ARNAVI 5

USER MANUAL

FIRMWARE VERSION 0.79 OR LATE

OOO ARUSNAVI ELECTRONICS

CONTENTS

GENERAL

Arnavi 5 navigation controller (hereinafter referred to as ‘tracker’) is designed for the remote monitoring of moving objects, with the option to operate with two monitoring servers, and can be used in conjunction with any compatible software package.

Supported data transfer protocols to the server:

- Arnavi(INTERNAL) – our open protocol, available for integration.
- EGTS – Era Glonass Telematics Standard.

To ensure enhanced control over the condition of the vehicle or the equipment installed on the vehicle, the device can be connected with discrete (on/off), analogue, and pulse-frequency sensors (fuel consumption, passenger availability, temperature, and other sensors).

Connection of digital sensors via RS232, RS485 and 1-WIRE interfaces is envisaged.

Four programmable ‘open drain’ outputs allow for remote control of systems such as auto-start or engine lock.

Internal support of the CAN bus according to the standard J1939 Protocol is implemented. It is also possible to connect an external CAN module via RS232 or RS485 interfaces. More than 20 parameters are read: total fuel consumption and level, total mileage, operating time, engine rpm speed and temperature, speed, axle loads, accident controllers, etc.

The built-in backup battery ensures the autonomous operation of the device when the vehicle battery goes off with alerting about this event. This feature is widely used for security and anti-theft purposes.

The built-in motion (acceleration) sensor is used in intelligent energy-saving algorithms and can also be used to determine the vehicle parking places.

The tracker can record the level of the GSM signal, identify base stations and the accuracy of navigation data at the moment of recording each coordinate point.

The firmware update feature without disassembling from the facility and without the need for direct access to the device (via GSM) is available.

The housing is made of plastic in accordance with the requirements of European electrical and fire safety standards.

The tracker can operate in the temperature range from -40 to +80 degrees Celsius (storage temperature of up to -45 to +85 degrees Celsius) and is suitable for installation on passenger vehicles with 12 V in-vehicle network, heavy vehicles with 24 V in-vehicle network as well as on any other vehicles.

The permissible voltage is 7 to 44 V. There is protection against reverse polarity, short-term voltage surges of no more than 300V and also protection of the built-in battery from overcharging.

For more information about the possibility of connecting various external sensors, please contact the Support Service at support@arusnavi.ru.

1. TECHNICAL CHARACTERISTICS

The main technical characteristics of the tracker modifications are presented in Table 1.

Table 1 – The main technical characteristics

Technical characteristics	Note	Modification
		ARNAVI 5
Device dimensions, mm	Excluding antennas and mountings	74 x 69 x 22
Weight, g	Excluding antennas and harness	70
Supply voltage, V	Without pulse emissions	7–44
Operating temperature range, °C	Without the battery	-40...+80
Analogue input, pcs	Measurement range 0–33 V; 12 bit resolution, discrete mode	4
Discrete input, pcs	Internal pull-up 3.3V. State “1” – input voltage less than 1V, else – state “0”.	6
Discrete output, pcs	Switching current up to 540 mA	4
Motion/tilt sensor	Inbuilt	yes
RS232 interface		yes
RS485 interface		yes
CAN interface	J1939 Standard	yes
1-WIRE interface	Temperature sensors, I-Button keys	yes
Body opening sensor	Mechanical	Optional
USB interface	Diagnostics, update	yes
GSM module	GSM / GPRS / HTTP	SIM868
Navigation module	Glonass / GPS	SIM868
GSM antenna	Cable length 2–3 m	external
Navigation antenna	Cable length 2–5 m	external
Number of SIM card slots	Alternate operation	2
Number of SIM chip slots	Alternate operation	2
MicroSD memory card		Optional
Autoinformer		Optional
Speakerphone connection		yes
Backup battery, mA	Li-Pol	250–1500
Non-volatile memory, Mb	400,000 events	32

2. APPEARANCE OF THE DEVICE AND MAIN TRACKER CONNECTOR PINOUT

The appearance of the device is presented in Fig. 1 and 2. The pin assignment of the main tracker connector is presented in Fig. 3 and described in Table 2.

Fig. 1 – Appearance of the device

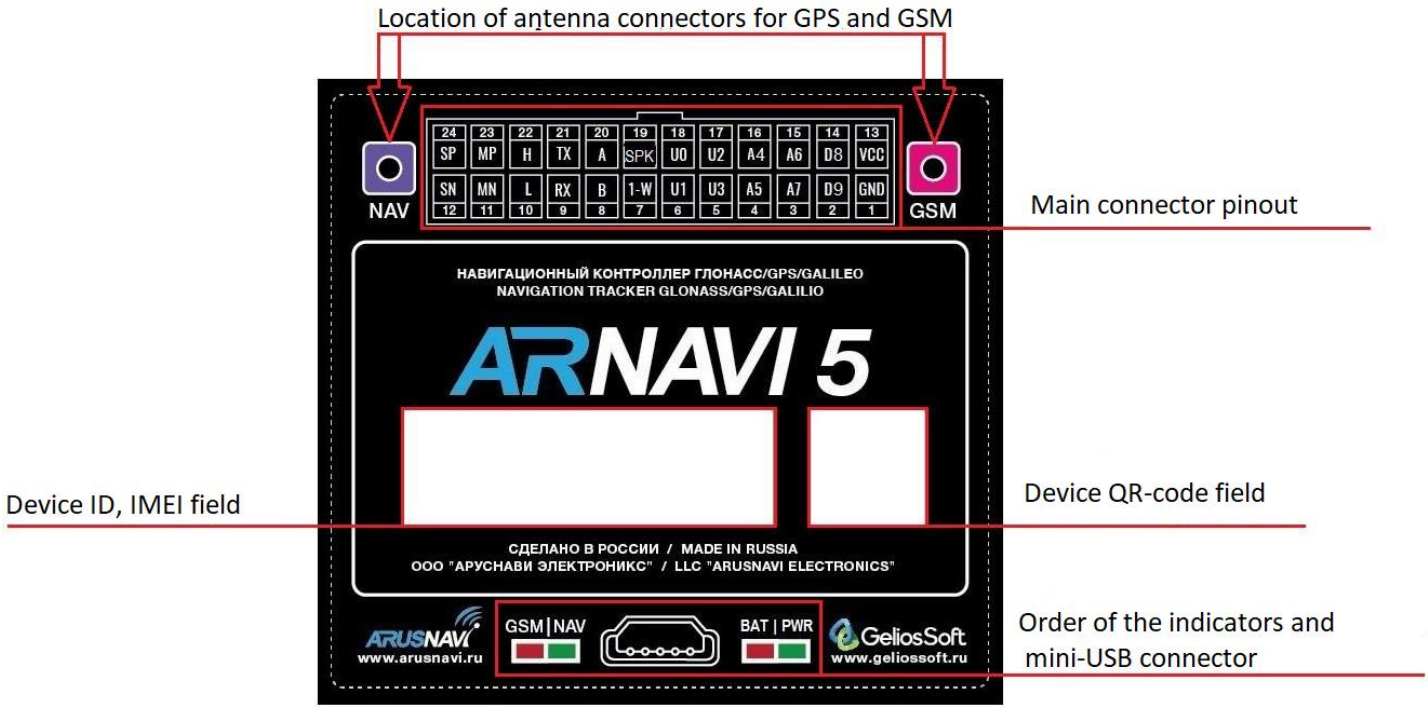


Fig. 2 – Information part of the device

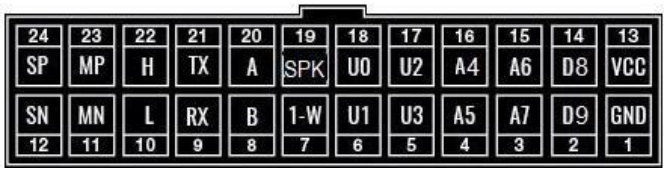


Fig. 3 – Main connector pinout

Table 2 – Pin assignment of the main connector

No	Design ation	Intended purpose	Application/connection
1	**GND**	Minus power	Minus supply voltage
2	**D9**	Discrete	Discrete / frequency / pulse sensors
3	**A7**	Analogue +	Analogue sensors, discrete
4	**A5**	Analogue +	Analogue sensors, discrete
5	**U3**	Output	Switching current up to 540 mA
		Discrete	Discrete / frequency / pulse sensors
6	**U1**	Output	Switching current up to 540 mA
		Discrete	Discrete / frequency / pulse sensors
7	**1-W**	1-WIRE interface	Digital temperature sensors, identification keys
8	**B**	RS485 interface	RS485 sensors
9	**RX**	RS232 interface	RS232 sensors
10	**L**	CAN interface	L CAN line
11	**MN**	Microphone –	Speakerphone microphone connection
12	**SN**	Speaker –	Speakerphone speaker connection
13	**VCC**	Plus power	Plus supply voltage
14	**D8**	Discrete	Discrete / frequency / pulse sensors
15	**A6**	Analogue +	Analogue sensors, discrete
16	**A4**	Analogue +	Analogue sensors, discrete
17	**U2**	Output	Switching current up to 540 mA
		Discrete	Discrete / frequency / pulse sensors
18	**U0**	Output	Switching current up to 540 mA
		Discrete	Discrete / frequency / pulse sensors
19	**SPK**	Autoinformer	Autoinformer connection
20	**A**	RS485 interface	RS485 sensors
21	**TX**	RS232 interface	RS232 sensors
22	**H**	CAN interface	H CAN line
23	**MP**	Microphone +	Speakerphone microphone connection
24	**SP**	Speaker +	Speakerphone speaker connection

TRACKER SETTING

1.WEB CONFIGURATOR

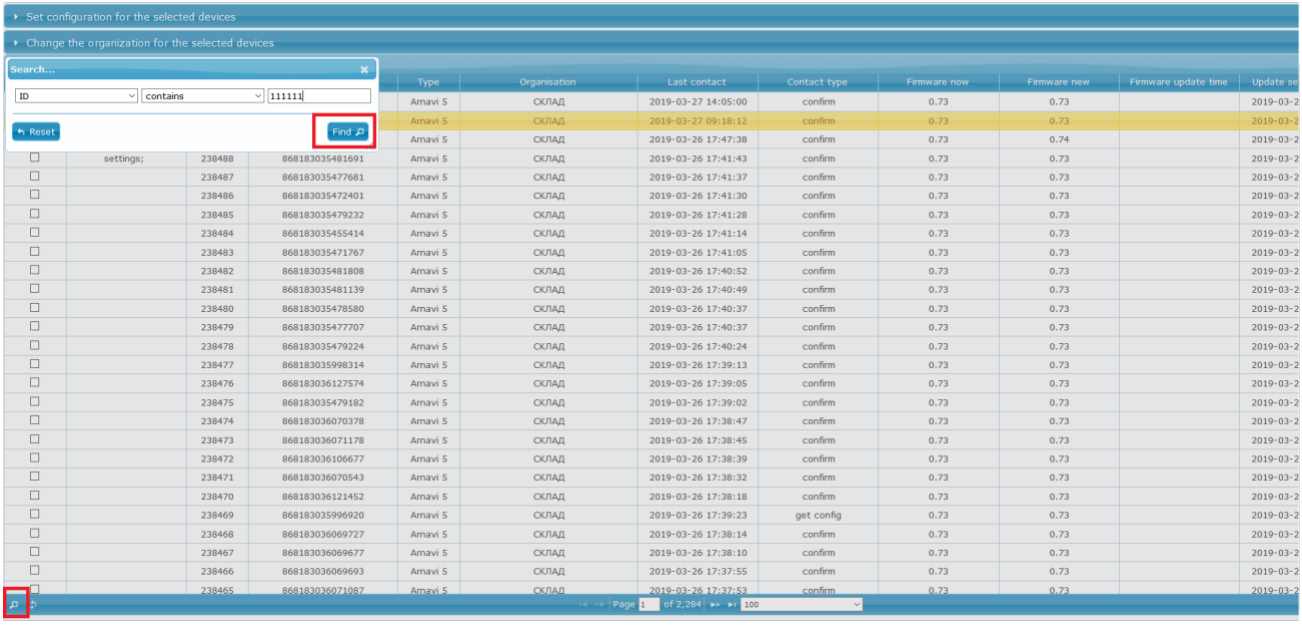
For the remote configuration of the tracker, a cloud service, web configurator, is used. It allows remotely configuring a device or group of devices without physical connection to the tracker via a cable or adapter.

In addition, the web configurator service supports the function of the remote updating of device software.

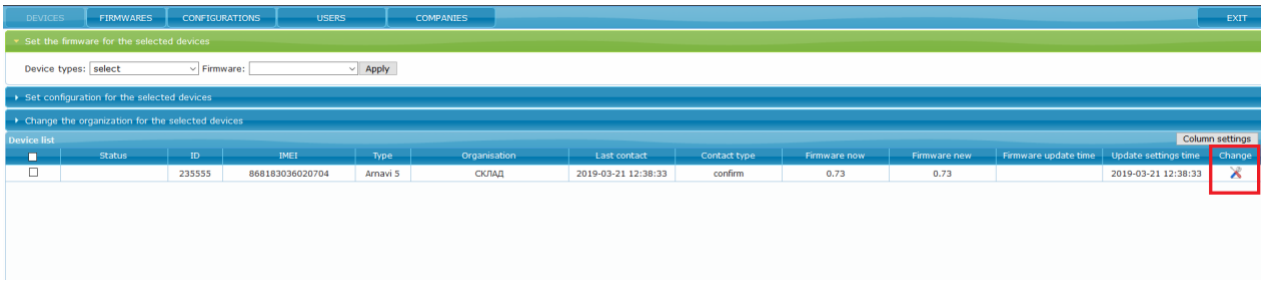
To work with the web configurator, you will need an account (login/password), which you can always get receive at the Support Service at support@arusnavi.ru.

In any Internet browser, type http://ws.arusnavi.ru and access your personal section, where you make the following steps to configure the device:

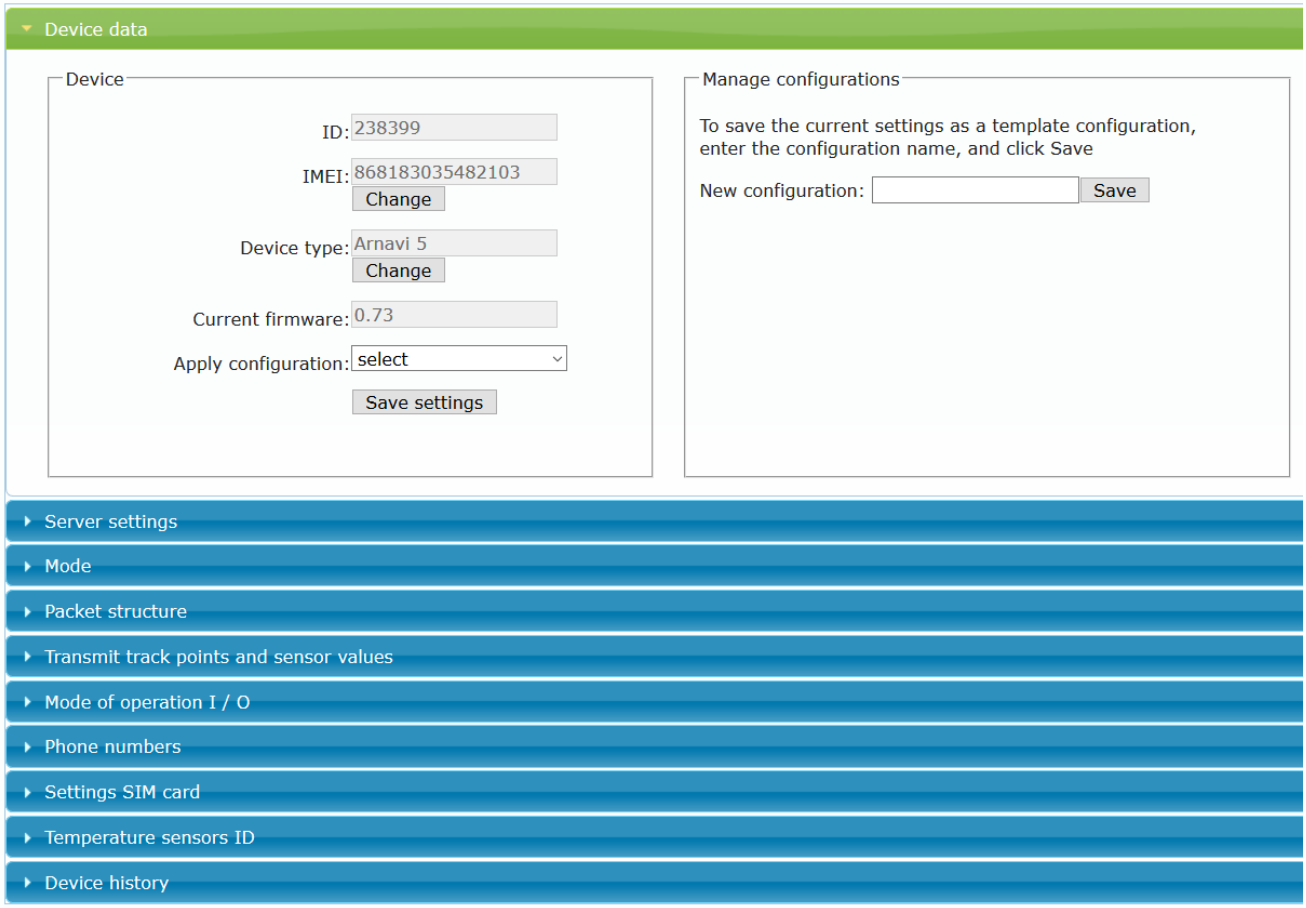
Step 1 – Through the search, at the bottom left corner, find the desired device by ID or IMEI



Step 2 – Click on the icon ‘ ’ – go to the tracker settings

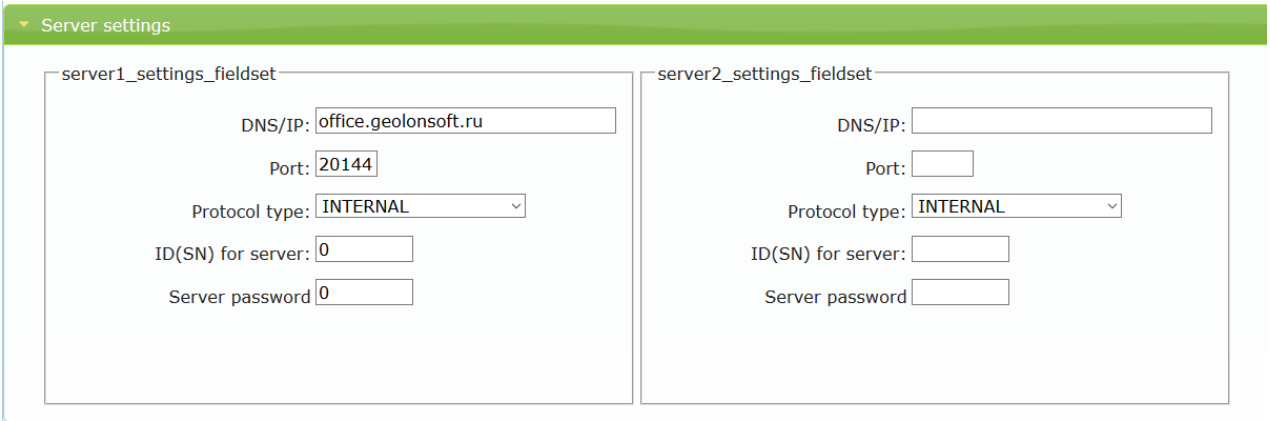


Step 3 – ‘Device data’ section displays general information: ID, IMEI, type, firmware version.

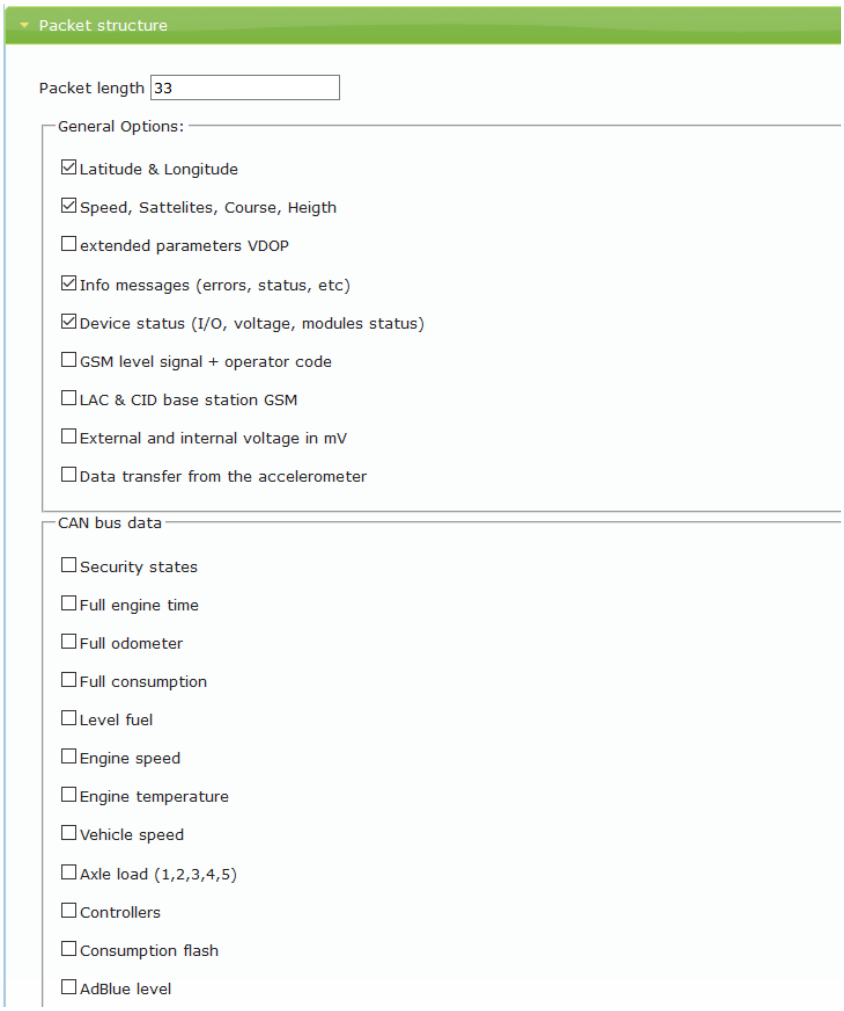


Step 4 – ‘Server settings’ section.

It is necessary to enter the address, port of the monitoring server, select the protocol type (INTERNAL or EGTS) and, if necessary, assign the server ID and password. Also, if necessary, you can assign a second address of the monitoring server.

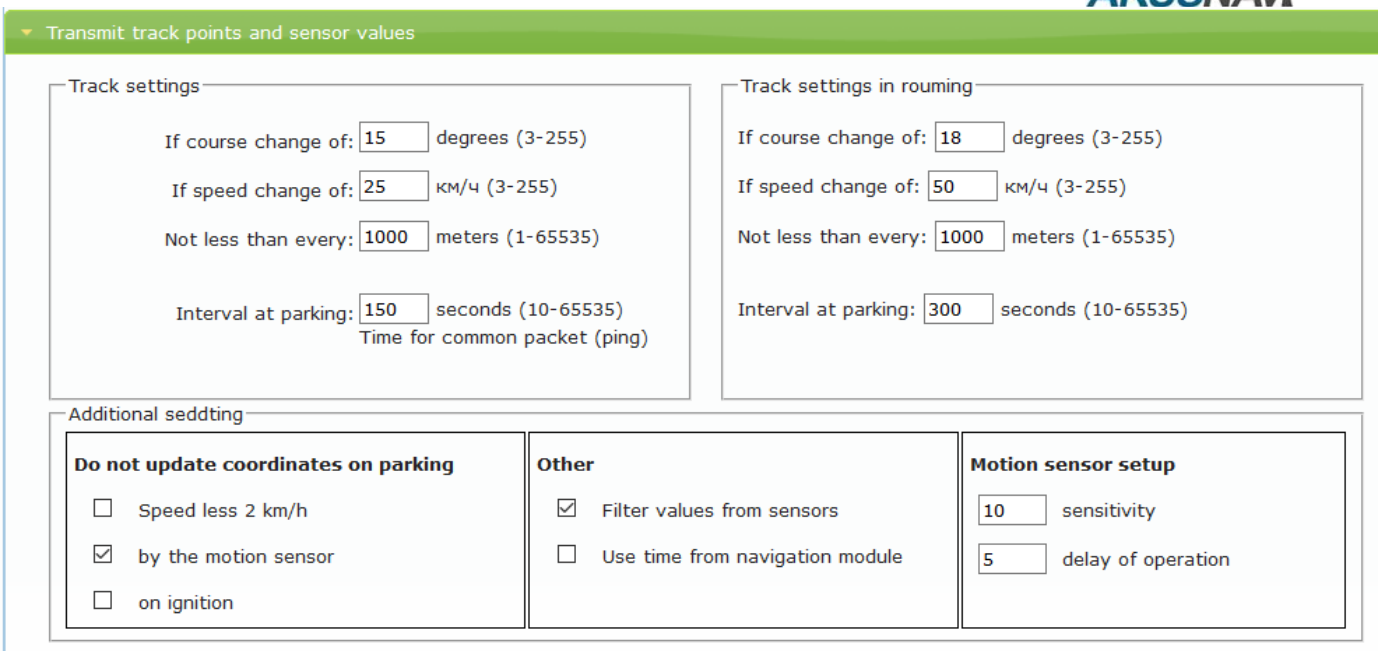


Step 5 – For the efficient transmission of data to the server with consideration of traffic compression, select the dataset to be transmitted to the server in ‘Packet structure’ section.



Note: In the simplest case of setting the device only for the purpose of determining the location of the mobile object (vehicle) without the use of inputs/outputs and other interfaces, it is enough to select only the first two points
‘Package structures’: GPS/GLONASS coordinates and GPS/GLONASS settings. In this case, the data traffic from the device to the server will be minimal, which will have a positive impact on the cost of cellular communication.

Step 6 – ‘Transmit track points and sensor values’ section. This section allows configuring the parameters of the movement trajectory processing.



<If course change of – angle> – If the change of the angle between the routing of the last position sent to the server and the current routing exceeds the specified value, the current position will be sent to the server. Unit of measure: degree.

<If speed change of – speed> – If the change between the speed at the moment of determining the last position sent to the server and the current speed exceeds the specified value, the current position will be sent to the server.

<Not less than every – distance> – If the distance between the last position sent to the server and the current position exceeds the specified value, the current position will be sent to the server. Unit of measure: metre.

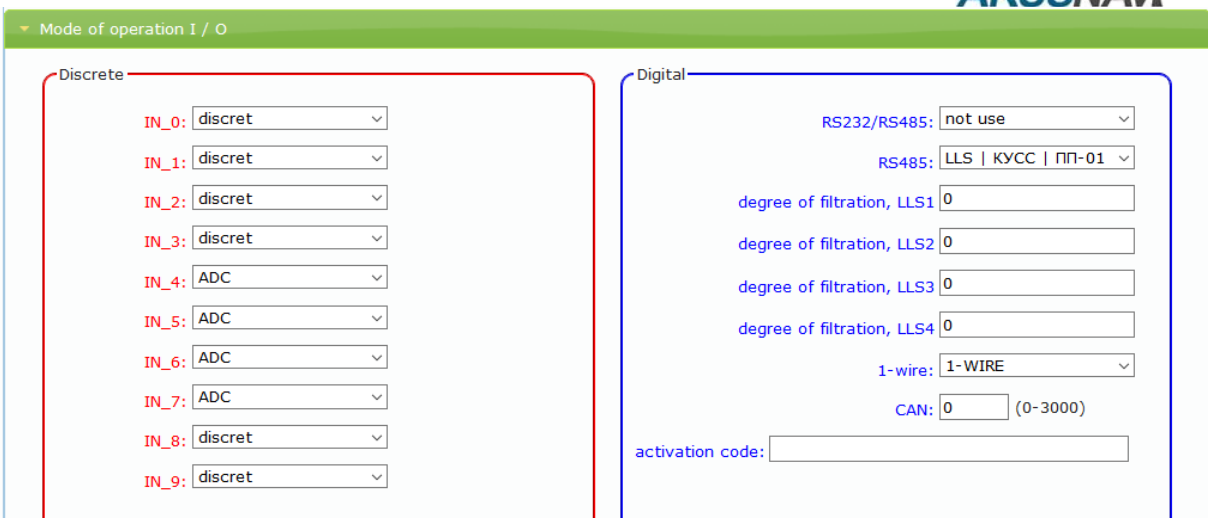
ATTENTION: EVENTS BY ANGLE, SPEED AND DISTANCE WILL ONLY BE SENT DURING THE MOVEMENT OF THE VEHICLE, I.E. WHEN THE TERMS 'FREEZE COORDINATES WHEN PARKED' WILL BE VALID.

<Interval at parking – time> – The time interval between the last sending of data to the server and the next sending of data sent to the server, when at the parking position. Unit of measure: second.

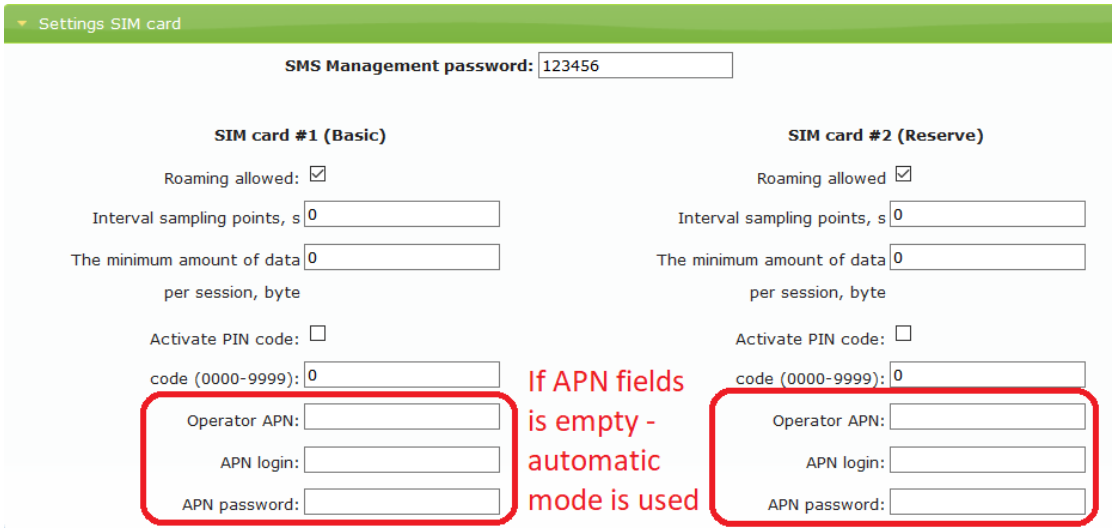
<Do not update coordinates on parking> – The condition under which the coordinates of the location will be fixed and remain unchanged (freeze coordinates) – Parking.

We recommend to leave the default settings.

Step 7 – 'Mode of operation I/O' section allows configuring digital interfaces and digital inputs/outputs.



Step 8 – ‘Settings SIM card’ section

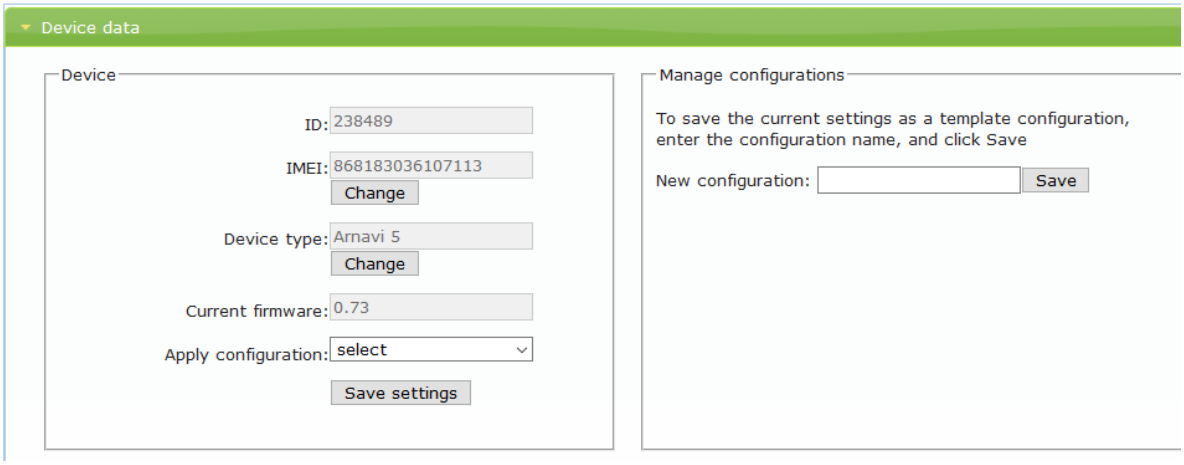


The board has a holder for two SIM cards and two heat-resistant SIM chips. SIM card #1 (main) is installed in the upper compartment of the holder and SIM card #2 (backup) is installed in the lower compartment of the holder.

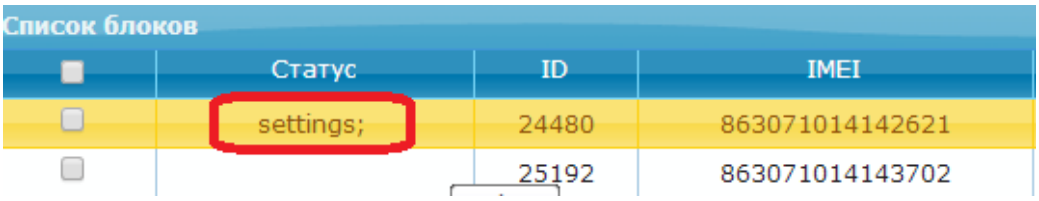
The tracker initially establishes a connection via SIM card #1. If the connection to the server fails after several attempts or SIM card #1 is missing, the tracker switches to SIM card #2 and tries to connect to the server again.

When inserting a single SIM card, use the upper compartment of the holder – SIM card #1 (main).

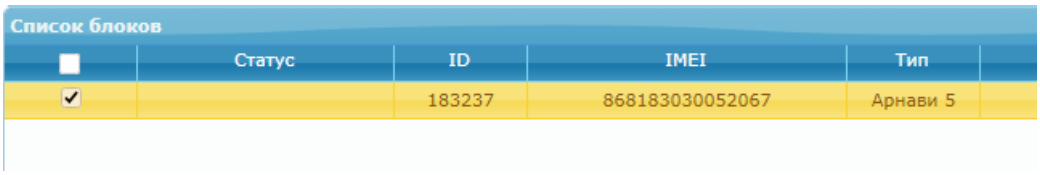
Step 9 – After entering the required settings, they should be saved. Go to ‘Device data’ section and click ‘Save settings’.



Then, in the general table of devices, in ‘Status’ field, the ‘settings’ entry will appear. It shows that the device has been assigned new settings but they are not yet applied on the device. To apply the new settings, send a command to the device in one of the following ways: by SMS, a command from the server (see the description of commands in ‘SMS and TCP command list’ section) or via ArnaviConfigurator software.

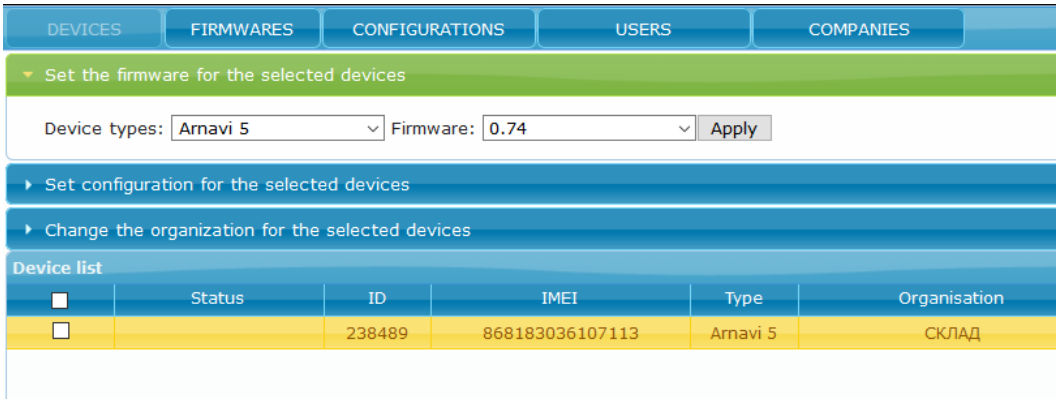


The status ‘settings’ will disappear when the device confirms the receipt of the settings.

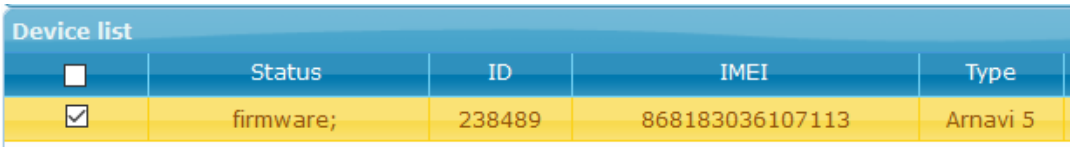


To update the tracker software, you need to:

1. Select a device (check the box ‘device list’ on the left)
2. Open the ‘Set the firmware for the selected devices’ tab
3. Select the device type, firmware version and click ‘Apply’



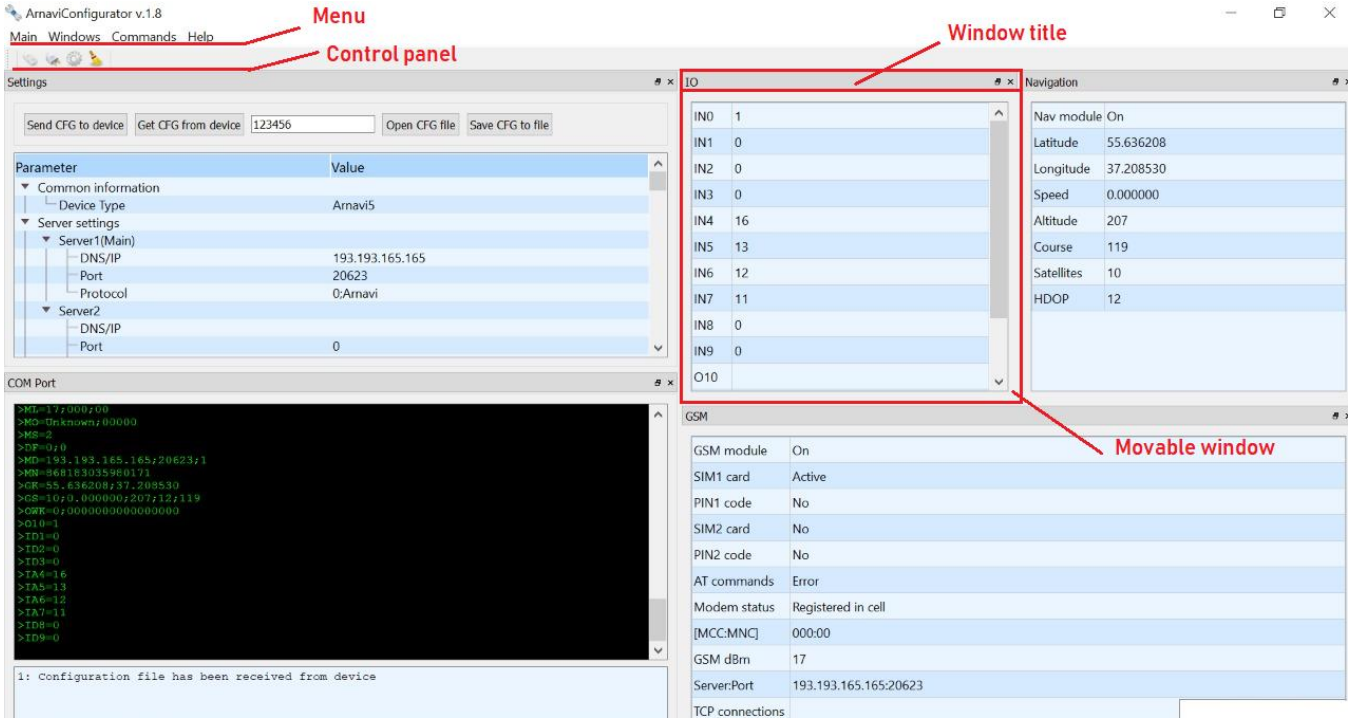
Then, in the ‘Status’ field, the ‘firmware’ entry will appear. It shows that the device has been assigned new software but it is not yet applied on the device. To apply the new software, send a command to the device in one of the following ways: by SMS, a command from the server (see the description of commands in ‘SMS and TCP command list’ section) or via ArnaviConfigurator software.



2. DIAGNOSTICS PROGRAMM

To check the correct operation and configuration of the tracker locally, you can use the ArnaviConfigurator programme, which allows providing a complete picture of the device as well as connected sensors and mechanisms at the installation site and configuring the tracker using the settings tree.

ATTENTION: WHEN CONNECTING THE TRACKER, THE PROGRAMME WILL REQUIRE ENTERING A PASSWORD TO ACCESS THE DEVICE (THE DEFAULT PASSWORD IS 123456).



To work with the programme, you will need to install the device driver, for which purpose:

4. Download the driver for the configurator from the website http://www.arusnavi.ru and install it.
5. After completing the installation process, in the ‘STMicroelectronics’ folder, select and run the installation file" ‘dpinst_xxx’, where xxx – bitness of the operating system on your PC.

The main parameters of the programme:

- Tracker information (ID, IMEI, software version, etc.))
- The operation statuses of the modules of the device
- GSM unit (operator, signal level, current server address, SMS messages, work status)
- Navigation unit (current coordinates, reception quality, speed, altitude)
- Discrete inputs/outputs (output status, input values)
- Digital sensors (RS232, RS485, 1-WIRE, CAN)
- The possibility of opening the calibration tables for the connected FLS
- Logging of events
- Commands for the tracker: update software, update settings, etc.
- The settings tree

When changing the settings via the programme or SMS, they are automatically synchronised on the WEB configurator.

More detailed information on working with the ArnaviConfigurator programme is described in the Arnavi Configurator User Guide (the Guide can be found in the folder
Arusnavi with the installed programme).

3. LOCAL UPDATING OF THE DEVICE SOFTWARE

The device software can be updated in the main operation mode and in the bootloader mode.

Updating of the device software in the main operation mode

1. Connect the device to a PC via USB.

   Once connected, the device will be identified as a removable media ‘APP’.

2. Copy the firmware file to the root of the removable media ‘APP’.
3. Send the device the command ‘upgrade extflash’ (without quotation marks) to start the update process using the ArnaviConfigurator programme.
4. Wait for the update process to finish. After the update process is complete, the device will restart automatically.

Updating of the device software in the bootloader mode

1. Enter the bootloader mode in one of the following ways:

   - by sending the command ‘upgrade msc’;

   - by closing 1-W (pin 7) to GND (pin 1) and shorting RX (pin 9) to TX (pin 21), and then supplying power to the device. After entering the bootloader mode, at least one of the pairs must be closed off.

   In the bootloader mode, the device will be detected as a removable media ‘LOADER’ and will stay in this mode for 120 seconds, after which the device will restart automatically.

2. Copy the firmware file to the root of the removable media ‘APP’, after which the update process will start automatically.
3. Wait for the update process to finish. After the update process is complete, the device will restart automatically.

4. SETTING VIA SMS

The structure of the message with the command to change the settings is as follows:

<access_password>*SETP*<changing_parameters_list>

By default, the <access_password> field has the value123456.

The <changing_parameters_list> field contains the number and value of one or more parameters to be changed.

Each item of the changing parameters list has the following structure:

#<parameter_number>=<value>

<parameter_number> – the numerical index of the parameter.

<value> – the new value of the parameter, which can be either simple or composite.

List items are rendered without delimiters: the beginning of the next item is the sign of the end of the previous one (symbol #).

If you type space key instead value – you will remove value from the server.
Example: '123456*SETP*#2= , , ' – clear the APN parameters(space key instead argument)

When sending messages via SMS, it is necessary that the length of the message does not exceed 160 characters and that the message contains only letters of the Latin alphabet.

Note: To enable understanding the beginning and end of a message, the latter are enclosed in single quotation marks ('). Do not use quotation marks when sending messages to the device.

Monitoring server parameters 1 – Parameter number: 1

Command format:
'#1=<server_address>,<server_port>,<protocol_type,<server_SN>,<server_password>'
Arguments:

<**server_address**> – a string with a length of up to 32 symbols. Contains the DNS name or IP address of the server.

<**server_port**> – a number within the range from 1 to 65535. It is not a mandatory parameter and this parameter is not required to be transmitted when it is not necessary to change the server port.

<**protocol_type**> – the number of the protocol: 0 – INTERNAL; 4 – EGTS.

<**server_SN**> – the ID for the server. It is not a mandatory parameter and this parameter is not required to be transmitted when it is not necessary to change the ID for the server.

<**server_password**> – the password for the server. It is not a mandatory parameter and this parameter is not required to be transmitted when it is not necessary to change the password for the server.
Examples:
'123456*SETP*#1=193.193.165.165,20623,0' – set the IP address, server port, and protocol
'123456*SETP*#1= hw.geliospro.ru,20144,0' – set the DNS name, server port, and protocol
'123456*SETP*#1= hw.geliospro.ru' – change only the server address.

APN parameters of the SIM card's mobile operator 1 – Parameter number:2

Command format: '#2=<name>,<user_name>,<password>' Arguments:

<name> – a string with a length of up to 32 symbols. Contains the name of the access point

<**user_name**> – a string with a length of up 32 symbols. Contains the user name of the access point

<**password**> – a string with a length of up 32 symbols. Contains the password of the access point

Examples:
'123456*SETP*#2=internet,gdata,gdata' – set the APN parameters of Megafon operator
'123456*SETP*#2= , , ' – clear the APN parameters(space key instead argument)

Trajectory processing parameters – Parameter number: 5

Command format:
'#5=<distance_home>,<angle_home>,<speed_home>,<interval_дома>,
<distance_roaming>,<angle_roaming>,<speed_roaming>,<interval_roaming>'

Home – settings for the home network mode Roaming – settings for the roaming mode

Arguments:

<distance> – a number within the range from 100 to 65535 or 0. If the distance between the last position sent to the server and the current position exceeds the specified value, the current position will be sent to the server. Unit of measure: metre. Is not a mandatory parameter: The parameter is not required to be transmitted when it is not necessary to change the distance. The value '0' disables the condition of sending to the service by distance.

<**angle**> – a number within the range from 0 to 180. If the change of the angle between the routing of the last position sent to the server and the current routing exceeds the specified value, the current position will be sent to the server. Unit of measure: degree. Is not a mandatory parameter: The parameter is not required to be transmitted when it is not necessary to change the angle. The value '0' disables the condition of sending to the service by angle.

<speed> – a number within the range from 5 to 65535 or 0. If the change between the speed at the moment of determining the last position sent to the server and the current speed exceeds the specified value, the current position will be sent to the server. Unit of measure: kilometres per hour. Is not a mandatory parameter: The parameter is not required to be transmitted

when it is not necessary to change the speed. The value ‘0’ disables the condition of sending to the service by speed change.

<interval> – a number within the range from 5 to 65535 or 0. If the interval between the time of the last sending of the coordinates to the server and the current time exceeds the specified value, the current position will be sent to the server. Unit of measure: second. Is not a mandatory parameter: The parameter is not required to be transmitted when it is not necessary to change the sending interval. The value ‘0’ disables the condition of sending to the service by interval.

Examples:
‘123456*SETP*#5=400,18,20,150’ – set all trajectory processing parameters
‘123456*SETP*#5=,,35,300’ – change only the speed and interval, distance and angle leave unchanged
*‘123456*SETP**#5=,15’ – change only the angle
*‘123456*SETP**#5=400,18,20,150, 1000,25,40,360’ – different modes for home and roaming

APN parameters of the SIM card’s mobile operator 2 – Parameter number: 7

Command format: ‘#7=<name>,<user_name>,<password>’

Arguments:

<**name**> – a string with a length of up to 32 symbols. Contains the name of the access point

<**user_name**> – a string with a length of up 32 symbols. Contains the user name of the access point

<**password**> – a string with a length of up 32 symbols. Contains the password of the access point

Examples:
‘123456*SETP*#7=internet,gdata,gdata’ – set the APN parameters of Megafon operator
‘123456*SETP*#7= , , ’ – clear the APN parameters(space key instead argument)

Changing the number of the CAN bus handler – Parameter number: 12

TO ACTIVATE THE INTERNAL CAN INTERFACE (J1939 STANDARD), SPECIFY THE PROGRAMME NUMBER – 3.

Command format: ‘#12=<programme_number>’

Arguments

<**programme_number**> – a number within the range from 0 to 3000.

Example:
‘123456*SETP*#12=188’ – set the programme number 188.

Table 3 – Default device settings (factory settings)

Parameter number	Description	Default value
#1	Monitoring server address 1	hw.geliospro.ru,20144,0
#2	APN parameters of the SIM card's mobile operator 1	No parameters are specified; automatic mode
#5	Trajectory processing parameters	400,18,20,150 (transmission of the point to the server when passing a distance of 400 m, changing the course by 18 degrees or changing the speed by 20 km/h, and also at least once every 150 seconds)
#7	APN parameters of the SIM card's mobile operator 2	No parameters are specified; automatic mode
#12	Changing the number of the CAN bus handler	

Information SMS messages

The device is able to send a set of SMS messages with information about operation. To receive an information message, send a corresponding request:

<access_password>*SMSI – receive SMS with IMEI;

<access_password>*SMSK– receive SMS with coordinates and a link to the map;

SMS with the answer will return to the number of the sender of the request.

To receive information on the SIM card of the device, the function of sending SMS messages must be enabled.

GUIDELINES FOR CONNECTING

The device is made in the form of a monoblock and requires a minimum number of connections for normal operation. The minimum set of actions required for the operation of the device is as follows:

1. Insert a SIM card(s)
2. Connect the internal battery of the device
3. Close the housing
4. Connect the navigation antenna to the corresponding connector on the housing
5. Connect the GSM antenna to the corresponding connector on the housing
6. Connect power to the device (red and black wires of the main harness)

ATTENTION: THE POSITIVE WIRE OF DC POWER SUPPLY IS CONNECTED LEAST OF ALL AND ALL TIMES THROUGH A 2A FUSE, WHICH IS PLACED AS CLOSE AS POSSIBLE TO THE CONNECTION POINT TO THE ONBOARD NETWORK OF THE OBJECT.

7. The remaining wires of the harness are connected as required by the necessary functionality. The device is designed to be installed inside the cabin or luggage compartment of the vehicle.

Depending on the type of the vehicle, it is preferable to install the device, for example, under the dashboard, behind the dashboard, behind the centre console, behind the glove box, behind the upholstery (at the left and right) of the luggage compartment if they are rigid, with a complex mount that makes it difficult to dismantle them, in the cabin under the carpets, under the right passenger or driver seat, etc.

The navigation antenna is placed horizontally. The arrow marked on the side surface of the antenna housing should point upwards. It is allowed to install the antenna directly on top of the metal elements of the vehicle structure. To install the antenna, it is necessary to choose a place that provides the maximum field of view of the upper hemisphere of the space that is not shaded by metal and non-radio-transparent elements of the vehicle structure.

ATTENTION: NO SHARP BENDS OF THE ANTENNA CABLES ARE ALLOWED.

1. DISCRETE INPUTS/OUTPUTS

The device has the following discrete inputs/outputs:

- four universal discrete inputs/outputs – IN0(U0), IN1(U1), IN2(U2), and IN3(U3);
- four analog inputs – IN4(A4), IN5(A5), IN6(A6), IN7(A7);
- two main discrete inputs – IN8(D8), IN9(D9).

Each discrete input/output has several operation modes:

Table 4

№	Universal IN0(U0), IN1(U1), IN2(U2), IN3(U3)	Discrete IN8(D8), IN9(D9)	Analog IN4(A4), IN5(A5), IN6(A6), IN7(A7)
1	Discret	Discret	Discret
2	Impuls	Impuls	
3	Frequency	Frequency	ADC
4	Call button	Call button	Call button
5	Control massa	Control massa	Ignition
6	Out mode 1		
7	Reset Wi-Fi		
8	i-Button		
9	speed control output		
10			

1.1 OUTPUTS

The tracker supports control of four external executive devices that are connected to the universal contacts IN0(U0), IN1(U1), IN2(U2), and IN3(U3).

Output type – open drain. In the active state, the outputs, including external devices, are ground-connected.
The outputs allow for a load of up to 540 mA.

To switch more powerful devices, they should be connected via external relays (the relay winding is connected between the on-board network and the output of the device, and the contacts are connected to the load).

An example of using the device outputs as motor lock relay control is shown in Figure 4.

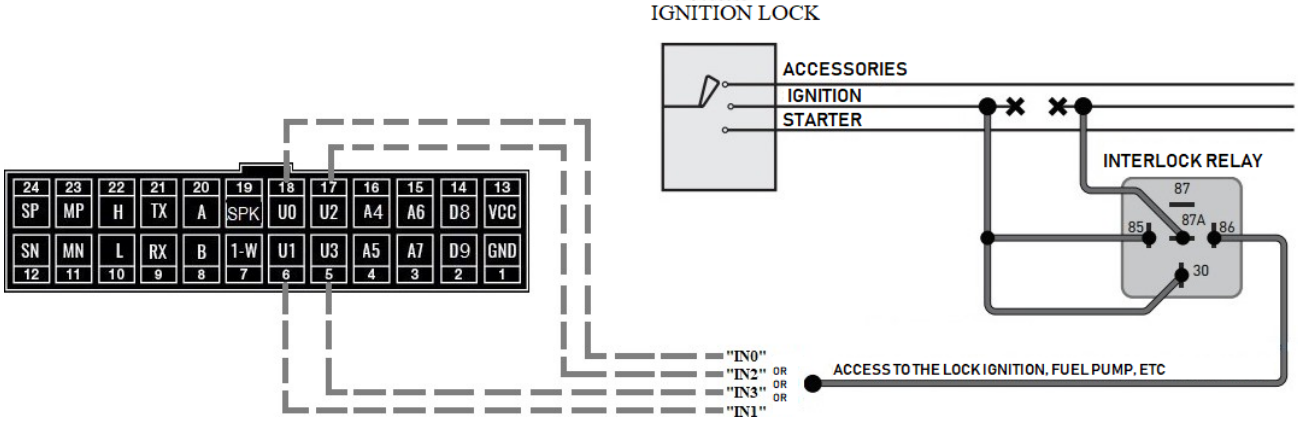
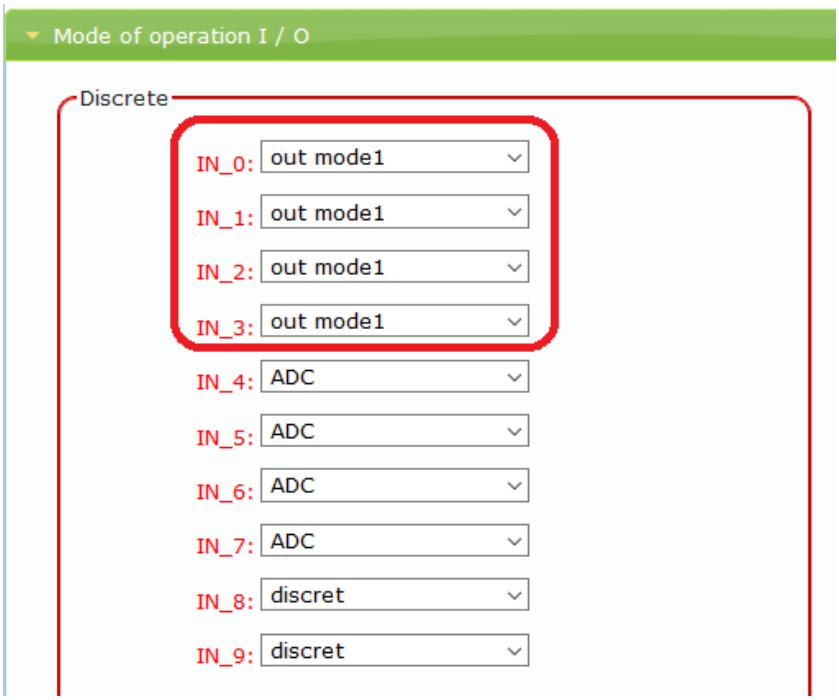


Fig. 4 – An example of connecting a motor lock relay

The relay is connected to one of the outputs of the device IN0 (U0), IN1 (U1), IN2 (U2), or IN3 (U3). For correct operation, it is necessary to set the output mode in the device settings.



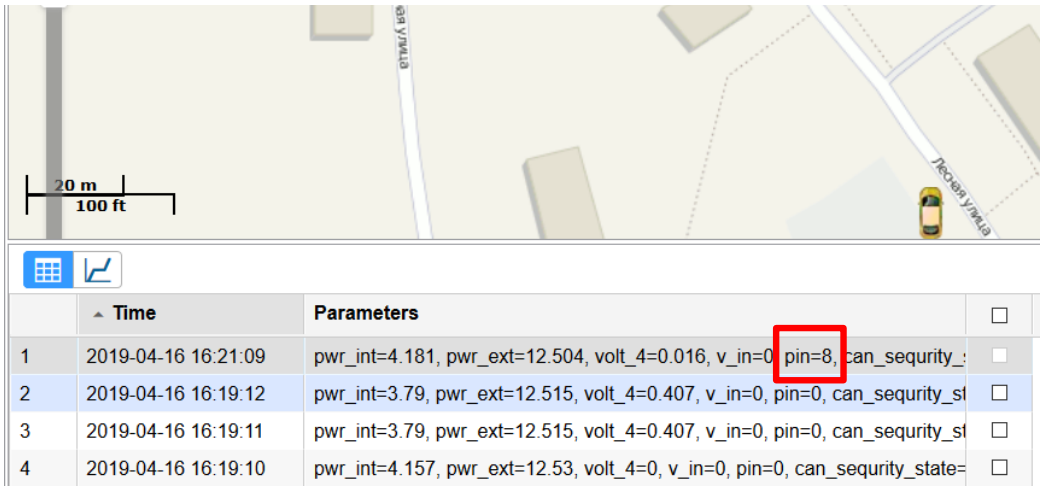
‘Output mode 1’ – the normal operation mode of the output with saving the state in non-volatile memory and recovery after restarting the device.

The output status is changed by a command from the server or SMS. The output is forcibly deactivated when the operating mode is changed.

In Wialon system, output state is contained in parameter “pin”.

The state of the discrete inputs/outputs is transmitted bitwise in "pin" parameter. In binary form, each bit of the "pin" parameter reflects the status of the corresponding input. For example, if value = 8 in decimal, it means that IN_3 is activated and the others are deactivated.

You can request a communication protocol for details.



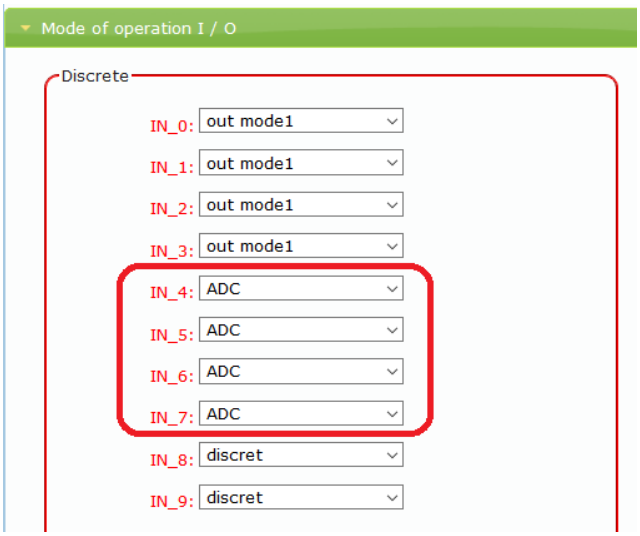
For commands to control the outputs, refer to the section “SMS and TCP command list”.

‘Reset Wi-Fi’ – the mode is used when using an external WI-FI module. Detailed description in section "RS-232 interface" - WI-FI mode.

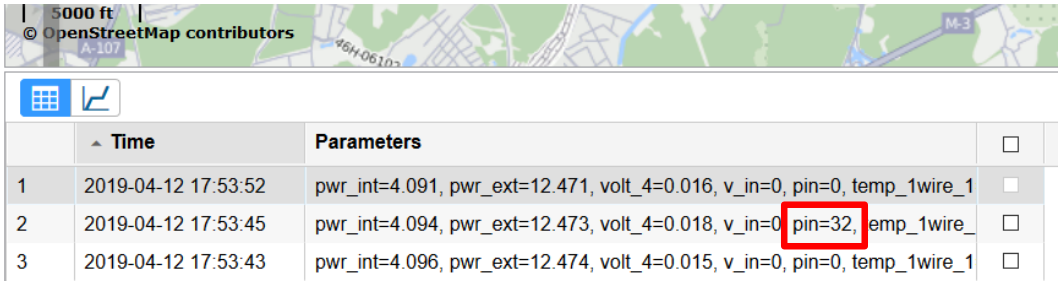
‘i-Button’ – the mode is used to indicate the fact of reading any 1-Wire key. At moment of reading, the output is activated for a few seconds, then deactivated. See "1-WIRE Interface" for more information.

1.2 ANALOG INPUTS

The device has four analog inputs – IN4 (A4), IN5 (A5), IN6 (A6), and IN7 (A7), which support several operation modes for connecting the corresponding sensors.



'Discrete mode' shows the input state, when input voltage more than 6V – the input is activated (state "1"), else – the input is deactivated (state "0"). The state of the discrete inputs is transmitted bitwise in the Wialon`s "pin" parameter. In binary form, each bit of the "pin" parameter reflects the status of the corresponding input. For example, a value of 32 in decimal means that IN_5 is activated and the others are deactivated.



ADC mode – sensors with an analog outputs can be connected (temperature sensors, analogue FLSs, regular FLSs, and ignition). Up to four sensors can be connected at the same time.

Analog sensors are connected to the analogue inputs IN4 (A4), IN5 (A5), IN6 (A6), IN7 (A7).

The bit width of the ADC input is 12 bits. Voltage measurement range: 0-33 V.

In Wialon system, analog state is contained in parameters "volt_4 - volt_7".

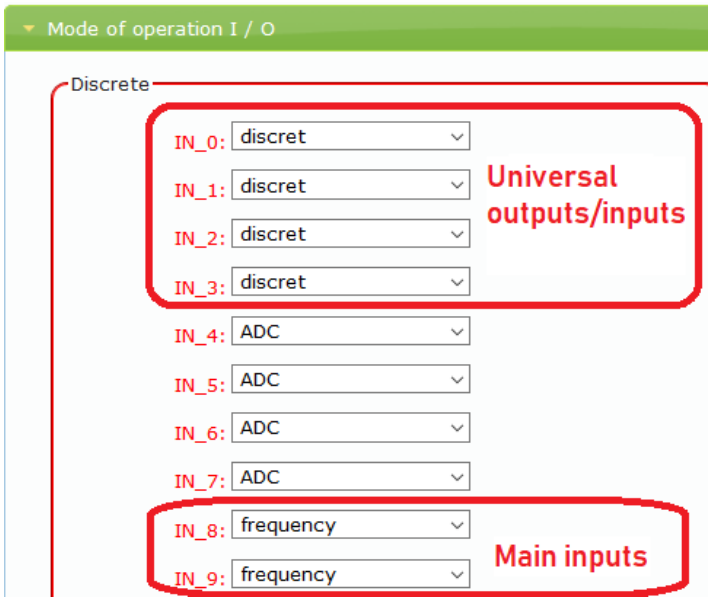
Ignition mode – the mode is selected when the ignition is connected to the selected input. The input configured for this mode works on the principle of discrete and its state is duplicated in a separate parameter "v_in".

Call button mode – input works as discrete. After activation of the input (including short-term) will be made to dial the numbers listed in the device settings, in order of priority (from 1 to 5). In the "phone numbers" web Configurator it is possible to adjust the sensitivity of the microphone and the volume level of the speakers.

1.3 DISCRETE INPUTS

The device has six discrete inputs:

- two main discrete inputs – IN8 (D8) and IN9 (D9)
- four universal discrete inputs/outputs – IN0 (U0), IN1 (U1), IN2 (U2), IN3 (U3).



Discrete inputs have an internal pull-up to 3.3V. If input voltage less than 1V – state "1", else – state "0". The allowed input voltage range is 0-33V.

The discrete inputs support several operation modes:

'Discrete mode' – shows the input state. when shorted to ground – state "1", else – state "0". In Wialon system, input state is contained in parameter "pin".

In Wialon monitoring system, inputs are counted from 1, i.e. in0 in wialon is in1, etc.

'Impulse' mode – sensors with pulse output (fuel flow sensors, various counters) can be connected. Up to six sensors can be connected at the same time (IN8 (D8), IN9 (D9), IN0 (U0), IN1 (U1), IN2 (U2), and IN3 (U3)). In Wialon system, impulse state is contained in parameter "imps_X", X – input number.

'Frequency' mode – FLSs with frequency output can be connected. Up to six frequency sensors can be connected at the same time, which allows controlling the fuel consumption of vehicles with multiple fuel tanks (Fig. 5). In Wialon system, frequency state is contained in parameter "freq_X", X – input number.

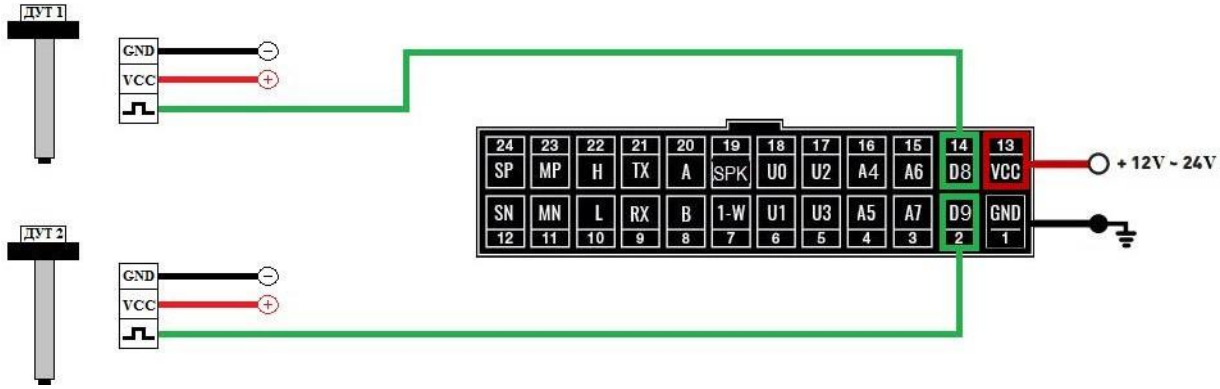


Fig. 5 – Frequency FLSs connection diagram

In the settings of the frequency FLS, specify the following parameters:

- Output signal type – frequency
- Frequency range: 30–4000 Hz
- Activate the pull-up resistor

When connecting frequency FLSs of other manufacturers, resistor pull-up may be required. The nominal value of the resistor is selected based on the on-board voltage and output parameters of the FLS.

‘Call button’ mode – input works as discrete. After activation of the input (including short-term) will be made to dial the numbers listed in the device settings, in order of priority (from 1 to 5). In the "phone numbers" web Configurator it is possible to adjust the sensitivity of the microphone and the volume level of the speakers.

‘Control massa’ – mode is used on vehicles equipped with a ground switch. The input is shorted to minus the power of the tracker. Used in conjunction with the "ignition"mode”. At the moment when the ground is switched off, the "ignition" state is considered to not valid (parameter v_in=0).

‘Speed control output – mode is used on vehicles for control speed. If speed is more than entered in field – output is go to active state. Output is deactivated after speed decrease less then entered level in field.

2. DIGITAL INPUTS

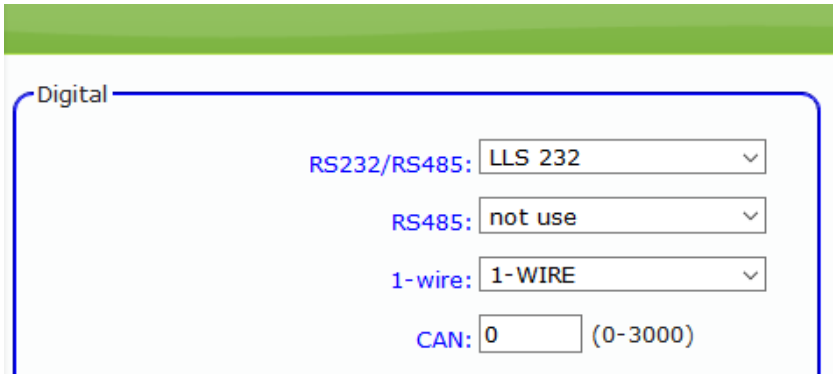
The device has a set of digital interfaces for connecting external sensors as well as for the scalability of the device capabilities:

- RS232,
- RS485,
- 1-WIRE,
- CAN.

Some digital interfaces have several operation modes:

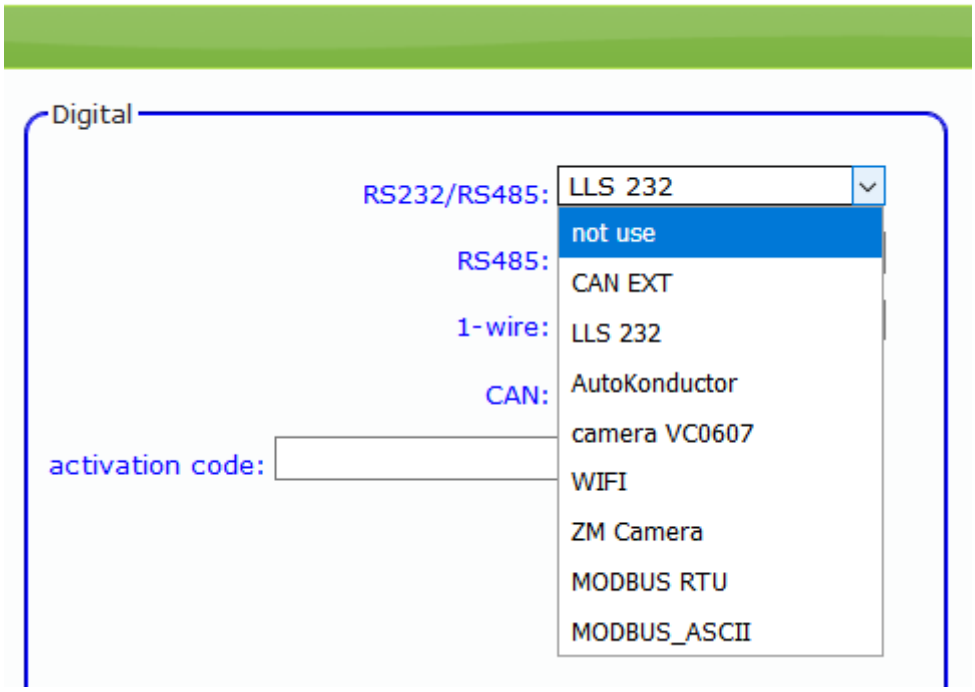
Table 5

№	RS-232	RS-485	1-WIRE
1	CAN EXT	CAN EXT	1-Wire
2	LLS	LLS/KUSS/PP-01	
3	ZM Camera	ZM Camera	
4	MODBUS RTU	MODBUS RTU	
5	MODBUS ASCII	MODBUS ASCII	
6	VC0607 Camera	Tachograph Shtrih	
7	WIFI		
8			
9			
10			



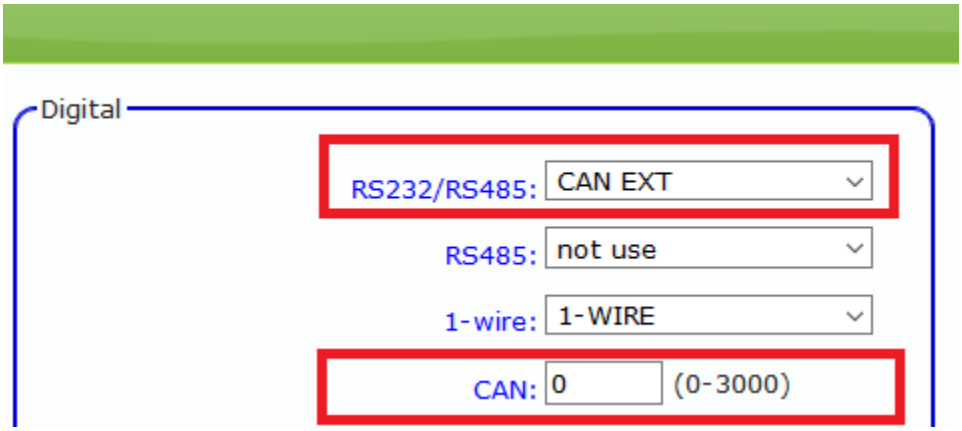
2.1 RS-232 INTERFACE

For correct operation, it is necessary to set the respective operation mode of the R232 digital input in the tracker settings.



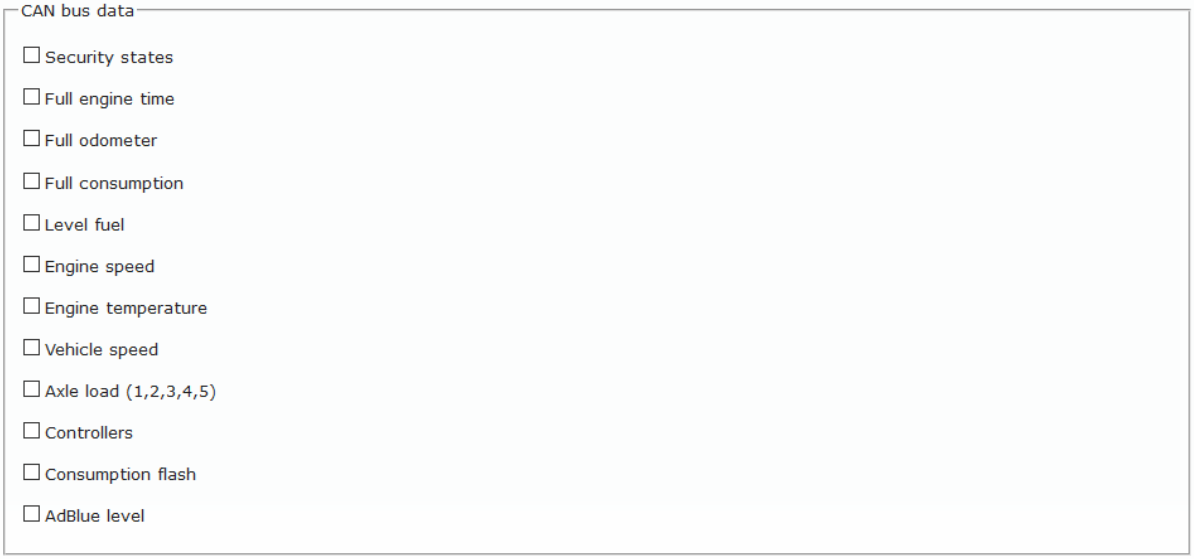
“CAN EXT” mode – connecting an external CAN module via the RS232 interface.

The programme number for CAN can be specified through the configurator in the field ‘CAN:’.



ATTENTION: WHEN ACTIVATING THE ‘CAN EXT’ MODE OF RS232 INTERFACE, THE SAME MODE OF RS485 INTERFACE MUST BE DEACTIVATED AND THE CAN PROGRAMME NUMBER MUST BE DIFFERENT FROM ‘3’.

In the section ‘Packet structure’ it is necessary to mark the necessary parameters to be transmitted to the server.



“LLS 232” mode – connecting an FLS (Fuel Level Sensor) using RS232 interface supporting Omnicomm LLS protocol.

Connecting an FLS using RS232 interface is similar to connecting an FLS using RS485 but has a number of specific features:

- only one FLS can be connected;
- RS232 interface is used;
- the value will be transmitted from the FLS with the number ‘0’ (lls_l0, lls_t0).

The connection of the fuel level sensor via RS232 interface (to contacts ‘9’ and ‘21’ of the main connector) is shown in Fig. 6.

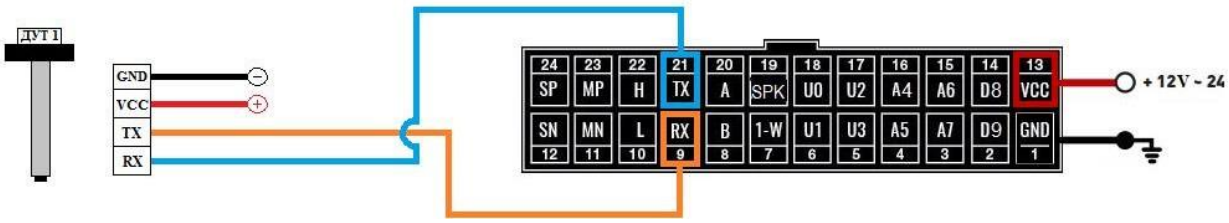


Figure 6 – Diagram of connecting the FLS via RS232 DUT

The unique network address for the FLS in RS232 mode is not fundamental and can be set as any sequence of symbols (see the Level Sensor User Manual); the symbol rate is 19200 baud.

ATTENTION: WHEN CONNECTING DIGITAL FLSs via RS485 AND RS232 AT THE SAME TIME, THE NETWORK ADDRESS ‘0’ IS AUTOMATICALLY RESERVED FOR FLS RS232. FOR THIS REASON, THE NUMBERING OF FLS RS485 MUST EXCLUDE THE ADDRESS ‘0’.

“MODBUS RTU” mode – connection of external devices via RS-232 interface supporting Modbus Protocol.

Arnavi 5 works with Modbus Protocol only in data reading mode.

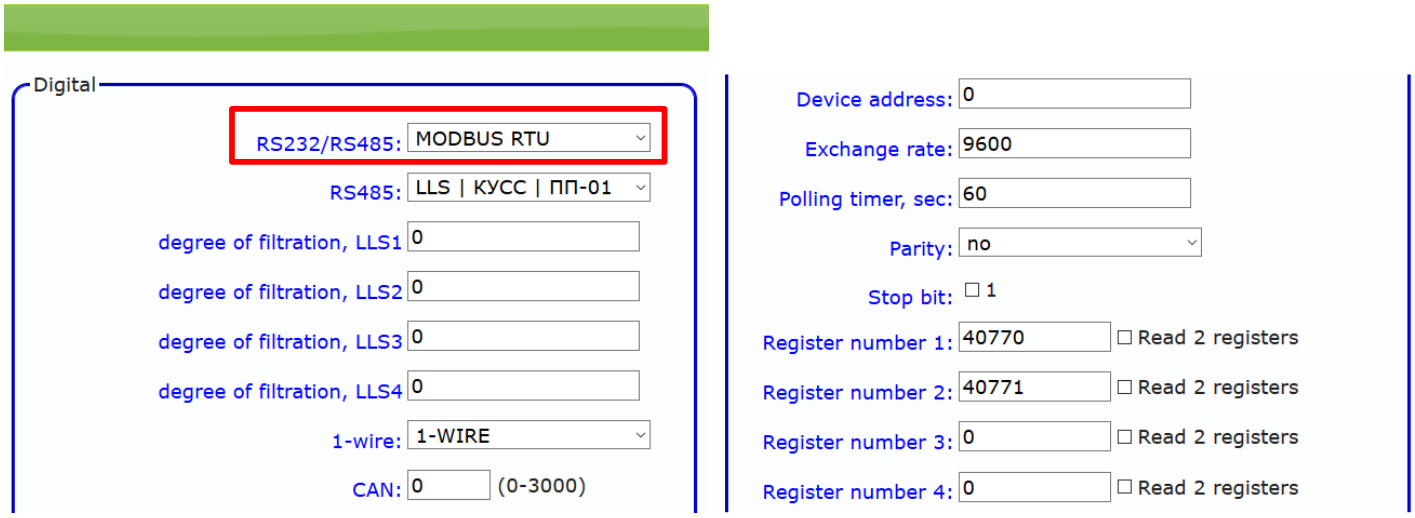
Up to 20 registers (two or four-byte) can be read and transmitted to the server. If you need to transfer four-byte register, you must check the box ‘read 2 registers’ (See illustration below).

Mode setting:

Available baudrate: 9600, 19200, 38400, 57600.

Polling timer (measured in seconds): 0-65535. **Note:** for each register polling cycle, a packet is generated and sent to the server. Too low value of the polling timer will lead to a significant increase in Internet traffic.

Parameters ‘Device address’, ‘Parity’, ‘Stop bit’ are set in accordance with the technical documentation of the connected equipment.



When setting up the register number for reading, you should take into account the following feature:

If the register number specified in the settings is in the range ≥ 1 And ≤ 10000 inclusive, the function 01 will be used for read request, and the register address in the request will remain unchanged.

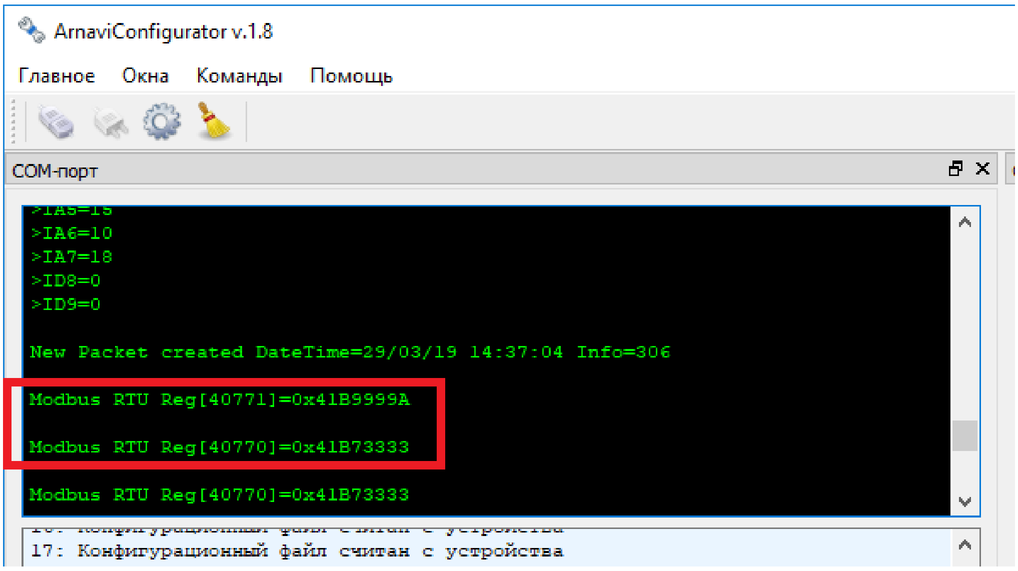
If the register number specified in the settings is in the range ≥ 10001 And ≤ 20000 inclusive, the function 02 will be used for read request, and the register address in the request will be reduced by 10001 relative to the one specified in the settings.

If the register number specified in the settings is in the range ≥ 30001 And ≤ 40000 inclusive, the function 04 will be used for read request, and the register address in the request will be reduced by 30001 relative to the one specified in the settings.

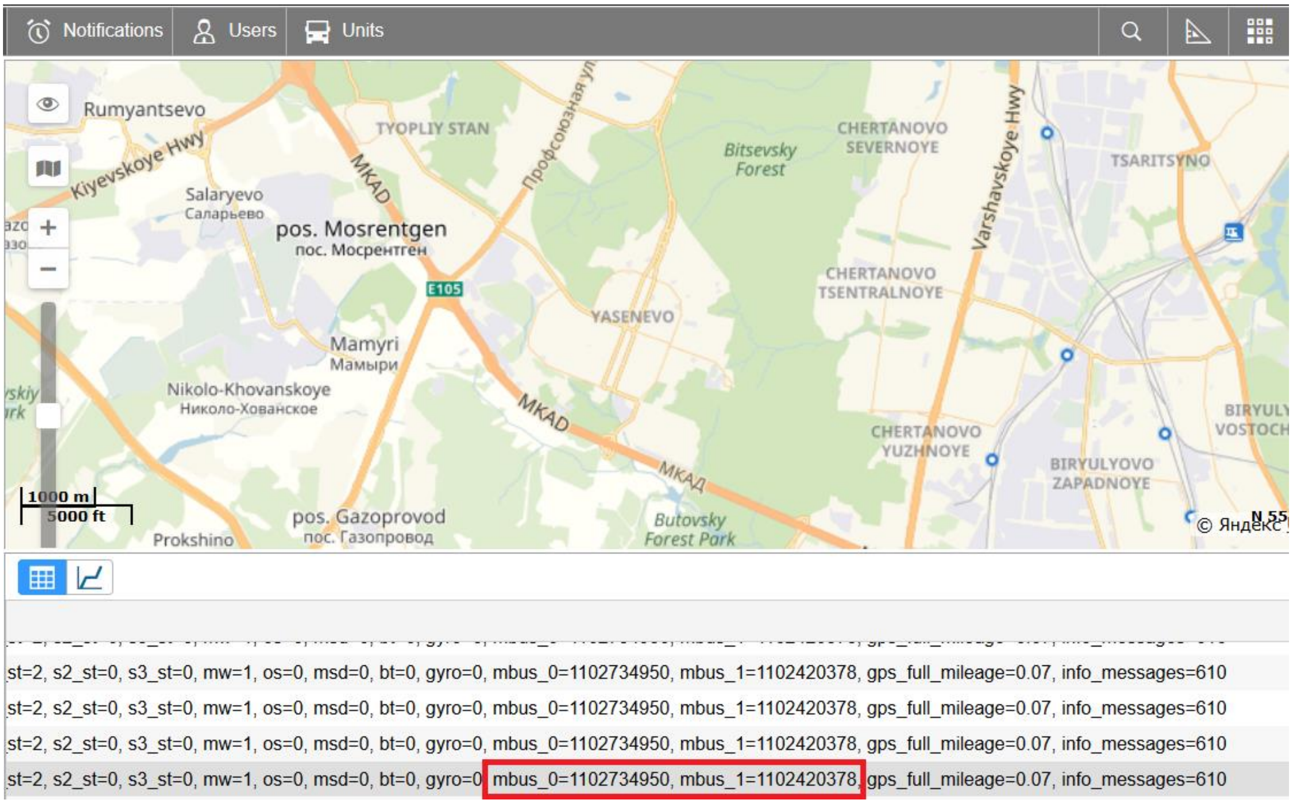
If the register number specified in the settings is in the range ≥ 40001 And ≤ 50000 inclusive, the function 03 will be used for read request, and the register address in the request will be reduced by 40001 relative to the one specified in the settings.

Example: To read the register 769 using function 03 in the settings you need to specify the register number 40770.

If the external device has been configured and connected, then in the tab 'COM port' Arnavi Configurator at the time of reading will appear the rows with the values of the required registers:



After reading the registers, a packet is generated and sent to the server:



In Wialon system, read registers is contained in parameter "mbus_X", X – (register sequence number -1).

"MODBUS ASCII" mode – use and setup similar to **MODBUS RTU** mode.

"Camera VC0607" mode – connecting the camera "VC0607" via RS-232 interface.

Interval shooting and manual shooting are available.

A single photo can be taken using the following commands:

'<Access_password>*CMD*foto' – SMS command

'foto' – TCP command in text form (driver message in Wialon).

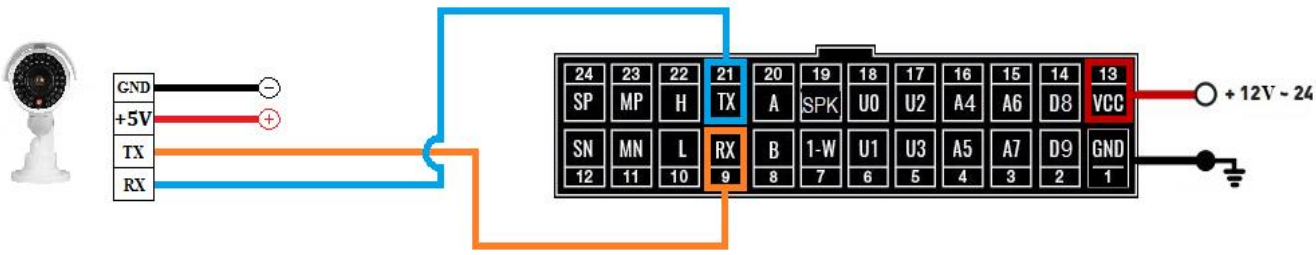
To activate, select the mode of operation of the digital interface RS-232(see the illustration below).

Mode setting:

Interval shooting. To activate, set the interval of photos from 1 to 65535 minutes. A value of 0 disables the interval shooting.

Photo quality : 160×120, 320×240, 640×480.

Connection:



CAMERA SUPPLY VOLTAGE IS 5V.
ARNAVI 5 CANNOT BE USED AS A POWER SOURCE FOR THE CAMERA.

"ZM Camera" mode – connecting the camera "ZM" via RS-232 interface.

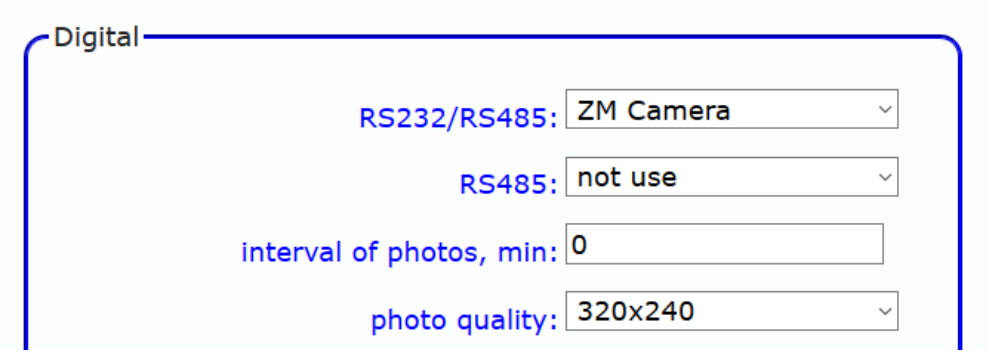
Interval shooting and manual shooting are available.

A single photo can be taken using the following commands:

'<Access_password>*CMD*zmcam' – SMS command

'zmcam' – TCP command in text form (driver message in Wialon).

To activate, select the mode of operation of the digital interface RS-232(see the illustration below).

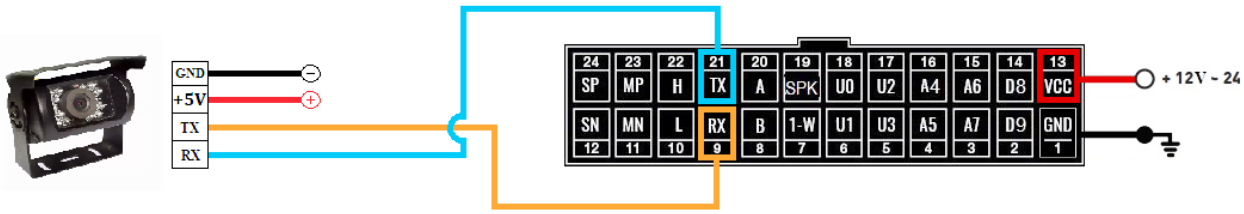


Mode setting:

Interval shooting. To activate, set the interval of photos from 1 to 65535 minutes. A value of 0 disables the interval shooting.

Photo quality : 160×120, 320×240, 640×480.

Connection:



CAMERA SUPPLY VOLTAGE IS 5V.
ARNAVI 5 CANNOT BE USED AS A POWER SOURCE FOR THE CAMERA.

“Wi-fi” mode – connection using external module "Arnavi Wi-Fi".

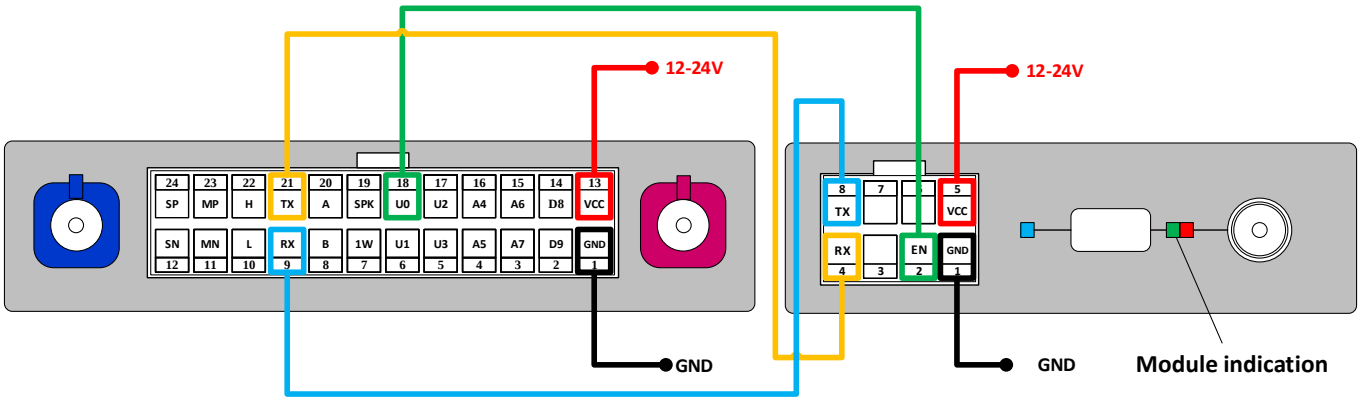
Allows you to connect to a server (or two servers) via Wi-fi access point. This mode has priority over data transmission via GSM channel. If an access point is available, data transmission will be carried out primarily via Wi-Fi. The Arnavi Wi-Fi module supports 802.11 b/g/n Wi-Fi protocols.

IF THE DEVICE USES WIFI CONNECTION, IT IS IMPOSSIBLE TO UPLOAD THE TACHOGRAPH .DDD FILE, UPLOAD PHOTOS AND TRANSFER DATA USING EGTS PROTOCOL

Connection:

Wi-Fi module has RS-232 interface and ‘EN’ input. If ‘EN’ is shorted to ground – module is activated. "EN" output can be rigidly closed to the ground, or can be connected to free arnavi 5 outputs (U0, U1, U2, U3). The last connection method allows the tracker to independently control the operation of the external module, as well as to reboot it in emergency situations.

The connection diagram using the U0 output is shown in the figure:



The WI-FI module has the following indication:

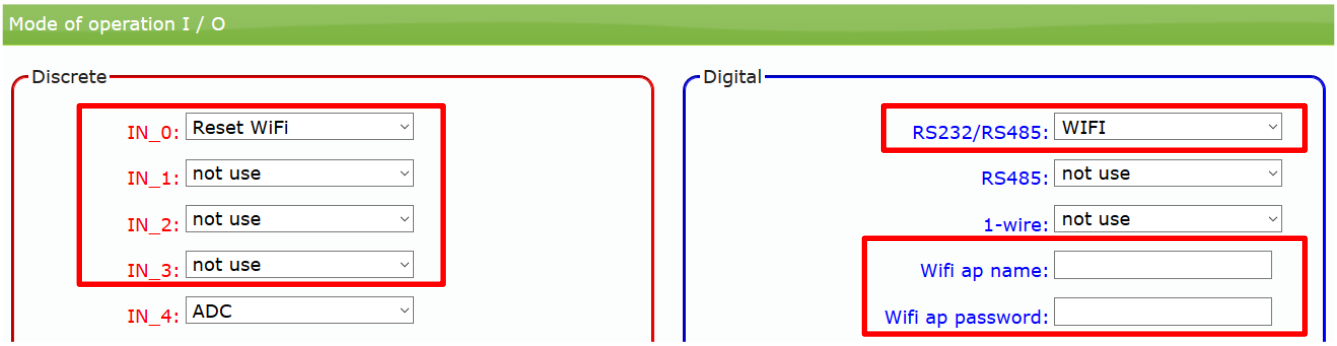
• green – power source is connected

• green and red – power is normal and the module is activated ("EN" output is closed to ground)

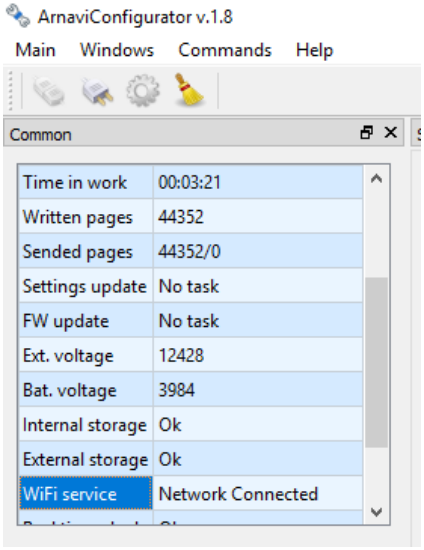
Also, the data transfer process may be accompanied by short blue flashes.

Setting:

To configure this mode via the web Configurator, you need to configure the selected fields in the "Mode of operation I/O" tab:



• Select "WI FI" mode RS-232 interface»;
• Enter the access point name and password ("wifi ap name" and "wifi ap password»);
• If the connection is made using the output U0-U3 (IN_0-IN_3), the selected corresponding output must be set to the "Reset WIFI" mode (Attention! Only one output must be set to this mode at a time).

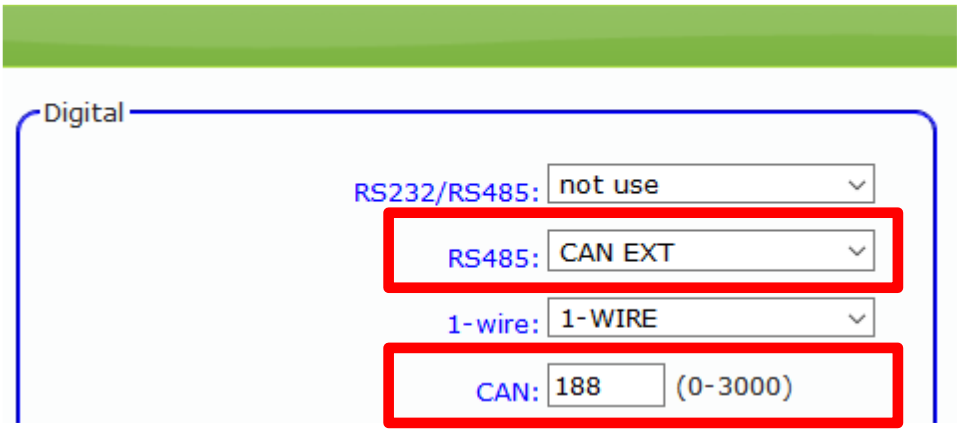


In Arnavi-Configurator`s section "Common" displayed the current status of the WiFi module. Wi Fi module can have the following statuses:

State	Description
Module not found	Arnavi 5 cannot connect to module (it is necessary to check the connection and settings)
Network searching	Search for the access point specified in the settings
Network connecting	The module is connected, the process of connecting to the access point is underway
Network connected	The connection to the access point is established, but there is no connection to the server
Server connected	Connection to the server is established (normal mode)

2.2 RS-485 INTERFACE

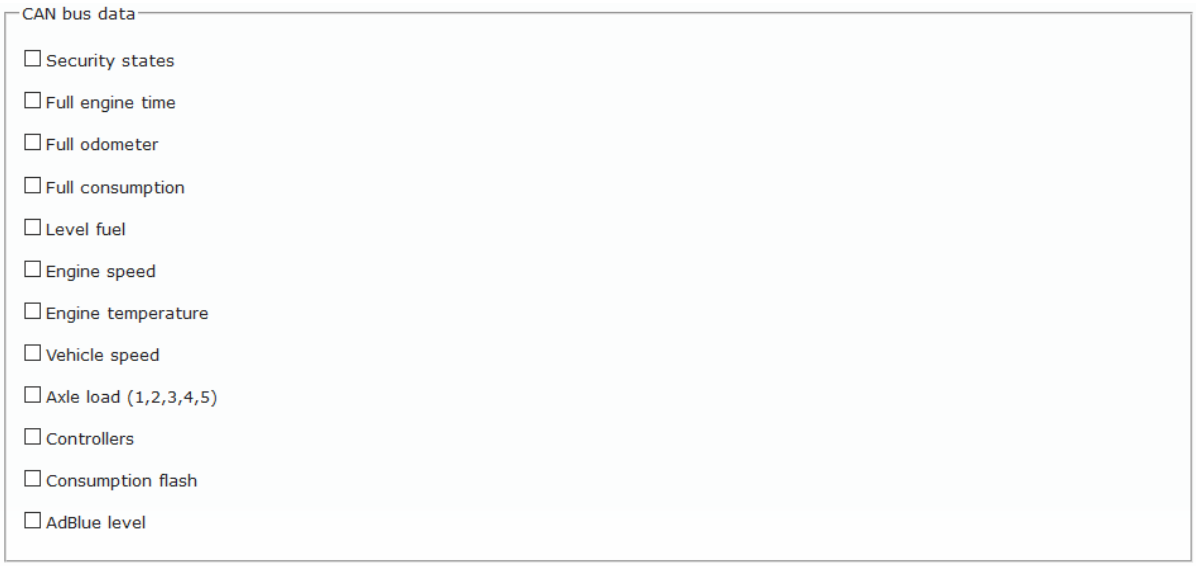
“CAN EXT” mode – connecting an external CAN module via the RS485 interface. The programme number for CAN can be specified through the configurator in the field ‘CAN:’.



An external CAN module can also be connected in parallel with one or more FLS. To do this, you must select the mode "LLS | KUSS | PP-01".

ATTENTION: WHEN ACTIVATING THE ‘CAN EXT’ MODE OF RS485 INTERFACE, THE SAME MODE OF RS232 INTERFACE MUST BE DEACTIVATED AND THE CAN PROGRAMME NUMBER MUST BE DIFFERENT FROM ‘3’.

In the section ‘Package structure’ you can mark the necessary parameters to be transmitted to the server.



LLS | KUSS| PP-01 mode – work with fuel level sensors via RS485, signal pick-up device controller, and passenger traffic flow sensor PP-01.

To control the flow as well as fuel filling and discharge operations, the device supports operation with external digital (RS-485 interface, 12 bit) fuel level sensors (capacitive, ultrasonic, etc.) that support Omnicomm's LLS protocol.

The sensors are connected to the contacts '20' and '8' of the main connector (see Fig. 7). Up to eight sensors can be connected to the device at the same time (a bigger number is also possible), which allows controlling the fuel consumption of vehicles with multiple fuel tanks. The sensors are connected to the device in parallel.

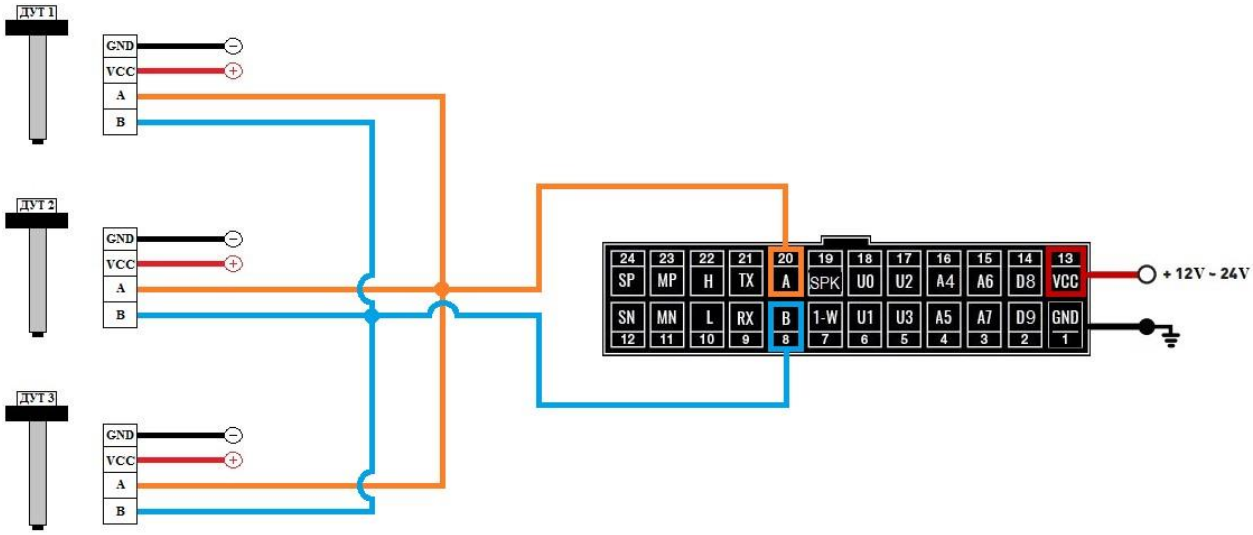
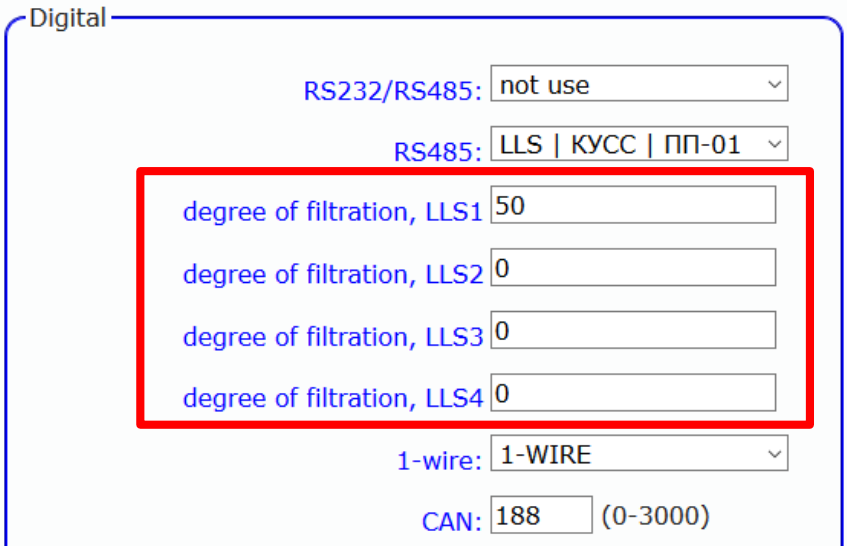


Figure 7 – Diagram of connecting several FLSs via RS485 DUT

The device distinguishes the connected FLSs by their network address (the device polls sensors with the addresses 01, 02, 03, 04, 05, 06, 07, and 08). Therefore, when connecting several sensors to a single device, each sensor must have a unique network address within the range from 1 to 8 (see the Level Sensor User Manual); the symbol rate is 19200 baud.

When configuring via the web Configurator, it is possible to configure an additional degree of filtering inside the tracker for sensors with addresses 01-04:



Working with the signal pick-up device controller
Data are transmitted from KUSS to the server in the form of two tags:

155		KUSS_L	Filling capacity in ml
156	0xNNTTTTTT	KUSS_N, KUSS_T	Filling operation number and filling operation duration

ATTENTION: THE KUSS MODE COMBINED WITH LSS 485 MODE, WHICH ALLOWS SIMULTANEOUSLY USING BOTH FLSs AND KUSS AT THE BUS

Working with the passenger traffic flow sensor PP-01
The tracker can simultaneously work with 4 passenger traffic flow sensors, which must have different network addresses within the range from 01 to 04.
Data transmission to the server takes place in tag No 190 – virtual sensors:

- Sub-tag 0 – the number of entries from the sensor with the address 01
- Sub-tag 1 – the number of exits from the sensor with the address 01
- Sub-tag 2 – the number of entries from the sensor with the address 02
- Sub-tag 3 – the number of exits from the sensor with the address 02
- Sub-tag 4 – the number of entries from the sensor with the address 03
- Sub-tag 5 – the number of exits from the sensor with the address 03
- Sub-tag 6 – the number of entries from the sensor with the address 04
- Sub-tag 7 – the number of exits from the sensor with the address 04
- Sub-tag 8 – indicates the door status of each sensor bitwise

ATTENTION: THE PASSENGER TRAFFIC FLOW MODE COMBINED WITH LSS 485 MODE, WHICH ALLOWS SIMULTANEOUSLY USING BOTH FLSs AND PASSENGER TRAFFIC FLOW AT THE BUS

“MODBUS RTU” mode – connection of external devices via RS-485 interface supporting Modbus Protocol.

Arnavi 5 works with Modbus Protocol only in data reading mode.

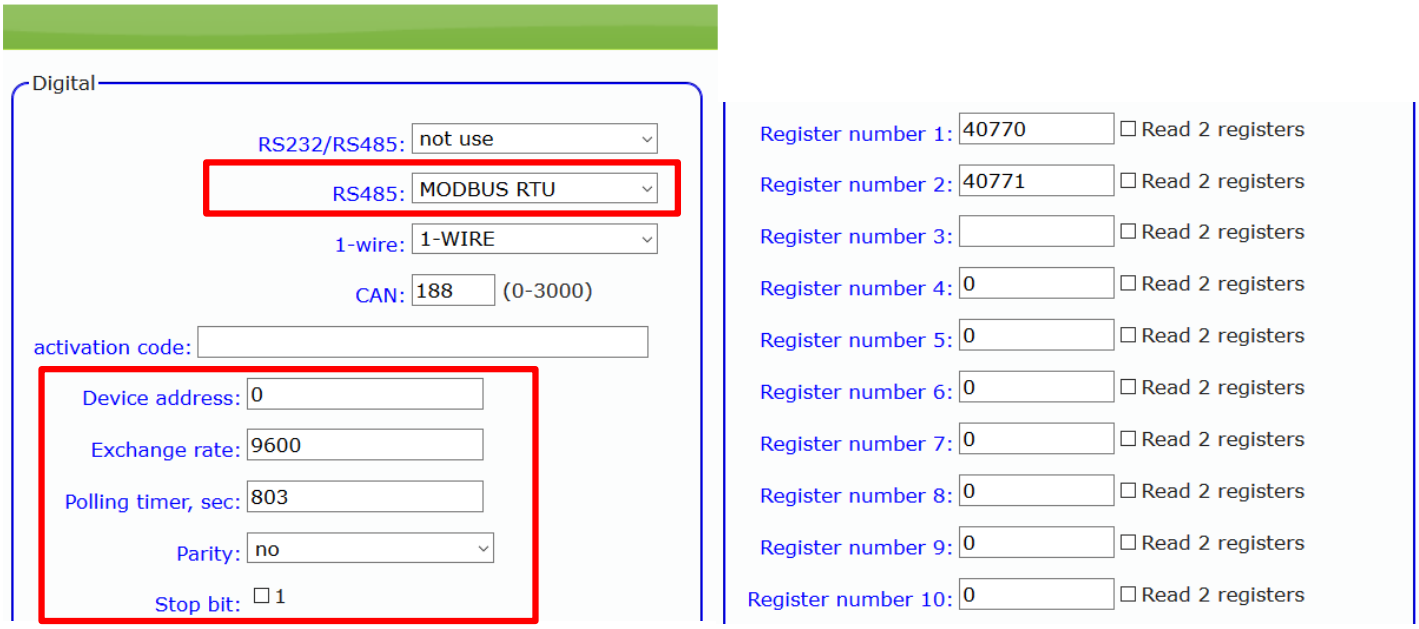
Up to 20 registers (two or four-byte) can be read and transmitted to the server. If you need to transfer four-byte register, you must check the box ‘read 2 registers’ (See illustration below).

Mode setting:

Available baudrate: 9600, 19200, 38400, 57600.

Polling timer (measured in seconds): 0-65535. **Note:** for each register polling cycle, a packet is generated and sent to the server. Too low value of the polling timer will lead to a significant increase in Internet traffic.

Parameters ‘Device address’, ‘Parity’, ‘Stop bit’ are set in accordance with the technical documentation of the connected equipment.



When setting up the register number for reading, you should take into account the following feature:

If the register number specified in the settings is in the range ≥ 1 And ≤ 10000 inclusive, the function 01 will be used for read request, and the register address in the request will remain unchanged.

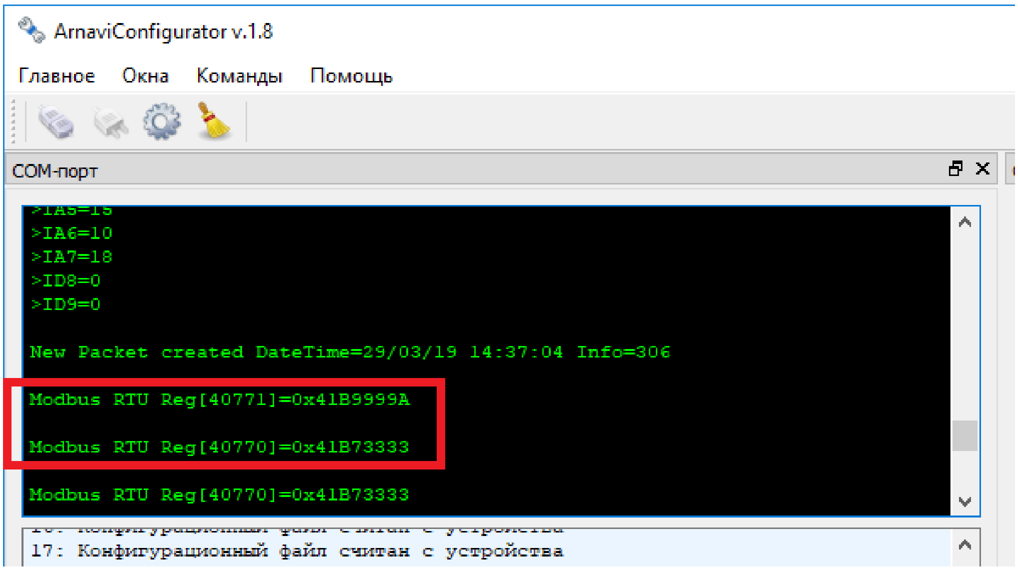
If the register number specified in the settings is in the range ≥ 10001 And ≤ 20000 inclusive, the function 02 will be used for read request, and the register address in the request will be reduced by 10001 relative to the one specified in the settings.

If the register number specified in the settings is in the range ≥ 30001 And ≤ 40000 inclusive, the function 04 will be used for read request, and the register address in the request will be reduced by 30001 relative to the one specified in the settings.

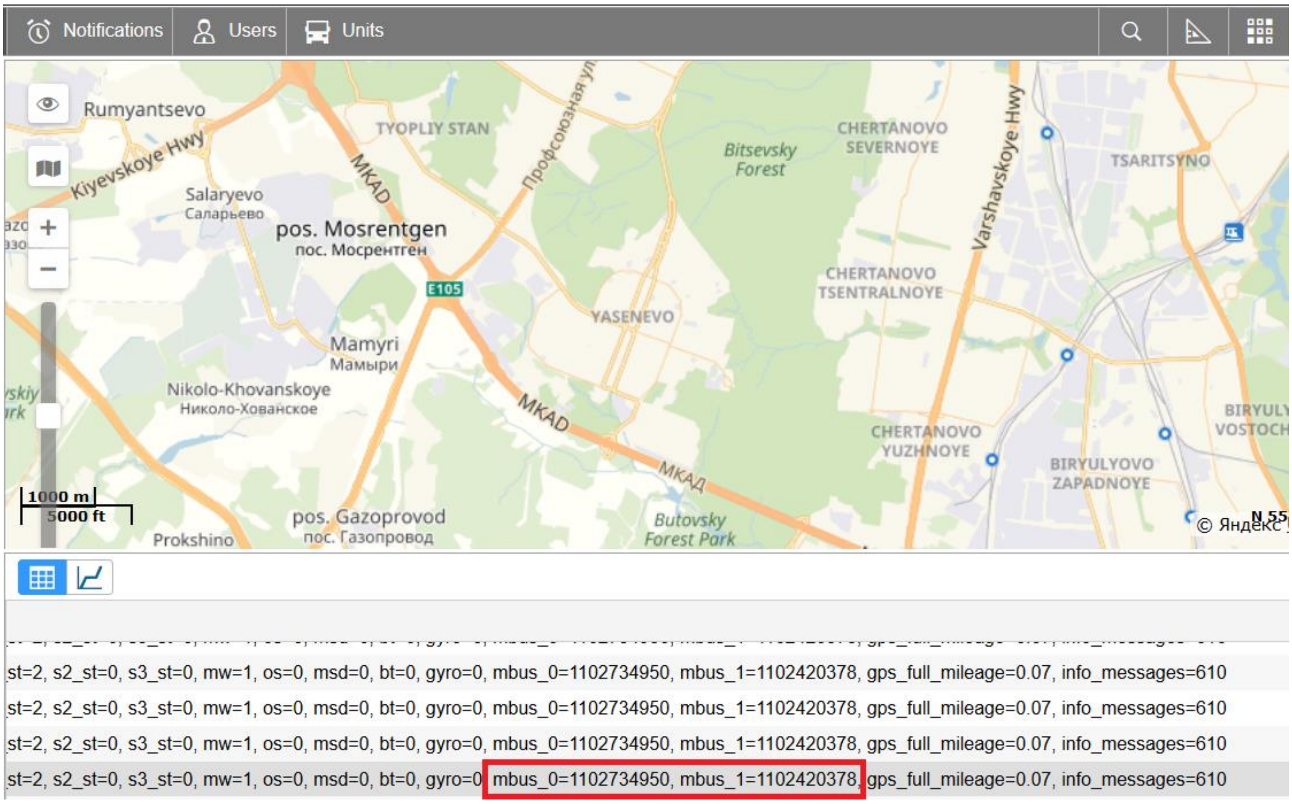
If the register number specified in the settings is in the range ≥ 40001 And ≤ 50000 inclusive, the function 03 will be used for read request, and the register address in the request will be reduced by 40001 relative to the one specified in the settings.

Example: To read the register 769 using function 03 in the settings you need to specify the register number 40770.

If the external device has been configured and connected, then in the tab ‘COM port’ Arnavi Configurator at the time of reading will appear the rows with the values of the required registers:



After reading the registers, a packet is generated and sent to the server:



In Wialon system, read registers is contained in parameter “mbus_X”, X – (register sequence number -1).

"MODBUS ASCII" mode – use and setup similar to **MODBUS RTU** mode.

"ZM Camera" mode – connecting the camera "ZM" via RS-485 interface.

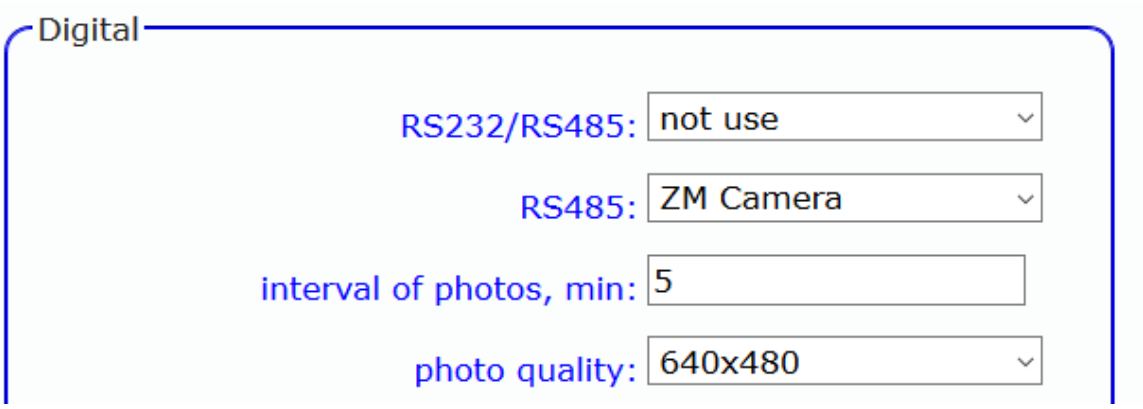
Interval shooting and manual shooting are available.

A single photo can be taken using the following commands:

'<Access_password>*CMD*zmcam' – SMS command

'zmcam' – TCP command in text form (driver message in Wialon).

To activate, select the mode of operation of the digital interface RS-485(see the illustration below).

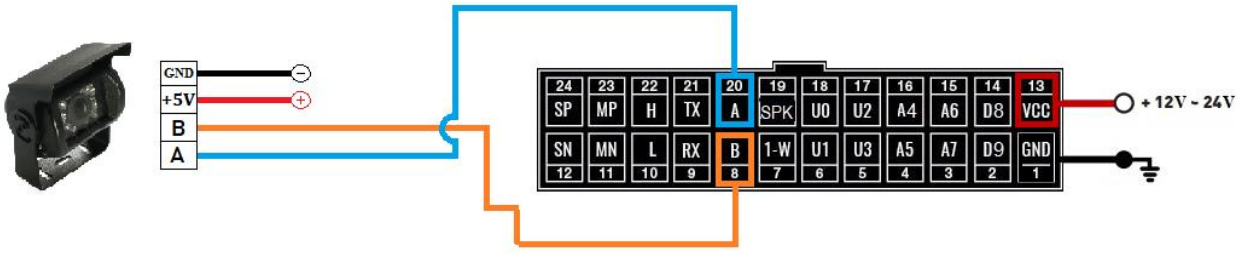


Mode setting:

Interval shooting. To activate, set the interval of photos from 1 to 65535 minutes. A value of 0 disables the interval shooting.

Photo quality : 160×120, 320×240, 640×480.

Connection:



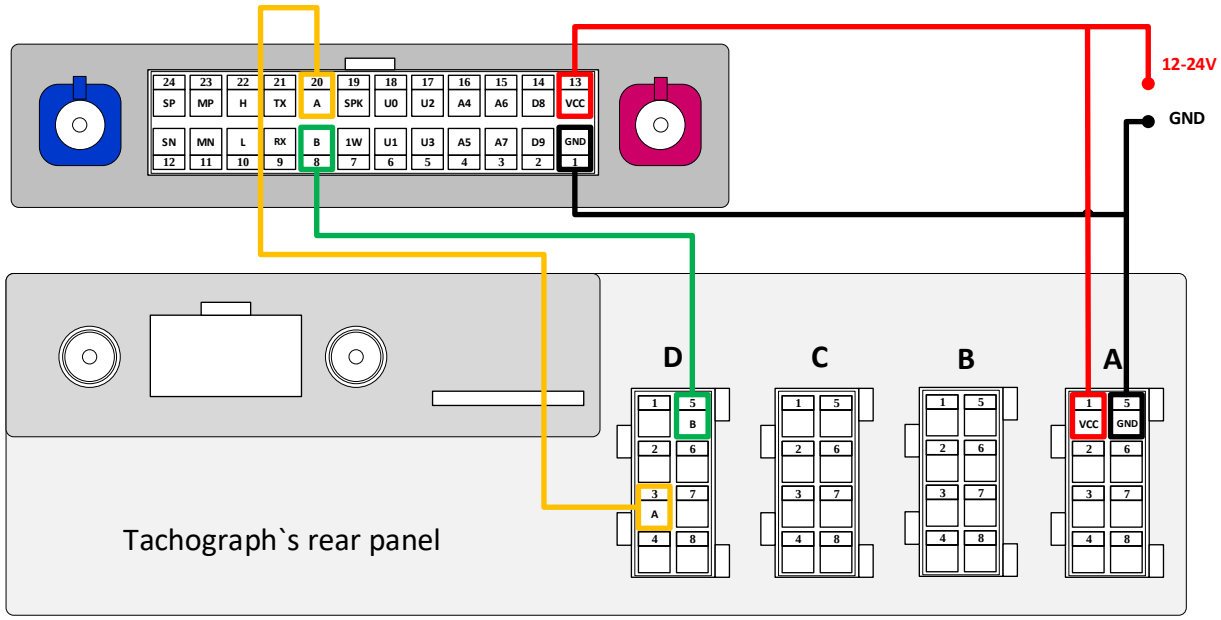
CAMERA SUPPLY VOLTAGE IS 5V.
ARNAVI 5 CANNOT BE USED AS A POWER SOURCE FOR THE CAMERA.

"Tachograph Shtrih" mode – allows you to connect the tachograph "Stroke" using RS-485 interface.

Mode allows you to upload .DDD tachograph file to the server using SMS and TCP commands:

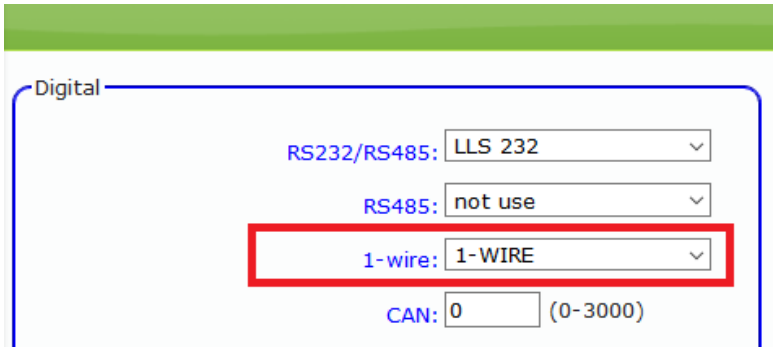
SMS: <Access_password>*SERV*20.0 TCP: 2000	Upload data from tachograph "Shtrih" to server
SMS: < Access_password >*SERV*20.1 TCP: 2001	Upload data from tachograph "Shtrih" to server using second SIM

Connection:



2.3 1-WIRE INTERFACE

Connection of digital sensors via 1-WIRE interface



To control the temperature of various devices or objects, temperature sensors are used. They operate via the 1-wire interface (up to 8 sensors can be connected simultaneously on one data bus). Also, in parallel with the temperature sensors it is possible to connect a connector for reading ibutton keys.

Figure 8 shows the connection of several temperature sensors of different Types and i-button reader:

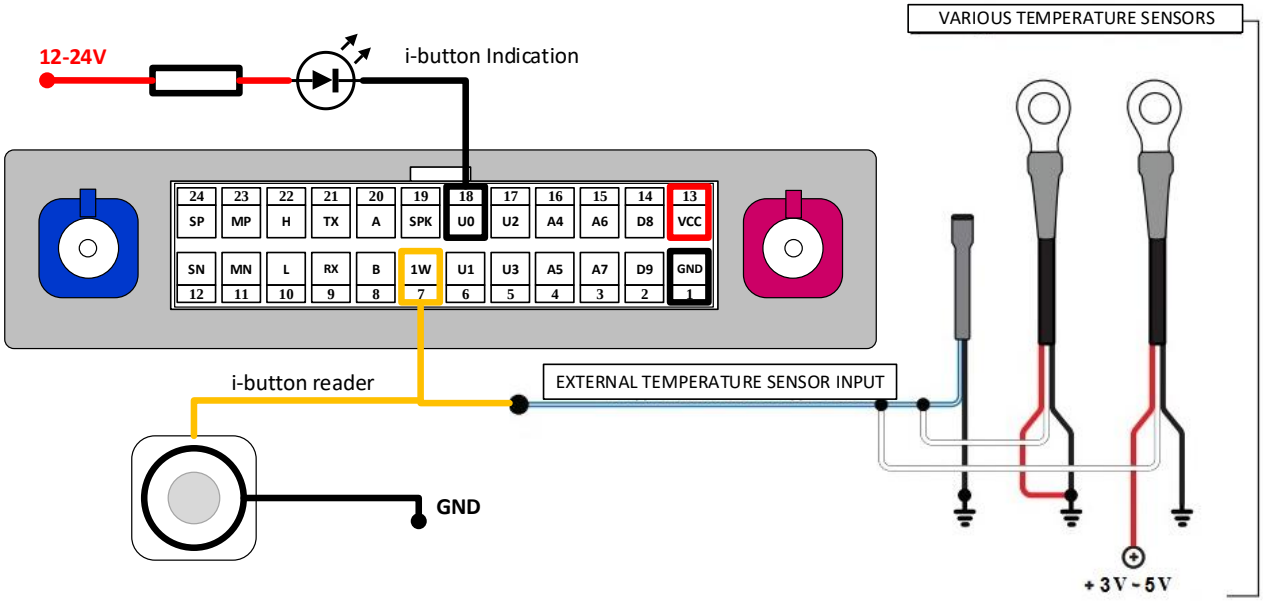


Figure 8 – Diagram of connecting temperature sensors of different type

For the 1-wire mode, no special settings are required as everything works in an automatic mode.

When new temperature sensors are connected, they are automatically assigned id from 0 to 7, which they are transmitted to the server. In Wialon system, temperature sensor state is contained in parameter "Temp_1wire_X", X – sensor number.

ATTENTION: WHEN CONNECTING SENSORS USING A PARASITIC POWER SUPPLY (TWO-WIRE CONNECTION CIRCUIT), THE OPERATION OF UP TO 3 SENSORS ON THE BUS IS GUARANTEED.

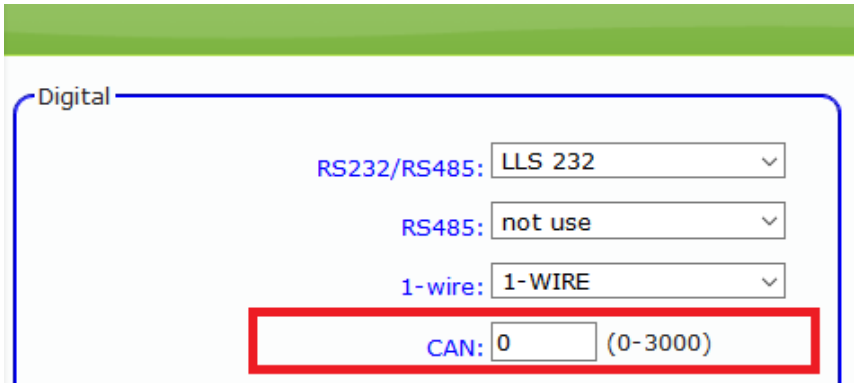
I-button keys can be read simultaneously with the operating temperature sensors. In the Wialon system, the key ID is stored in the "ID" parameter. Reading the key can be accompanied by an indication by setting one of the outputs(U0-U3) to the "i-button"mode.

At the time of reading, the output is activated for a few seconds, then deactivated. The connection diagram is shown in Fig. 8. When connecting an external indicator, it is necessary to take into account the maximum output load current (540mA).

2.4 CAN INTERFACE

Internal support of the CAN bus according to the standard J1939 Protocol, without using an external CAN module, is envisaged for the user's convenience.

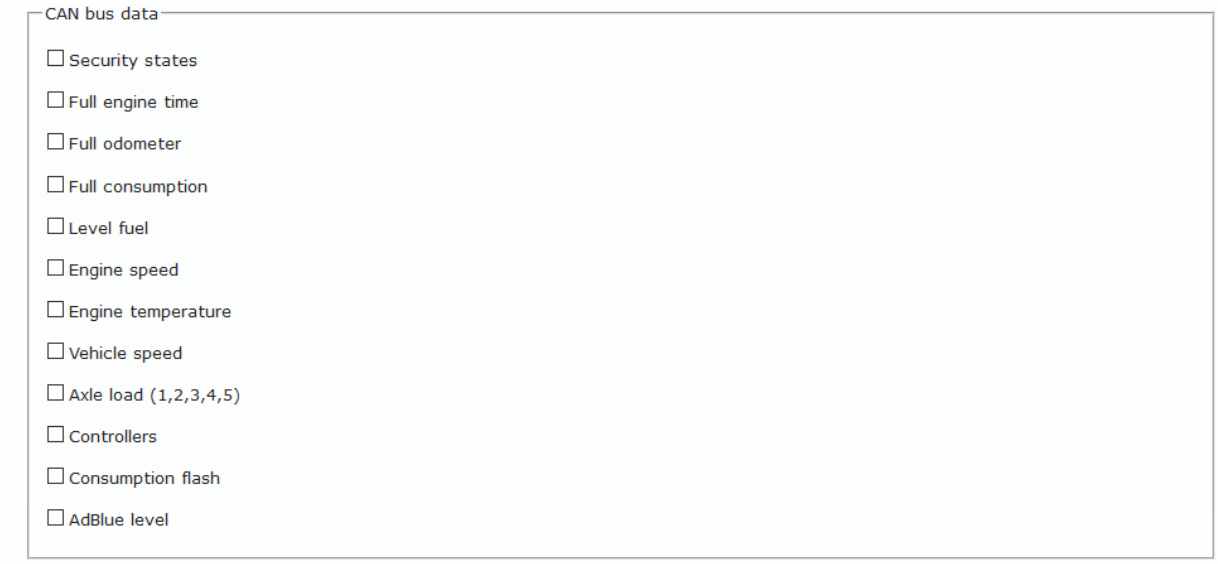
The connection is made to pins 10 (L) and 22 (H) of the main connector of the device.
The transmission rate is 250 kbps.



For correct operation, it is necessary to set the number of the Can program – 3 in the tracker settings.

ATTENTION: WHEN USING THE CAN INTERFACE, THE CAN EXT MODES OF THE INTERFACES RS232 AND RS485 MUST BE DEACTIVATED

In the section 'Package structure' it is necessary to mark the necessary parameters to be transmitted to the server.



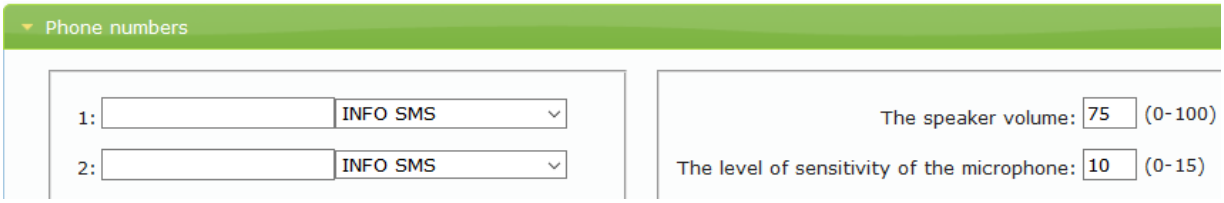
3. CONNECTION OF THE SPEAKERPHONE COMMUNICATION WITH THE DRIVER

The output volume of the device can be adjusted when the configuring the device.
The connection diagram of the microphone and speaker is shown in Figure 9.

Figure 9 – Diagram of connecting the microphone and speaker

An external electret microphone with a balanced output should be used as a microphone for balanced connection. The power for the microphone is generated by a GSM modem.

The sensitivity and the volume level of the microphone can be adjusted when configuring the device – see the section 'Phone numbers'.



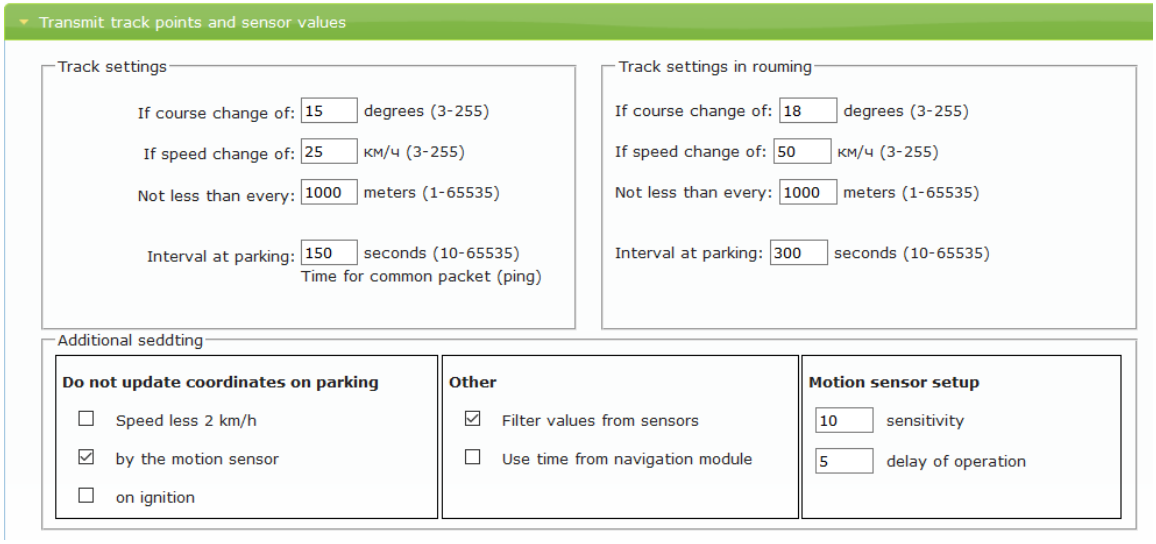
If it is necessary to produce a more powerful (loud) sound, an external amplifier and a loudspeaker corresponding to its power output should be used.

ADDITIONAL FUNCTIONALITY

1. ROAMING – ADDITIONAL SETTINGS

For any SIM can be enabled or disabled to work in roaming.
In the roaming mode, will be active ‘Track settings in the roaming’.

If any of the filters is not required (track settings in roaming, interval or buffer settings), then ‘0’ is entered in its field and it is disabled.



INDICATION OF OPERATION

To reflect the operation process, the tracker has two light indicators: NAV | GSM and PWR | BAT (Fig.10).

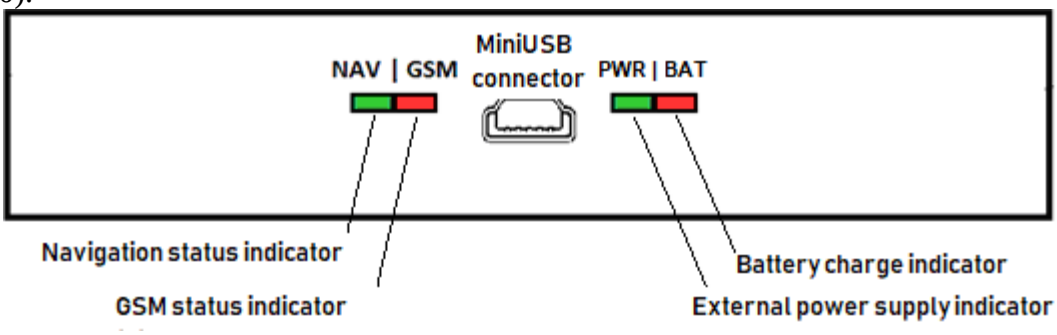


Fig. 10 – Rear panel view (schematic)

PWR | BAT light-emitting diode

- Green light is on – external power is connected
- Green and red lights are on at the same time – external power is connected and the built-in battery is charging.

NAV | GSM light-emitting diode

Green light – the operation mode of the navigation module:

- Off – the module is off / no coordinates
- 1 flash / 1 second – satellites are found, the coordinates are valid

Red light – the operation mode of the GSM modem:

- Off – the modem is off
- constantly on – searching for a network
- 1 flash / 5 seconds – attempting to connect to the server
- 1 flash / 1 second – connection with the server is established

After some time (1–2 minutes), the NAV | GSM light-emitting diode should switch to the mode ‘green and red, 1 flash / 1 second’, which means that the device has switched into the normal mode, i.e. everything works correctly.

If this does not happen, then this fact may be evidence of a malfunction of the device. Check whether the connection of power and antennas is correct. Also check server settings. If it is not the case, contact the Support Service support@arusnavi.ru.

SMS AND TCP COMMAND LIST

The tracker supports receiving and processing SMS and TCP commands. The description of all available commands is presented in tables 6 - 8.

Таблица 6 - SMS commands:

Format	Command description
< access_password >*SETP* <parameter_list>	Command to configure the tracker. Detailed description of the command in the section "setting via SMS".
Control commands	
< access_password >*SERV*1.1	Send a package with coordinates to the server immediately
< access_password >*SERV*1.4	Update the software via the web configurator even if assigned and current versions coincide
< access_password >*SERV*1.5	Update the software via the web configurator if assigned version differs from the current one
< access_password >*SERV*1.5.80	Update the software of the external CAN-module
< access_password >*SERV*1.7	Reboot
< access_password >*SERV*1.8	Download settings from the web configurator
< access_password >*SERV*1.9	Send the current settings to the web configurator
< access_password >*SERV*8.X.Y	Change the output status, where x – the output number (0 – IN0 (U0), 1 – IN1 (U1), 2 – IN2 (U2), 3 – IN3 (U3)) and y – the new status (0 – off, 1 – on));
< access_password >*SERV*20.0	Upload data from tachograph "Shtrih" to server
< access_password >*SERV*20.1	Upload data from tachograph "Shtrih" to server using second SIM
< access_password >*CMD*zmcam	Take a photo (ZM Camera only).
< access_password >*CMD*foto	Take a photo (VC0607 Camera only).
Info commands	
< access_password >*SMSI	Receive SMS with IMEI, ID and address of the monitoring server 1
< access_password >*SMSK	Receive SMS with the coordinates and map link

Table 5 - TCP-commands from server

Format	Command description
0101	send a package with coordinates to the server immediately
0102	update the software via the web configurator even if assigned and current versions coincide
0105	update the software via the web configurator if assigned version differs from the current one
010550	update the software of the external CAN-module
0107	reboot
0108	download settings from the web configurator
0109	send the current settings to the web configurator
080X0Y(ZZ)	change the output status, where x – the output number (0 – IN0 (U0), 1 – IN1 (U1), 2 – IN2 (U2), 3 – IN3 (U3)) and y – the new status (0 – off, 1 – on)); ZZ – (optional) temporary activation in seconds from 01 to 99(01 – 1 second, 10 – 10 seconds)
2000	Upload data from tachograph "Shtrih" to server
2001	Upload data from tachograph "Shtrih" to server using second SIM

TCP text commands (driver message)

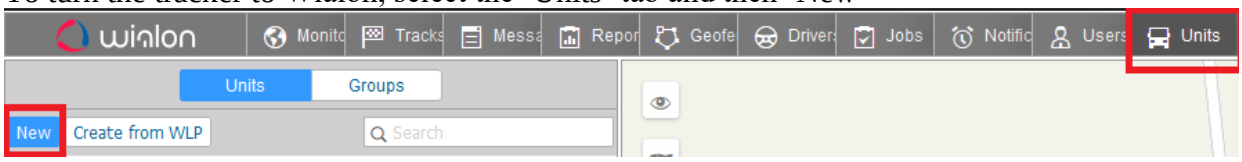
Format	Command description
extcan_upgrade	update the software of the external CAN-module
zmcam	Take a photo (ZM Camera only).
foto	Take a photo (VC0607 Camera only).

DESCRIPTION OF PARAMETERS IN THE WIALON SYSTEM

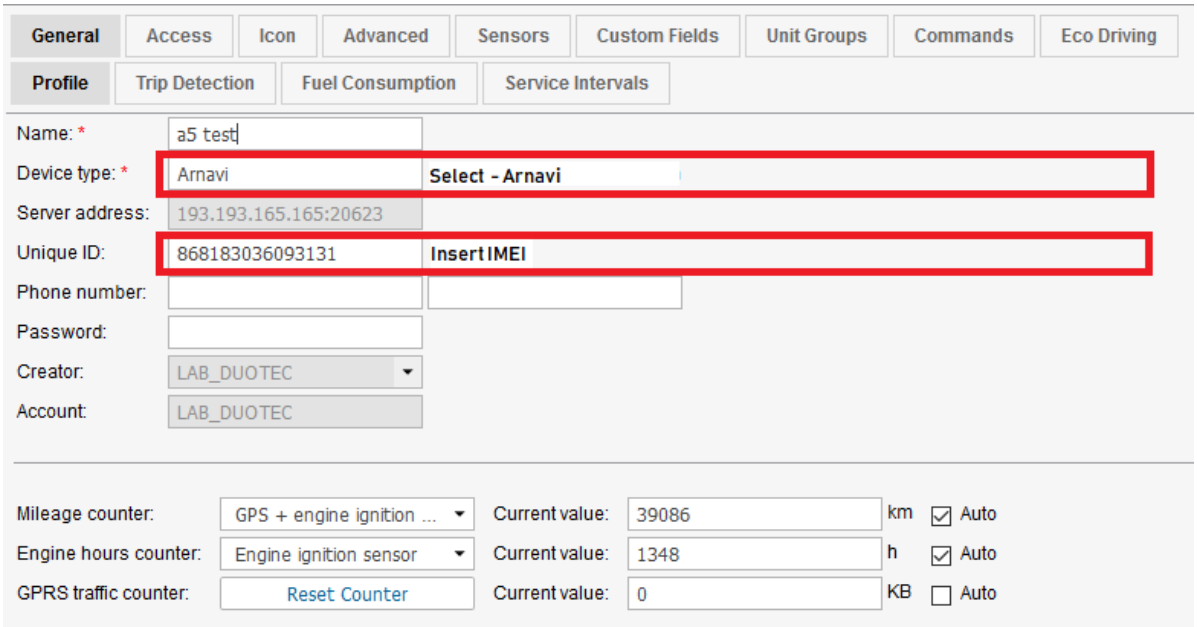
Prameter Wialon	Parameter Geliospro	Description	Comments
pwr_ext	BU	External power supply voltage	
pwr_int	RBU	Internal battery voltage	
hdop	hdop	Horizontal Dilution of Precision	
cell_id		GSM Base station unique ID	
lac		GSM Location area code	
mnc	mnc	GSM Mobile network code	
mcc	mcc	GSM Mobile country code	
gsm	gsm	GSM Signal level	Range from 1 to 31 (99 – no service)
gsm_st	gsm_st	GSM module state	0 – turned off, 1 – turned on, 2 – AT Ok, network search, 3 – GPRS test, 4 – GPRS OK
nav_st	nav_st	GPS module state	0 – turned off, 1 – turned on, 2 – satellites search, 3 – satellites captured
mw	mv	Accelerometer sensor state	0 – no move, 1 – move
sim_t	sim_t	Active SIM card number	0 – SIM1, 1 – SIM2
sim1_st	sim1_st	SIM-1 state	0 – no SIM, 2 – network search, 1 – home network, 5 - roaming
sim2_st	sim2_st	SIM-2 state	0 – no SIM, 2 – network search, 1 – home network, 5 - roaming
s1_st	S1_st	Server 1 state	0 – not defined, 1 – connection attempt, 2 – connection established
s2_st	S2_st	Server 1 state	0 – not defined, 1 – connection attempt, 2 – connection established
os	os	Penetration sensor state	1 – activated, 0 – not activated
v_in	ign_virt	Ignition	Считывается с IN4(при подключенном CAN – считывание ведется с CAN-шины)
msd	msd	MicroSD availability	1 – installed, 0 – not installed
bt	BT	Bluetooth state	1 – on, 0 - off
gyro	gyro	Gyroscope state	Optional
	call_btn	Call button state	1 – pressed, 0 – not pressed
gps_full_ mileage	milleage	Full mileage according to the GPS module	
freq_X	FREQ_X	Frequency value on discrete input	X – input number (For example, freq_4 – IN4(A4))
info_messages	im1	Info message tag	Displays the reason for recording a new package
lls1_val	LLS_1_L	RS485 fuel level	1 – sensor number
lls1_temp	LLS_1_T	RS485 temperature	1 – sensor number
volt_X	VOLT_X	Voltage value on analog input	X – input number (For example, volt_4 – IN4(A4))
pin	-	Bitwise parameter (in**X**/out**X** state)	Bitwise state of discrete sensors (for inputs IN0-IN9, number IN+1). For example, to monitor the status of IN4, the parameter to create the sensor pin:5 (which means: control the fifth bit of the parameter 'pin')
-	in**X**	Discrete inputs value	X – number IN (IN0(device)= in0 in Geliospro)
Mbus_X		Modbus register value	X- register number(0-19)
Imps_X		Pulse sensor value	X – discrete input number
ID		i-button key id	
Temp_1Wire_X		Temperature sensor value	X – temperature sensor number

Parameter Wialon	Parameter Geliospro	Description	Comments
can_eng_full_ time	CAN_FT	CAN engine hours	
can_full_ mileage	CAN_MLG	CAN mileage	
can_fuel_level_ cons	CAN_FFC	CAN fuel consumption	
can_fuel_level	CAN_FLP	CAN fuel level (%)	
can_fuel_level	CAN_FFL	CAN fuel level (liters)	
can_rpm	CAN_RPM	CAN engine rpm	
can_eng_temp	CAN_T	CAN engine temperature	
can_speed	CAN_S	CAN speed	
can_axle_ load1	CAN_AXL1	CAN axle load 1	1 – axle number (от 1 до 5)

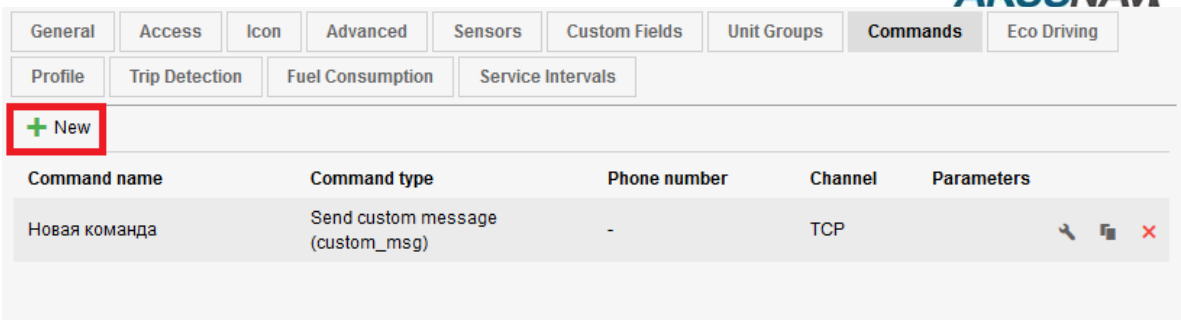
To turn the tracker to Wialon, select the 'Units' tab and then 'New'



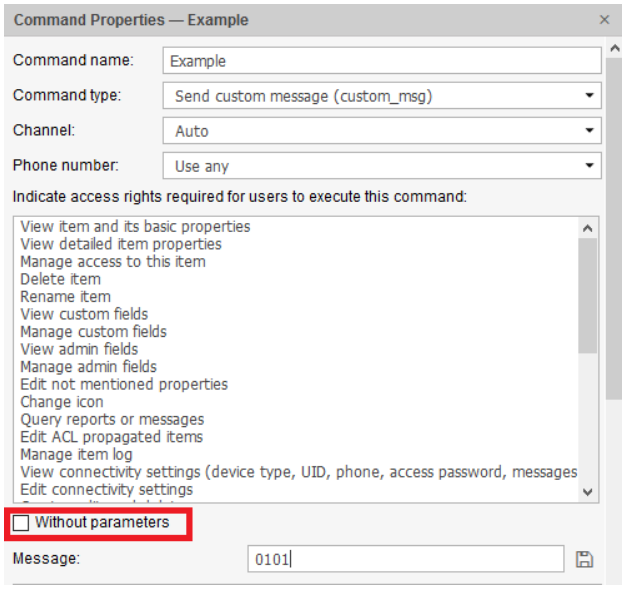
In the window that appears, enter its IMEI in the 'Unique ID' field and select the type of the Arnavi device.



To create commands, select the 'Commands' tab in the object properties, then '+ Create'



In the window that appears, fill in the required fields. In the ‘Message’ field, enter the command number and click ‘OK’



The created command will appear in the object properties. Save the object properties – click ‘OK’

WARRANTY OBLIGATIONS

The equipment is designed for a long service life in the autonomous maintenance-free mode (except for the internal battery).

The warranty period for the equipment is 5 years (except for the battery) and is counted from the moment of initial installation, provided it is carried out by the installer authorised by the manufacturer of the equipment. The date of initial installation and information about the installer must be specified in the warranty card and stamped by the installer.

The warranty obligations do not apply to the battery.

To ensure the specified characteristics of the tracker, it is recommended to replace the battery with a periodicity of 2 years.

THE PRODUCT IS NOT SUBJECT TO WARRANTY REPAIR / REPLACEMENT IN THE FOLLOWING CASES:

- violations of the rules of operation of the product;
- presence of mechanical damage (either external or internal);
- malfunctions caused by ingress of foreign objects, insects, or liquids;
- presence of chemical, electrochemical, electrostatic, or extreme thermal damage;
- damage caused by the non-compliance of power, communication, or cable networks with state standards;
- damage caused by the installation of components that fail to meet the manufacturer's specifications;
- if repair or maintenance work during the warranty period was carried out by a person(s) not authorised for the purpose by the manufacturer;
- in case of the damage of the manufacturer's seals on the equipment;
- in cases of deficiencies in the operation of the equipment due to external effects on the equipment and the electrical circuit to which the equipment is connected;
- in case of disturbances caused by the actions of third parties or other unforeseen circumstances that are not related to the obligations of the equipment manufacturer.

SUPPLY PACKAGE

The tracker is supplied in the configuration shown in Table 5.

Table 5 – Tracker configuration

No	Name	Quantity	Note
1	Navigation controller ARNAVI 5	1	Monitoring device
2	Main harness	1	Comes with individual pins
3	Backup battery (inside the tracker)	1	Capacity depends on the modification
4	GSM antenna	1	1–3 m (FAKRA)
5	Navigation antenna	1	3–5 m (FAKRA)
6	Product certificate	1	

All the latest technical information and software can always be found on the relevant page of the manufacturer's website:

http://www.arusnavi.ru

Note: The manufacturer reserves the right to change the configuration of the device without compromising consumer performance.