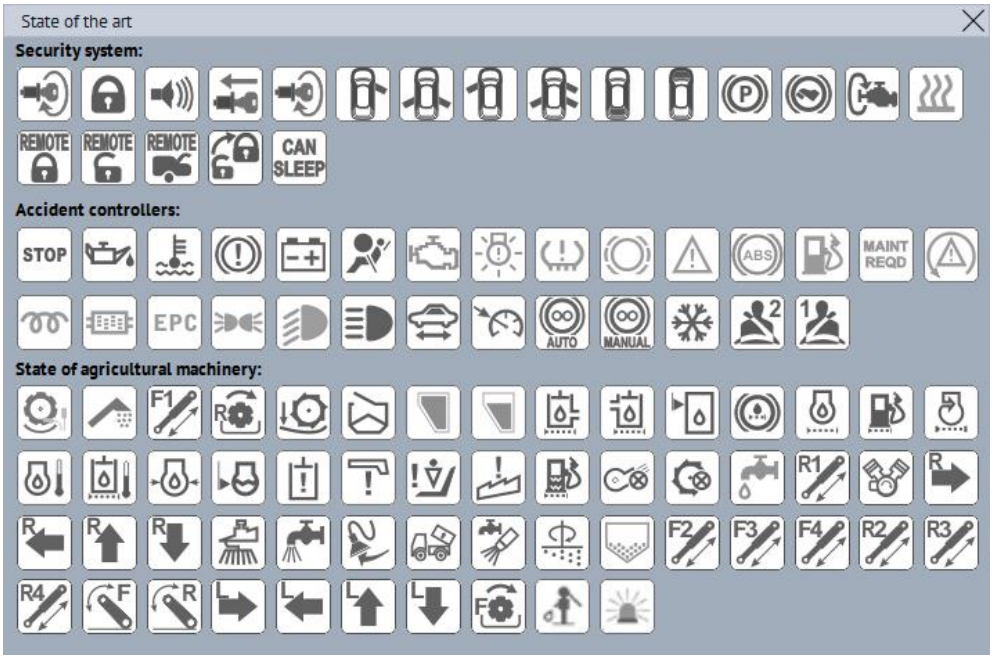


Figure 3.31 "Machinery state" tab

3.20 "iQFreeze" tab

On the page "iQFreeze" (Figure 3.32) the current parameters that are received from an iQFreeze device are represented. Here the parameters that will be transmitted on the server are configured as well. It is also necessary to configure the interface to which the iQFreeze is connected, so that it works properly.

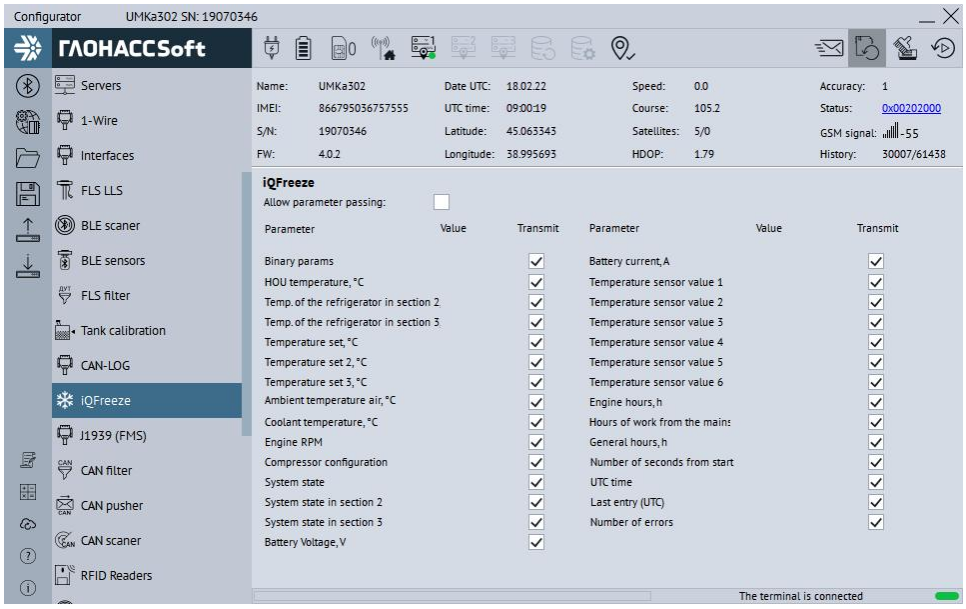


Figure 3.32 "iQFreeze" tab

3.21 “J1939(FMS)” tab

The tab is available in version UMKa302(v2) with CAN interface.

To configure the transmission of J1939(FMS) protocol parameters the tab “J1939(FMS)” is used (Figure 3.33).

To start work with FMS go to “Interfaces” tab and in parameters group “CAN” from the dropdown window “Mode” choose “J1939(FMS)”. It is necessary to set the interface operational velocity depending on that used in the bus.

In “J1939(FMS)” tab the main parameters transmitted via FMS protocol on the CAN bus are represented. To transmit data on monitoring system tick “Allow parameter passing" and set the ticks opposite the needed parameters. Then enter configuration on the tracker.

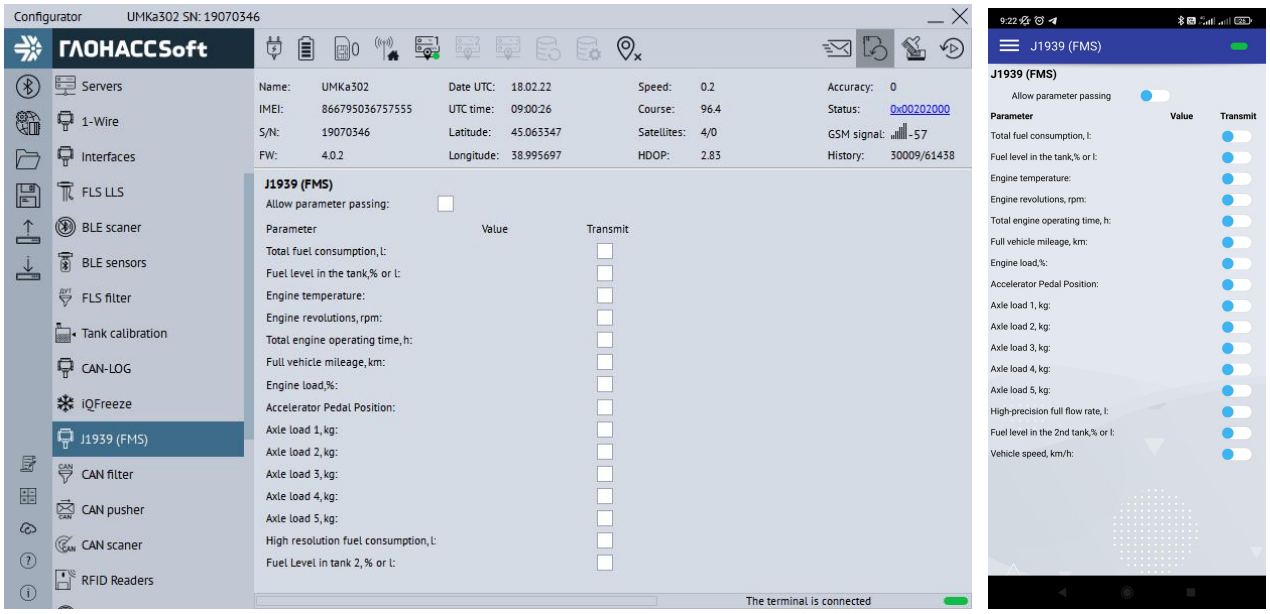


Figure 3.33 “J1939(FMS)” tab

3.22 “CAN filter” tab

The tab is available in version UMKa302(v2) with CAN interface.

To control the configuration of customer filters use “CAN filter” tab.

The tab allows to flexibly configure the customer filter in corresponding settings such as an identificator on a CAN bus, bit data displacement within the field, th length of parameter in bit, primary paramater transformation, recalculation formula, parameter description.

32 customer filters are available for configuration. The combine operational mode is also supported for customer filters of FMS protocol where it deciphers the standard

parameters, and the customer filters decipher the parameters specified by manufacturer. The mode configuration is implemented with “CANMODE” command.

To transmit the parameter on the server tick “Allow parameters pressing”.

The list of supported vehicles find on the website https://glonasssoft.ru/ru/equipment/umka302, the document “The list of supported vehicles”, section instructions.

In column “Type” there are the following parameters:

UB SIMPLE – any transformation parameters (with MBS forward, unsigned integer);

SB SIMPLE - any transformation parameters (with LBS byte forward, signed integer);

UL SIMPLE - any transformation parameters (with LBS forward, unsigned integer);

SL SIMPLE - any transformation parameters (with LBS forward, signed integer);

UB OVERFLOW – absolute fuel consumption in terms of counter overflow (with MBS forward, unsigned integer);

UB MOMENT - absolute fuel consumption in terms of instant consumption (with MBS forward, unsigned integer);

UL OVERFLOW - absolute fuel consumption in terms of counter overflow (with LBS forward, unsigned integer);

UL MOMENT - absolute fuel consumption in terms of instant consumption (with LBS forward, unsigned integer).

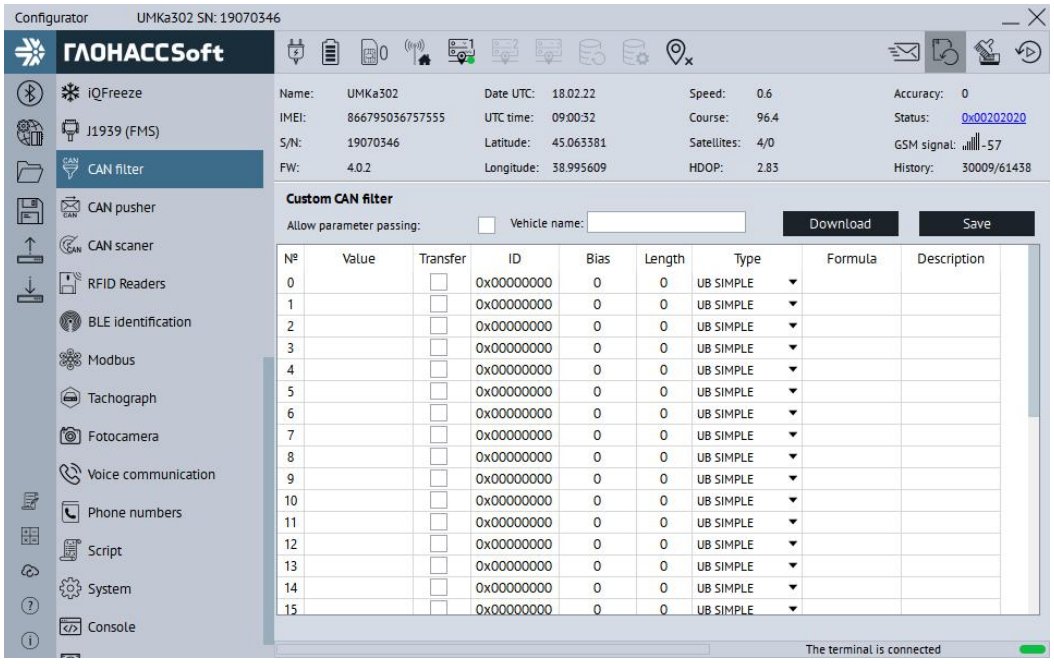


Figure 3.34 “CAN filter” tab

3.23 “CAN pusher” tab

The tab is available in version UMKa302(v2) with CAN interface.

CAN pusher sends the preliminary configured messages with specified period on the CAN bus. These messages can initialize the transmission from the vehicle on the bus of auxiliary parameters. For instance, fuel level sensor. It is possible to configure up to 16 unique messages.

The table consists of the following columns:

№ – number of channels from 0 to 15;

Period – period of messages transmission, sec;

ID – message identificator in hexadecimal format by the mask 0x7FF (11 bits) or 0x1FFFFFFF (29 bits);

ID size – the size is 11 or 29 bits;

EX – expanded identificator format (29 bits);

Length – message length from 0 to 8 bytes;

Byte 0…Byte 7 – the value of message bytes in hexadecimal format.

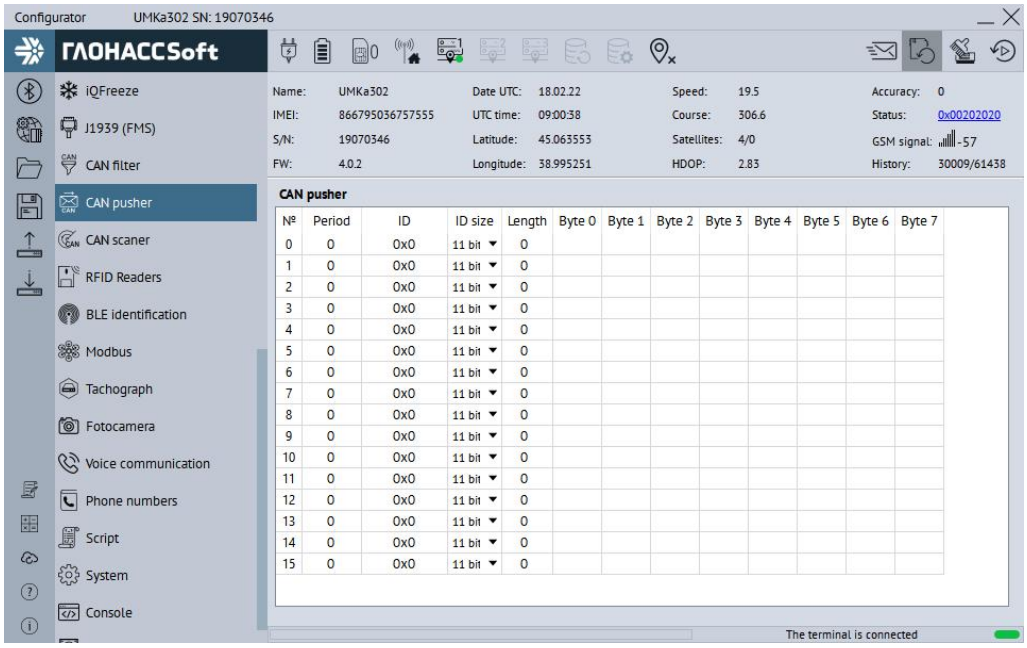


Figure 3.35 “CAN pusher” tab

3.24 “CAN scanner” tab

The tab is available in version UMKa302(v2) with CAN interface.

CAN scanner is designed for facilitation of the needed parameters search in the CAN bus. Processing of the data from CAN is divided into two parts. The first part is

implemented in the tracker firmware, it detects unique identificators and keeps the last package for each identificator. The second part must be implemented in configurator. It intermittently collects the list of identificators with the latest data from the tracker and provides to the customer in convenient analysis form.

The table has the following columns:

ID - unique message identificator;

Data - message data;

Number - number of received packages with current ID from the moment of scanning start;

Value - resulting value of chosen data;

Type - type of data providing, one can choose from 4 types

BU - MSB Unsigned - with MSB forward, unsigned integer;

BS - MSB Signed - with MSB forward, signed integer;

LU - LSB Unsigned - with LSB forward, unsigned integer;

LS - LSB Signed - with LSB forward, signed integer.

Further information about CAN scanner find on the website https://glonasssoft.ru/ru/equipment/umka302, in instructions section, document “CAN scanner”.

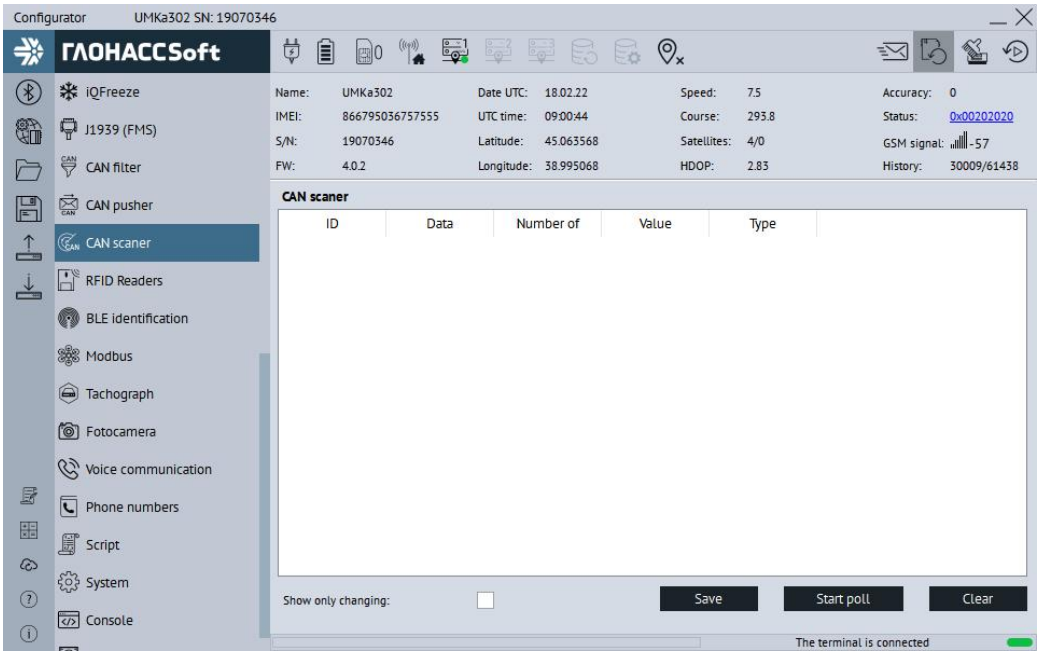


Figure 3.36 “CAN scanner” tab

3.25 “RFID reader” tab

To configure and receive information from RFID cards that use RS-485 use the tab “RFID reader”. To specify the addresses for the tracker it is sufficient to enter them into the field “RFID addresses configuration” and download the configuration into the tracker.

In the tab in colomn “Mode” one can also set the mode of adjunction with RFID reader. The following operational modes are available: “ADM-20 and UMKa200 without temperature”, “UMKa200 with temperature” and “RFID Exzotron(LLS)”.

Attention! In “Interfaces” tab switch RS-485 interface into “RFID” or “FLS via LLS and RFID”, set value 19200 for the option “Velocity” and enter the configuration into the tracker. The readers addresses should not coincide with FLSs addresses.

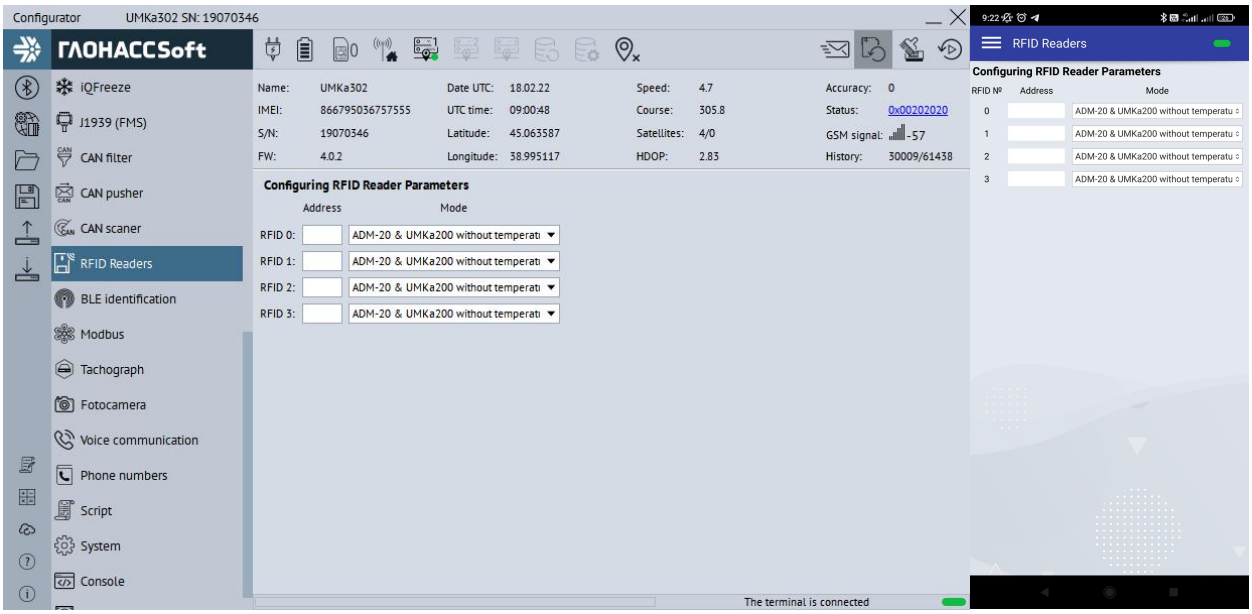


Figure 3.37 “RFID reader” tab

3.26 “BLE identification” tab

Only for UMKa302 and UMka302v2.

In the tab “BLE identificator” one can configure the tracker on the receiver or beacon mode.

In receiver mode the terminal tracks the events of the specified beacon group.

In “Mode” column one can choose the coincidence test on the needed identificators. To track all identifiers within the radius one should choose “Any”.

In radius column the radius of direct visibility where the identifiers will be tracked is specifiied.

In “UUID” column the unique identificator of beacon group is specified.

In “Major” colomn the group number of identifiers with similar UUID is specified.

In “Minor” colomn the group number of identifiers with similar UUID and Major is specified.

By ticking “Transmit 0” the tracker will send value “0” if there are no events in tracking radius according to configured filter.

By ticking “Event” the tracker will send on the server the chnages within the tracking radius according to configured filter.

To enable the beacon mode tick the corresponding configurator field.

UUID - is a 128-bit unique identificator of beacon group that sets their type or belonging to one organization. To receive unique UUID press the button “generate UUID”.

With “Major” the configuration of 16-bit unsigned value which helps group beacons with similar UUID is implemented. The value is within the range from 0 to 65535.

With “Minor” the configuration of 16-bit unsigned value which helps group beacons with similar UUID and Major is implemented. The value is within the range from 0 to 65535.

RSSI – is the reference level on the 1 metre distance. It is needed for more accurate calculation of the distance to the receiver.

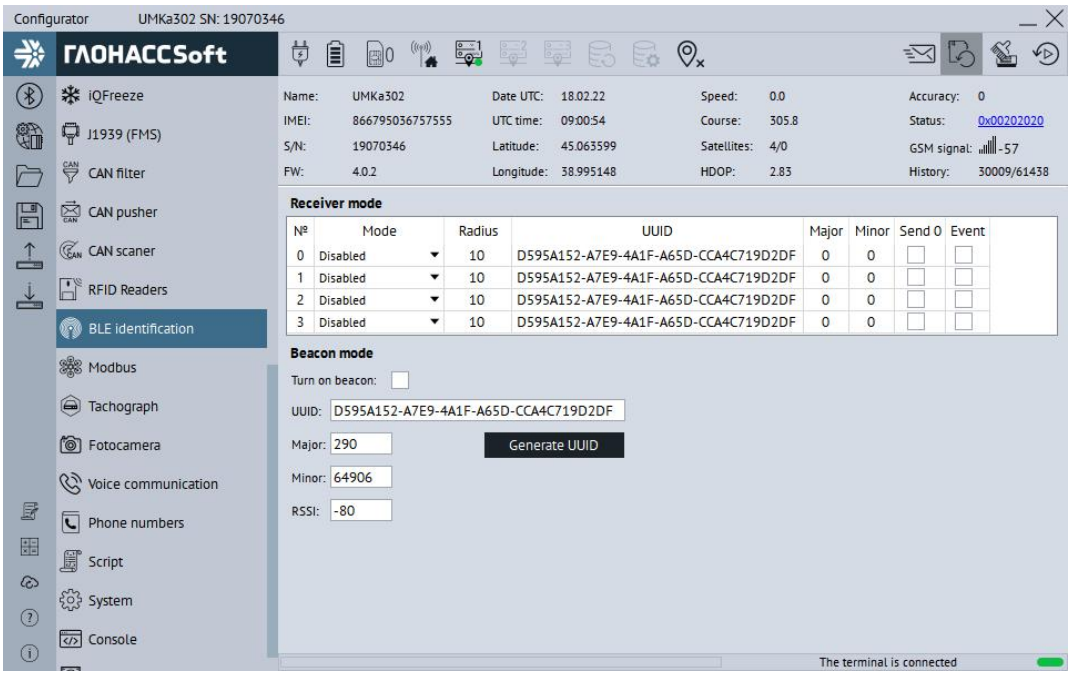


Figure 3.38 “BLE identification” tab

3.27 “Modbus” tab

Only for UMKa302 and UMKa302v2.

To control the Modbus protocol settings use “Modbus” tab.

To transmit parameters on the server tick “Allow parameters transmission”.

The table in the tab consists of the following columns:

№ – parameter number from 0 to 31;

Value – current parameter value;

Transmission – tick to transmit parameters on the server;

Address – device address on the bus from 1 to 247 if request is declined;

Query – query type:

01 BIT – function 1. Reading 1 of Coils type bit;

02 BIT – function 2. Reading 1 of Input Discrete type bit;

03 UINT16 – function 3. Reading 1 of Holding Registers register type. Unsigned. 0…65535;

03 INT16 – function 3. Reading 1 of Holding Registers register type. Signed -32768…32767;

04 UINT16 – function 4. Reading 1 of Input Register register type. Unsigned. 0…65535;

04 INT16 – function 4. Reading 1 of Input Register register type. Signed -32768…32767;

03 FLOAT 1032 – function 3. Reading 2 of Holding Registers registers type. Registers are processed as float. Lower half is in lower register (Byte order 1032);

04 FLOAT 1032 – function 4. Reading 2 of Input Register registers type. Registers are processed as float. Lower half is in lower register (Byte order 1032);

03 INT32 1032 – function 3. Reading 2 of Holding Registers registers type. Registers are processed as signed integer (Byte order 1032);

04 INT32 1032 – function 4. Reading 2 of Input Register register type. Registers are processed as signed integer. Lower half is in lower register (Byte order 1032);

03 INT32 3210 – function 3. Reading 2 of Holding Registers registers type. Registers are processed as signed integer. Lower half is in higher register (Byte order 3210);

04 INT32 3210 – function 4. Reading 2 of Input Register register type. Registers are processed as signed integer. Lower half is in higher register (Byte order 3210);

03 FLOAT 3210 – function 3. Reading 2 of Holding Registers registers type. Registers are processed as float. Lower half is in higher register (Byte order 3210);

04 FLOAT 3210 – function 4. Reading 2 of Input Register register type. Registers are processed as float. Lower half is in higher integer (Byte order 3210).

Register – initial address of register or input for chosen query;

Formula – the line with recalculation formula sized of up to 10 symbols. In recalculation line integer and fraction figures of 5, 2.25, 0.45 type, mathematical addition (+), subtraction (–), multiplication (*), division (*), brackets. Default value is coded by the symbol x or X. If the line is empty, the default value is recalculated. Recalculation formulae example: «2.5x–60», «5(x+10)», «x/2»;

Description – description of parameters sized to 10. Letters A–Z, a–z and numbers 0–9 only are available. Parameters description can be empty and is kept for the user's convenience only.

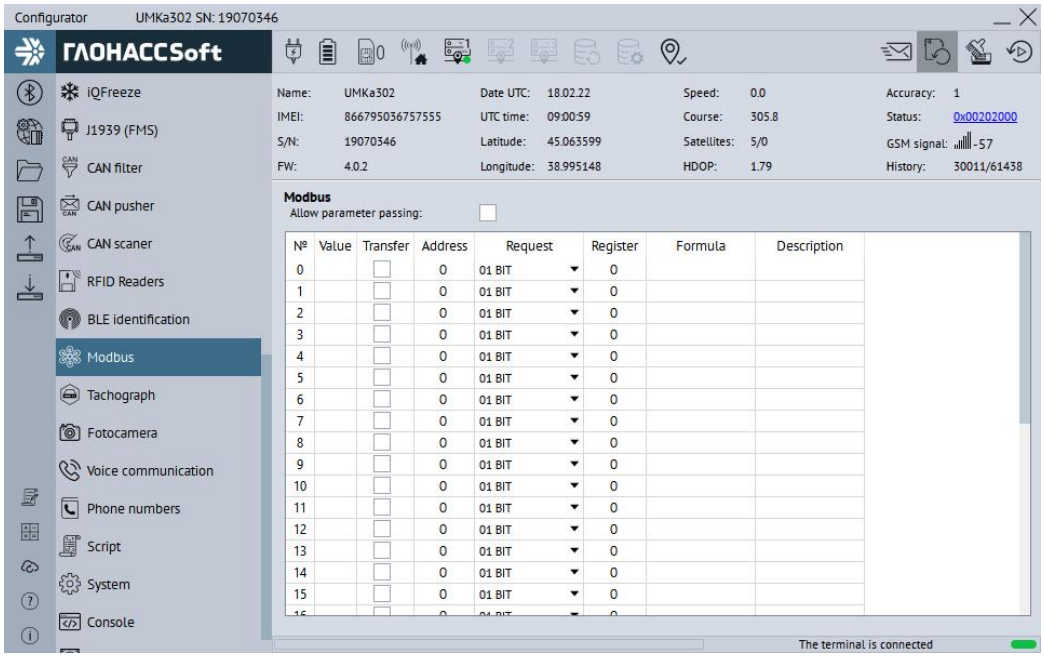


Figure 3.39 "Modbus" tab

Further information find on https://glonasssoft.ru/ru/equipment/umka302, in instructions section, the document "Modbus protocol support".

3.28 "Tachograph" tab

For UMKa302 and UMKa302(v2) only.

In the tab one can choose the type of used tachograph. The following tachographs are supported:SHTRIH-Taho RUS, ATOL Drive 5, ATOL Drive Smart, Mercury TA-001 и VDO DTCO 3283 (upload of DDD file only).

It allows to set user ID and автоpauthorization key.

In group parameters “DDD files” one can choose the driver’s card number from which the DDD files must be transmitted as well as on which telematic server to send the data. Transmission of both current data and DDD files of driver’s cards is supported.

To receive the needed data tick opposite the needed parameters. Received data are shown in the “value” colomn.

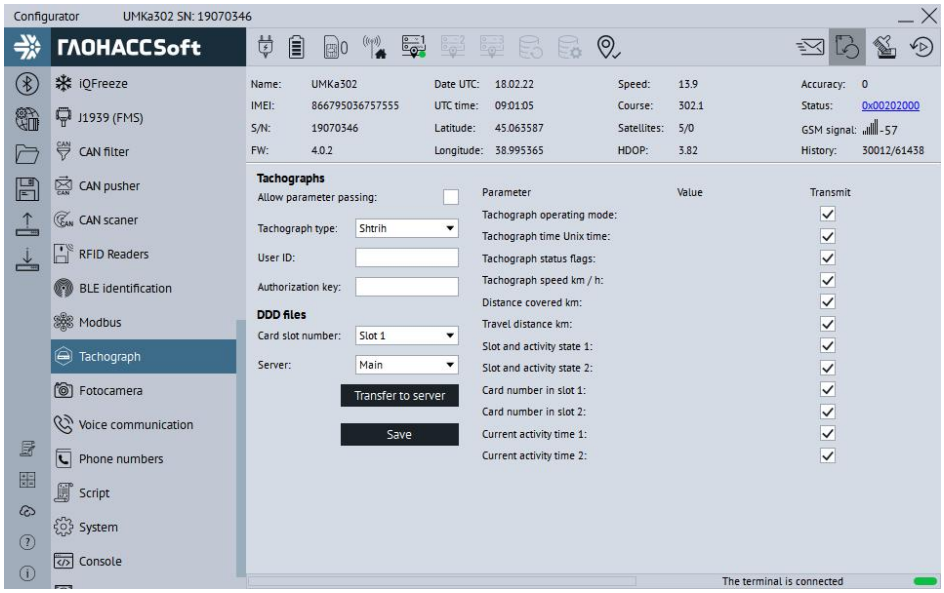


Figure 3.40 “Tachographs” tab

Further information find on https://glonasssoft.ru/ru/equipment/umka302, in instructions section, document “Tachographs support”.

3.29 “Photocamera” tab

For UMKa302 and UMKa302v2 only.

Use this tab to configure the photocameras connected via RS-232 or RS-485 interfaces. To work with camera enetr the camera address and choose resolution and compression level.

Choose on which telematic server the photos from the camera will be transmitted. By pressing the button “Receive the shot” the photo from the camera will be represented in corresponding configurator field.

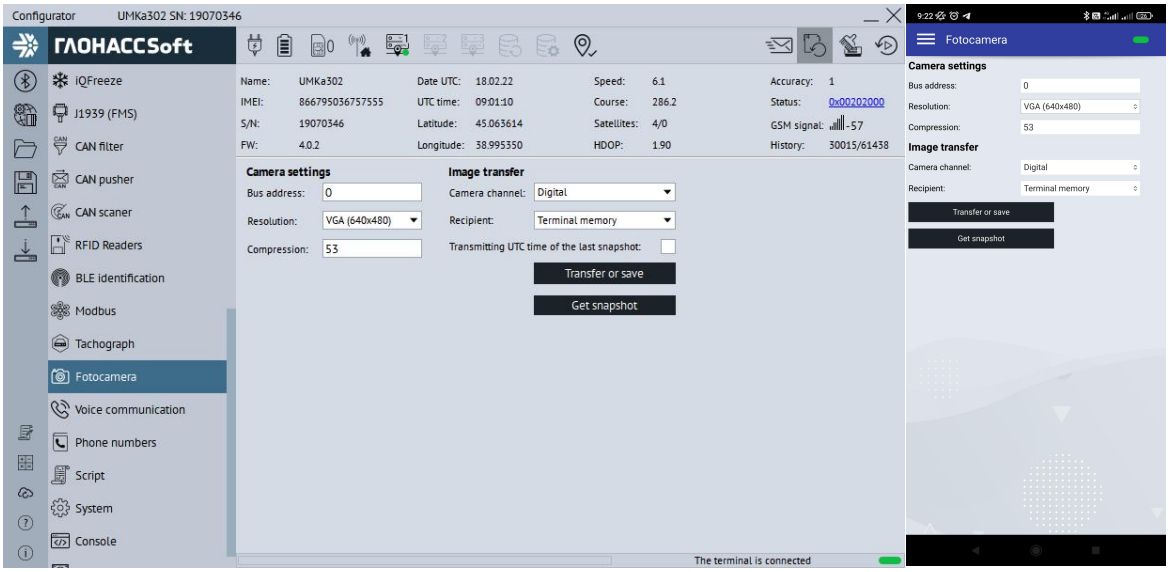


Figure 3.41 “Photocamera” tab

3.30 “Voice communication” tab

To configure the parameters of a loud speaker and a microphone and also to set the number list use the tab “Voice communication”.

Option group “Voice headset parameters” allow to set the dynamic volume and amplify the microphone. In order to do it shift the corresponding cursor to the needed direction.

Option group “Call parameters” allow to set the number of dial tones before automatic pick-up in the option “Automatic handset pick-up after:”, the ring volume and choose the ringtone from the dropdown list.

The option “Phones for call reception” is meant for adding, edit and deletion of phone numbers from which the device will accept the calls. Please note that the quantity of phone numbers is limited to five. To list the restriction set by the list enable the option “Accept from any numbers”. In case the list is empty and the option “Accept from any numbers” is disabled, there will be no calls on this device.

The option “Phones for outgoing call” is meant for adding, edit and deletion of phone numbers on which the device can perform an outgoing call. Please note that the quantity of phone numbers is limited to five. To enable the opportunity to perform outgoing calls enable the option “Allow outgoing calls”. Otherwise the call will not be performed even with available phone numbers in the list.

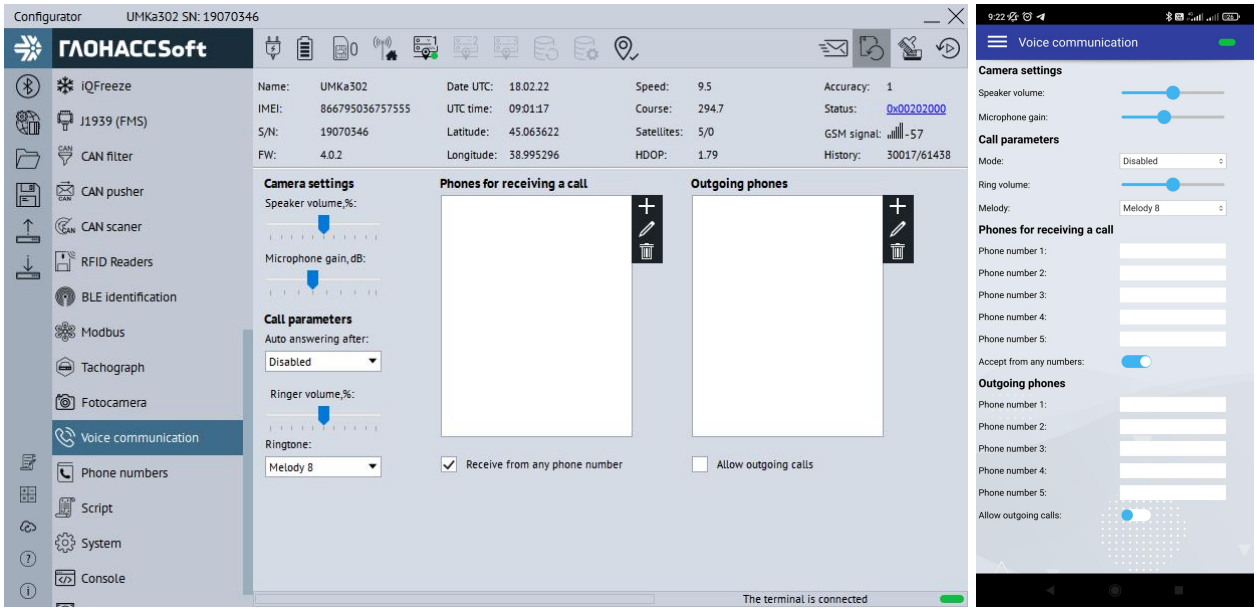


Figure 3.42 “Voice communication” tab

To receive the incoming calls and to end the current one press the button on the connected voice headset.

To dial the number from the list press the button on the voice headset. The number of pressings on the button sets the order number of the phone from the list.

A long button pressing on the voice headset changes the bit state of the 15th parameter “status”. This bit if necessary can be attached to the “SOS” function on the telematic server.

3.31 “Phones” tab

To add, edit and delete the phone numbers that have access to the tracker configuration the “Phones” tab is used (Figure 3.43). Please note that the quantity of phone numbers is limited to five.

To add a phone number, press + “Add”, enter the phone number in the dialogue-box field and press “OK” (3.44).

To edit a phone number, select the number from the list and press ”Edit”, enter the phone number in the dialogue-box field and press “OK” (Figure 3.44).

To delete a phone number, select the number from the list and press “Delete”, press “Yes” in the dialogue-box (3.45).

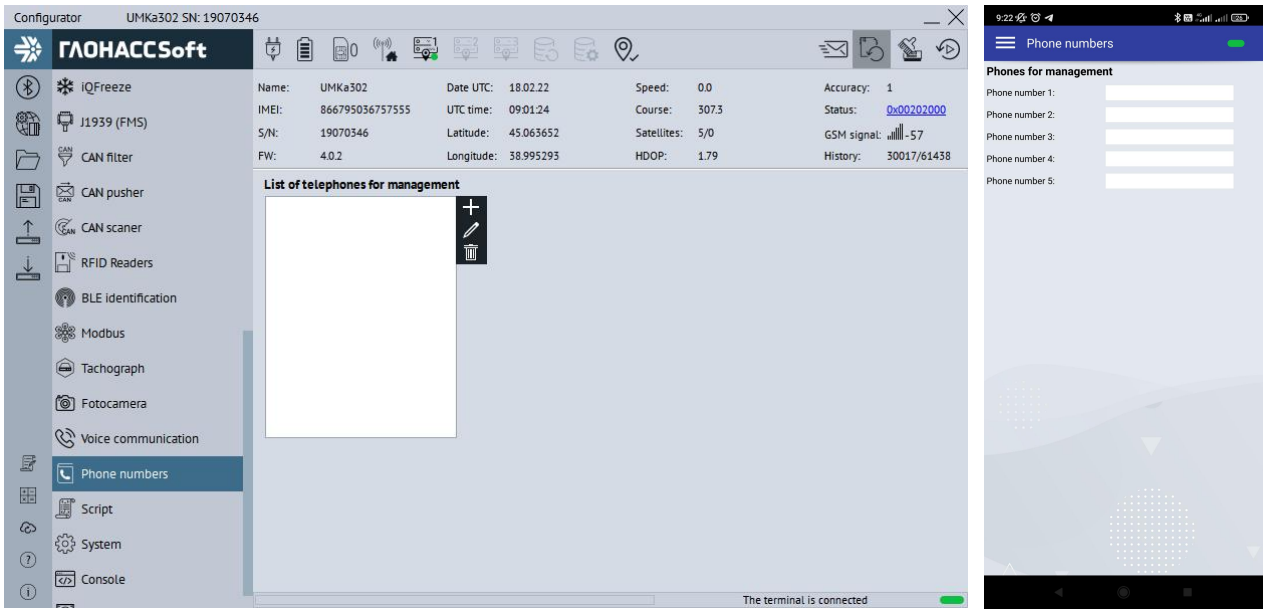


Figure 3.43 “Phones” tab

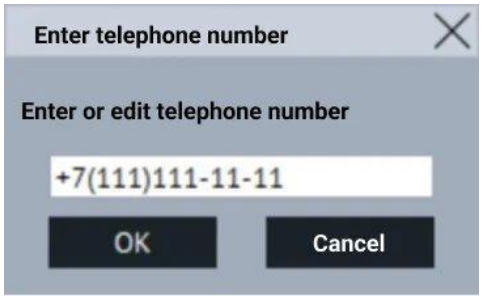


Figure 3.44 Phone number enter/edit dialogue-box

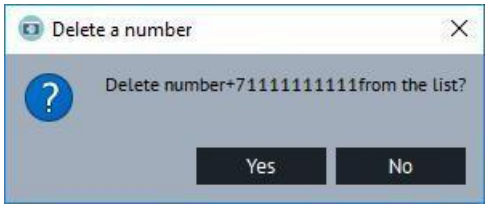


Figure 3.45 Phone number delete confirmation dialogue-box

3.32 “Scripts” (MyLogic) tab

To work with the scripts use “Scripts” tab (figure 3.46).

Press the button “Choose”. In appeared window (scripts choice) press + and mark the way to the file of the script. Pick the needed script and press “Choose“. To start the script work press “Launch” button. In “value” field the needed parameters will appear. Tick opposite the needed parameters for transmission onto the server.

To transmit parameters onto the server tick the parameter “Permit parameters transmission”.

With a tick on “Autostart” the script will function immediately after starting the tracker.

To write MyLogic scripts the simple, not typable 23-bit scripting language with the syntax similar to C language is used. Various libraries can be connected for facilitation of complex scripts writing.

Main assignment: creating a non-typical logic of device operation, support of specific and rarely used equipment.

The compiler generates the byte-code launched on the virtual vehicle.

To start scripts writing process use the “Scripts editor” button . The editor window will open (Figure 3.47).

Further information find in the document “Operation manual for MyLogic scripts writing”. It is in the scripts editor in the Menu-> List of documents together with the rest of necessary materials on programming language.

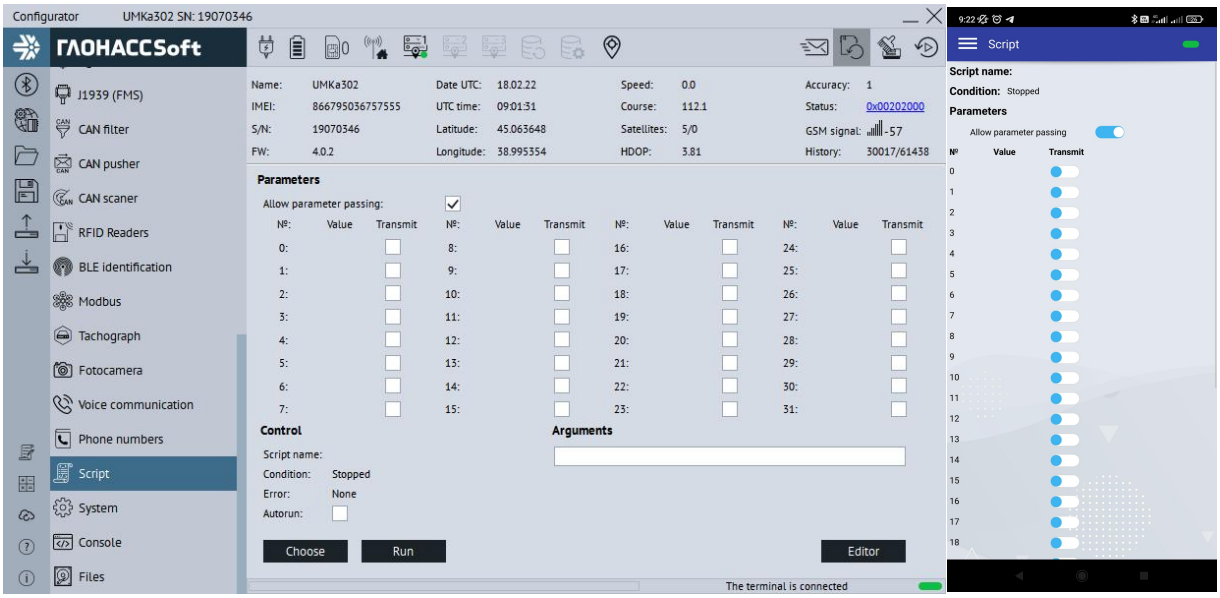


Figure 3.46 "Scripts" tab

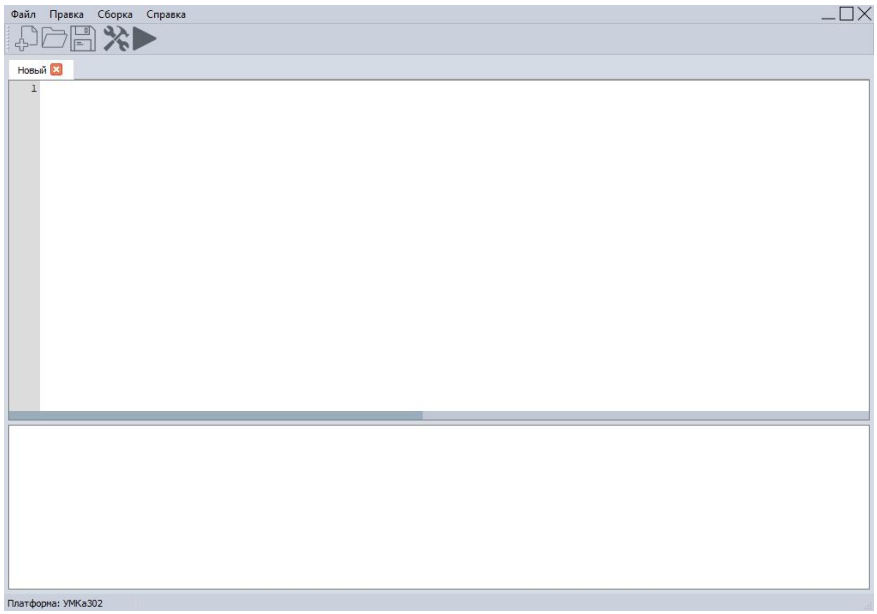


Figure 3.47 Scripts editor window

3.33 "System" tab

To configure the access to the tracker use the "System" tab (Figure 3.48) where one can set the tracker name and the access password. This password is used both for remote configuration and configuring via SMS commands. To change the password click "Change password" button. The name change is performed without confirmation.

In parameters group "General parameters" one can set the battery parameters:

"Battery capacity, mA" option allows to set the battery capacity for correct operation. The values range is from 250 to 1100 mA.

“Quick battery charge” option enables the quick charge mode. The mode description find in “Power supply manager” section.

“Tracker indication” option allows to control the tracker indication. With enabled parameter the indication works at standard mode. With disabled - it is off (except for green LED).

To configure the energy saving use the “static power saving” options group.

“IDLE mode, in:” option allows to set the time before switching to IDLE mode. The value is from 1 sec to 24 hours. When the value is “0”, the switch to IDLE mode does not occur.

“STANDBY mode, in:” option allows to set the time before switching to STANDY mode. The value is from 1 sec to 7 days. When the value is “0”, the switch to STANDBY mode does not occur.

To configure the energy saving use the “energy saving towards” options group.

“Controlled input:” option sets the analog input for energy saving mode by the voltage. Values: “Battery”, “Power supply”, “IN0(AIN0)”, “IN1(AIN1)”. “Power supply” is by default.

“Lower idle threshold:” option sets the voltage before switching to the idle mode . Value is from 0 to 42000. When the value is “0”, the switch to IDLE mode does not occur.

“Lower standy threshold:” option sets the voltage for switching to standby mode. Value is from 0 to 42000. When the value is “0”, the switch to STANDBY mode does not occur.

To start work with the battery use the “battery energy saving” options group.

“Time before switching to idle mode from the battery, sec” option allows to set the time before switching to IDLE mode when working with the battery.

“Operation time from the battery, sec” option allows to set limitation of operation time from internal battery in seconds if there is no main voltage supply. When the value is “0”, the tracker will continue operating during the maximum period. Maximum parameter value is 24 hours.

To enable the permanent configuration the “permanent connection” option in “Remote configuration” options group is used. When enabling this option the tracker in online mode will be constantly connected to configuration server waiting for configurator connection.

To configure Bluetooth the parameter “Mode:” in “Bluetooth parameters” options group is used. It also allows to disable Bluetooth.

To configure the black box the “Black box” parameter is used. In “Storage place” dropdown tab one can choose the place for black box storage. The function is available if there is an option of a SD card support.

Attention! This option can be enabled only by the set password different from the default one.

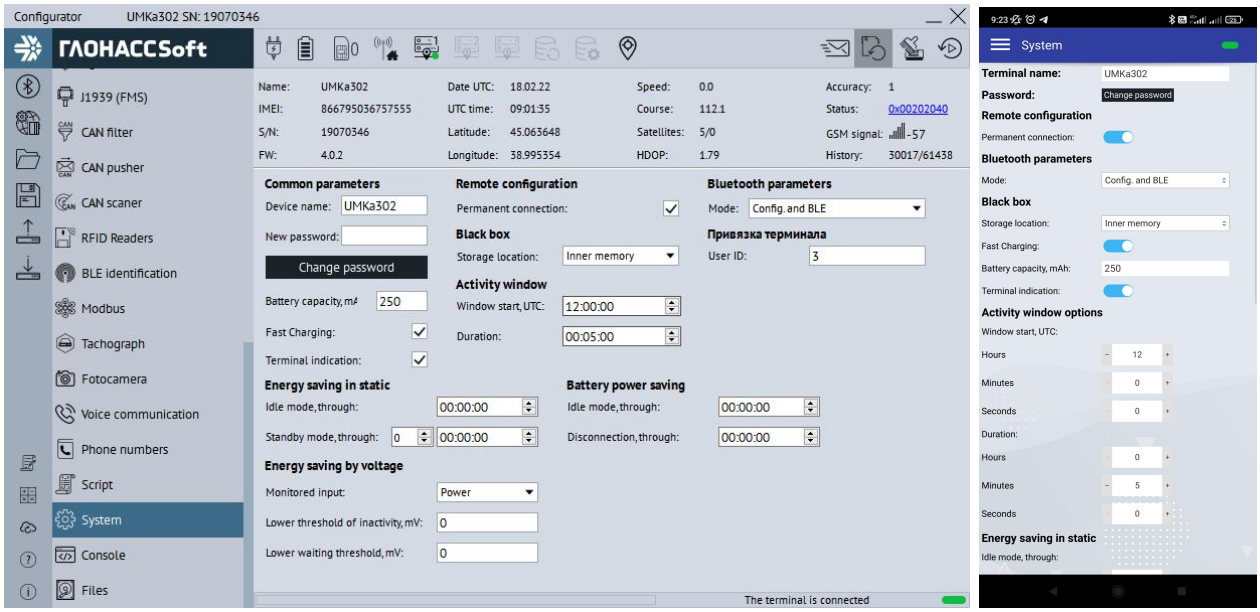


Figure 3.48 “System” tab

3.34 “Console” tab

Use the “Console” tab to enter the commands manually Appendix A) and for the tracker troubleshooting (Figure 3.49).

Commands are entered in the field at the bottom of the window. When typing, the previously entered commands are displayed. To speed up entering process, one can select one of them. All previously entered commands are as well available in the dropdown list.

The command is sent by pressing the "Enter" key or the "Send" button.

The commands sent and their outputs are displayed in the main window. At that, the symbol ">" is displayed in the command row, and the symbol "<" - in the result row.

To clear the console, select the "Clear Log" option in the rightclick menu.

To save the contents of the console, select the "Save to file" option in the rightclick menu.

To test the operation of various modules or the tracker as a whole, one can press the "Troubleshooting" button. As a result, a dialogue-box will pop up (Figure 3.27) containing the "Source" option, with the field for selecting a module, and the “Level” option, with the field for selecting a message level filter ("Level. Click the "Apply" button, and debug messages will be displayed in the main window.

Attention! From the version 2.4.0 the reply format of some commands is changed. For proper work with 2.4.0 firmware and higher the configurator of version not lower than 1.8.0 is required.

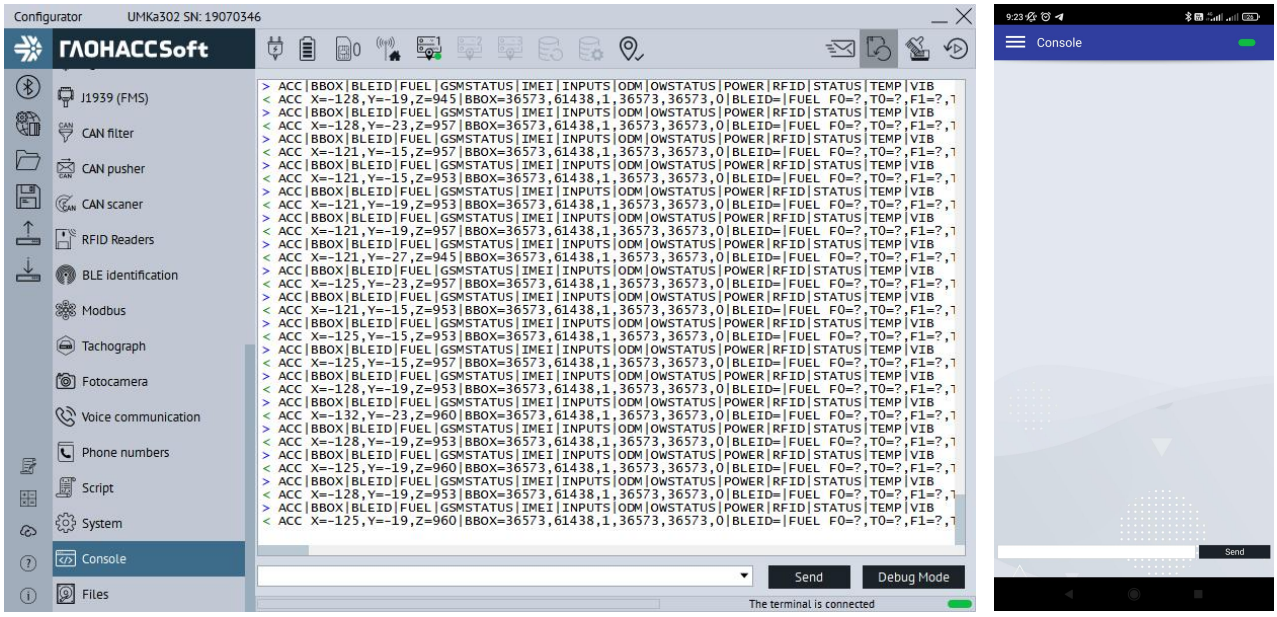


Figure 3.49 “Console” tab

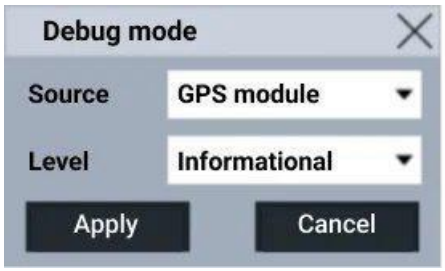


Figure 3.50 “Troubleshooting” dialogue-box

3.35 Configuring via SMS

It is possible to perform tracker configuration and troubleshooting via SMS. The tracker will respond to every command described in Appendix A sent from an

authorized phone number. Before starting tracker configuration via SMS, one must authorize the phone number from which the command will be sent. To do so, send the AUTH command from it. For instance, the “AUTH 0” command, where “0” is a default password, authorizes the phone number, which sent the SMS. The “AUTH OK +7XXXXXXXXXX” message will be sent in respond to this command. In order to delete the second phone number from the list, use “AUTH 0,2,-“ command, where “-“ means “delete the phone number”.

Thus, some of the commands have mandatory and optional parameters to specify, this in turn simplifies the configuration. To get detailed information on the list of commands and their purpose see Appendix A.

Attention! When the tracker configuration via SMS is finished reboot the tracker for changed parameters to come in force.

4 MALFUNCTIONS

Information about typical malfunctions arising at tracker configuringand debugging and methods of their elimination can be found in Appendix B of this document. Beforehand, it is advised to read the sections "INSTALLATION", "OPERATING INSTRUCTIONS" very carefully, and the operator manual for the navigation system as well.

5 INDICATIONS OF USE

5.1 Safety instructions

Installation of the trackers should be carried out by specially trained technicians with the knowledge of the fundamentals of electrical engineering and safety.

Installation should be performed under normal illumination and in the absence of rain.

When connecting the tracker to an auxiliary equipment (FLS, flowmeters, etc.), one should comply with the operating manuals for this equipment.

5.2 Operational constraints

Operational constraints of the trackers are imposed by limiting values of the technical characteristics specified in the passport of the VBRM 022.000.000 PS product and in technical specifications TU 26.30.11-001-29608716-2018.

5.3 Technical maintenance

Technical maintenance (hereinafter referred to as TM) of the product must performed in compliance with the technical specifications TU 26.30.11-001-29608716- 2018.

TM is carried out with the purpose of maintaining the operability or integrity of the product during its entire service life.

While in use, the product should go through the following types of TM:

− periodic maintenance;

− preventive maintenance;

− corrective maintenance.

Periodic maintenance to be performed at least once a year.

Preventive maintenance includes a technical survey of the product. Technical survey is performed once a 2 year interval or after the repair or modernization of the product.

Corrective maintenance is performed right after a malfunction has been detected.

When maintaining the product, it is necessary to follow safety instructions specified in 6.1 paragraph of this manual.

All tests should be carried out under normal conditions:

− air temperature (25 ± 10) ° C;

− relative air humidity of 45 to 80%;

− air pressure of 630 to 800 mm Hg.

It is allowed to perform maintenance under other conditions, if they fall within the permissible range. In this case, the values of parameters characterizing these conditions should not exceed the value limits of operating conditions for the instrumentation (measuring instruments).

When troubleshooting the product, follow the instructions in Section 3 and Appendix B of this MM.

The product repair is performed by the manufacturer.

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5.4 Transportation and storage

When transporting and storing, comply with the technical specifications TU 26.30.11-001-29608716-2018. Transportation by water (river or sea) is carried out in a sealed package or in dry sealed compartments or containers. Transportation by air is carried out in the sealed compartments. After transporting the tracker at subzero temperatures, it is necessary to keep it at room temperature for 24 hours.

Besides, please keep in mind that mobile operators can impose some extra restrictions on the use of the SIM cards inactive for a long period of time.

5.5 Manufacturer warranty

Warranty life – 5 years from the manufacture date.

The manufacturer promises to repair the UMKa310 tracker free of charge within the warranty period (or replace it with the device of a similar modification).

This warranty is legally valid when the device is submitted together with the rightly and legibly completed complaint form (you can find the form at https://glonasssoft.ru). Customers deliver the device to the place of repair by their own means.

The manufacturer shall not be liable for damages to property, or persons, or any other damages suffered by the UMKa310 owner or the third party due the failure to comply with the rules of transportation, storage, installation and operation specified in the Operating Manual.

The tracker service life is 5 years.

The warranty does not cover:

- defects caused by the failure to comply with the rules of transportation, storage, installation and operation specified in the Operating Manual;

- connecting wires, slots, pins and SIM card holders;

- trackers without casing or with mechanical damages and defects (cracks and nicks, dents, traces of blows, etc.) caused by the customers due to violating operating,storage and transportation conditions;

- trackers with traces of corrosion or other signs of fluid exposure;

- trackers with the signs of an unauthorized repair or upgrade;

- trackers with electrical and/or other damages due to the invalid condition of the external electrical circuit or improper use of the tracker;

- trackers that failed due to unauthorized software updates.

5.6 Claim information

The manufacturer will not accept claims if the device malfunction has been caused by a customer due to improper operation and failure to comply with the instructions of this manual, or violation of transportation conditions by freight companies.

Manufacturer contacts:

OOO Internet Veshchey

Ul. Zipovskaya, d. 5, korp. 1, liter 2B Krasnodar, Krasnodar Krai

Russia

350010

Manufacturer website:
https://www.glonasssoft.ru/

Technical support:
support@glonasssoft.ru

Phone number: 8(800)700 82 21

6 FREQUENTLY ASKED QUESTIONS

5.1 GPRS traffic costs optimization

One can reduce the costs of GPRS traffic in the online monitoring mode by following these tips:

1. In order to reduce traffic, use Wialon Combine protocol. To change the protocol, in “Servers” tab menu select “Protocol” option, then select “Wialon Combine” in dropdown menu.
2. Disable transmission of the unused parameters. To do so, open the configurator tab “Servers”, and then uncheck unused parameters in “Advanced options” group.
3. Increase the number of records in data packets. To do so, open the configurator tab “Servers”, select “Online mode” option, and then increase the “Group records by” parameter.
4. Increase the spot recording period. To do so: open the configurator tab “Navigation”, select “Setting the recording period” option and increase the parameter.
5. Increase the value of the angle and distance, exceeding of which leads to spot recording. To do so, open the configurator tab “Navigation”, increase the values in “Angle in degrees” and “Distance, m” options. One can also change the parameter by sending SMS command “TRACK” (command description ref. app. A). Route drawing quality will get lower, but the traffic will be reduced as well.

6.2 How to reupload data from black box?

From version 0.18.12 the command “Bbox Upload=X” is used for data reupload. The process is given below.

By entering the command to the queue for transmission all spots in the black box are added. With this the new and earlier not transmitted spots have a priority according to the chosen strategy of data upload, and are transmitted in due manner. The reuploaded spots are added into the packages on leftover principle. Yet if there is no current spots for transmission, the package consisting of reuploaded spots only is formed.

The command is formed up to reupload of all added spots or to the tracker reupload. The command and black box reupload does not enter any changes into black box file.

APPENDIX A. Table of supported SMS commands

№	Command	Reply	Parameters	Description	Version
1	AUTH X,Y,Z Example: AUTH 1234 AUTH 0,2 AUTH 0,1,+79001234567 AUTH 0,1,-	AUTH OK +79001234567, AUTH FAIL +79001234567	X – password (by default 0). Y=0..4 – memory location for storing a phone number (optional argument), Z=phone number in format “+7xxxxxxxxxx” to be written in the memory location (optional argument, used when sending the command via GPRS and USB). Z=- -delete a telephone number in the specified memory location	Authorize the phone number which sent the SMS or the explicit phone number Z, and write it into the first free location or into Y location. Authorization is only required for the tracker configuration via SMS. Numbers are always entered and displayed in an international format. Example: +79001234567	0.3.1 and higher
2	PHONES X Example: PHONES 0,,+798765432101	PHONES=,+798765432101,,,	X – password	Display the list of authorized phone numbers. Password is required for SMSs from unauthorized phone numbers.	0.3.1 and higher
3	STATUS	ID=0 Soft=0.3.0 GPS=0 Time=08:33:18 09.02.17 Nav=1 Lat=44.016106 Lon=39.173347 Speed=45.50 Course=0.0 SatCnt=9+4 SatCnt=0+0 HDOP=99.99 RSSI=-81 Stat=0x00000000	Command without arguments	Requesting the current tracker status. ID – serial number, Soft – software version, GPS – current phone number of data package, Time – current date and time GMT, Nav – coordinates validity, Lat – latitude, Lon – longitude, Speed – velocity, SatCnt – number of sattelites (GPS+GLONASS), Stat – status.	1.2.0 and higher
4	PASS X,Y Example: PASS 0,1234	PASS OK	X – an old password, by default X=0. Y – a new password.	Password setting.	0.3.1 and higher

№	Command	Reply	Parameters	Description	Version
5	IMEI Example: IMEI	IMEI 866104027972994	Command without arguments	Display IMEI of the GSM module, installed in the tracker. (Available at any time. The copy is saved in a configuration).	0.3.1 and higher
6	SETGPRS0 X,Y,Z Example: SETGPRS0 internet.beeline.ru,beeline,beeline	GPRS0: APN=internet.beeline.ru, user=beeline, pass=beeline	X – access point, by default X=internet.beeline.ru Y – login, by default Y=beeline Z – password, by default Z=beeline	Setting GPRS parameters for the SIM card. Command without arguments returns the current GPRS setting.	0.3.1 and higher
7	SETGPRS1 X,Y,Z Example: SETGPRS1 internet.mts.ru,mts,mts	GPRS1: APN= internet.mts.ru, user=mts, pass=mts	X – access point Y – login Z – password	The same as SETGPRS0, but for the SIM card №1.	0.3.1 and higher
8	SETSERV D1:P1,D2:P2,D3:P3	SERVER= D1:P1,D2:P2,D3:P	D1 – IP address or domain of the first (primary) server; P1 – the first (primary) server port; D2 – IP address or domain of the second (alternate) server; P2 – the second (alternate) server port; D3 – IP address or domain of the third (auxiliary) server; P3 – the third (auxiliary) server port.	Setting IP address or domain name for the primary and alternate servers, to which the tracker gets connected to transfer data. Addresses and ports are separated by the colon. If the alternate server is not specified, it is off. Command without arguments returns the current addresses/domain names, and ports either for both servers or for the primary server only.	1.3.0 and higher
9	PERIOD X,Y	PERIOD min=30,max=300	X – record period in movement, sec Y – record period at stops, sec	Setting the recording periods (in seconds) for data packages at driving and at stops.	0.3.1 and higher
10	TRACK X,Y,Z,A,B,C	TRACK 3,10,300,10,20,30	X – minimum velocity Y – angle in degrees	The command sets tracing quality. New spot is recorded when vehicle-course angle exceeds Y, or the distance to the previous spot is larger than Z, or acceleration is bigger than A.	2.2.1 and higher

№	Command	Reply	Parameters	Description	Version
			Z – distance in meters A – acceleration, km/h B – minimum distance between spots, m. C - threshold velocity of “Dynamic angle”, km/h		
11	RELOAD	Reloading…	Command without arguments	The tracker is reloaded.	0.3.1 and higher
12	RESET	Reloading…	Command without arguments	The tracker is reset.	0.3.1 and higher
13	WHO	DEV: UMKa300 FW: 0.2.26 SN: 17001234 OPT: None IMEI: 866104027988164	Command without arguments	Returns information about the tracker.	0.3.1 and higher
14	NAME X Example: NAME SuperCar NAME -	NAME "SuperCar" NAME ""	X – the tracker name, '-' character resets the name to blank	Setting the tracker name. The name may contain only digits and Latin characters. The name is no more than 10 characters. It is added to SMSs.	0.3.1 and higher
15	PIN0 X Example: PIN0 1234 PIN0	PIN0 OK	X = PIN X='-' – PIN disabled	Setting a PIN for the SIM card. Command without arguments displays status: PIN0 SET – PIN is set, PIN0 CLEAR – PIN is cleared.	0.3.1 and higher
16	PIN1 X	PIN1 OK	X = PIN	The same as for PIN0, but for the SIM card	0.3.1

№	Command	Reply	Parameters	Description	Version
	Example: PIN1 1234		X='-' – PIN disabled	№1.	and higher
17	SIMMODE [X[,Y]]	SIMMODE=1,1000	X – operational mode: X=0 – SIM0 only; X=1 – SIM0 priority; X=2 – SIM1 priority; X=3 – without priority; X=4 – both; X=5 – SIM1 only. Y – switch time from the card on the card, sec. From 600 to 86400 seconds. By default: X=0, Y=3600	Choice mode with SIM cards. And also a SIM card priority. Command without arguments returns current settings.	2.2.0 and higher
18	ERASE X Example: ERASE EEPROM	EEPROM ERASED! Reloading…	X=FLASH – “black box” clearing; X=EEPROM – tracker factory settings reset; X=SDCARD - SD card formatting; X=ALL - clearing of all informational packages and factory settings reset.	“Black box” clearing and the tracker reset. Factory settings reset and tracker reload.	0.3.1and higher
19	LLS485 X0,X1,X2,X3,X4,X5,X6 Example: LLS485 0,1,2,3,4,5,6	LLS485 0,1,2,3,4,5,6	X0,X1,X2,X3,X4,X5,X6 - addresses of the LLS sensors connected to the tracker via RS485 RS485. X='-' - query is disabled	Setting LLS sensors addresses.	0.3.1 and higher
20	FUEL	FUEL F0=187, T0=19; F1=321, T1=21; F2=0, T2=0; F3=235, T3=21; F4=377, T4=24; F5=0, T5=0; F6=0, T6=0;	Command without arguments	Display the current fuel level and temperature readings from fuel level sensors connected via RS485. If a sensor query fails, the "?" character is rendered in the corresponding fields F and T.	0.3.1 and higher
21	SN	SN 17003456	Command without arguments	Returns tracker serial number.	0.3.1 and higher
22	UPDATE	Updating...	Command without arguments	Connecting to an update server, checking for	0.3.1

№	Command	Reply	Parameters	Description	Version
				the current firmware version, updating to the current version.	and higher
23	INPUTS	INPUTS=0 (0),12875 (12875),1 (1),0 (0)	A – input value IN0 (AIN0) B – input value IN1 (AIN1) X – value IN2 (DIN0) Y – value IN3 (DIN1)	Burst reading of the input values. The range of measured input values is specified by its setting. Analog inputs are returned in mV. In brackets, there is an unprocessed input status. For AINn – voltage in mV, for DINn - current logical level.	0.4.0 and higher
24	SETINPUT0 A SETINPUT1 B SETINPUT2 X SETINPUT3 Y SETINPUTS A,B,X,Y Example: SETINPUTS 0,2,1,1	SETINPUTS=0,2,1,1	A – input opertaional mode IN0 (AIN0) B – input opertaional mode IN1 (AIN1) X – input opertaional mode IN2 (DIN0) Y – input opertaional mode IN3 (DIN1) Modes (applicability): 0 – “Discrete (+)” (all) 1 – “Discrete (–)” (DIN0 and DIN1) 2 – “Analog” (AIN0 and AIN1) 3 – “DFM flowmeter (+)” (DIN0 and DIN1) 4 – “DFM differential flowmeter (+)” (DIN0 and DIN1) 5 – “Differential flowmeter with encoder(–)” (DIN0 and DIN1) 6 – “Frequency (+)” (DIN0 and DIN1) 7 – “VZP flowmeter (–)” (DIN0 and DIN1) 8 – "VZP differential flowmeter (–)” (DIN0 and DIN1) 9 – “Discrete priority (+)” (all) 10 – “Discrete priority (–)” (DIN0 and DIN1) 11 – “Frequency (–)” (DIN0 and DIN1) 12 – “Disabled” (all) 13 – “Analog FLS” (AIN0 and AIN1)	Burst reading of the input values. Command without arguments returns the current settings.	2.14.13 and higher (UMKa 302)

№	Command	Reply	Parameters	Description	Version
			14 – “Frequency FLS (+)” (DIN0 and DIN1) 15 – “Frequency FLS (–)” (DIN0 and DIN1) 16 – “Mechanical flowmeter (+)” (DIN0 and DIN1. UMKa302 and UMKa302v2) 17 – “Differential mechanical flowmeter (+)” (DIN0 and DIN1. UMKa302 and UMKa302v2) 18 – “Mechanical flowmeter (–)” (DIN0 and DIN1. UMKa302 and UMKa302v2) 19 – “Differential mechanical flowmeter (–)» (DIN0 and DIN1. UMKa302 and UMKa302v2) 20 – “Discrete without events (+)” (all) 21 – “Discrete without events (–)” (DIN0 and DIN1) 22 – “Discrete output” (DIN0. UMKa302v2)		
25	SETLIM0 X,Y Example: SETLIM0 6000,8000 SETLIM0 6000	SETLIM0=6000,8000 SETLIM0=6000,6000	X – lower switching threshold for IN0 (AIN0). Y – upper switching threshold for IN0 (AIN0). Default values: X = 5000, Y = 6000.	Setting the switching thresholds for IN0 input. Thresholds are specified in mV. Only one threshold is allowed. Command without arguments returns the current settings.	0.4.0 and higher
26	SETLIM1 X,Y	SETLIM1= X,Y	X – lower switching threshold for IN1 (AIN1) Y – upper switching threshold for IN1 (AIN1) Default values: X = 5000, Y = 6000.	The same as for SETLIM0, but for IN1	0.4.0 and higher
27	INSTATIC X,Y Example: INSTATIC 0,0 INSTATIC -1	INSTATIC=0,0 INSTATIC=-1,0	X – number of the input for static navigation mode. To disable: X = -1 or X = 255 Y – logical level of the input in static navigation mode, 0 or 1. Default values: X = -1, Y = 0	Selecting the input for static navigation mode. The input selected should be set with the SETINPUTx command into 0 or 1 mode. Command without arguments returns the current settings.	0.4.1 and higher
28	OUTPUT0 X Example: OUTPUT0 0 OUTPUT0 1	OUTPUT0=0 OUTPUT0=1	X – output value OUT (OUT0). X=0 – output open X=1 – output shorted to	Controlling the discrete output OUT (OUT0). Command without argument returns the current settings.	0.4.5 and higher

№	Command	Reply	Parameters	Description	Version
			GND		
29	STATMASK X,Y	STATMASK=0x00020200,0x00000000	X – event status mask in decimal or hexadecimal format Y –priority mask for event status changes in hexadecimal format	Status field mask. When any of set bits changed, non-queue black-box record is made. Default values for UMKa300: STATMASK=0x00020200,0x00000000 Default values: UMKa301/302: STATMASK=0x00028200,0x00008000.	1.2.0 and higher
30	SPEEDALARM X Example: SPEEDALARM 90 SPEEDALARM -1	SPEEDALARM=90 SPEEDALARM=-1	X – the vehicle velocity, km/h. Within the range of 0 to 1192. To disable: X = -1. Default value: X = -1.	Controlling the tracker discrete output OUT (OUT0) depending on the vehicle velocity. Output gets shorted when the vehicle velocity exceeds X and opens when the velocity less than or equal to X.	0.4.21 and higher
31	OWSTATUS	OWSTATUS=ib=?,ow1=26,ow2=26,ow3=?,ow4=?	X – iButton key number; Y1 – temperature 0 of DS18 sensor ; Y2 – temperature 1 of DS18 sensor; Y2 – temperature 2 of DS18 sensor; Y4 – temperature 3 of DS18 sensor.	Status of 1-Wire connected sensors.	0.5.0 and higher
32	PSTATIC X Example: PSTATIC 1	PSTATIC=1	X – mode of the static navigation by accelerometer X=0 – disabled X=1 – enabled	Controlling the static navigation by accelerometer.	0.6.3 and higher
33	MAXACC X,Y,Z Example: MAXACC 100,300	MAXACC=100,300	X – accelerometer threshold in nominal units Y – static navigation mode timeout in seconds Z – number of threshold exceedings to exit the static navigation mode	Setting accelerometer threshold and static navigation mode timeout. By default Z=1.	0.6.3 and higher

№	Command	Reply	Parameters	Description	Version
34	SETPROTOCOL P1,P2,P3 Example: SETPROTOCOL 0,1,0	SETPROTOCOL=0,1,0	P1 – the first (primary) server protocol P2 – the second (alternate) server protocol P3 – the third (auxiliary) server protocol For P1, P2, P3: 0 – Wialon IPS v1.1 protocol; 1 – Wialon IPS v2.0 protocol; 2 – Wialon Combine v1.04 protocol; 3 – ADM 1.07 (hidden); 4 – ASC-6 (hidden); 5 – M2M-Avelon G6 2.0 (hidden); 6 – M2M-Avelon G6 1.0 (hidden); 7 – EGTS protocol; 8 – Scout Open (hidden for UMKa302 only); By default X = 0 ,Y = 0	Selecting the protocol for communication between the server and the terminal. Command without arguments returns the current settings.	2.15.1 and higher
35	ROAMING0 X Example: ROAMING0 1	ROAMING0=1	X – SIM0 roaming. X=0 – disabled; X=1 – enabled. Default value: X = 0.	The command enables or disables SIM0 roaming operation. Command without arguments returns the current settings.	0.7.1 and higher
36	ROAMING1 X Example: ROAMING1 1	ROAMING1=1	X – SIM1 roaming. X=0 – disabled; X=1 – enabled. Default value: X = 0.	The same as for ROAMING0, but for SIM1	0.7.1 and higher
37	SERIAL X Example: SERIAL 1	SERIAL=1	X – data uploading order. X=0 – from old to new; X=1 – ccurrent first. Default value: X = 0.	Setting the order of data transmission to the server. Command without arguments returns the current settings.	0.8.4 and higher
38	OWTEMP X Example: OWTEMP 1	OWTEMP=1	X – data of DS18 sensor uploading. X=0 – disabled; X=1 – enabled.	Setting the temperature data uploading from external DS18B20 sensor on the server. Command without arguments returns the	0.8.4 and higher

№	Command	Reply	Parameters	Description	Version
			Default value: X = 1.	current settings.	
49	OWIBUTTON X ,Y Example: OWIBUTTON 1,0	OWIBUTTON=1,0	X – Connected iButton number uploading. X=0 –disabled; X=1 – enabled. Default value: X = 1. Y - permanent iButton uploading if there is no key on the bus: Y=0 - parameter is not uploaded; Y=1 - 0 is always uploaded.	Setting the connected iButton number uploading on the server. Command without arguments returns the current settings.	1.4.10 and higher
50	TEMP	TEMP 35	X – Temperature inside the tracker	Current temperature inside the tracker.	0.8.4 and higher
51	SETTEMP X Example: SETTEMP 1	SETTEMP=1	X – Tracker temperature uploading. X=0 – disabled; X=1 – enabled. Default value: X = 0.	Setting the tracker temperature data on the server. Command without arguments returns the current settings.	0.8.4 and higher
52	ACC	ACC X=27, Y=15, Z=103 1	X – acceleration along the X axis; Y – acceleration along the Y axis; Z – acceleration along the Z axis.	Current acceleration along the tracker in milli-gravities.	0.8.4 and higher
53	SETACC X Example: SETACC 1	SETACC=1	X – tracker acceleration transmission X=0 – disabled X=1 – enabled Default value: X = 0.	Configuring the transmission of the current acceleration data along the tracker axises. Command without arguments returns the current settings.	0.8.4 and higher
54	RS485 X,Y,Z Example: RS485 1,9600,0	RS485=2,19200,0	X – interface operating mode: X=0 – interface disabled; X=1 – LLS FLS query mode; X=2 – CAN-LOG query mode; X=3 – RFID reader query mode; X=4 – LLS FLS and RFID reader combined query mode;	RS-485 interface configuration. Specifying data transfer speed and the operating mode.	2.14.13 and higher

№	Command	Reply	Parameters	Description	Version
			X=5 – Trimble; X=6 – iQFreeze; X=7 – Script (For UMKa302); X=8 – Modbus (For UMKa302); X=9 – Tachograph (For UMKa302 only); X=10 – Photocamera (For UMKa302 only); Y – interface operating velocity. For Y the following values are supported: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bit/sec. Z – sign uploading format (bits, evenness, stop bits); Z=0 – 8 bit, without evenness, 1 stop bit (8-N-1); Z=1 – 8 bit, evenness, 1 stop bit (8-E-1); Z=2 – 8 bit, oddness, 1 stop bit (8-O-1) Without arguments returns current settings.		
55	RS232 X,Y Example: RS232 1,9600	RS232=0,9600	X – interface operational mode: X=0 – interface disabled; X=1 – LLS FLS query mode; X=2 – CAN-LOG query mode; X=3 – RFID reader query mode; X=4 – LLS FLS and RFID reader combined query mode; X=5 – Trimble; X=6 – iQFreeze; X=7 – Script (For UMKa302); X=8 – Modbus (For UMKa302 only); X=9 – Tachograph (For UMKa302 only); X=10 – Photocamera (For UMKa302 only); Y – interface operating velocity.	RS-232 interface configuration. Specifying data transfer speed and the operating mode.	1.4.0 and higher

№	Command	Reply	Parameters	Description	Version
			For Y the following values are supported: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bit/sec. Z – sign uploading format (bits, evenness, stop bits) ; Z=0 – (8-N-1); Z=1 – 8 bit, without evenness, 1 stop bit (8-N-1) (8-E-1); Z=2 – 8 bit, oddness, 1 stop bit (8-O-1); Without arguments returns current settings.		
56	SETCANLOG X,Y Example: SETCANLOG 1, 0x001FFF7F	SETCANLOG=1,0x001fff7f	X – CAN-LOG query mode: X=0 – CAN-LOG query is disabled; X=1 – CAN-LOG query is enabled. Y – mask of transmitted parameters of 0x001FFF7F type where 1 is a bit value – parameter is transmitted, 0 – parameter is not transmitted.	Setting CAN-LOG query and the maska of transmitted parameters.	0.9.0 and higher
57	CANLOG Example: CANLOG	CANLOG S=0x026F1B,A=10540.00…	Command without arguments. Reply type: “CANLOG S=0x026F1B,A=10540.00…” where “S” and “A” are the protocol prefixes.	CAN-LOG current values query.	0.9.0 and higher
58	RS2USB X,Y Example: RS2USB 0,9600	- без ответа -	X – Interface: X=0 – RS-485; X=1 – RS-232. X=2 – GNSS module X=3 – Modem X=4 – UART expansion board Y – interface operational mode. Y=0 automatic velocity assignment.	Input into interfaces converter mode. The tracker will be in this mode until host is disabled. The command is available for input via USB.	0.9.0 and higher
59	GNSSRESTART X Example: GNSSRESTART 1	GNSSRESTART=1	X – GNSS module start after restart: X=0 – Hot start; X=1 – Warm start;	Restart the GNSS module. Record without reading only.	0.9.4 and higher

№	Command	Reply	Parameters	Description	Version
			X=2 – Cold start; X=3 – End-to-end cold start.		
60	GNSSMODE X Example: GNSSMODE 1	GNSSMODE=1	X – satellites grouping: X=0 – GPS and GLONASS; X=1 - GLONASS only; X=2 – GPS only.	Selecting satellites grouping for GNSS. Write only.	0.9.4 and higher
61	GNSSMONITOR X,Y,Z Example: GNSSMONITOR 1,5,120	GNSSMONITOR=1,5,120	X – monitoring the minimum number of visible satellites: X=0 – disable monitoring; X=1 – enable monitoring. Y – the minimum number of visible satellite to initiate GNSS reload timeout, within the range of 1 to 12. Z - GNSS reload timeout in seconds, within the range of 60 to 3600.	Automatic end-to-end cold start of the GNSS module when number of visible satellites is below minimum for the set period of time.	0.9.7 and higher
62	RINGS [X[,Y[,Z]]] Example: RINGS 2,80,11	RINGS=2,80,11	X – number of tones before automatic handset pick-up. From 1 to 10 or 0 if automatic handset pick-up is disabled. Y – Ring volume in percents. From 0 to 100. Z – Ringtone number. From 1 to 19. Without arguments returns current settings.	Setting the incoming voice call features.	0.11.0 and higher
63	VOICE [X,Y] Example VOICE 40,8	VOICE=40,8	X – Dynamics volume in percents.From 0 to 100. Y – Microphone amplification. From 0 to 15. 0 = 0 dB, 15 = +22.5dB, step 1.5dB. Without arguments returns current settings.	Setting the dynamic volume and microphone amplification.	0.11.0 and higher
64	WHITELIST X,P1,P2,P3,P4,P5 Example:	WHITELIST=1,+71111111111,,,,	X = 0 – disable the “white” list. Incoming call from any numbers. X = 1 – enable the “white” list. Incoming call	Controlling the “white” number list.	0.11.0 and higher

№	Command	Reply	Parameters	Description	Version
	WHITELIST 1,+71111111111		is on P1-P5 numbers only. P1-P5 – number in format +71234567890 or empty line.		
65	DIALLIST X,P1,P2,P3,P4,P5 Example: DIALLIST 0,+71234567890	DIALLIST= X,P1,P2,P3,P4,P5 Пример: DIALLIST=0,+71234567890,,,,	X = 0 – disable the list of outgoing calls. Function is unavailable. X = 1 – enable the list of outgoing numbers. The outgoing call is on P1-P5 numbers only. P1-P5 – number in format +71234567890 or empty line.	Controlling the list of numbers for outgoing calls.	0.11.0 and higher
66	TRAFFIC X,Y,Z Example: TRAFFIC 1,0,1460	TRAFFIC=1,0,1460	X – grouping by quantity. If X = 1 - grouping is disabled; Y – time on grouping, sec. If Y = 0 - grouping by time is disabled. Z – Maximum size of transmission package. Value within the range from 536 to 1460.	Grouping the spots by quantity and time in one package for reducing the traffic consumption.	0.12.1 and higher
67	ICCID	ICCID="89999999999999999999"	Command without arguments.	Returns ICCID of the active SIM card.	0.12.1 and higher
68	MAXHDOP X Example MAXHDOP 5.5	MAXHDOP=5.5	X – maximum HDOP Value X from 0 to 12	Setting maximum HDOP. All the coordinates with the HDOP above maximum will be transmitted as the invalid ones. By default: X=5.0	0.12.8 and higher
69	SATHDOP X,Y Example: SATHDOP 3,5.5	SATHDOP=3,5.50	X – minimum satellites number. Value from 1 to 10. Y – maximum HDOP. Values from 0 to 25.	Setting the maximum HDOP for the minimum number of satellites. All the coordinates with the HDOP above Y and the satellites number below X, will be transmitted as the invalid ones. By default: X=6,Y=2.0.	0.12.8 and higher
70	NAVMODULE	NAVMODULE="B03V02	Command without arguments	Returns the GNSS module firmware version.	0.12.12

№	Command	Reply	Parameters	Description	Version
		SIM868_96"		If the version is not determined, returns “NONE”.	and higher
71	SETRFID A,B,C,D Example SETRFID 10,11,14	SETRFID=10,11,14	A – the first reader address, B - of the second one, etc. Addresses must be within the range from 0 to 254. Without arguments returns current settings.	Enable and configure addresses of up to 4 readers.	0.13.0 and higher
72	RFID	RFID=2423025,0;?,?;0,100460	n – reader number from 1 to 4; Xn – RFID card number; Yn – radio identifier number (usually 0). EIf the reader doe not reply, the command returns “?,?”. For instance, reply of “RFID=2423025,0;?,?;0,100460” type means that the card 2423025 is installed into the reader 1, reader 2 does not reply on queries, reader 3 accepted the signal from identifier 100460, and reader 4 is not queried.	Query of RFID card and radio identifier current numbers.	0.13.0 and higher
73	SETODM X Example: SETODM 1	SETODM=1	X – virtual odometer operating mode: X=0 – odometer disabled; X=1 – odometer enabled.	Configuring the transmission of the value from the virtual odometer to the server.	0.13.0 and higher
74	ODM X Example: ODM 150	ODM=150	If X is specified – initial mileage setting. X – initial mileage, in meters.	Obtain or set the virtual odometer value. Returns mileage in meters or “?” in case of error.	0.13.0 and higher
75	SETRSSI X Example: SETRSSI 1	SETRSSI=1	X – mode of signal level transmission: X=0 – transmission is disabled; X=1 - transmission is enabled.	Configuring the transmission of the RSSI signal level to the server.	0.12.2 and higher
76	UPDATE VER=X.Y.Z	Updating...	VER=X.Y.Z for update to the specified version.	Updating to the specified firmware version, but	0.12.7

№	Command	Reply	Parameters	Description	Version
	Example: UPDATE VER=0.13.2		X.Y.Z – three numbers of the version divided by three dots.	not older than the current one.	and higher
77	SENDSMS X,Y Example: SENDSMS +71111111111,WHO	SENDSMS=OK,+71111111111	X – phone number, to which the reply to the Y command will be sent. Y – command, the reply to which will be sent to the phone number X.	Responding to the Y command in the form of SMS to the X number.	0.14.0 and higher
78	CHARGE [X[,Y]] Example: CHARGE 1,250	CHARGE=1,250	X – quick battery charge is disabled; X=0 – quick charge is disabled; X=1 – quick charge is enabled. Y – battery capacity from 250 to 1100 mAh. By default X = 0, Y = 250	Command controlls the function of the battery quick charge.	0.14.1 and higher
79	DISCHARGE X,Y Example: DISCHARGE 3000,1200	DISCHARGE=3000,1200	X – time in seconds from 1 to 86400 before complete cut-off with the work from battery. If X = 0 – the maximum operational time is not limited. Y – time in seconds from 1 to 86400 before IDLE mode timeout (IDLE) by working from the battery. If Y = 0 is the IDLE mode timeout does not occur. By default X = 0 и Y = 0.	Sets the maximum time of tracker operation from the battery and the energy saving mode timeout.	0.15.1 and higher
80	SETEXT X Example: SETEXT 1	SETEXT=1	X – power supply voltage transmission on the server; X=0 – transmission is disabled; X=1 - transmission is enabled . By default X = 1	Settings the power supply voltage transmission on the server.	0.14.2 and higher
81	SETAKB X Example: SETAKB 1	SETAKB=1	X – battery voltage transmission on the server X=0 – transmission is disabled; X=1 - transmission is enabled.	Setting the battery transmission voltage on the server.	0.14.2 and higher

№	Command	Reply	Parameters	Description	Version
			By default X = 1		
82	GNSSTIME X Example: GNSSTIME 04.04.2018 15:12:41	GNSSTIME=04.04.2018 15:12:41	X – UTC time in format “DAY.MON.YEAR HOUR:MIN:SEC”, for instance “29.12.2017 12:45:05”. UTC time = MSK – 3 h where MSK – Krasnodar Krai time.	Set the tracker time when it cannot detect any satellites for some reason.	0.14.2 and higher
83	ENABLELEDS X Example: ENABLELEDS 1	ENABLELEDS=1	X – indication mode. X = 0 – indication is permannetly disabled; X = 1 – indication in normal mode. By default X = 1	Controlling the LEDs mode operation (except the green).	0.14.6 and higher
84	SDLOG X Пример: SDLOG 0	SDLOG=0	X – black box record mode. X = 0 – black box record into internal memory. X = 1 – black box record on the SD card. By default X = 0	Mode of black box record on the SD card.	0.15.0 and higher
85	POWERSAVE X,Y Пример: POWERSAVE 0,1500	POWERSAVE=0,1500	X – time in seconds from 1 to 592200 before standby mode timeout (STANDBY). Если X = 0 – standby mode timeout does not occur. Y – time in seconds from 1 to 86400 before idle mode timeout (IDLE). Если Y = 0 – idle mode timeout does not occur. By default X = 0 и Y = 0.	Sets the idle and stanby modes timeout in static navigation mode.	0.15.1 and higher
86	REMCFG STATUS	REMCFG=OK,Disable, medium.glonasssoft.ru: 12358	X – Permanent connection to the remote configuration server: X = Disable – off; X = Enable – On; Y:Z – Remote configurationserver port and address. By default X = Disable, Y:Z =	Query of remote configuration mode settings.	1.1.0 and higher

№	Command	Reply	Parameters	Description	Version
			medium.glonasssoft.ru:12358		
87	REMCFG ENABLE	REMCFG=OK	Command without arguments	Enable permanent connection to the remote configuration server.	1.1.0 and higher
88	REMCFG DISABLE	REMCFG=OK	Command without arguments	Disable permanent connection to the remote configuration server.	1.1.0 and higher
89	REMCFG DEFAULT	REMCFG=OK	Command without arguments	Return default settings.	1.1.0 and higher
90	REMCFG START	REMCFG=OK,1800,861510030390799	1800 – session duration, sec. Y – tracker IMEI.	Start the remote configuration session for 30 min.	1.1.6 and higher
91	REMCFG START=A	REMCFG=OK,1800,861510030390799	A – session duration. Can be specified in sec, min or h. For instance, if A = 600 or A = 600s – пsession duration is 600 seconds, if A = 30m – 30 minutes, if A = 2h – 2 hours. X – session duration, sec. Y – tracker IMEI.	Start the remote configuration session for specified duration.	1.1.6 and higher
92	REMCFG STOP	REMCFG=OK	Command without arguments	Finish the remote configuration session.	1.1.6 and higher
93	REMCFG	REMCFG=OK,1800,861510030390799	X – session duration, sec. Y – tracker IMEI	Command without argument equals the command”REMCFG START”.	1.1.6 and higher
94	SU X,Y	Ответ на команду Y.	X – Tracker password. Y – Command with arguments that must be implemented. If it succeeds, it will send a reply on Y command.	Implement the command without preliminary authorization on the tracker (“Super User”).	1.1.5 and higher

№	Command	Reply	Parameters	Description	Version
95	OWFIXED A0,A1,A2,A3	OWFIXED=132,521,752,126	A0,A1,A2,A3- temperature sensors addresses.	Set the temperature sensors addresses.	1.3.0 and higher
96	GSMMODULE	GSMMODULE=1418B02 SIM868E32_BLE_DS_TLS12	Command without arguments	Query the modem firmware version.	1.3.3 and higher
97	SETIQFREEZE X,Y	SETIQFREEZE=0,0x1fffffff	X – iQFreeze query mode: X=0 – iQFreeze query is disabled; X=1 – iQFreeze query is enabled. Y – mask of transmitted parameters of 0x1FFFFFFF type where 1 in bit value – parameter is transmitted, 0 – parameter is not transmitted.	Bit number complies the following parameters: 0 - binary parameters, 1 - MT (Cooling and heating equipment temperature) 2 - T2 (Refrigerator temperature in section 2) 3 - T3 (Refrigerator temperature in section 3) 4 - SP (Specified temperature) 5 - SP2 (Specified temperature 2) 6 - SP3 (Specified temperature 3) 7 - AMBT (Ambient temperature) 8 - AFZT (Cooling liquid temperature) 9 - RPM (Engine revs) 10 - CONF (Compressor cinfiguration) 11 - STATE (System state) 12 - STATE2 (System state in section 2) 13 - STATE3 (System state in section 3) 14 - BATV (Battery voltage) 15 - BATA (Battery current power) 16 - ADC1 (Temperature sensor data 1) 17 - ADC2 (Temperature sensor data 2) 18 - ADC3 (Temperature sensor data 3) 19 - ADC4 (Temperature sensor data 4) 20 - ADC5 (Temperature sensor data 5) 21 - ADC6 (Temperature sensor data 6) 22 - HM (Moto hours operation from engine)	1.4.0 and higher

№	Command	Reply	Parameters	Description	Version
				23 - HME (Moto hours operation from network) 24 - HMT (Moto hours total) 25 - UPTIME (Number of seconds since operation start) 26 - TIME (UTC time) 27 - REGTIME (Actual time of the last record registration (UTC)) 28 - ALCOUNT (Errors number) IQFR_ALARM_TAG	
98	IQFREEZE	IQFREEZE flags=0x0A48,t1=16.2,.. alc=0	where: flags - binary data, t1, alc, etc. - iQFreeze protocol parameters	Current data query.	1.4.0 and higher
99	IQFREEZEINFO	IQFREEZEINFO dtp=0,sn=654326672266736,...,btn =iQF654326672266736,	where: dtp, sn, btn, etc. - iQFreeze protocol parameters.	iQFreeze information query.	1.4.0 and higher
100	IQFREEZEHOU	IQFREEZEHOU ncn=0,...,alc=0,	where: ncn, alc, etc. - iQFreeze protocol parameters	Query of cooling and heating equipment parameters connected to iQFreeze.	1.4.0 and higher
101	EGTSPROTOCOL X	EGTSPROTOCOL=0	X - Object Identifier (OID) can be specified within the range from 0 to 4294967295	If X equals 0, OID is formed from 9 - 14 IMEI numbers.	1.4.0 and higher
102	SETRFIDTEMP X0,X1,X2,X3	SETRFIDTEMP=1,0,0,0	Xn – mode of UMKa100 identifier temperature transmission for each connected reader: X0 – transmission for reader 0; X1 – transmission for reader 1; X2 – transmission for reader 2; X3 – transmission for reader 3 Xn=0 – tempearure transmission is disabled;	Command sets parameters of UMKa100 identifier temperature transmission.	1.4.16 and higher

№	Command	Reply	Parameters	Description	Version
			Xn=1 – tempearure transmission is enabled;		
103	UPTIME	UPTIME=13732	Command without arguments	Command returns the operation time from the last reboot in seconds.	1.4.16 and higher
104	BBOX	BBOX=0,21064,0,0,0,0	X – number of spots went through the black box. It is cleared at every 255*Y spots. Y – number of spots that can be stored in the black box A – number of spots in the black box queuing for the transmission to the primary server. B – number of spots in the black box queuing for the transmission to the alternate server. C – number of spots in the black box queuing for the transmission to the auxiliary server. Z – number of the detected black box power on errors.	The command returns the black box status (BB).	1.4.22 and higher
105	HISTORY X	HISTORY=2,0,0,0,0,0,0 …	X - number of the spot to read from the black box.	The command for history reading from the black box. Command without arguments returns the current settings.	1.4.22 and higher
106	SETLBS X	SETLBS=1	X - transmit LBS data on the server: X=0 - parameters are not transmitted; X=1 - parameters are transmitted.	Setting LBS parameter transmission;	1.4.18 and higher
107	SETVIB X	SETVIB=1	X - transmit vibration data on the server: X=0 - parameters are not transmitted; X=1 - parameters are transmitted.	Setting vibration parameter transmission;	1.4.25 and higher
108	VIB	VIB=4	Command without arguments	Current (instant) vibration mode	1.4.25

№	Command	Reply	Parameters	Description	Version
					and higher
109	POWER	POWER=0.000,0.000,30,USB	On query without arguments the reply of POWER=A,B,C,Z type is returned where: A - power supply voltage, V B - battery voltage, V A - Microcontroller temperature Z - power supply system operational mode. One of the following parameters: INIT - initialization; MAIN - power supply from the main source; AKB - power supply from the battery; USB - power supply from USB; REPAIR - repair of completely discharged battery; SLOW - battery slow charge; FAST - battery quick charge; FUSE - battery malfunction; OFF - disabled.	Command returns the power supply system status.	1.4.22 and higher
110	BLEMODE X	BLEMODE=1	X – BLE (Bluetooth) module operational mode: X = 0 – Disabled; X = 1 –Configuration;	Command sets BLE (Bluetooth) module operational mode. Without arguments returns the specified mode	1.5.3 and higher
111	VOLTSAVE X, Y, Z	VOLTSAVE=-1,0,0	X – analog input number of energy saving by voltage. For UMKa3xx the following values are permitted: -2 - measuring channel of battery voltage; -1 - measuring channel of power supply voltage; 0 - AIN0 channel; 1 - AIN1 channel;	Setting the number of the analog input and voltage for STANDBY and IDLE modes timeout.	1.7.0 and higher

№	Command	Reply	Parameters	Description	Version
			Y - voltage in millivolts within the range of 0 to 40000 for STANDBY mode (STANDBY) timeout.if the voltage the input is lower (Y - 50), back to the mode, if voltage is higher (Y + 50). Z - voltage in millivolts within the range of 0 to 40000 IDLE mode (IDLE) timeout. Switch from the mode occurs, if the voltage the input is lower (Y - 50), back to the mode, if voltage is higher (Y + 50). By default: X = 0, Y = 0 and Z = 0.		
112	ACTIVEWIN X,Y Example: ACTIVEWIN 40000, 150	ACTIVEWIN=43200,300	X – activity window starting time. Time offset from the UTC day start, in seconds. Y – activity window duration, in seconds. 0 – if disabled. Minimum duration is 300 seconds. By default: X = 43200 and Y = 300. The activity window starts for 5 minutes at 3.00 pm, Moscow time.	Setting the activity window parameters.	1.7.0 and higher
113	SMOOTH	SMOOTH=0	X - filtration reference parameter from the range 1 - 100. If X=0 filter is disabled. By default X=0.	Track smoothing by Kalman filter.	2.0.5 and higher
114	NETMON	«NETMON=1,Mcc=250, Mnc=2,Lac=2302,Cid=3 0926» где NETMON=1 - данные валидны.	Mcc - mobile country code; Mnc - mobile network code; Lac - local area code; Cid - cell identificator.	Returns Net monitoring data.	2.0.5 and higher
115	SATS	SATS A,24,263,72,29,A,17,50 ,37,23,A,2,159,23 ,28,V,6,0,0,29,V,12,0,0, 26,N,74,0,0,0	Leading letter of each satellite can take one of the following values: A - Active. This satellite is used for solving navigational task. V - Visible. The satellite is tracked by receiver,	Returns the list of visible satellites.	2.0.5 and higher

№	Command	Reply	Parameters	Description	Version
			but does not impact the navigational task solution. N - Not tracked. Receiver does not track the satellite, but is aware that it must be somewhere around. The satellite number follows the leading number. The satellite azimuth in degrees from 0 to 359 follows the satellite number. Satellite elevation quadrant in degrees from 0 to 90 follows the azimuth. The relation signal/noise (SNR) is the last parameter in group. The more, the better.		
116	BBOX UPLOAD X	BBOX=33,21064,33,33,33,0	X=0 - black box retransmission on primary server; X=1 - black box retransmission on alternate server; X=2 - black box retransmission on auxiliary server.	Black box retransmission on chosen telematic server.	2.2.0 and higher
117	BBOX UPLOAD	BBOX=33,21064,33,33,33,0	Equivalent to “BboxUpload=0”.	Retransmission of black box on the main telematic server.	2.2.0 and higher
118	LLSREPORT	Addr0=0,Type0=NONE,Addr1=1,Type1=TD100,Sn1=86137,Fw1=1.9.1,Mode1=I,Level1=7,Addr2=2,Type2= NONE…	AddrX - address on the bus. TypeX - FLS type: TypeX=NONE - FLS in query, is not connected; TypeX=UNKNOWN - FLS in query and is connected, type is not specified; TypeX=ESCORT - “Escort” FLS with ДУТ типа «Эскорт» with leading Cyrillic characters; TypeX=TD500 - “Escort TD-500” FLS; TypeX=TD100 - “Escort TD-100” FLS;	Returns overall report on connected FLSs.	2.2.0 and higher

№	Command	Reply	Parameters	Description	Version
			TypeX=TD150 - “Escort TD-150” FLS. SnX - serial number. FwX - firmware version. ModeX - smoothing mode: ModeX=I - “Intellectual”; ModeX=M - “Median”. LevelX - smoothing level from 0 to 15.		
119	IMSI	IMSI=25001861122222	Command without arguments	Command returns the SIM card IMSI.	2.3.2 and higher
120	REMCFGCONFIG E,D:P	REMCFGCONFIG=0,medium.glonasssoft.ru:12358	E - permanent connection to the remote configuration server: E=0 - disabled E=1 - enabled D - remote configuration server domain; P - remote configuration server port. Command duplicates “REMCFG STATUS”, “REMCFG SETSERV”, “REMCFG ENABLE”, “REMCFG DISABLE”.	Command of remote configuration server control.	2.4.3 and higher
121	RFIDCONFIG X	RFIDCONFIG=1	X=0 - standard length ID. Length is 3 or 4 bytes. Depends on the card standard. X=1 - short ID. 2 last bytes only. By default X=0	For RFID readers enables the transmission of short ID card (2 bytes) for compatibility with ADM trackers.	2.3.5 and higher
122	LLSBLE	LLSBLE=X0,Y0,X1,Y1,X2,Y2,X3,Y3,X4,Y4,X5,Y5,X6,Y6,X7,Y	Command without arguments. X0-X7 - mode of FLS query from 0 to 7. Xn=0 - query is disabled; Xn=1 - Escort TD-BLE FLS query; Xn=2 – Escort temperature sensor query; Xn=3 – Escort illumination and temperature sensor query; Xn=4 - NEOMITIKA ADM31 temperature	For UMKa302. All current settings query of wireless sensors at the same time. Command without arguments.	2.4.1

№	Command	Reply	Parameters	Description	Version
			sensor query; Xn=5 – NEOMATIKA ADM 32 tilt sensor query; Xn=6 – Escort tilt sensor query; Xn=7 - DFM fuel flowmeter . Parameters; Xn=8 - DFM fuel flowmeter . Tiotal flow rate; Xn=9 - DFM fuel flowmeter. Operational time; Xn=10 - DFM fuel flowmeter. Concumption by cameras. Xn=11 - GL-TV BLE FLS. Xn=12 – ELA Blue COIN T temperature sensor; Xn=13 – “TESLiOT” sensor; Xn=14 – Eurosens Degree BT tilt sensor; Xn=15 – Eurosens Dominator Bt sensor. Y0-Y7 - FLS MAC address from 0 to 7. MAC address consists of 6 hexadecimal figures pairs separated by “:”. Example MAC: “C7:3B:E0:66:C6:3C” By default X0-X7=0, Y0-Y7=00:00:00:00:00:00		
123	LLSBLEn X,Y	LLSBLE1=0,00:00:00:00:00:00	n - FLS number from 0 to 7. X=0 - query disabled; X=1 - Escort TD-BLE sensor query; X=2 - Escort temperature sensor query; X=3 - Escort illumination and temperature sensor query; X=4 - NEOMAIKA ADM31 temperature sensor query; X=5 - NEOMATIKA ADM32 tilt sensor query; Xn=6 - Escort tilt sensor query;	UMKa302 only. Settings record of wireless sensors.	2.4.1

№	Command	Reply	Parameters	Description	Version
			n=7 - DFM fuel flowmeter . Parameters; Xn=8 - DFM fuel flowmeter . Tiotal flow rate; Xn=9 - DFM fuel flowmeter. Operational time; Xn=10 - DFM fuel flowmeter. Concumption by cameras. Xn=11 - GL-TV BLE FLS. Xn=12 – ELA Blue COIN T temperature sensor; Xn=13 – “TESLiOT” sensor; Xn=14 – Eurosens Degree BT tilt sensor; Xn=15 – Eurosens Dominator Bt sensor. Y0-Y7 - FLS MAC address from 0 to 7. MAC address consists of 6 hexadecimal figures pairs separated by “:”. Example MAC: “C7:3B:E0:66:C6:3C” By default X0-X7=0, Y0-Y7=00:00:00:00:00:00		
124	CANMODE X,Y,Z	CANMODE=0,250000,0	X – mode for interface operation: X=0 – interface disabled; X=1 – J1939 (FMS) mode; X=2 – customer filters mode; X=3 – combined mode of J1939 (FMS) and customer filters. Y – interface operational velocity. The following values are supported for Y: 10000, 20000, 50000, 83333, 100000, 125000, 250000, 500000 and 1000000 bit/sec. Z - interface active mode: Z=0 - passive mode (recommended); Y=1 - active mode.	For UMKa302.FC2, UMKa302.FR2, UMKa302.FIC2 only. CAN interface settings.	2.4.1

№	Command	Reply	Parameters	Description	Version
			Without arguments returns current settings. By default: X=0, Y=250000, Z=0		
125	SETFMS X,Y	SETFMS=0,0x00002AEB	X – mode of J1939 protocol processing settings: X=0 – J1939 protocol processing is disabled; X=1 – J1939 protocol processing is enabled. Y – mask of 0x7FFF type transmitted parameters, where 1 in bit value - parameter is transmitted. Without arguments returns current settings. By default: X=0, Y=0x0	For UMKa302 only. Protocol J1939 settings. Bits have the following assignments: Y.0 – TFU - Total Fuel Used or full flow consumption; Y.1 – FL - Fuel Level or fuel level in tank; Y.2 – ECT - Engine Coolant Temperature or engine temperature; Y.3 – ES - Engine Speed or engine revs velocity Y.4 – ETH - Engine total hours or engine operational time Y.5 – HRTVD- High resolution total vehicle distance or vehicle mileage Y.6 – EPL - Engine Percent Load At Current Speed or load on engine Y.7 – APP - Accelerator Pedal Position or accelerometer pedal position Y.8 – AW1 - Axel weight or load on axis 1 Y.9 – AW2 - Axel weight or load on axis 2 Y.10 –AW3 - Axel weight or load on axis 3 Y.11 –AW4 - Axel weight or load on axis 4 Y.12 –AW5 - Axel weight or load on axis 5 Y.13 – HRLFC- High Resolution Fuel Consumption (Liquid) or high-precision full fuel consumption Y.14 – Fuel Level 2 or fuel level in the second tank	2.14.13 (UMKa 302)
126	FMS	FMS TFU=123.4,ECT=85,…	Command without arguments	For UMKa302 only. Query of J1939 protocol current settings.	2.4.1
127	SETCAN X,Y	SETCAN=0,0x00000000	X – mode of customer filters transmission:	Setting the mode of customer filters	2.8.2

№	Command	Reply	Parameters	Description	Version
			X=0 – transmission is disabled; X=1 – transmission is enabled. Y – mask of 0x7FFF type transmitted parameters, where 0 in bit value - parameter is not transmitted. Matters only when X=1. Without arguments returns current settings. By default: X=0, Y=0x0,	transmission.	(UMKa 302)
128	CANFILTERn X,Y,Z,A,B,C	CANFILTER1=0x04214001 ,24,8,0,x-40,ET	n – filter number within the range from 0 to 31. X – message identificator on the bus of 0x285 type. Y – parameter displacement in bits from the package start within the range from 0 to 63. For zero byte the displacement is 0, for the first one - 8, etc. Z – parameter length in bits from 0 to 32. If 0, parameter is not processed. A – primary parameter transformation: A=0 – MSB. Unsigned. Without original bit sequence transformation. The first bit is LBS. A=1 – MSB. Signed. Without original bit sequence transformation. The first bit is LBS and codes the values in auxiliary code. A=2 – LSB. Unsigned. With byte displacement. Only for values with 16, 24 or 32 bits length. A=3 – LSB. Signed. With byte displacement. Only for values with 16, 24 or 32 bits length. After byte displacement the first bit is LBS and codes the values in auxiliary code. A=4 – counter of fuel rate with adding data	Setting the mode of customer filters.	2.8.2 (UMKa 302)

№	Command	Reply	Parameters	Description	Version
			to EEPROM. MSB. Unsigned. A=5 – counter of fuel rate with adding data to EEPROM. MSB. Unsigned. A=6 – EEPROM overflow counter. LSB. Unsigned. A=7 –counter of fuel rate with adding data to EEPROM. LSB. Unsigned. For A=2 and A=3, A=6, A=7 in 32-bit value 1 – 4 and 2 – 3 bytes change position, in 24-bit 1 – 3 bytes, in 16-bit 1 – 2 bytes. B – line with recalculation formula of up to 10 symbols. In recalculation line integers and fraction figures of 5, 2.25, 0.45 type are used, mathematical computations of addition (+), subtraction (–), multiplication (*), division (/), rasing to the power «^», remainder of division «%», brackets. Original value codes with symbol x or X. If the line is empty, the original value is not recalculated. Recalculation formulae example: ”2.5x–60”, “5(x+10)”, “x/2”. C – parameter description of size up to 10. Letters A–Z, a–z and figures 0–9 only are available. Parameter description can be empty and is saved only for customer convenience.		
129	CANFILTERS	CANFILTERS X0,Y0,Z0,A0,B0,C0,...,X31,Y31,Z31,A31,B31,C31.	Description of parameters Xn,Yn,Zn,An,Bn and Cn correspond “CANFILTERn” command	Reading of all customer filters settings.	2.8.2 (UMKa 302)
130	CAN	CAN F0=50.5,F1=1619,F2=37	Fn – value of customer filter parameter.	Reading of all customer filters current values	2.8.2 (UMKa

№	Command	Reply	Parameters	Description	Version
					302)
131	CANAUTOBAUD	CANAUTOBAUD=0	Supports the following velocity: 125000, 250000, 500000, 20000, 50000, 83333, 10000, 100000 and 1000000 bit/sec	Returns the CAN bus velocity or 0 if the velocity was not specified.	2.8.2 (UMKa 302)
132	CANSCAN STATUS	CANSCAN=X,Y	X – operational mode: X=0 – CAN scanner is disabled; X=1 – CAN scanner is enabled. Y – number of unique identificators on the bus	CAN scanner operational status	2.8.3 (UMKa 302)
133	CANSCAN	CANSCAN=0,0	Command without arguments.	The same as for “CANSCAN STATUS»”	2.8.3 (UMKa 302)
134	CANSCAN START	CANSCAN=1,0	Command without arguments.	Launch CAN scanner. Reply corresponds to “CANSCAN STATUS” command	2.8.3 (UMKa 302)
135	CANSCAN STOP	CANSCAN=0,0	Command without arguments.	Stop CAN scanner. Reply corresponds to “CANSCAN STATUS” command	2.8.3 (UMKa 302)
136	CANSCAN GET=A,B	CANSCAN=0,0,0,0	A – first record number. B – reading records number. Reply of “CANSCAN=X,Y,A,B,C0,ID0,DLC0, B00,…,B0m,Cn,IDn,DLCn, Bn0,…,Bnm” type X – scanner operational mode; Y – number of unique identificators on the bus (records); A – number of the first record in reply; B – number of records in reply; C0, Cn – counter of packages quantity with specified identificator; ID0, IDn – identificator; DLC0, DLCn – length of data field,	Read one or several records from CAN scanner.	

№	Command	Reply	Parameters	Description	Version
			B00, Bn0 – the first data field byte if DLC > 0; B0m, Bnm – the last data field byte if DLC > 1		
138	SETINCLINE X	SETINCLINE=1	X – transmission mode. X = 0 – transmission disabled; X = 1 – transmission enabled.	Control of inclinometer readings transmission on the server.	2.6.5
139	INCLINE	INCLINE X=-7,Y=3,Z=82	Command without arguments.	Inclinometer current readings query. Tilt angle measurement of various objects relating the Earth gravity field	2.9.8
140	STATUS	STATUS ID=30200007,Soft=2.15.8,GPS=91923/43884,Time=11:13:12,18.12.20,Nav=1,Lat=45.063698,Lon=38.995369,Speed=0.0,Course=136.6,SatCnt=7+1,HDOP=1.17,RSSI=-63,Stat=0x00220054	Command without arguments.	In reply on the command within GPS field now 2 figures separated by '/' are transmitted. The first figure is the number of spots recorded in black. The second one - size of black box in points.	2.9.8
141	LLSFILTERn X,Y,Z	LLSFILTER2=0,1,0	n – FLS number. n=0…6 – for wired FLSs; n=7…14 – for wireless (for UMKa 302); n=15…16 – for analog; n=17…18 – for frequency. n=19…20 – CAN FMS – level in tanks; n=21…22 – CAN filters in 0 and 1. X – filtration mode: X=0 – without filtration; X=1 – simple low frequency filter (LFF); X=2 – composite filter (Median+LFF). Y – filtration level within the range from 1 to 20. Z – step of fuel level for event generation	Record of fuel level filtration settings.	2.9.5

№	Command	Reply	Parameters	Description	Version
			change. If Z=0, event generation is disabled. By default X=0, Y=1, Z=0		
142	LLSFILTERS	LLSFILTERS 0,X0,Y0,Z0,…n,Xn,Yn,Zn	Parameters values and filters numbers correspond to “LLSFILTERn” command	Reading of all filters settings	2.9.5
143	LLSDETECTORn X,Y	LLSDETECTOR3=10,30	n – FLS number. n=0…6 – for wired FLS; n=7…14 – for wireless (for UMKa 302)); n=15…16 – for analog; n=17…18 – for frequency. n=19…20 – CAN FMS – level in tanks; n=21…22 – CAN filters in 0 and 1. X – Operational time of fill-up detector within the range from 0 to 120. 0 - fill-up detector is disabled. Y – drain detector operational time within the range from 0 to 120. 0 - drain detecrot is disabled. By default X=10, Y=30	Record of drain detector settings.	2.16.3 (UMKa 302 and UMKa302v2)
144	LLSDETECTORS	LLSDETECTORS 0,X0,Y0,Z0,…n,Xn,Yn,Zn	Parameters values and detector numbers correspond to “LLSDETECTORn” command	Reading of all detectors settings. Reply of type	2.9.11
145	IOFUELLIMn MIN,MAX	IOFUELLIM2=0,65535	n – input number n=0 – IN0 (AIN0) n=1 – IN1 (AIN1) n=2 – IN2 (DIN0) n=3 – IN3 (DIN1) MIN – minimum operational FLS value MAX – maximum operational FLS value .	Setting the range validity of input signal for FLSs connected to analog and digital inputs that are configured in modes “Analog FLS”, “Frequency FLS (+)” и “frequency FLS (–)”.	2.9.11
146	FUEL	FUEL F0=?,T0=?,F7=?,T7=?,B7=?,S7=?,F10=?,T10=?,B10=?,S10=?	F15 – fuel level on input IN0 (AIN0) F16 – fuel level on input IN1 (AIN1) F17 – fuel level on input IN2 (DIN0) F18 – fuel level on input IN3 (DIN1)	Output data is added in command reply for FLS connected to analog and digital inputs that are configured in modes подключенных к “Analog FLS”, “Frequency FLS (+)” и	2.16.3 (UMKa 302 and

№	Command	Reply	Parameters	Description	Version
			F19 – fuel level in the first FMS FL tank F20 – fuel level in the first FMS FL2 tank F21 – CAN filter 0 fuel level F22 – CAN filter 1 fuel level	“frequency FLS (–)”.	UMKa302v2)
147	GSMSTATUS	GSMSTATUS=1,State=0x01000000,CMEErr=-1,CMSErr=-1	State – modem status; CMEErr – latest modem failure. -1 - no latest failure; CMSErr - latest network failure. -1 - no latest failure;	Query of status and lastest modem failures. For status description refer to APPENDIX G.	2.9.11
150	SETGSMSTATUS X	SETGSMSTATUS=0	X – status and black box failures record: X=0 – record disabled; X=1 – record enabled;	Setting the status and modem failures record in black box.	2.9.11
151	BLESENS	BLESENS=T0=27.0,P0=3.4,P1=-67,P2=35,F1=1,T1=23.0,P8=3.5,P9=-61	Command without arguments. Fn – fuel level of n sensor; Tn – sensor n temperature; Pn – arbitrary parameter. Sensor number is n / 8, parameter number for the sensor is n % 8.	BLE sensors current values query.	2.9.14 (UMKa302)
152	SETMDB X,Y	SETMDB=0,0x00000005	X – mode of Modbus parameters transmission: X=0 – transmission is disabled; X=1 – transmission is enabled. Y – transmitted parameters mask of 0xFFFF type where 1 in bit value – parameter is transmitted, 0 – parameter is not transmitted. Matters only if X=1. Without arguments returns current settings. By default: X=0, Y=0x0	Setting the Modbus parameters transmission.	2.11.0 (UMKa302)
153	MDBPARAMn X,Y,Z,A,B	MDBPARAM5=0,0,0,,	n – parameter number within the range from 0 to 31. X – device address on the bus from 1 to 247	Setting Modbus parameters.	

№	Command	Reply	Parameters	Description	Version
			or o if query is disabled. Y – query type: Y=0 – function 1. 1 bit reading of Coils type; Y=1 – function 2. 1 bit reading of Input Discrete type; Y=2 – function 3. 1 register reading of Holding Registers type. Unsigned. 0…65535. Y=3 – function 3. 1 register reading of Holding Registers type. Signed 32768…32767 Y=4 – function 4. 1 Register reading of Input Register type. Unsigned. 0…65535. Y=5 – function 4. 1 Register reading of Input Register type. Signed -32768…32767 Y=6 – function 3. 2 registers reading of Holding Registers type. Registers are processed as float. Most significant byte (Byte order is 1032). Last significant byte first (Byte order 1032). Y=7 – function 4. 2 registers reading of Input Register type. Registers are processed as float. Last significant byte first (Byte order is 1032). Y=8 – function 3. 2 registers reading of Holding Registers type. Registers are processed as unsigned integer (Byte order is 1032). Y=9 – function 4. 2 registers reading of Input Register type. Registers are processed as signed integer. Most significant byte (Byte order is 1032). Y=10 – function 3. 2 registers reading of		

№	Command	Reply	Parameters	Description	Version
			Holding Registers type. Registers are processed as float. Most significant byte (Byte order 3210). Y=11 – function 4. 2 registers reading of Input Register type. Registers are processed as float. (Byte order 3210). Y=12 – function 3. 2 registers reading of Holding Registers type. Registers are processed as signed integer. Most significant byte (Byte order 3210). Y=13 – function 4. 2 registers reading of Input Register type. Registers are processed as signed integer. Most significant byte (Byte order 3210). Z – initial address of register or picked query input. A – line with recalculation formula of up to 10 symbols. In recalculation line integers and fraction figures of 5, 2.25, 0.45 type are used, mathematical computations of addition (+), subtraction (–), multiplication (*), division (/), rasing to the power «^», remainder of division «%», brackets. Original value codes with symbol x or X. If the line is empty, the original value is not recalculated. Recalculation formulae example: ”2.5x–60”, “5(x+10)”, “x/2”. C – parameter description of size up to 10. Letters A–Z, a–z and figures 0–9 only are available. Parameter description can be empty and is saved only for customer		

№	Command	Reply	Parameters	Description	Version
			convenience.		
154	MDB	MDB P0=27.0,P1=3.4,P2=-67»	Command without arguments. Pn – parameter n value;	Query of all modbus parameters current values.	2.11.0 (UMKa 302)
155	BLEIDBEACON EN,UUID,MAJOR,MINOR,ONEPWR	BLEIDBEACON=0,D595A152-A7E9-4A1F-A65D-CCA4C719D2DF,460,53447,-80	EN – beacon operational mode: EN=0 – beacon disabled; EN=1 – beacon enabled; UUID – UUID of D595A152-A7E9-4A1F-A65D-CCA4C719D2DF type; MAJOR – Major within the range from 0 to 65535; MINOR – Minor within the range from 0 to 65535; ONEPWR – measured beacon power at 1 metre distance.	Setting the beacon.	2.10.2 (UMKa 302)
156	BLEIDLISTENn MODE,MAXDIST,DEFEN,EVENTEN,UUID,MAJOR,MINOR	BLEIDLISTEN2=0,10,0,0,D595A152-A7E9-4A1F-A65D-CCA4C719D2DF,0,0	n – listening channel from 0 to 3; MODE – listening channel operational mode ; MODE=0 – listening channel disabled; MODE=1 – reception of identifiers with exact; UUID, Major and Minor coincidence; MODE=2 – reception of identifiers with exact UUID and Major coincidence . Minor can be any; MODE=3 – reception of identifiers with exact UUID coincidence. Major and Minor can be any; MODE=4 – reception of all identifiers with any UUID, Major and Minor; MAXDIST – maximum distance to identifier reception. Properly configured identifier that is beyond the circle with MAXDIST radius will	Setting listening channel.	

№	Command	Reply	Parameters	Description	Version
			definitely not be “heard”. Everything that is near - it depends. Maximum value is limited by 100 meters. DEFEN – transmit the default value or not if there are no suitable identifiers nearby. DEFEN=0 – when there are no suitable identifiers nearby nothing is transmitted on the server; DEFEN=1 – when there are no suitable identifiers nearby 0 is transmitted on the server; EVENTEN – spot record in black box by each channel value change; EVENTEN=0 – spot record in black box by change is not implemented; EVENTEN=1 – spot record in black box by any channel status change; UUID – UUID of D595A152-A7E9-4A1F-A65D-CCA4C719D2DF type; MAJOR – Major within the range from 0 to 65535; MINOR – Minor within the range from 0 to 65535;		
157	BLEID	BLEID=ID0=12345,DST0=15,…,ID3=543210,DST3=51	Command without arguments. IDn – identificator of visible identifier in channel n; DSTn – estimated distance to identifier in channel n. Estimated by the signal level from identifier.	Query of visible identifiers for all identification channels.	2.10.2 (UMKa 302)
158	CANPUSHn PERIOD,0xID,EXT,RTR,	CANPUSH2=2,0x456,1,0,1,0xAA	n – channel number from 0 to 15 PERIOD – message transmission period, sec.	Setting CAN pusher channel.	

№	Command	Reply	Parameters	Description	Version
	LEN,0xD0...,0xD8		0xID – message identificator in hexadecimal format by mask 0x7FF (11 bit) or 0x1FFFFFFF (29 bit) EX – extended identificator format (29 bit) EX=0 – 11-bit identificator EX=1 – 29-bit identificator RTR – remote query flag. Must be always 0. Entered for further expansion LEN – message length from 0 to 8 bytes 0xD0...0xD8 – message byte value in hexadecimal format		
159	CANPUSH	CANPUSH=0,0x123,0,0,3,0x01,0x02,0x55…		Reading of all CAN pusher channels settings.	2.10.0
161	SETAMX X,Y	SETAMX=1,0x00000000	X – mode of script parameters transmission: X=0 – transmission disabled; X=1 – transmission enabled. Y – transmitted parameters mask of 0xFFFFFFFF type where 1 in bit value – parameter is transmitted, 0 – parameter is not transmitted. Matters only if X=1. Without arguments returns current values. By default: X=1, Y=0x0	Setting script parameters transmission.	2.11.4
162	AMX	AMX P0=27.0,P1=3.4,P2=-67	Command without arguments. Pn – parameter n value	Query of all script parameters current values.	2.11.4
163	SETTACHO X,Y	SETTACHO=0,0x0FFF	X – mode of tachograph parameters transmission: X=0 – transmission disabled; X=1 – transmission enabled. Y – transmitted parameters mask of 0x03FF type where 1 in bit value – 1 in bit value – parameter is transmitted, 0 – parameter is	Setting tachograph parameters transmission.	2.12.2 (UMKa 302)

№	Command	Reply	Parameters	Description	Version
			not transmitted. Matters only if X=1. Y bit numbers correspond the following parameters: 0 – Tachograph operational mode (Mode); 1 – Tachograph time Unix time (Time); 2 – Tachograph status flag. (Flags); 3 – Velocity by tachograph, km/h (Speed); 4 – Covered distance (Dist); 5 – Trip distance, km (Trip); 6 – Slot and activity status 1 (Card1); 7 – Slot and activity status 2 (Card2); 8 – Card number in slot 1 (Cnum1); 9 – Card number in slot 2 (Cnum2); 10 – Current activity time 1 (Ctime1); 11 – Current activity time 2 (Ctime2); Without arguments returns current values. By default: X=0, Y=0x0xFFF		
164	TACHOCONFIG X,Y,Z	TACHOCONFIG=0,1,1234567890	X – Tachograph type: X=0 – Shtrih; X=1 – ATOL; X=2 – Mercury; X=3 – VDO; Y – customer ID (for ATOL) Z – Authorization key (for Shtrih and ATOL) By default: X=0, Y=empty, Z=empty	Setting tachograph.	2.14.13 (UMKa 302)
165	TACHO		Command without parameters. In reply: Mode – Tachograph operational time; Time – Tachograph time Unix time; Flags – Tachograph status flag; Speed – Velocity by tachograph, km/h;	Query of current values of all availbale tachograph parameters.	2.12.2 (UMKa 302)

№	Command	Reply	Parameters	Description	Version
			Dist – Covered distance, km; Trip – Trip distance, km; Card1 – Slot and activity status 1; Card2 – Slot and activity status 2; Cnum1 – Card number in slot 1; Cnum2 – Card number in slot 2; Ctime1 – Current activity period 1; Ctime2 – Current activity period 2.		
166	TACHOGETDDD X,Y	TACHOGETDDD=2	X – slot number 1 or 2; Y – number of server where the file will be sent Y=0 – primary server; Y=1 – auxiliary server; Y=2 – alternate server; Y is not specified – DDD file is stored in internal memory. Returns the following values: 0 – when reading a DDD file a failure occured; 1 – DDD is read successfully. Command completion time depends on connected tachograph and can last for up to 1 min and more.	Read DDD file by slot number and send it on the server or save in tracker internal memory.	2.12.0 (UMKa 302)
167	RFIDMODE X0,X1,X2,X3	RFIDMODE=1,2,0,0	Xn – operational mode for each of connected readers: X0 – mode for reader 0; X1 – mode for reader 1; X2 – mode for reader 2; X3 – pmode for reader 3. Xn=0 – ADM-20, UMKa200without temperature;		2.11.7

№	Command	Reply	Parameters	Description	Version
			Xn=1 – UMKa200 with temperature; Xn=2 – RFID Exzotron (LLS)		
168	NETWORK	NETWORK="MTS"		Returns network name where the SIM card is registered.	2.11.10
169	CAMCONFIG X,Y,Z	CAMCONFIG=0,1,53	X – camera address on the bus; Y – photoshot resoltuion: Y=0 – QVGA (320x240); Y=1 – VGA (640x480); Z – JPG compression level within the range from 0 to 255. By default: X=0, Y=1, Z=53	Photocamera settings.	2.14.13 (UMKa 302)
170	CAMSNAPSHOT X	CAMSNAPSHOT=0	X=0 – primary server; X=1 – auxiliary server; X=2 – alternate server; X = –1 – do not transmit on the server. Save in tracker memory. If a shot is taken successfully and queued, the command will return reply “CAMSNAPSHOT=1”. If error - ”CAMSNAPSHOT=0”.	Take a shot and queue it for transmission on the server.	2.14.13 (UMKa 302)
171	SETBOUNCEn X	SETBOUNCE2=20	n – input number: n=2 – input IN2 (DIN0); n=3 – input IN3 (DIN3); X – contact bounce, milliseconds. By default: X=20	Setting contact bounce timeout of input contacts IN2 (DIN0) and IN3 (DIN1) in 16 – 19 modes.	2.14.13 (UMKa 302)
172	TAMPER PASS	TAMPER=NOKEY	PASS – tracker password. Without arguments returns current status. If you enter the right pass, it'll turn off the opening flag and resets sensor. Possible replies:	Work with opening sensor.	2.15.0

№	Command	Reply	Parameters	Description	Version
			"TAMPER=0" - no opening; "TAMPER=1" - opening is detected; "TAMPER=OK" - opening flag is reset, opening sensor is reset; "TAMPER=NOKEY" - no button (not specified in plant settings); "TAMPER=BADBOOT" - loader is to reboot.		
173	UPDATE BOOT	UPDATE=OK,0.4.1		Command returns the loader version	2.15.0
174	OUTPUT1 [X]		X – output value OUT1. X=0 – output is opened; X=1 – output is shorted on GND.	OUT1 discrete output control. Command without arguments returns current value.	3.0.5 (UMKa 302v2)
175	CANMODEn		n – CAN interface number 0 or 1. X – interface operational mode: X=0 –interface disabled; X=1 – J1939 (FMS) mode; X=2 – customer filters mode; X=3 – combined J1939 (FMS) mode and customer filters. Y – interface operational speed. For Y the following values are supported: 10000, 20000, 50000, 83333, 100000, 125000, 250000, 500000 and 1000000 bit/sec. Z – interface active mode: Z=0 – passive mode (recommended); Y=1 – active mode. Without arguments return current settings. By default: X=0, Y=250000, Z=0	Setting CAN interfaces.	3.0.5 (UMKa 302v2)
176	CANAUTOBAUDn		Supports the following speeds: 125000, 250000, 500000, 20000, 50000, 83333, 10000, 100000 and 1000000 bit/sec.	Returns the CAN bus speed or 0 if speed was not specified.	3.0.5 (UMKa 02v2)

№	Command	Reply	Parameters	Description	Version
			n – CAN interface number 0 or 1.		
177	SIMPERMn [X,Y]		n – SIM card number 0 or 1. X – home network resolutions; Y – roaming resolutions. For X and Y there are few permissions: 1 – resolution for primary server; 2 – resolution for alternate server; 4 – resolution for auxiliary server.	Recod of permission for transmission via SIM cards.	2.17.6
178	RUN [X[,Y…]]		X – way to the script. Y… – script arguments separated by commas. Without arguments returns status, name and parameters of implemented script.	Script start for implementation.	2.16.0 (UMKa 302 and UMKa 302v2)
179	AUTORUN [A[,X[,Y…]]]		A – script autostart. A=0 – autostart disabled; A=1 – autostart enabled. X – way to the script. Y… – script arguments separated by commas. Without arguments returns current settings.	Autostart of script for implementation.	2.16.0 (UMKa 302 and UMKa302v2)
180	SETBOOT		X – transmission mode. X = 0 – transmission disabled ; X = 1 – transmission enabled.	Control of counter downloads transmission on the server.	3.0.3 (UMKa 302 and UMKa302v2)

APPENDIX B. Troubleshooting

Trouble	Indication	Causes	Troubleshooting tips
The tracker does not turn on	Green LED is off	Power supply is not properly connected	Check that the power supply is properly connected (see section "Connecting power supply") and whether the polarity of the supply voltages is observed. The tracker has protection against reverse polarity and can continue operation after the error is fixed.
		Poor contact	Check the tracker supply connections to the on-board vehicle network. Check the connections made with “twisted pair” cable.
		Undervoltage	Using the multimeter, check the supply voltages directly on the pins of the tracker mount port. If the tracker is connected in close proximity to powerful consumers (heaters, starter, etc.), then during their operation the tracker supply voltage may drop below the minimum value. In this case, connect the tracker as close as possible to the vehicle battery.
The tracker does not connect to the server	Yellow LED is off	The tracker is in the power saving mode. Modem error. LED indication is disabled.	Check the settings of the power saving modes. Check the power supply of the tracker. Wait for 5-7 minutes before the receiver “cold” start end. Enable the tracker LED indication.
	Yellow LED flashes 1 time	The SIM card is not installed or out of order. Insufficient supply voltage.	Install the SIM card (see Section "SIM card installation"). Disable the PIN, if enabled, or write the correct PIN-code into the tracker via the configurator (see section "Operating the configurator"). Check the SIM card priority settings. Check the power supply of the tracker.
	Yellow LED flashes 2 times	The terminal cannot register on the GSM network.	Check the coverage and the GSM signal strength of the selected mobile operator. Change the SIM card. Install the SIM card of another mobile operator. Make sure that the SIM card is not roaming. Install the card in

Trouble	Indication	Causes	Troubleshooting tips
			another slot.
	Yellow LED flashes 3 times	The terminal is in the OFFLINE mode.	Check the settings of the power saving modes. Check the power supply of the tracker.
	Yellow LED flashes 4 times	The terminal cannot connect to the GPRS network.	Check SIM cards settings (APN, login, password, see section “Operating the configurator”). Check the balance on the SIM card. Make sure that the packet data service is enabled. Reconnect the packet data service. Try to activate the SIM card in another device and install it into the tracker again.
	Yellow LED goes out 1 time	The terminal cannot connect to the primary server. The terminal cannot login on the primary server.	Check the tracker settings (server IP address, TCP port, see "Operating the configurator" section). Check the balance on the SIM card. Make sure the server is up and running. Check the settings of the tracker to be connected on the server. Pay special attention to the correctness of the IMEI entered. Check the correspondence between the selected TCP port and the data transfer protocol.Check the sufficient sum of money on the SIM card. Ensure the server working capacity.
	Yellow LED goes out 2 times	The terminal cannot connect to the alternate server. The terminal cannot login on the alternate server.	
	Yellow LED goes out 3 times	The terminal cannot connect to the primary and alternate servers. The terminal cannot login on the primary and alternate servers.	
	Yellow LED is permanently on	Invalid coordinates. Disconnected. Unstable	Wait for the GNSS receiver to fix the coordinates. Wait for 5 to 10 minutes for the tracker to reconnect. Use the SIM card of another

Trouble	Indication	Causes	Troubleshooting tips
		connection.	mobile operator.
Invalid coordinates	Red LED is off	Navigational receiver failure. Indication disabled.	Reboot the tracker. Enable tracker indication.
	Red LED flashes 1 time	Coordinates are not detected. “Cold”, “Warm” or “Hot” start. No visible satellites.	Wait for 5-7 minutes before receiver “cold” start end. Follow recommendations in “Installing the tracker in the vehicle” section. Install the tracker as further as possible from radiointerference sources (breakers, transmitters, etc.)
	Red LED flashes 2 times	Two-dimensional coordinates, minimum number of visible satellites.	Wait for 5-7 minutes before the end of receiver’s “cold” start. Follow recommendation in section “Setup of the tracker into the vehicle”. Install the tracker as further as possible from radiointerference sources (breakers, transmitters, etc.) Check connection to the server. Make sure the server is up and running
	Red LED flashes 3 times	Three-dimensional coordinates, sufficient number of visible satellites.	Check connection to the server. Make sure the server is up and running.

APPENDIX C. Default settings values

Parameter	Default value
Navigation	
Minimum velocity, km/h	3
Angle in degrees	10
Distance, m	300
Acceleration, km/h	10
Minimum between spots, m	2
Dynamic angle	0
The recording period at driving,sec	30
The recording period at stops, sec	300
Accelerometer positioning	Yes
Activation threshold	
Time of switching to static mode, sec	300
Number of activations for exit from static mode	1
Positioning by the input	No
Maximum HDOP limits	5.0
Number of satellites	6
HDOP coordinates	2.0
Filtration coefficient	0
Inputs/outputs	
Input mode IN(0)	Discrete input with ground pull-up
Input mode IN(1)	Discrete input with ground pull-up
Input mode IN(2)	Discrete input with ground pull-up

Parameter		Default value
Input mode IN(3)		Discrete input with ground pull-up
Logical low on IN(0) and IN(1)		5000
Logical high on IN(0) and IN(1)		6000
Tracker output disabled		No
SIM cards		
SIM0	Profiles	Auto
	APN	Empty
	Login	Empty
	Password	Empty
	Use PIN code	No
	Allow roaming on SIM card	Yes
SIM1	Profiles	Auto
	Use PIN code	No
	Allow roaming on SIM card	Yes
SIM card operational mode		SIM0 only
Interval		01:00:00
Servers		
Primary server	Choose from the list	GLONASSSoft
	Server address	gw1.glonasssoft.ru
	Port	15050
	Protocol	Wialon Combine
Alternate server	Choose from the list	Other
	Protocol	Wialon Combine
Auxiliary server	Choose from the list	Other
	Protocol	Wialon Combine
Accelerometer		No
RSSI signal level		No
Virtual odometer		No

Parameter		Default value
LBS data		No
Vibration level		No
Temperature		No
Power supply voltage		Yes
Battery voltage		Yes
Group records by		5
Dispatch every, sec		300
Maximum package size		1460
Upload order		From old to new
1-Wire		
1-wire temperature		No
1-wire iButton		No
Transmit 0 with no iButton		No
Sensor 0		0
Sensor 1		0
Sensor 2		0
Sensorк 3		0
Interfaces		
RS-485	Mode	LLS FLS
	Speed	19200
RS-232	Mode	Disabled
	Speed	9600
CAN	Mode	Disabled
	Speed	250000
	Active mode	No
Transparent mode	Source	RS-485
	Speed	Auto
FLSs		
Sensor 0		1
Sensor 1		No

Parameter	Default value
Sensor 2	No
Sensor 3	No
Sensor 4	No
Sensor 5	No
Sensor 6	No
CAN-LOG	
Query CAN-LOG	No
iQfreeze	
Query iQfreeze	No
J1939(FMS)	
Query	No
RFID reader	
RFID 0	Empty
RFID 1	Empty
RFID 2	Empty
RFID 3	Empty
Voice communication	
Dynamic volume, %	50
Microphone amplification, dB	9
Hand set pick-up after	Disabled
Ringtone volume, %	50
Ringtone	Melody 8
Telephones for incoming call reception	Empty
Accept from any numbers	Yes
Telephones for outgoing call	Empty
Allow outgoing calls	No
Telephones	
The list of telephones for control	Empty
System	
Tracker name	UMKa300/ UMKa301/UMKa302

Parameter		Default value
Password		0
Black box	Storage	Tracker
Remote configuration	Permanent connection	No
Power supply control	Battery quick charge	No
	Battery capacity, mA	250
	Operation from battery time, sec	0
	IDLE mode timeout from battery, sec	0
	Standy mode timeout, sec	0
	IDLE mode timeout, sec	0
	Tracker indication	Yes

APPENDIX D. Description of Wialon system parameters

Protocol		Description	
IPS	Combine		
status	param1	Tracker status. Bit field. Bits assignment is given below: *	
		Bit	Bit discription
		0	Reserved
		1 (:2)	Number of active SIM card. 0-SIM0, 1-SIM1
		2 (:3)	Primary server is disconnected (0-connected)
		3	Reserved
		4 (:5)	Battery low voltage attribute (0-norm, 1-low)
		5 (:6)	Coordinates invalidity attribute (0 – valid, 1 – not valid)
		6 (:7)	Positioning at stops (1 – fixed)
		7 (:8)	Low voltage of the tracker power supply attribute (0-norm, 1-low)
		8	Reserved
		9 (:10)	1 - GNSS signal suppression is detected.
		10	Reserved
		11 (:12)	High voltage of the tracker power supply (0-norm, 1-high)
		12 (:13)	Black box data is recorded on SD card. (0 – internal memory, 1 – SD card)
		13 (:14)	Case opening is detected. (1 – detected)
		14	Reserved
		15 (:16)	SOS (voice headset)
		16	Reserve
		17 (:18)	Discrete output status 0 (0 – open, 1 – shorted)
		18	Reserve
		19 (:20)	Alternate server is disconnected. (0 – Connected. When the alternate server is not set, 0 is always returned)
		20 (:21)	The terminal is connected to the remote configuration server. (1 – connected)

Protocol		Description	
		21 (:22)	Connected via USB
		22 (:23)	Connected to the update server
		23 (:24)	iButton connected
		24 (:25)	Roaming (0 – home network, 1 – guest network)
		25 (:26)	The terminal is attached to a hosting. (0 – not attached, 1 – attached)
		26 (:27)	Navigational data source (0 – GNSS receiver data, 1 –Trimble data)
		27	Reserved
		28 (:29)	Faulty “black box” (0 – OK, 1 –faulty)
		29 (:30)	1 – power saving mode IDLE
		30 (:31)	Auxiliary server is disconnected. (0 – Connected. When the auxiliary server is not set, 0 is always returned)
		31 (:32)	1 – power saving mode STANDBY
hdop		Reduced accuracy in the horizontal plane	
sats_gps	param2	GPS satellites solutions	
sats_glonass	param3	GLONASS satellites solutions	
pwr_ext	param8	External power supply, V	
pwr_akb	param9	Battery voltage, V	
in1		Discrete input value IN0 (AIN0)	
in2		Discrete input value IN1 (AIN1)	
in3		Discrete input value IN2 (DIN0)	
in4		Discrete input value IN3 (DIN1)	
adc1		Value of analog input voltage AIN0 (IN0), V	
adc2		Value of analog input voltage y AIN1 (IN1), V	
count1	counter1	Input counter value DIN0 (IN2)	
count2	counter2	Input counter value DIN1 (IN3)	
out1		Discrete output value OUT0. Where 1 – output shorted	
fuel1		Fuel rate from FLS 0.	
fuel2		Fuel rate from FLS1	

Protocol	Description
fuel3	Fuel rate from FLS2
fuel4	Fuel rate from FLS3
fuel5	Fuel rate from FLS4
fuel6	Fuel rate from FLS5
fuel7	Fuel rate from FLS6
fuel8	Fuel rate from BLE FLS0.
fuel9	Fuel rate from BLE FLS1
fuel10	Fuel rate from BLE FLS2
fuel11	Fuel rate from BLE FLS3
fuel12	Fuel rate from BLE FLS4
fuel13	Fuel rate from BLE FLS5
fuel14	Fuel rate from BLE FLS6
fuel15	Fuel rate from BLE FLS7
fuel16	Fuel rate from FLS at input IN0 (AIN0)
fuel17	Fuel rate from FLS at input IN1 (AIN1)
fuel18	Fuel rate from FLS at input IN2 (DIN0)
fuel19	Fuel rate from FLS at input IN3 (DIN1)
fuel20	Filtered fuel rate in the first FMS FL tank (raw “can65”)
fuel21	Filtered fuel rate in the second FMS FL2 tank (raw «can78»)
fuel22	Filtered fuel rate of CAN filter 0 (raw «can32»)
fuel23	Filtered fuel rate of CAN filter 1 (raw «can33)
temp1	Fuel temperature from FLS0
temp2	Fuel temperature from FLS1
temp3	Fuel temperature from FLS2
temp4	Fuel temperature from FLS3
temp5	Fuel temperature from FLS4
temp6	Fuel temperature from FLS5
temp7	Fuel temperature from FLS6
temp8	Fuel temperature from BLE FLS0
temp9	Fuel temperature from BLE FLS1

Protocol		Description	
temp10		Fuel temperature from BLE FLS2	
temp11		Fuel temperature from BLE FLS3	
temp12		Fuel temperature from BLE FLS4	
temp13		Fuel temperature from BLE FLS5	
temp14		Fuel temperature from BLE FLS6	
temp15		Fuel temperature from BLE FLS7	
ow1	temp16	Temperature 0 of DS18 sensor. Transmission is set by “OWTEMP” command	
ow2	temp17	Temperature 1 of DS18 sensor. Transmission is set by “OWTEMP” command	
ow3	temp18	Temperature 2 of DS18 sensor. Transmission is set by “OWTEMP” command »	
ow4	temp19	Temperature 3 of DS18 sensor. Transmission is set by “OWTEMP” command	
avl_driver	driver_code1	iButton key number. Transmission is set by “OWIBUTTON” command	
temp_int	param10	Tracker internal temperature in degrees. Transmission is set by “SETTEMP” command	
bootcount	param12	Tracker dowload counter	
acc_x	param16	Tracker acceleration along X (width). 1000 units are equal to 1G. The transmission is configured with the “SETACC” command.	
acc_y	param17	Terminal acceleration along the Y axis (depth). 1000 units are equal to 1G. The transmission is configured with the “SETACC” command.	
acc_z	param18	Terminal acceleration along the Z axis (height). 1000 units are equal to 1G. The transmission is configured with the “SETACC” command.	
can0		Total fuel consumption from 0000000.0 to 9999999.9l (E or F)	
can1		Number of engine revs from 0000 to 9999 revs/min (H)	
can2		Engine temperature (I)	
can3		Engine operation full time from 000000.00 to 999999.99 ч (A or B)	
can4		Vehicle mileage from 0000000.00 to 9999999.99 km (C or D)	
can5		Fuel level in tank from 000.0 to 100.0 % or from 000.0 to 999.9 l (G or R)	
can6		Security state flags. Bit field. (S) Bits value is given below: *	
		Bit	Bit description
		0 (:1)	Ignition
		1 (:2)	Plant alrm is activated (in alarm mode)

Protocol	Description	
	2 (:3)	Vehicle is locked by the plant remote control
	3 (:4)	Key is in ignition switch
	4 (:5)	Dynamic ignition
	5 (:6)	Passenger door is opened
	6 (:7)	Back passenger doors are opened
	7	Reserved
	8 (:9)	Driver's door is opened
	9 (:10)	Passenger door is opened
	10 (:11)	Trunk door is opened
	11 (:12)	Hood is opened
	12 (:13)	Handbrake is activated (information is available with enabled ignition only)
	13 (:14)	Footbrake is activated (information is available with enabled ignition only)
	14 (:15)	Engine is activated (information is available with enabled ignition only)
	15 (:16)	Webasto
	16 – 18 (:17 – :19)	0x1 - Vehicle is locked by plant remote control 0x2 - Vehicle is opened by plant remote control 0x3 - Trunk lid is opened by plant remote control 0x4 - Module has sent the signal of restart the security mode 0x7 - CAN module is in "sleep" mode
	19 – 31	Reserved
can7	Accidents controllers. Bit field. (P) Bits value is given below: *	
	Bits	Bits description
	0 (:1)	STOP
	1 (:2)	Pressure / oil amount
	2 (:3)	Temperature / cooling agent level
	3 (:4)	Handbrake system
	4 (:5)	Battery charge
	5 (:6)	AIRBAG
	6 – 7	Reserved
	8 (:9)	Check up the engine

Protocol	Description	
	9 (:10)	Lighting failure
	10 (:11)	Low air pressure in the bus
	11 (:12)	Worn-out brake pads
	12 (:13)	Warning
	13 (:14)	ABS (anti-block system)
	14 (:15)	Low fuel level
	15 (:16)	Approaching maintenance
	16 (:17)	ESP (Electronic stability pilot)
	17 (:18)	Spark plug indicator
	18 (:19)	FAP (Macro-Particle Filter)
	19 (:20)	Electrical pressure controller
	20 (:21)	Dimensional lights
	21 (:22)	Dimlight
	22 (:23)	Distance light
	23	Reserved
	24 (:25)	Readiness to start movement
	25 (:26)	Cruise control
	26 (:27)	Automatic retarder
	27 (:28)	Hand retarder
	28 (:29)	Air-conditioning enabled
	29	Reserved
	30 (:31)	Passenger fastening belt
	31 (:32)	Driver fastening belt
can8	Load on axis 1 from 00000.0 to 99999.9 kg (K)	
can9	Load on axis 2 from 00000.0 to 99999.9 kg (L)	
can10	Load on axis 3 from 00000.0 to 99999.9 kg (M)	
can11	Load on axis 4 from 00000.0 to 99999.9 kg (N)	
can12	Load on axis 5 from 00000.0 to 99999.9 kg (O)	
can13	Harvesting period from 000000.00 to 999999.99 h (WB)	
can14	Harvested area from 000000.00 to 999999.99 hectars (WC)	

Protocol	Description	
can15	Amount of harvested crop from 000000.00 to 999999.99 tonns (WE)	
can16	Crop humidity from 000.0 to 100.0 % (WF)	
can17	Agroculture machinery status. Bit field. (WA) Bit values are given below: *	
	Bits	Bits
	0 (:1)	Beater drum enabled
	1 (:2)	Discharge pipe enabled
	2 (:3)	Primary front hydraulic system enabled
	3 (:4)	Power takeoff back block enabled
	4 – 7	Reserved
	8 (:9)	Escessive play under beater drum
	9 (:10)	Grain tank entrance is opened
	10 (:11)	Grain tank 100%
	11 (:12)	Grain tank 70%
	12 (:13)	Hydraulic power system oil filter is dirty
	13 (:14)	Low pressure of hydraulic power system oil
	14 (:15)	Low level of hydraulic oil
	15 (:16)	Filter of brake hydraulic sustem is dirty
	16 (:17)	Engine oil filter is dirty
	17 (:18)	Fuel filter is dirty
	18 (:19)	Air filter is dirty
	19 (:20)	Emergency oil temperature in running gear hydraulic system
	20 (:21)	Emergency oil temperature in power cylinder hydraulic system
	21 (:22)	Emergency oil pressure in engine
	22 (:23)	Emergency level of cooling fluid
	23 (:24)	Hydraulic unit overflow unit
	24 (:25)	Screw conveyor gearing by heavy unload enabled
	25 (:26)	Operator is out!
	26 (:27)	Straw-walker blinding
	27 (:28)	Water availability in fuel
	28 (:29)	Fanning mill revvs

Protocol		Description
	29 (:30)	Drum revvs
	30 – 32	Reserved
	33 (:34)	Low level of water in the tank
	34 (:35)	Primary back hydraulic system enabled
	35 (:36)	Auto engine is not activated
	36 (:37)	Right joystick on the right
	37 (:38)	Left joystick on the left
	38 (:39)	Right joystick forward
	39 (:40)	Right joystick backwards
	40 (:41)	Scrubber enabled
	41 (:42)	Water supply enabled
	42 (:43)	Vacuum cleaner
	43 (:44)	Upload from hopper
	44 (:45)	High-pressure cleaning (Karcher)
	45 (:46)	Salt (sand) dispersion included
	46 (:47)	Low salt (sand) level in tank
	47	Reserved
	48 (:49)	Second front hydraulic system enabled
	49 (:50)	Third front hydraulic system enabled
	50 (:51)	Fourth front hydraulic system enabled
	51 (:52)	Second back hydraulic system enabled
	52 (:53)	Third back hydraulic system enabled
	53 (:54)	Fourth front hydraulic system enabled
	54 (:55)	Three-point front suspension system enabled
	55 (:56)	Three-point back suspension system enabled
	56 (:57)	Left joystick on the right
	57 (:58)	Left joystick on the left
	58 (:59)	Left joystick forward
	59 (:60)	Left joystick backwards
	60 (:61)	Front power takeoff block enabled

Protocol		Description	
		61 (:62)	Fluid supply pump enabled
		62 (:63)	Special LEDs enabled
		63	Reserved
can18		Load on engine % (XB)	
can19		Fluid level AdBLUE from 000.0 to 100.0 % or from 000.0 to 999.9 l (U or V)	
can32		CAN. Customer filter 0 (Can32 in “History” tab)	
can33		CAN. Customer filter 1 (Can33 in “History” tab)	
…			
can63		CAN. Customer filter 31 (Can63 in “History” tab)	
can64		FMS. TFU - Total Fuel Used from 0000000.0 to 9999999.9 l	
can65		FMS. FL - Fuel Level from 000.0 до 100.0 % or from 000.0 to 999.9 l	
can66		FMS. ECT - Engine Coolant Temperature	
can67		FMS. ES - Engine Speed from 0000 to 9999 revvs/min	
can68		FMS. ETH - Engine total hours from 000000.00 to 999999.99 h	
can69		FMS. HRTVD - High resolution total vehicle distance from 0000000.00 to 9999999.99 km	
can70		FMS. EPL - Engine Percent Load At Current Speed from 0 to 125 %	
can71		FMS. APP - Accelerator Pedal Position from 000.0 to 100.0 %	
can72		FMS. AW1 - Axel weight 1 from 00000.0 to 99999.9 kg	
can73		FMS. AW2 - Axel weight 2 from 00000.0 to 99999.9 kg	
can74		FMS. AW3 - Axel weight 3 from 00000.0 to 99999.9 kg	
can75		FMS. AW4 - Axel weight 4 from 00000.0 to 99999.9 kg	
can76		FMS. AW5 - Axel weight 5 from 00000.0 to 99999.9 kg	
can77		FMS. HRLFC - High Resolution Fuel Consumption (Liquid) from 0.0 to 4211081.215 l	
can78		FMS. FL2 - Fuel Level 2 from 000.0 to 100.0 %	
Rssi	param7	GSM signal level accepted by GSM modem, dBm. Can be within the range from -113 to -51 dBm.	
odometer	param11	Virtual odometer mileage, m	
IncX	param13	Tilt along X (IncX in “History” tab)	
IncY	param14	Tilt along Y (IncY in “History” tab)	
IncZ	param15	Tilt along Z (IncZ in “History” tab)	
Vib	param19	Vibration level	

Protocol		Description	
frid0	param20	RFID card number for reader 1	
radio0	param21	Radio identifier number for reader 1	
frid1	param22	RFID card number for reader 2	
radio1	param23	Radio identifier number for reader 2	
frid2	param24	RFID card number for reader 3	
radio2	param25	Radio identifier number for reader 3	
frid3	param26	RFID card number for reader 4	
radio3	param27	Radio identifier number for reader 4	
iq_flags0	param40	Binary parameters. Bits values are given below: *	
		Bit	Description
		0 (:1)	NO_CONNECT - Disconnection attribute with Cooling and cleaning equipment (1 - disconnection, except SPN562 where 0 - disconnection)
		1 (:2)	ADC1ERR - Sensor 1 failure(1-failure)
		2 (:3)	ADC2ERR - Sensor 2 failure (1-failure)
		3 (:4)	ADC3ERR - Sensor 3 failure (1-failure)
		4 (:5)	ADC4ERR - Sensor 4 failure (1-failure)
		5 (:6)	ADC5ERR - Sensor 5 failure (1-failure)
		6 (:7)	ADC6ERR - Sensor 6 failure (1-failure)
		7 (:8)	TIMEERR - Internal clock failure (1-failure)
		8 (:9)	HSERR - Humidity sensor failure (1-failure)
		9 (:10)	DR - Main installation door failure (1-opened)
		10 (:11)	DR2 - Section 2 installation door status (1-opened)
		11 (:12)	DR3 - Section 3 installation door status (1-opened)
		12 (:13)	IN1 - Discrete input 1 voltage (1- more than 3.3 V)
		13 (:14)	IN2 - Discrete input 2 voltage (1- more than 3.3 V)
iq_temp0	temp32	MT - Cooling and cleaning equipment temperature	
iq_temp1	temp33	T2 - Refrigerator temperature in section 2	
iq_temp2	temp34	T3 - Refrigerator temperature in section 3	
iq_temp3	temp35	SP - Specified temperature	
iq_temp4	temp36	SP2 - Specified temperature 2	

Protocol		Description
iq_temp5	temp37	SP3 - Specified temperature 3
iq_temp6	temp38	AMBT - Environment temperature
iq_temp7	temp39	AFZT - Cooling fluid temperature
iq_temp8	temp40	ADC1 - Data from analog sensor temperature 1
iq_temp9	temp41	ADC2 - Data from analog sensor temperature 2
iq_temp10	temp42	ADC3 - Data from analog sensor temperature 3
iq_temp11	temp43	ADC4 - Data from analog sensor temperature 4
iq_temp12	temp44	ADC5 - Data from analog sensor temperature 5
iq_temp13	temp45	ADC6 - Data from analog sensor temperature 6
iq_rpm0	param41	RPM - Engine revvs
iq_conf0	param42	CONF - Compressor configuration
iq_state0	param43	STATE - System status
iq_state0	param44	STATE2 - System status in section 2
iq_state2	param45	STATE3 - System status in section 3
iq_adc0	param46	BATV - Battery voltage
iq_adc1	param47	BATA - Battery current power
iq_mh0	param48	HM - Running hours from engine
iq_mh1	param49	HME - Running hours from network
iq_mh2	param50	HMT - Running hours total
iq_time0	param51	UPTIME - Number of seconds before start
iq_time1	param52	TIME - UTC (UNIX) time
iq_time2	param53	REGTIME - Current time of last record registration UTC (UNIX)
iq_alc0	param54	ALCOUNT - Number of failures
Amx0	param64	Parameter 0 of the script (Amx0 in “History” tab)
Amx1	param65	Parameter 1 of the script (Amx1 in “History” tab)
…		
Amx31	param95	Parameter 31 of the script (Amx31 in “History” tab)
Ble0	param128	BLE sensor 0. Auxiliary parameter 0. Depends on sensor
Ble1	param129	BLE sensor 0. Auxiliary parameter 1. Depends on sensor
…		

Protocol		Description			
Ble7 Ble8	param135 param136	BLE sensor 0. Auxiliary parameter 7. Depends on sensor BLE датчик 1. Дополнительный параметр 0. Зависит от датчика			
Ble9	param137	BLE sensor 1. Auxiliary parameter 1. Depends on sensor			
…					
Ble15	param143	BLE sensor 1. Auxiliary parameter 7. Depends on sensor			
…					
Ble56	param184	BLE sensor 7. Auxiliary parameter 0. Depends on sensor			
Ble57	param185	BLE sensor 7. Auxiliary parameter 1. Depends on sensor			
…					
Ble63	param191	BLE sensor 7. Auxiliary parameter 7. Depends on sensor			
rtemp0	temp28	UMKa100 radio identifier temperature accepted by reader 0			
rtemp1	temp29	UMKa100 radio identifier temperature accepted by reader 1			
rtemp2	temp30	UMKa100 radio identifier temperature accepted by reader 2			
rtemp3	temp31	UMKa100 radio identifier temperature accepted by reader 3			
mcc	mcc	Mobile country code			
mnc	mnc	Mobile network code			
lac	lac	Local area code			
cell_id	cell_id	Cell identificator			
BleId0	driver_code8	BLE identification. Channel 0			
BleId1	driver_code9	BLE identification. Channel 1			
BleId2	driver_code10	BLE identification. Channel 2			
BleId3	driver_code11	BLE identification. Channel 3			
Mdb0	param256	Modbus. Parameter 0. (Mdb0 in “History” tab)			
Mdb1	param257	Modbus. Parameter 1. (Mdb1 in “History” tab)			
…					
Mdb31	param287	Modbus. Parameter 31. (Mdb31 in “History” tab)			
		Tachograph	Shtrih	ATOL	Mercury
-	+	DDD file transmission	+	+	+
TMode	param384	Tachograph operational mode (TMode)	+	-	-

Protocol		Description				
		0 – operational mode 1 – control mode 2 – calibration mode 3 – plant mode				
TTime	param385	Tachograph time Unix time (TTime)		+	+	+
TFlags	param386	Tachographs status flags. (TFlags). Bits values are given below: *		+	+	+
		Bits	Bits description			
		0 (:1)	Ignition	+	+	+
		1 (:2)	Lighting	-	+	+
		2 (:3)	Weight disabled	+	+	+
		3 (:4)	“train/ferry” mode	+	+	+
		4 (:5)	“Not applicable” mode	-	+	-
TSpeed	param387	Speed by tachograph, km/h (TSpeed)		+	+	-
TDist	param388	Covered distance, km (TDist)		+	+	+
TTrip	param389	Trip distance (TTrip)		+	-	-
TCard1	param390	Slot and activity status 1 (TCard1)		+	+	+
		0	Rest	+	+	+
		1	Readiness to work	+	+	+
		2	Work without vehicle control	+	+	+
		3	Work without vehicle control	+	+	+
		4	Without card	+	+	+
		5	Card is not authorized	-	+	+
		6	Card wasn’t taken out	-	+	+
TCard2	param391	Slot and activity status 1 (TCard1)		+	+	+
		0	Rest	+	+	+
		1	Readiness to work	+	+	+
		2	Work without vehicle control	+	+	+
		3	Work without vehicle control	+	+	+
		4	Without card	+	+	+
		5	Card is not authorized	-	+	+

Protocol		Description				
		6	Card wasn’t taken out	-	+	+
TCtime1	param392	Current activity time 1, sec (TCtime1)		+	+	+
TCtime2	param393	Current activity time 2, se (TCtime2)		+	+	+
TCnum1	driver_code16	Card number in slot 1 (TCnum1)		+	+	+
TCnum2	driver_code17	Card number in slot 2 (TCnum2)		+	+	+

* – in Wialon bits are calculated from 1. In bits parameters table the bit number is given first, then in brackets the way to address to the bit in formulae for Wialon system. For instance, one needs to use the formula “param1:16” to know the SOS suignal status.

APPENDIX E. BLE sensors description

Для каждой модели BLE датчика/ДУТа доступен свой набор передаваемых параметров.

Table 6.1 Escort TL-BLE temperature sensor parameters

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature -70.0…125.0 C°	temp8	temp8
	Battery voltage 2.0…4.0 V	param128	Ble0
	Signal level dBm	param129	Ble1
n	Temperature -70.0…125.0 C°	temp(8+n)	temp(8+n)
	Battery voltage 2.0…4.0 V	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)

Table 6.2 Escort TL-BLE temperature and illumination sensor parameters

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature -70.0…125.0 C°	temp8	temp8
	Battery voltage 2.0…4.0 V	param128	Ble0
	Signal level dBm	param129	Ble1
	Illumination 0…10000 Lux	param130	Ble2
n	Temperature -70.0…125.0 C°	temp(8+n)	temp(8+n)
	Battery voltage 2.0…4.0 V	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)
	Illumination 0…10000 Lux	param(130+8n)	Ble(2+8n)

Table 6.3 Neomatica ADM31 temperature sensor parameters

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature -30.0…125.0 C°	temp8	temp8
	Battery voltage 2.0…4.0 B	param128	Ble0
	Signal level dBm	param129	Ble1
	Illumination 0.01...83000.00 Lux	param130	Ble2
	Humidity 0…100 %	param131	Ble3
	Sattus. Bit field. Bit 0 – Magnetic field; Bit 1 – Attribute of another package dispatch due to magnetic sensor Bit 5 – Humidity sensor failure; Bit 6 – Temperature sensor failure Бит 7 – Illumination sensor failure	param132	Ble4
n	Temperature -30.0…125.0 C°	temp(8+n)	temp(8+n)
	Battery voltage 2.0…4.0 V	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)
	Illumination 0.01...83000.00 Lux	param(130+8n)	Ble(2+8n)
	Humidity 0…100 %	param(131+8n)	Ble(3+8n)
	Status. Bit field.	param(132+8n)	Ble(4+8n)

Table 6.4 Neomatica ADM32 tilt sensor parameters

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Battery voltage 2.0…4.0 B	param128	Ble0
	Signal level dBm	param129	Ble1
	Angle 0…180°	param130	Ble2
	Fixed angle 0…180°	param131	Ble3
	Status. Bit field. Bit 0 – Flag of movement Bit 1 – Flag of active angle change Bit 2 – Flag of exceeding the angle value limits (overturn) Bit7 – Angle sensor error	param132	Ble4
n	Battery voltage.0…4.0 B	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)
	Angle 0…180°	param(130+8n)	Ble(2+8n)
	Fixed angle 0…180°	param(131+8n)	Ble(3+8n)
	Status. Bit field.	param(132+8n)	Ble(4+8n)

Table 6.5 Escort DU-BLE tilt sensor parameters

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature -70.0…125.0 C°	temp8	temp8
	Battery voltage 2.0…4.0 V	param128	Ble0
	Signal level dBm	param129	Ble1

	Tilt 0..180 °	param130	Ble2
	Upper angle calibration 0..180 °	param131	Ble3
	Lower angle calibration 0..180 °	param132	Ble4
	Operation time of sensor	param133	Ble5
	Sensor activation In angle control mode:0x01 - activation occurred-angle is exceeded	param134	Ble6
n	Tempreture -70.0…125.0 C°	temp(8+n)	temp(8+n)
	Battery voltage 2.0…4.0 V	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)
	Tilt 0..180 °	param(130+8n)	Ble(2+8n)
	Upper angle calibration 0..180 °	param(131+8n)	Ble(3+8n)
	Lower angle calibration 0..180 °	param(132+8n)	Ble(4+8n)
	Operation time of sensor	param(133+8n)	Ble(5+8n)
	Sensor activation	param(134+8n)	Ble(6+8n)

Table 6.6 Escort TD-BLE FLS parameters

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Fuel level	fuel8	fuel8
	Temperature	temp8	temp8
	Battery voltage	param128	Ble0
	dBm signal level	param129	Ble1
N	Fuel level	fuel(8+n)	fuel(8+n)
	Temperature	temp(8+n)	temp(8+n)

	Battery voltage	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)

Table 6.7 ”Technoton DFM.Parameters”

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Fuel temperature -40…215 C°	temp8	temp8
	Battery charge level 0..100 %	param128	Ble0
	Signal level dBm	param129	Ble1
	Fuel consumption rate per hour 0.00..500.00 l/h	param130	Ble2
	Modes of engine and cameras operation. Bits 0 - 3 camera mode “Supply”, bits 4 - 7 camera mode “Reverse”, bits 4 - 7 engine operation mode is based on consumption rate	param131	Ble3
	Fuel consumption rate per hour in the camera “Supply” 0.00..500.00 l/h	param132	Ble4
	Fuel consumption rate per hour in the camera “Reverse” 0.00..500.00 l/h	param133	Ble5
	Operation time of flowmeter. Interference. sec	param134	Ble6
	Mask of flowmeter failures. Bit field. Bit 0 – Fuel temperature. Data is not available or incorrect; Bit 5 – Failure of AD converter launch; Bit 8 – Calibration is not available; Bit 10 – Low battery charge (<10 %); Bit 21– Real time clocks. Bit synchronizing is not available ; Bit 31 – Device is working in production mode;	param135	Ble7
n	Fuel temperature -40…215 C°	temp(8+n)	temp(8+n)
	Battery charge level 0..100 %	param(128+8n)	Ble(0+8n)

	Signal level dBm	param(129+8n)	Ble(1+8n)
	Fuel consumption rate per hour 0.00..500.00 l/h	param(130+8n)	Ble(2+8n)
	Modes of engine and cameras operation. Bits 0 - 3 camera mode “Supply”, bits 4 - 7 camera mode “Reverse”, bits 4 - 7 engine operation mode is based on consumption rate	param(131+8n)	Ble(3+8n)
	Fuel consumption rate per hour in the camera “Supply” 0.00..500.00 l/h	param(132+8n)	Ble(4+8n)
	Fuel consumption rate per hour in the camera “Reverse” 0.00..500.00 l/h	param(133+8n)	Ble(5+8n)
	Opration time of flowmeter. Interference. sec	param(134+8n)	Ble(6+8n)
	Mask of flowmeter failures.	param(135+8n)	Ble(7+8n)

Table 6.8 Description of parameters for “Technoton DFM.Total consumption” sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Signal level dBm	param128	Ble0
	Total fuel consumption of high resolution. Resolution 0.001 l	param129	Ble1
	Total fuel consumption of high resolution. Idle run. Resolution 0.001 l	param130	Ble2
	Total fuel consumption of high resolution. Optimum. Resolution 0.001 l	param131	Ble3
	Total fuel consumption of high resolution. Overload. Resolution 0.001 l	param132	Ble4
	Total fuel consumption of high resolution. Wrapping. Resolution 0.001 l	param133	Ble7
n	Signal level dBm	param(128+8n)	Ble(0+8n)
	Total fuel consumption of high resolution. Resolution 0.001 l	param(129+8n)	Ble(1+8n)
	Total fuel consumption of high resolution. Idle run. Resolution 0.001 l	param(130+8n)	Ble(2+8n)
	Total fuel consumption of high resolution. Optimum. Resolution 0.001 l	param(131+8n)	Ble(3+8n)
	Total fuel consumption of high resolution. Overload. Resolution 0.001 l	param(132+8n)	Ble(4+8n)

Sensor number	Parameter description	Combine Protocol	IPS Protocol
	Total fuel consumption of high resolution. Wrapping. Resolution 0.001 l	param(133+8n)	Ble(5+8n)

Table 6.9 Description of parameters for "Technoton DFM.Operation time"sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Signal level dBm	param128	Ble0
	Flowmeter operation time , sec	param129	Ble1
	Flowmeter operation time. Idle mode, sec	param130	Ble2
	Flowmeter operation time. Optimum mode, sec	param131	Ble3
	Flowmeter operation time. Overload, sec	param132	Ble4
	Flowmeter operation time.Wrapping, sec	param133	Ble7
n	Signal level dBm	param(128+8n)	Ble(0+8n)
	Flowmeter operation time , sec	param(129+8n)	Ble(1+8n)
	Flowmeter operation time. Idle mode, sec	param(130+8n)	Ble(2+8n)
	Flowmeter operation time. Optimum mode, sec	param(131+8n)	Ble(3+8n)
	Flowmeter operation time. Overload, sec	param(132+8n)	Ble(4+8n)
	Flowmeter operation time.Wrapping, sec	param(133+8n)	Ble(5+8n)

Table 6.10 Description of parameters for "Technoton DFM.Camera consumption" sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Signal level dBm	param128	Ble0

	Total fuel consumption of high resolution. Camera “Supply”. Resolution 0.001 l	param129	Ble1
	Total fuel consumption of high resolution. Camera “Reverse”. Resolution 0.001 l	param130	Ble2
	Total fuel consumption of high resolution. Negative. Resolution 0.001 l	param131	Ble3
	Total fuel consumption of high resolution.. Camera “Supply”. Wrapping. Resolution 0.001 l	param132	Ble4
	Total fuel consumption of high resolution.. Camera “Reverse”. Wrapping. Resolution 0.001 l	param133	Ble7
n	Signal level dBm	param(128+8n)	Ble(0+8n)
	Total fuel consumption of high resolution. Camera “Supply”. Resolution 0.001 l	param(129+8n)	Ble(1+8n)
	Total fuel consumption of high resolution. Camera “Reverse”. Resolution 0.001 l	param(130+8n)	Ble(2+8n)
	Total fuel consumption of high resolution. Negative. Resolution 0.001 l	param(131+8n)	Ble(3+8n)
	Total fuel consumption of high resolution.. Camera “Supply”. Wrapping. Resolution 0.001 l	param(132+8n)	Ble(4+8n)
	Total fuel consumption of high resolution.. Camera “Reverse”. Wrapping. Resolution 0.001 l	param(133+8n)	Ble(5+8n)

The peculiarity of “GL-TV BLE” FLS is that it transmits fuel level without preinstallation of empty and full tanks levels. That is a FLS of random length can have output data within the range between 0 and 65535. At the same time the fuel level in “fuel” type parameters is limited by the range from 0 to 32767. If a rough level within the range higher than 32767 is needed, use parameter “Relative fuel level”. In othercases use “fuel” type parameter as the setup of filtration level parameters is available for it.

Table 6.10 Description of parameters for “GL-TV BLE” sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Fuel level from 0 to 32767	fuel8	fuel8
	Temperature	temp8	temp8
	Relative fuel level from 0 to 65535	param128	Ble0
	Message reader	param129	Ble1
	Signal level dBm	param130	Ble2
n	Fuel level from 0 to 32767	fuel(8+n)	fuel(8+n)
	Temperature	temp(8+n)	temp(8+n)
	Relative fuel level from 0 to 65535	param(128+8n)	Ble(0+8n)
	Message reader	param(129+8n)	Ble(1+8n)
	Signal level dBm	param(130+8n)	Ble(2+8n)

Temperature sensor ELA “Blue COIN T”. Xn=12. Parameters are given in the table.

Table 6.11 Description of parameters for “ELA blue COINT” sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature -30.0…70.0 C°	temp8	temp8
	Signal level dBm	param128	Ble0
n	Temperature -30.0…70.0 C°	temp(8+n)	temp(8+n)
	Signal level dBm	param(128+8n)	Ble(0+8n)

Sensor “TESLiOT”. Xn=13. Parameters are given in the table.

Table 6.12 Description of parameters for “TESLiOT” temperature sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature, C°	temp8	temp8
	Power supply voltage, V	param128	Ble0
	Triggers activation: Closed doors on magnetometer - 0x01 Open doors on magnetometer – 0x02 Alarm 1 – 0x04 Alarm 2 – 0x08	param129	Ble1
	Acceleration on X axis, g	param130	Ble2
	Acceleration on Y axis, g	param131	Ble3
	Acceleration on Z axis, g	param132	Ble4
	Level of magnetic field, relative units	param133	Ble5
	Level of illumination, Lux	param134	Ble6
	Level of humidity, %	param135	Ble7
n	Temperature, C°	temp(8+n)	temp(8+n)
	Power supply voltage, V	param(128+8n)	Ble(0+8n)
	Triggers activation: Closed doors on magnetometer - 0x01 Open doors on magnetometer – 0x02 Alarm 1 – 0x04 Alarm 2 – 0x08	param(129+8n)	Ble(1+8n)
	Acceleration on X axis, g	param(130+8n)	Ble(2+8n)
	Acceleration on Y axis, g	param(131+8n)	Ble(3+8n)

Sensor number	Parameter description	Combine Protocol	IPS Protocol
	Acceleration on Z axis, g	param(132+8n)	Ble(4+8n)
	Level of magnetic field, relative units	param(133+8n)	Ble(5+8n)
	Level of illumination, Lux	param(134+8n)	Ble(6+8n)
	Level of humidity, %	param(135+8n)	Ble(7+8n)

For tilt angle sensor Eurosens Degree BT Xn=14 parameters are given in the table.

Table 6.13 Description of parameters for"Eurosens Degree BT" sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Temperature, C°	temp8	temp8
	Signal level dBm	param128	Ble0
	Angle X, -90°...+90°	param129	Ble1
	Angle Y, -90°...+90°	param130	Ble2
	Angle Z, -90°...+90°	param131	Ble3
	Sensor status	param132	Ble4
	Number of events	param133	Ble5
	Number of event chains	param134	Ble6
n	Temperature, C°	temp(8+n)	temp(8+n)
	Signal level dBm	param(128+8n)	Ble(0+8n)
	Angle X, -90°...+90°	param(129+8n)	Ble(1+8n)
	Angle Y, -90°...+90°	param(130+8n)	Ble(2+8n)
	Angle Z, -90°...+90°	param(131+8n)	Ble(3+8n)

Sensor number	Parameter description	Combine Protocol	IPS Protocol
	Sensor status	param(132+8n)	Ble(4+8n)
	Number of events	param(133+8n)	Ble(5+8n)
	Number of event chains	param(134+8n)	Ble(6+8n)

Table 6.14 Description of parameters for “Eurosens Dominator BT” sensor

Sensor number	Parameter description	Combine Protocol	IPS Protocol
0	Detector value	fuel8	fuel8
	Temperature, C°	temp8	temp8
	Battery charge , %	param128	Ble0
	Signal level dBm	param129	Ble1
	Message number	param130	Ble2
	Fuel amount, l.	param131	Ble3
	Fuel amount, % of fuel from full tank	param132	Ble4
n	Detector value	fuel(8+n)	fuel(8+n)
	Temperature, C°	temp(8+n)	temp(8+n)
	Battery charge , %	param(128+8n)	Ble(0+8n)
	Signal level dBm	param(129+8n)	Ble(1+8n)
	Message number	param(130+8n)	Ble(2+8n)
	Fuel amount, l.	param(131+8n)	Ble(3+8n)
	Fuel amount, % of fuel from full tank	param(132+8n)	Ble(4+8n)

APPENDIX F. Modem status

For command “GSMSTATUS” the response “GSMSTATUS=1, State=0x01000000, CMEErr=-1, CMSErr=-1” will be received, where State is the mask of modem status:

0x00000001 - Power supply to the modem	0x00010000 - Primary server
0x00000002 - Initialization of basic functions	0x00020000 - Second server
0x00000004 - Initialization of card	0x00040000 - Third server
0x00000008 -Registration in network	0x00080000 - Update server
0x00000010 - Context	0x00100000 - Configuration server
0x00000020 - Initialization online	0x00200000 - Hosting server
0x00000100 - Power supply is given onto modem	0x01000000 - SIM0
0x00000200 - Basic functions work	0x02000000 - SIM1
0x00000400 - SIM card is in slot	0x04000000 - Roaming
0x00000800 - There is registration in network	0x80000000 - Modem failure
0x00001000 - Context	CMEErr – the last modem failure
0x00002000 - It is online	CMSErr – the last network failure

APPENDIX G. Access spots

If access spot of network operation is not specified in settings(empty), the tracker will automatically use another spot, login and password when connecting to GPRS in familiar network.

Network code	Access spot (APN)	Login	Pass	Operator
Estonia				
24801	internet.emt.ee			m2mexpress
Russia				
25001	internet.mts.ru	mts	mts	MTS
25002	internet			MegaFon
25006	internet.danycom.ru			DANYCOM
25008	internet			Vainah Telecom
25011	internet.yota			Yota
25020	internet.tele2.ru			Tele2
25027	internet.letai.ru			Letai
25032	internet			Win mobile
25033	internet.sts.ru			Sevmobile
25034	internet.ktkru.ru			Krymtelekom
25035	inet.ycc.ru	motiv	motiv	MOTIV
25042	internet.emt.ee			ОАО «Межрегиональный ТранзитТелеком»; m2mexpress; ГудЛайн.
25060	internet	internet	internet	Volna mobile
25062	m.tinkoff			Tinkoff Mobile
25077	era	era	era	АО «ГЛОНАСС»
25099	internet.beeline.ru	beeline	beeline	Beeline
Republic of Belarus				
25701	web.velcom.by	web	web	velcom

Network code	Access spot (APN)	Login	Pass	Operator
25702	mts	mts	mts	MTS
25704	internet.life.com.by			life:)
Armenia				
28301	internet.beeline.am	internet	internet	Beeline
28304	connect.kt.am			Karabakh Telecom
28305	inet.vivacell.am			VivaCell-MTS
28310	internet			Ucom
Azerbaijan				
40001	internet			Azercell
40002	internet.bakcell.com			Bakcell
40004	nar			Nar Mobile
40006	internet			Naxtel
Kazakhstan				
40101	internet.beeline.kz	@internet.beeline	beeline	Beeline
40102	internet			Kcell
40107	internet.altel.kz			Altel
40177	internet.tele2.kz			Tele2.kz
Kirghizia				
43701	internet.beeline.kg			Beeline
43705	internet			MegaCom
43709	internet			O!
Nigeria				
62120	internet.ng.airtel.com			Airtel
62130	web.gprs.mtnnigeria.net			MTN
62150	gloflat	flat	flat	Glo
62160	9mobile			9mobile

HISTORY CHANGE

Version	Description	Data
0.8	First release	23.01.17
0.9	Sections 5 and 6 and Appendixes A and B were complemented.	15.02.17
1.0	Sections 1 – 4 and Appendix A are complemented. Release.	19.02.17
1.1	Added section 2.3 and Appendixes C и D. Sections are 3.1, 3.8, 4.3 and Appendix A are specified.	2.03.17
1.2	Sections 4.1 and Appendixes A-D are complemented. Figure 3.13 and figures in section 4.1 are changed.	23.03.17
1.3	Appendixes A and C are complemented. Figure 3.14 is added.	4.04.17
1.4	Section “Configurator” is performed with new design.	17.04.17
1.5	Section 3.14 and Appendixes A, C and D is complemented.	05.05.17
1.6	Appendixes A and C are complemented. Figures 3.20, 4.11, 4.12 are changed.	08.06.17
1.7	Appendixes A, C and D are complemented. Figures 4.10 and 4.11 are changed.	01.08.17
1.8	Section 4 is specified. Setting specifications of auxiliary parameters, roaming, static navigation, interfaces and CAN LOG, etc. transmission. Configurator figures are updated. Debugging mode is described. Appendix C is changed. Appendixes A, B and D are complemented.	14.09.17
2.0	Added description of UMKa301; Added description of versions; Added configurator functionality of version 0.9.9; Added commands; Added Wialon protocols.	19.12.17
2.1	Amended error in positioning of microphone and dynamic slots.	31.01.2018
2.2	Added version UMKa300.AR2; Added command “SETRSSI”.	09.02.2018
2.3	Added information on the records number on a SD card.	29.03.2018
2.4	Added section 2.20 “Voice communication”; Added section2.21 “Power supply manager”; Added section 3.15 “System”;	04.04.2018

	Added new commands; Added new default parameters.	
2.5	Amendmend in Table 2.1.	09.04.2018
2.6	Added section 2.22 “Data transmission on 2 servers” ; Added section 2.23 “Remote configuration”; In section 3.1 changed the patterns for yellow LED; Added description of new signs in Table 3.4 “Signs in toolbars and statuses”; Added new commands; Changed “status” parameter in Wialon system; Added new default parameters. Warranty for back-up battery.	13.06.2018
2.7	Complemented Table of features.	27.11.2018
2.8	Changed number of document on ВБРМ.014.000.000 РЭ Complemented section 2.17 “1-Wire connection”; Complemented section 2.22 “Data transmission on 3 servers”; Complemented section 2.24 “High-priority events”; Complemented section 2.25 “iQFreeze connecting”; Complemented section 3.5 “History tab”; Complemented section 3.14 “iQFreeze tab”; Added new commands; Added protocols.	25.01.2019
2.9	Renewed pictures. Added new commands; Added protocols.	21.02.2019
2.10	Changed section 2.21”Power supply manager”	05.04.2019
2.11	Changed section 5.5 “Manufacturer warranty”	28.06.2019
2.12	Added section 1.3 “Device marking” Added section 3.10 “SIM cards”; Added section 3.4 “Mobile configurator”; Complemented list of commands; Added section 2.25 “LBS positioning”	10.12.2019
3.0	Added UMKa302 Changed number of document on ВБРМ.046.000.000 РЭ Added section 2.14 “Connecting BLE FLS”	21.02.2020

	Added section 3.15 “BLE FLS tab” Added section 3.16 “BLE scanner tab” Added section 3.20 “J1939(FMS) tab”	
3.1	Added section 2.27 “Inclinometer” Added section 2.28 “MATRIX-II reader” Added section 2.29 “Modbus protocol support” Added section 2.30 “BLE identification” Added section 3.17 “FLS filters”	17.06.2020
3.2	Changed section 2.14 “Connecting BLE sensors” Added section 2.31 “Photocameras support” Added section 2.32 “Opening button” Added section3.23 “CAN pusher” Added section 3.24 “CAN scanner” Added section 3.27 “Modbus” Added section 3.28 “Tachographs” Added section 3.29 “Photocamera” Added new SMS commands Added supported BLE sensors	22.12.2020
3.3	Added UMKa302v2 Added section 2.2 “Tracker version” Added section 2.15 “Connecting to CAN bus” Added section 3.33 “System tab” Added new parameters Added new SMS commands	22.06.2021