



2016

USER GUIDE



Exclusive partner

**NAVISET GT-20 PRO
IRIDIUM/WiFi/BT**

NAVISET GT-20 LITE

**TRANSPORT MONITORING
TERMINALS**

Version 5.1

25.01.2016

1. APPLICATION AND MODIFICATIONS

«NAVISET» transport monitoring terminals are designed to control the location of a moving object, to transfer fuel consumption data and another telemetry (state of the inputs, data from the digital interfaces, and so on.) to the collection server.

NAVISET transport monitoring terminals are a solution for the most demanding users. They are designed to use for control motor transport, fuel consumption, security and so on. Integrated programmable logic interrelations allow the user to secure any object.

Basic versions of NAVISET GT-20

The device has two main versions:

Naviset GT-20 PRO is a full version with possible communication channels extent and unlimited functionality of the built-in programmable logic.

Naviset GT-20 LITE is a version with limited functionality, the main differences with the PRO version are shown in the table below.

Parameter Description	GT20 PRO	GT20 LITE
Number of universal inputs (expandable up to)	8 (12) pcs	4 pcs
Number of outputs (expandable up to)	4 (0) pcs	2 pcs
The volume of the black box, points	650000pcs	174000 pcs
SD card support (announcement device, additional black box)	Yes	No
Possible connection of the driver's display	Yes	No
Support of WiFi, Bluetooth, IRIDIUM, GLOBALSTAR	Yes	No
RS232 interface	2pcs	1 piece
Gyroscope for inertial guidance	option	No
Number of points of announcement device/phrases	Unlimited	0 pcs
Number of configurable logical events	Unlimited	Up to 4 pcs
Number of registers of data from CAN bus	Unlimited	Up to 4 pcs
Number of registers of data from MODBUS bus	Unlimited	Up to 4 pcs
Connection of the outer periphery	All is available	Fuel level sensors, MODBUS devices, CANLOG, NMEA transmission
Per-second data recording when braking hard	Yes	No
Data transmission to two servers and support of e-Call	Yes	No
Function of the Programmable Logic Controller	Yes	No

NAVISET GT-20 PRO terminals have six modifications:

Modification	Available data transfer channels			
	GSM	IRIDIUM	WiFi	Bluetooth
Naviset GT-20 PRO M.1	V			
Naviset GT-20 PRO M.2	V	V		
Naviset GT-20 PRO M.3*	V		V	
Naviset GT-20 PRO M.4	V	V	V	
Naviset GT-20 PRO M.5	V			V
Naviset GT-20 PRO M.6	V	V		V
Naviset GT-20 PRO M.7*	V		V	V

* - The version with WIFI is made with an integrated antenna. Modification with an external antenna is available by special order. In the modification 4 WIFI external antenna is not provided.

2. MAIN ADVANTAGES

NAVISET GT-20 hardware platform is completely versatile and allows you to expand the capabilities of the device by installing expansion cards.

NAVISET GT-20 terminals have a number of unique features:

PLC ON BOARD – is an integrated programmable logic controller (PLC) which allows the user to process and store data from internal or external sources, set the logic of interaction with the periphery and stay in sync with requirements of its communication protocol. Programming is carried out by the ladder logic and does not require knowledge of programming languages.

FULL HYBRID – is a simultaneous operation of two communication channels with the choice of each channel priority. Depending on the modification each channel can be used for transmission over the network of GSM / GPRS / IRIDIUM / GLOBALSTAR / WiFi / BLUETOOTH. INMARSAT and GONETS transmitters can be connected to the external digital interfaces.

QUICK START – is a wizard of standard configurations and loading of configurations from the cloud when turning on for the first time (if the configuration is in the cloud, the device will download it automatically).

MASTER FUEL – is a master of FLS calibration in automatic and semi-automatic modes without disconnection of the FLS from the device.

ANY DATA – is a generic communications protocol via RS485 interface. Processing of any data via MODBUS protocol in the master or client mode.

INERTIAL NAVIGATION – is the control of driving quality, collisions, overturns, sudden acceleration and braking, skidding and building the track without signals from satellites

A-GPS – satellite atlas loading before the first switching – speeds up cold start and increases accuracy

HANDS FREE – is a connection of any tablet PC based on Android to perform the functions of the driver's display, loudspeaker communication and access to 3G and LTE data transfer networks.

3. CORE CAPABILITIES

We have been striving to create a high-quality, versatile, customizable and inexpensive device for years. NAVISET GT-20 – is a top of our efforts, which allows deploying a wide variety of projects aimed at preservation of financial capital at minimal cost. The device can act as a controller of data collection and processing without any changes in hardware. All built-in logic is easily configured and requires no special knowledge. Dynamic reference data "on the fly" provides the user with the necessary information and a link to the section of the instructions describing the feature of interest.

Using NAVISET GT-20, You can:

Operate any data received from any source. All data can be placed in register cells for further analysis, change, comparison or conversion.

Connect the device to various monitoring programs (Wialon, Omnicomm, Navixy, Fort, AutoGRAPH, STMatix, ST CrossPoint, ENDS-FIZ, etc.)

Change the configuration and software of the device through any available communication channel - USB / GPRS / WiFi / IRIDIUM and so on.

Visually see the mileage and running time of the car

Store data in the device for over 6 months

Increase the memory many times 0(microSD)

Control refueling and fuel consumption (analog, pulse, frequency, digital sensors)

See the driver's full name

Get pictures from the camera

Use 2 SIM-cards or SIM-2 chips (optional) of different operators

Manage the protection state and block the engine using SMS and voice menu

Know the temperature of the refrigeration unit and the axes of the motor (8 sensors)

Connect the device for two-way communication with the crew (HF-1 handsfree)

Create automatic notification of stopping points
 Transfer information via open Wi-Fi access points free (optional)
 Receive information from the CAN-bus (FMS, J1939, J1979)
 Connect Can-log
 Solve a variety of customer's problems
 Transfer data via the IRIDIUM satellite channel or a WiFi network.

4. TECHNICAL SPECIFICATIONS

SPECIFICATION	GT-20 PRO	GT-20 LITE
Supply voltage, V (DC)	7,5...45	
Protection against excess input voltage, V	50	
Input voltage variation protection in the pulse, V	600	
Peak /work/sleep mode current of consumption, A	1,1/0,06-0,12/0,002	
Input self-impedance, kOhm	22	
Battery backup	Li-Po 1100mA	
Maximum output circuit load current, A	0,5	
Universal inputs: 0-36V analog, frequency, digital, inverting, pcs	8 (12**)	4
Ppen collector outputs, pcs	4 (0**)	2
1-Wire Interface	yes	yes
RS-232 interface, pcs	2	1
RS-485 interface (ModBUS supported, pcs	1	1
CAN interface	yes	yes
Number of slots for SIM cards / SD cards, pcs	2 / 1	2 / 0
Number of SIM chips, pcs (optional)	2	2
Voice interface for connection of loud speaker communication	yes	yes
Bluetooth interface for the display, optional	yes	no
Sensor of changes of location in space (accelerometer)	yes	yes
Gyroscope for inertial guidance, optional	yes	no
"Black Box", number of records	650000	174000
Interface for communication with the PC	USB 2.0 with the device powered by the USB-connector	
Automatic update via GPRS	yes	
Configuring	USB/GPRS/IRIDIUM	
GSM transmitter	Quectel 900/1800/2100MHz	
WiFi transmitter, option	WizNet	
SATELITE transmitter, option	IRIDIUM / Globalstar / INMARSAT / Gonets	
GPS + GLONASS receiver	GlobalTop	
Status indicators	GSM, WiFi, Glonass/GPS, Power Supply, Operation, Satellite	
Antenna connectors, type	SMA female	
Cold Start / Hot Start, sec	20-60 / 1-5	
The average time of autonomous operation powered by battery, hours	8	
Temperature range, degrees Celsius	- 40 ... + 55 (up to +115 without a backup battery)	
The efficiency, the height above sea level	0-9999	
Relative humidity	0...90% (0...35 °C);	
Overall dimensions, mm	150x65x29	

5. INTERFACES, MODIFICATIONS AND DESCRIPTION OF CONNECTIONS

5.1. MAIN MODIFICATIONS OF GT-20 PRO

The hardware platform allows you to increase the capabilities of the device by adding wireless interfaces. All modifications include a GSM network transmitter. The user can at his or her discretion disconnect the GSM channel in any modification or set the priorities of its interaction with other communication channels. Settings of interaction and priorities are available in NAVISET GT20 IR/WiFi and NAVISET GT20 BT/WiFi.

Modifications PRO	Channel 1	Channel 2	Description
NAVISET GT20	-	GSM	Basic modification
NAVISET GT20 IR	IR	GSM	GSM + IRIDIUM Modification
NAVISET GT20 WiFi	WiFi	GSM	GSM + WiFi Modification
NAVISET GT20 IR/WiFi	WiFi + IR WiFi	GSM GSM + IR	GSM + WiFi + IRIDIUM Modification Possible combination
NAVISET GT20 BT	BT	GSM	GSM + Bluetooth Modification
NAVISET GT20 BT/IR	BT	GSM + IR	GSM + Bluetooth + IRIDIUM Modification
NAVISET GT20 BT/WiFi	BT	GSM + WiFi	GSM + Bluetooth + WiFi Modification

IRIDIUM communication channel can be replaced by STX3 or Gonets or Inmarsat in software. **The yellow color** indicates the possible combinations of transmitters on the communication channels. Combined transmitters can not operate simultaneously on the same channel. Therefore, the user should determine the initially set priorities of the communication channels.

The priority of the communication channel and the switching logic are described in the truth table:

Variant 1	Channel 1	Channel 2	Available network		The network that will be selected
It is used in the case of periodic presence of the GSM network	WiFi + IR	GSM	WiFi	-	WiFi
			WiFi	GSM	WiFi
			-	GSM	GSM
			IR	GSM	GSM
			IR	-	IR

Variant 2	Channel 1	Channel 2	Available network		The network that will be selected
It is used in the case of absence of the GSM network	WiFi	GSM + IR	WiFi	-	WiFi
			WiFi	GSM	WiFi
			-	GSM	GSM
			-	IR	IR

As it can be seen from the truth tables above the priorities are arranged in the following way:

1. Priority - WiFi Network
2. Priority - GSM network
3. Priority - IRIDIUM network (or another satellite network)

If the user has set data transmission via satellite link after the buffer is filled in the configuration of the device, if the WiFi and GSM channels are absent, the data will be transmitted only

after the buffer is filled. While the buffer of data transmission via satellite is being filled, the presence of WiFi and GSM network is verified. If one of them appears and data are successfully transmitted, the data from the satellite buffer are removed from the transmission.

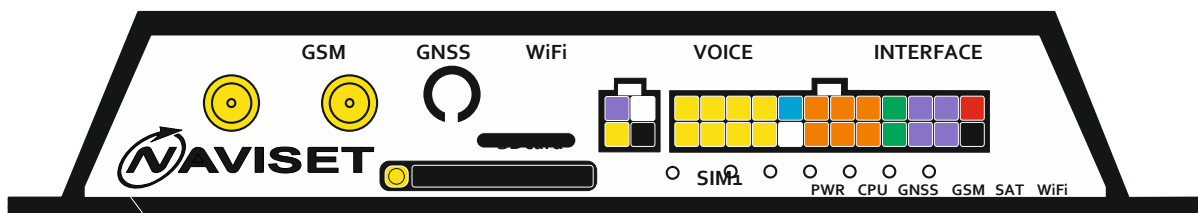
In the Variant 2, if a GSM network is completely absent, it is advisable to disable the GSM transmitter in the configuration to increase the speed of transmission over satellite communication channel.

In the modifications with Bluetooth interface, all transmitters are located on Channel 2. For the **NAVISET GT20 BT/WiFi** modification priorities of the transmitters and time of switching between them should be set. For example, if GSM is constantly present and WiFi occurs very rarely, it is advisable to set GSM as priority transmitter and 5-10 minutes for time of switching and testing of WiFi networks. If WiFi appears from time to time, it is better to let WiFi remain high-priority and to transmit data via GSM only after filling the buffer, the size of which is defined by the user.

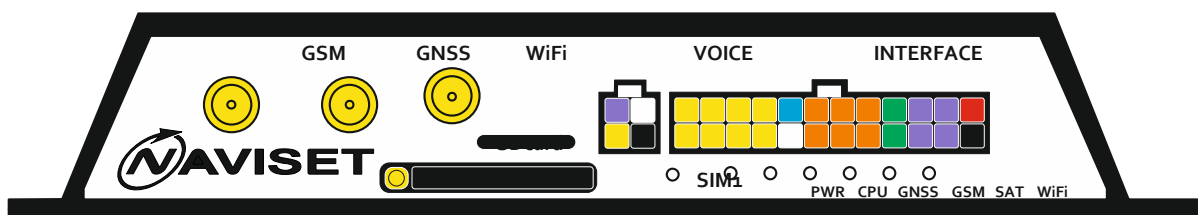
5.2. APPEARANCE AND HARDWARE VERSIONS OF NAVISET GT-20

All the necessary interfaces for connection are located on the side of the device. Various modifications of GT-20 PRO have differences in hardware and the front panel color. Therefore, the appearance may differ from the base platform.

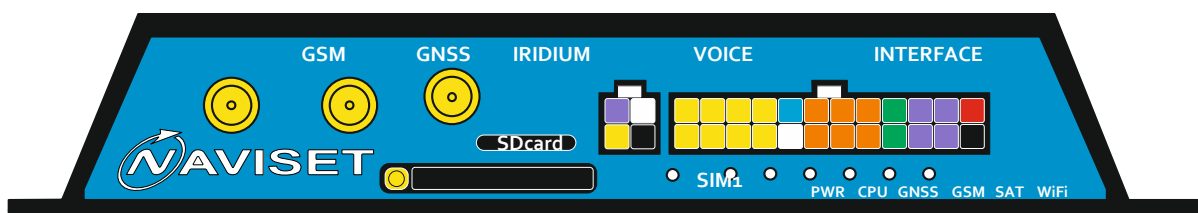
The sketches of the appearance of the products and their modifications are given below



modification of execution 1



modification of execution 2



modification of execution 3

Basic platform is limited to the capacity of output antenna interfaces, the following versions are available for each modification:

Modification version	WiFi antenna	IRIDIUM antenna	Version
NAVISET GT20	-	-	1
NAVISET GT20 IR	-	External	3
NAVISET GT20 WiFi (1)	Internal	-	1
NAVISET GT20 WiFi (2)	External	-	2
NAVISET GT20 IR/WiFi	Internal	External	3
NAVISET GT20 BT	-	-	1
NAVISET GT20 BT/IR	-	External	3
NAVISET GT20 BT/ WiFi (1)	Internal	-	1
NAVISET GT20 BT/ WiFi (2)	External	-	2

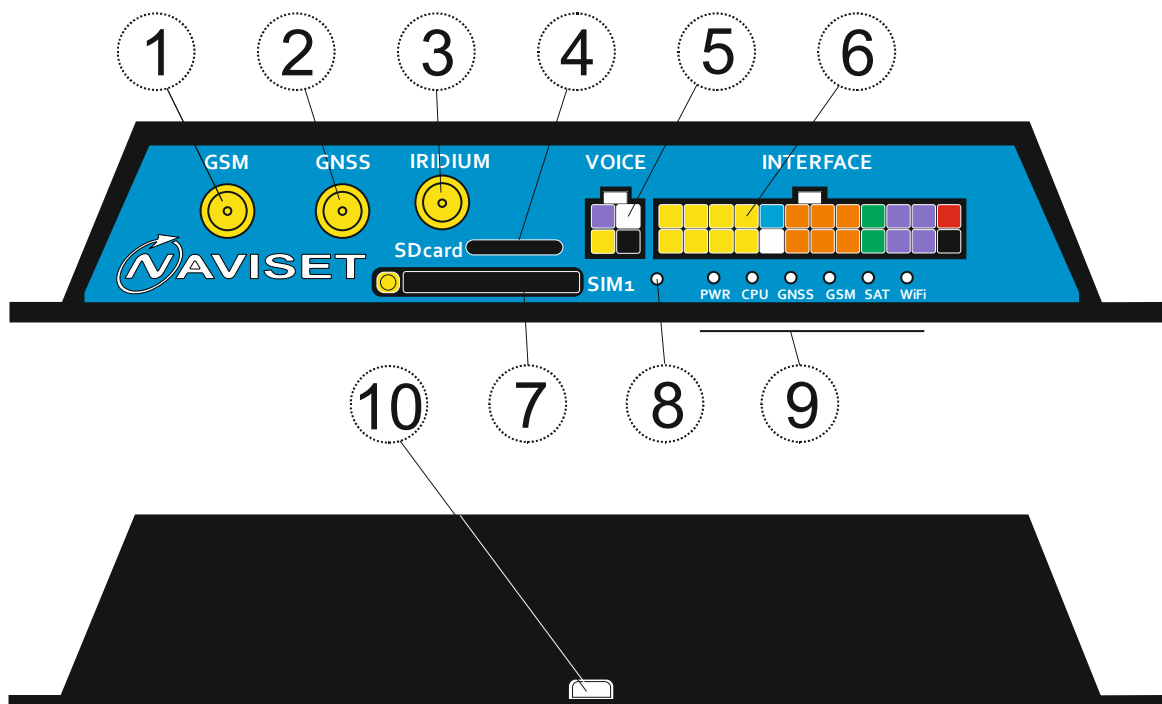
Version and modification are specified on the label on the bottom of the device.

Versions NAVISET GT20 WiFi (2) and NAVISET GT20 BT/ WiFi (2) are produced only upon request. Before ordering, it is necessary to agree on prices and date of execution of the order.

Other versions are available only by special order. At the same time, the appearance and location of the connectors may differ from the above three versions.

5.3. NAVISET GT-20 INTERFACES

All modifications and versions have the same appearance (except for the antenna connector), the purpose of the interfaces are given below.



- (1) – The connector to connect GSM antenna, SMA-FEMALE connector type
- (2) - The connector to connect GLONASS, GPS or GLONASS/GPS antenna, SMA-FEMALE connector type
- (3) - The connector to connect IRIDIUM (GLOBALSTAR) antenna for version 3 or WiFi antennas for version 2, SMA-FEMALE connector type

(4) – The Slot for Micro SD card. For black-box functions, an announcement device, the TM key store, and other logic integrated with the device.

(5) - The connector to connect Naviset HF-1 handsfree and dispatcher voice call button

(6) - The connector of power input, and for connection analog and digital peripherals, an announcement device, CAN interface, temperature sensors and TM key contactors.

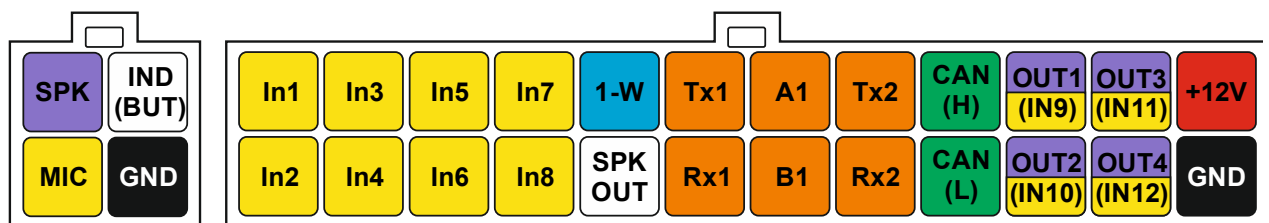
(7) – The slot for the SIM card 1. Slot for SIM2 is inside the device.

(8) - The button of the hard reset of the device. When an external power supply is absent, it is used to disconnect the battery, and as a result to completely disconnect the device.

(9) – The device state indicators. Depending on the modifications they may have different information display modes. See more detailed information in the truth table of indicating.

(10) - USB (B type) connector for connection to a PC and device settings using the Configurator program.

All external circuits described in the instructions are connected via the interface connector (6). For user's convenience, the illustrated interface connector has color differences for each contact in accordance with its functional purpose.



Contact of the Primary Interface	Functions Performed
+12V	Power input for connection to the car electrical system
GND	Common power wire, minus
IN1	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN2	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN3	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN4	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN5	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN6	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN7	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
IN8	0-36V analog/digital input, frequency (square signal) from 0 to 10 kHz
OUT1 / IN 9	Output - impedance, closed onto GND, the inversion/ discrete, frequency
OUT2 / IN10	Output - impedance, closed onto GND, the inversion/ discrete, frequency
OUT3 / IN11	Output - impedance, closed onto GND, the inversion/ discrete, frequency
OUT4 / IN12	Output - impedance, closed onto GND, the inversion/ discrete, frequency
CAN-H	RS232 interface or CAN line. Selection of the SW-1 switch
CAN-L	RS232 interface or CAN line. Selection of the SW-1 switch
RS485 A1	RS485 interface A line. Hardware-compatible with RS232 TX1
RS485 B1	RS485 interface B line. Hardware-compatible with RS232 RX1
RS232 TX1	RS232 TX interface 1 port, hardware-compatible with the RS485 line A
RS232 RX1	RS232 RX interface port 1 hardware-compatible with the RS485 line B
RS232 TX2	RS232 TX interface 2 port
RS232 RX2	RS232 RX interface 2 port
SKP OUT	Output to the loudspeaker of the announcement device or the voice alerter.
1-WIRE	Input for connection of the TM and temperature sensors
Contact of the Primary Interface	Functions Performed
SPK	Input for connection of the external headset amplifier input Naviset HF-1 handsfree
MIC	Input for connection external headset microphone Naviset HF-1 handsfree

IND (BUT)	Communication state indicator through an external headset, the dispatcher call button is used when using the Naviset HF-1 handsfree
GND	Common power wire, minus

Input universal circuits are designed to connect analog, pulse, discrete sensors. All inputs IN1 ... IN8 are completely universal, and each of them can perform the following functions (configured by the user):

1. Analog input, voltage measurement 0-36V – voltage measurement at the input and converting to digital form through a 10-bit AD converter. Measurement range is from 0 to 36V. The value is transferred in volts with a fractional part in multiples of 0.1V

2. Pulse input, accumulation of the amount of pulses - When a positive pulse appears at the input, the pulse counter is increased by 1 unit. When the sum of 65,535 is reached, the counter is reset to zero and the count starts afresh. The counter value is transmitted explicitly.

3. Pulse ++ input (increment) - works in conjunction with the pulse - - input (decrement). When the pulse arrives at the incrementing (++) input, the counter value increases, at the decrementing(- -), the input decreases. Thus, a clear counter value is always equal to the difference between the impulses of the ++ input and the - - input.

4. Pulse - - (decrement) - works in conjunction with the pulse + + input (increment). When the pulse arrives at the incrementing (++) input, the counter value increases, at the decrementing(- -), the input decreases. Thus, a clear counter value is always equal to the difference between the impulses of the ++ input and the - - input.

5. Engine hour indicator – the input function is designed to count the car engine running time (running time of the vehicle and to count the driver's working time). When an input voltage is positive, the counter increases by 1 unit every second. When the sum of 65,535 is reached, the counter is reset to zero and the count starts afresh. The counter value is transmitted explicitly.

6. Discrete input actuates in a predetermined voltage range - this feature is available for all inputs. To select an active or passive level, the logic of processing and the crossing line is set in the configurator. See the "Device Configuration" section.

Connection to any of the inputs is made regarding the common GND contact. Buttons, reed switches, circuit breakers and other passive sensors are connected to the device regarding the input voltage (via pull-up resistor). For active devices such as fuel sensors and others, the additional supply voltage is needed, before connecting such sensors please read the instructions for each of them.

Naviset GT-20 has two SIM cards holder, one is located on the processor board inside the device, and the second one is available on the front panel.

5.4. NAVISET GT-20 INDICATION DESCRIPTION

All indicators on the front panel of the device have the same glow. A name of the signal is located next to the indicator. You can determine the state of any unit by time and frequency of the glow in accordance with the following table of the mode states.

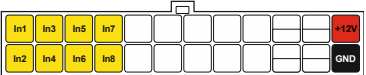
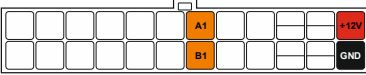
POWER INDICATOR	Description of modes
Is constantly on	Normal working mode of the device
Flashes once per second	Battery is being charged
Flashes 2 times per second	Battery is not connected


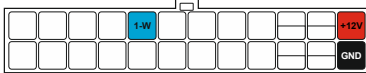
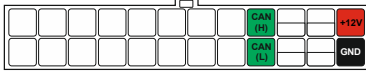
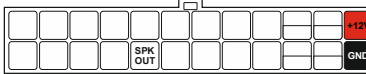
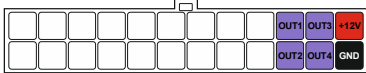

Is off	No external power supply
GSM INDICATOR	Description of modes
Is constantly on	The connection to the server has been established
Flashes once per second	Initialization of the GSM module
Flashes 2 times per second	No connection to the server
Is off	SIM-cards are not installed/the channel is disabled
GNSS INDICATOR	Description of modes
Is constantly on	The location data are valid
Flashes once per second	Initialization of the satellite receiver
Flashes 2 times per second	Satellites are captured, but the location data are not valid
Is off	Short circuit of the antenna, there is no communication with the reception.
CPU INDICATOR	Description of modes
Is constantly on	Normal working mode of the device
Flashes once per second	No external power supply, powered by the battery
Flashes 2 times per second	Loader mode
Is off	Connected via USB to a computer

WiFi INDICATOR	Description of modes
Is constantly on	Connected to the access point, there is Internet access
Flashes once per second	Connecting to an access point
Flashes 2 times per second	Searching for an access point, can not find any
Is off	WiFi is disabled
IR/SAT INDICATOR	Description of modes
Is constantly on	Data are being transmitted via a satellite
Flashes once per second	Initialization of the satellite channel
Flashes 2 times per second – for no longer than 2 sec.	There was a data communication error
Is off	Satellite modem is off

5.5. CONNECTION of the SENSORS and PERIPHERALS

The most common types of connections are given in the following table.

Type of the connected peripherals	Description of the connection	What contacts are used
Alarm button, Ignition control, Program counter, Engine hour indicator, Call of the dispatcher, Arming, Control of lights, The presence of the driver, Safety belt, ABS trigger, SRS trigger, The door is open, Smoking of the saloon, The alarm went off	To any IN ... IN8 input. the desired input function is selected in the configurator in the function selection menu. a sensor with the corresponding parameter should be created in the monitoring program.	
RS485 fuel sender, Other peripherals	Connected to the A1 and B1 contacts (Port1). A detailed description of the connection is given in the manual for the plug-in peripherals.	

	If something is connected the Tx1 and Rx1 lines (Port1), the connection to A1 and B1 (Port1) is prohibited.	
RS232 fuel sender, Other peripherals	Connected to the Tx1 и Rx1 contacts (Port1) or Tx2 и Rx2 (Port 2). A detailed description of the connection is given in the manual for the plug-in peripherals. If something is connected the A1 and B1 lines (Port1), the connection to Tx1 and Rx1 (Port1) is prohibited.	
TM key contactor or temperature sensor	Connected to the 1-Wire input. The contactor is connected directly to 1-W with a central pin, with an external to GND. DS1820 temperature sensor with a central one to 1-W, with combined ones to outer GND.	
CAN BUS interface	Connected to the CAN-L and CAN-H contacts through the 1kOhm resistors each line. With the direct connection 120 ohm resistor is placed between the contacts.	
Announcement device	An input of the external amplifier is connected to the SPK-OUT output, the common wire - to GND or the gross vehicle mass.	
Outputs	Have the "open collector" type, they are attracted to GND in the active state, IMPEDANCE in the passive state. The maximum load current is 0.5A. When more powerful load is connected, it is recommended to use an external relay connected to the "+ 12V contact.	
HF-1 handsfree	Connected to a single 4-pin connector according to the purpose of the contact. See more detailed information in the specification for the handsfree.	

6. CONTROL AND CHANGE OF SETTINGS USING SMS COMMANDS

To control and change the settings via SMS special set of commands is used. These commands are sent from any authorized (entered in the memory of the device) phone. List of available commands and their meanings are listed below.

Command	Taken values
COM0 PASS The device state query	PASS – is a current password set in the device. Factory default value is 1234. EXAMPLE: COM0 1234 After the command is executed the message of the current status will come: ID 0 FW27.1223.1456.00 IMEI 868204001123456 Ext 12521 Stop DISARM GSM 1 Connected GPS sats 15 T45 S15 I00000000 O0000 SMS message contains the information about device number, software version, IMEI, in-vehicle network voltage/battery voltage,

	stands/moves, security/ observation, the SIM card it works with, connected to the server/no/no gprs, receiver state, antenna short-circuit/no antennas/visible satellites, the terminal temperature, gsm signal level, discrete state of inputs/outputs.
COM1 OLD_PASS, NEW_PASS Change of the password	OLD_PASS – is a password set in the device. Factory default value 1234. NEW-PASS – is a password that does not require replacing the old one. EXAMPLE: COM1 1234,4321 After the command is executed the confirmation “NEW_PASS: 4321” will come
COM2 PASS,ID Change of device ID	PASS – is a current password set in the device. Factory default value is1234. ID – is a number of the device, which takes a value from 1 to 65535. EXAMPLE: COM2 1234,8888 After the command is executed the confirmation “NEW_ID: 8888” will come
COM3 PASS,IP,PORT Server setting	PASS – is a current password set in the device. Factory default value is 1234. IP – IP address of the remote data collection server PORT – IP port of the remote data collection server EXAMPLE: COM3 1234,255.255.255.255,15000 After the command is executed the confirmation “IP: 255.255.255.255:15000” will come
COM4 PASS,IN,OUT,MEM Security parameters	PASS – is a current password set in the device. Factory default value is 1234. IN – is a time of disarming, which takes a value from 0 to 255 sec. OUT – is a time of arming, which takes a value from 0 to 255 sec. MEM – is a time of recovery of the query, a value from 0 to 255 min. EXAMPLE: COM4 1234,10,10,1 After the command is executed the confirmation “NEW_TIMES: 10,10,1” will come
COM5 PASS,IP,PORT Remonte configuring	PASS – is a current password set in the device. Factory default value is 1234. IP – IP address of the remote data collection server PORT – IP port of the remote data collection server EXAMPLE: COM5 1234,255.255.255.255,12500 After the command is executed, the device will be reconnected to the specified address and send an SMS like: Remote config: 255.255.255.255:12500
COM6 PASS,MAP Location information	PASS – is a current password set in the device. Factory default value is 1234. MAP – Web-map. 0 – OpenStreet, 1 - Google. EXAMPLE: COM6 1234,0 After the command is executed CMC message with location data a link to the specified map will come.
COM7 PASS,OUTNUM,ON/OFF Control of outputs	PASS – is a current password set in the device. Factory default value is1234. OUTNUM – is an output number. Available values (1,2,3 or 4) ON/OFF – is an output state after the execution. 1 – turn on, 0 turn off. EXAMPLE: COM7 1234,3,1 After the command is executed the confirmation “OUT3: ON” will come
COM8 PASS,SW Automatic switching of SIM cards	PASS – is a current password set in the device. Factory default value is 1234. SW – state. 0 – disable automatic switching of SIM cards, 1 - enable. EXAMPLE: COM8 1234,1 After the command is executed the confirmation “Autoswitch SIM ON” will come
COM9 PASS,MOVE,PARKING1,PARKING2 Period of transmission of packages	PASS – is a current password set in the device. Factory default value is 1234. MOVE – a period of distribution of packages when moving (30 seconds by default). PARKING1 - a period of distribution of packages while standing (range from 1 to 120 seconds by default). PARKING2 - a period of distribution of packages while standing (range from 1 to 120 seconds by default). EXAMPLE: COM9 60,120,300 After the command is executed the confirmation “NEW_SEND_PACK: move 60, stop1 120, stop2 300” will come
COM10 PASS Disarming	PASS – is a current password set in the device. Factory default value is 1234. EXAMPLE: COM10 1234 After the command is executed the confirmation “DISARM XX:XX”, where XX:XX is a time of disarming, will come
COM11 PASS Arming	PASS – is a current password set in the device. Factory default value is 1234. EXAMPLE: COM11 1234 After the command is executed the confirmation ARM XX:XX, where

	XX:XX is a time of disarming, will come
COM12 PASS,SIM Переключить на другую СИМ	PASS – is a current password set in the device. Factory default value is 1234. SIM– a number of the СИМ card, to which the device shall be switched. EXAMPLE: COM12 1234,2 – switch to the second СИМ card. After the command is executed the confirmation “Switch to СИМ 2” will come
COM13 PASS,SIM,APN,LOGIN,PASS2# Switch to other APN СИМ cards	PASS – is a current password set in the device. Factory default value is 1234. SIM– a number of the СИМ card. APN – provider’s APN. LOGIN – user name. PASS2 – user password. The line must always end with # (pound). EXAMPLE: COM13 1234,1,myinternet,login,pass# – write down the APN parameters for the first СИМ card. After the command is executed the confirmation “APN update” will come
COM14 PASS Inquire of the i-button key list	PASS – is a current password set in the device. Factory default value is 1234. EXAMPLE: COM14 1234 After the command is executed the confirmation “Keys: 0014250d0a0c 254d6b789d3c” will come
COM15 PASS,KEY Add a key code	PASS – is a current password set in the device. Factory default value is 1234. KEY – a key code value in hexadecimal form EXAMPLE: COM15 1234,0d0a1023475f After the command is executed the confirmation “Key added” will come
COM16 PASS,CAM,RECEIVER Make a picture with the camera	PASS – is a current password set in the device. Factory default value is 1234. CAM – a number of the camera, 1 or 2. RECEIVER – an image sensor: 0 – to the SD card, 1 – to the server EXAMPLE: COM16 1234,1,1 – inquire of a picture from the camera 1 and sent it to the server After the command is executed the confirmation “Camera1: get picture” will come
COM17 PASS,NUMOP Change the operator in roaming	PASS – is a current password set in the device. Factory default value is 1234. NUMOP – an index of the operator of the terminal memory from 1 to 5 EXAMPLE: COM17 1234,2 - switch to work with the second operator. After the command is executed the confirmation Operator set to 2 will come
COM18 PASS Check the list of the "connection" numbers	PASS – is a current password set in the device. Factory default value is 1234. EXAMPLE: COM18 1234 After the command is executed the confirmation “Numbers: +79071211234” will come
COM19 PASS,NUMIND,NUMBER# Change the «connection» telephone number	PASS – is a current password set in the device. Factory default value is 1234. NUMIND – an index of the "connection" number , 1 or 2 NUMBER – a text of the phone number. It must end with # (pound). EXAMPLE: COM19 1234,1, + 71234568574 # - change the connection number 1. After the command is executed the confirmation “Number 1 changed” will come
COM20 PASS,MARSHRUT# Change the working route of the announcement service	PASS – is a current password set in the device. Factory default value is 1234. MARSHRUT – text name of the route, the file with such name must be recorded on the SD card. Must end with # (pound). EXAMPLE: COM20 1234,marsh25# After the command is executed the confirmation “Current marshrut: marsh25” will come If you send an SMS COM20 1234,? A current route will come in return.
COM21 PASS,F,H,MINSP,MAXSP,D,A,T,S Set the filtration parameters	PASS – is a current password set in the device. Factory default value is 1234. F – filtration: 0 - off, 1 - on H - filter hdop (horizontal accuracy 0 - 25) MINSP - the minimum rate of the filter (0 - 255) MaxSP - the maximum rate of the filter (0 - 255) D - jump of the coordinates for 1 sec. (0 -255) A - the maximum acceleration (0 - 25) The T - the minimum recording interval (0 - 255) S - the minimum number of satellites(0 - 255)

	<p>EXAMPLE: COM21 1234,1,2,3,150,50,3,1,5</p> <p>After the command is executed, the confirmation "Filter changed" will come</p> <p>If you send an SMS COM21 1234,? Current parameters will come in return.</p>
<p>COM22 PASS,TIMEOUT,TIME1,TIME2,EVENT</p> <p>Set the parameters of transmission while standing</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>TIMEOUT – the duration of the first interval (1 -255)</p> <p>TIME1, TIME2 – point recording intervals at the standstill, respectively, 1 and 2 (0 - 65535)</p> <p>EVENT – record on events upon the expiry of the interval TIMEOUT, 1-on, 0 – off.</p> <p>EXAMPLE: COM22 1234,30,120,120,0</p> <p>After the command is executed the confirmation "Data changed" will come</p> <p>If you send an SMS COM22 1234,? Current parameters will come in return.</p>
<p>COM23</p> <p>PASS,ACCEL,TIMETOPARK,MOVETIME,MOVEDIST</p> <p>Accelerometer response, parameters в движении</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>ACCEL – accelerometer response (0 - 65535)</p> <p>TIMETOPARK - transition time to the "stdadstill" mode (0 - 65535)</p> <p>MOVETIME - record time on the move</p> <p>MOVEDIST - distance record while moving</p> <p>EXAMPLE: COM22 1234,800,60,30,50</p> <p>After the command is executed the confirmation "Data changed" will come</p> <p>If you send an SMS COM23 1234,? Current parameters will come in return.</p>
<p>COM24</p> <p>PASS,FLINE,DELTA,MINSPEEDANGLE,ANGLE,FEVOL</p> <p>Set the parameters of tracking</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>FLINE – Filtration on a straight section (0-off, 1 on)</p> <p>DELTA - angle of leeway (0 - 360)</p> <p>MOVETIME - record time on the move</p> <p>MINSPEEDANGLE - minimum speed of the drawing on turns (0-250)</p> <p>ANGLE – angle of the drawing on turns</p> <p>FEVOL – filtration when rebuilding (0-off, 1-on)</p> <p>EXAMPLE: COM24 1234,0,5,3,7,0</p> <p>After the command is executed the confirmation "Data changed" will come</p> <p>If you send an SMS COM24 1234,? Current parameters will come in return.</p>
<p>COM90 PASS</p> <p>Reset to the factory settings</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>EXAMPLE: COM90 1234</p> <p>After the command is executed the confirmation "Default settings" will come</p>
<p>COM97 PASS</p> <p>Delete a track from the device memory</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>EXAMPLE: COM97 1234</p> <p>After the command is executed the confirmation TRACK DELETED will come</p>
<p>COM98 PASS</p> <p>Reboot the device</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>EXAMPLE: COM98 1234</p>
<p>COM99 PASS,IP,PORT,DAY</p> <p>Update of FW according to GPRS</p>	<p>PASS – is a current password set in the device. Factory default value is 1234.</p> <p>IP – IP address of the remote server of firmware update</p> <p>PORT - IP port of the remote update server</p> <p>DAY - the number of months of automatic update, takes values from 0 to 31. The value different from zero enables the automatic update, the value equal to zero - prohibits.</p> <p>EXAMPLE: COM99 1234,255.255.255.255,5001,10</p> <p>After update the confirmation "Firmware load" will come</p>

NOTE!

The factory value of password is 1234. Additional functions can only be adjusted by means of configurator program by direct connection or remotely via GPRS.

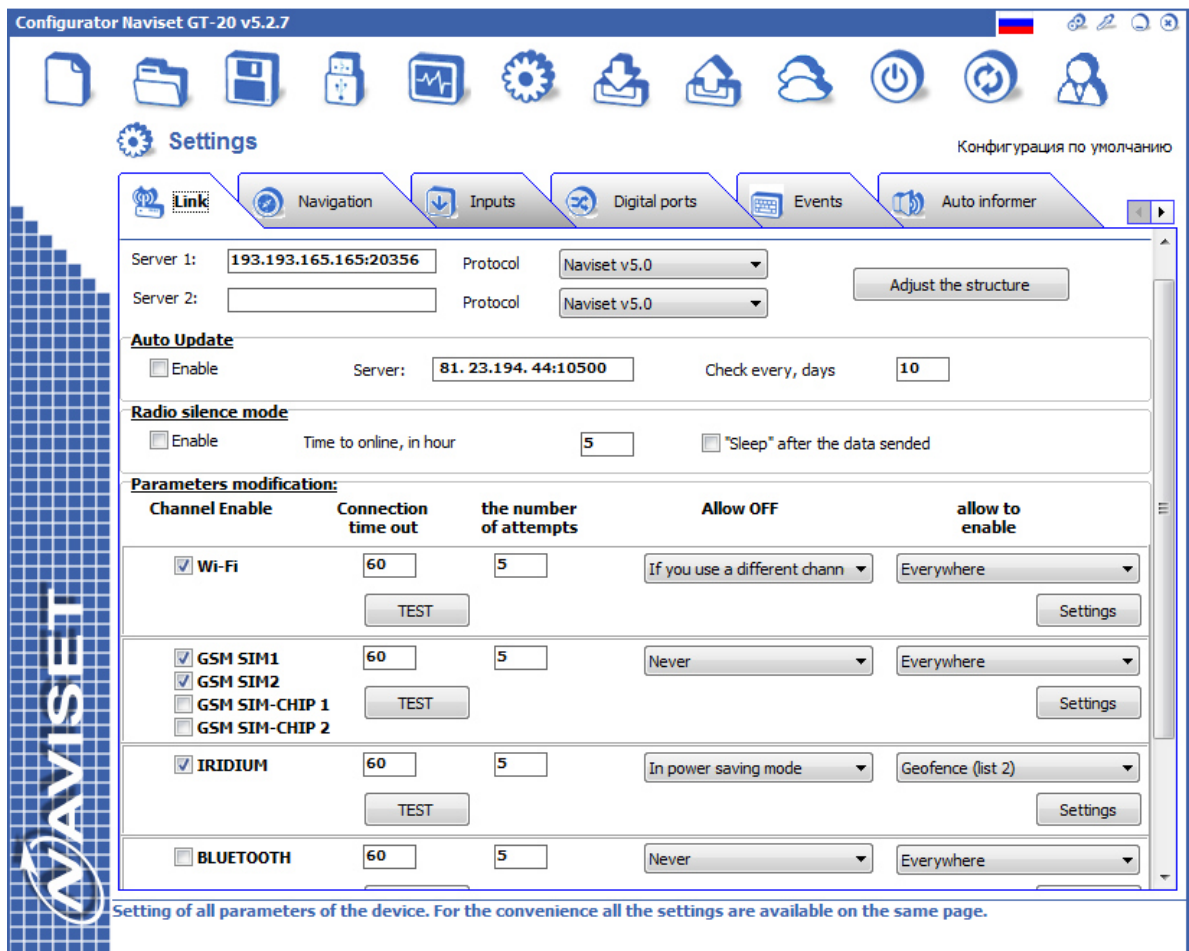
7. CONTROL AND CHANGE OF SETTINGS USING CONFIGURATOR

7.1. CONFIGURATOR FUNCTIONS AND IDENTIFICATION OF THE ELEMENTS

The configurator program is designed to perform the functions:

1. Changes of the device configuration parameters, setting of the connected peripherals.
2. Diagnosis and display of the current status of the device with the ability to view the current status of all inputs, outputs and digital outputs data
3. Calibration of the connected fuel level sensors in automatic and semi-automatic modes, with the subsequent saving of the calibration table in a file or a built-in table in the device.
4. Setting of the connected peripherals with regular software by providing a transparent communication channel USB <-> PORT 1, PORT2, GSM modem, Glonass/GPS module, WiFi module.
5. Software update

The configurator is designed to work with NAVISET GT20/GT50 transport monitoring terminals. When the configuration device is connected, the only parameters that can be used by this device are available.



The top button panel – is the panel of additional configurator functionality, button assignment from left to right:

1. Switching of a user interface language
2. Additional parameters, display of the availability of additional device options (WiFi, IRIDIUM, 433MHz radio module, etc.), operation in transparent mode with the peripherals, connected to the device via digital interfaces: the device connects USB interface to one of the digital interfaces, which makes it possible to set up peripherals with regular means of software settings through NAVISET devices.
3. Calibration of the fuel senders connected to the device and printing of the calibration table
4. Button of the program window minimization

5. Program close button

	Create a new configuration with the default parameters.
	Open previously saved configuration from the file
	Save the configuration in a file
	Select a type of connection to the device. Locally or via the Internet
E 	Monitoring of the status of all device parameters
	Configuration parameters setting, connection to the peripherals
	Loading the configuration to non-volatile memory of the device
C 	Reading of the configuration from the memory device
	Reboot the device to start up changes
	Firmware Update
	standard configuration setup wizard
	Help Topics

If the device is not connected to the computer or connection to the device has not been set, "device is not connected" is displayed, at the same time not all buttons on the navigation bar are active.

The navigation buttons are designed for quick navigation through sections of the configurator, the configuration file saving, loading the data into the device, firmware updates, and so on.

There is a dynamic help at the bottom of the window. When you mouse over any element in the configurator, description of the item and possible actions with it are displayed in this field.

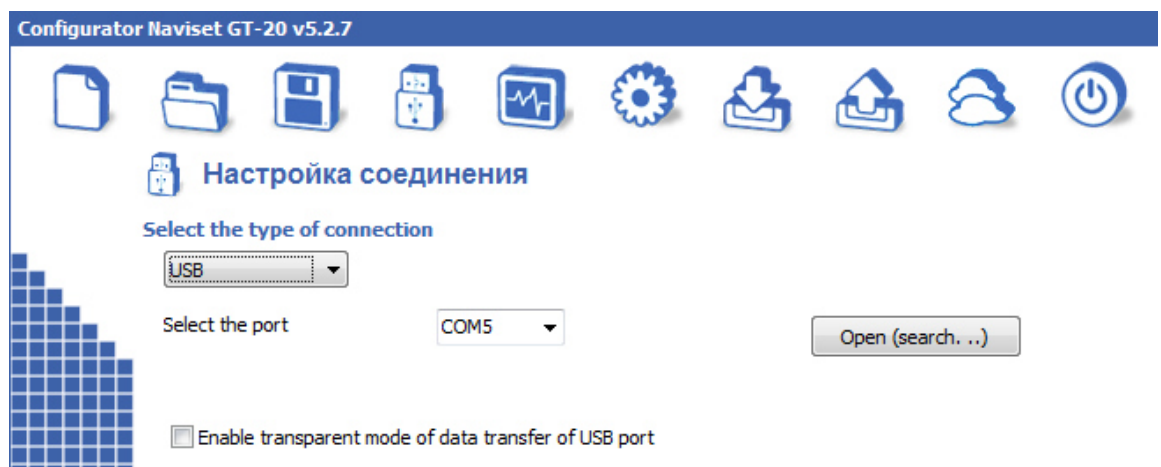
Dynamic Help does not work for elements like "drop-down list" and field for selection of the packet structure.

7.2. LOCAL AND REMOTE CONNECTION

There are two ways to connect NAVISET devices to the CONFIGURATOR program:

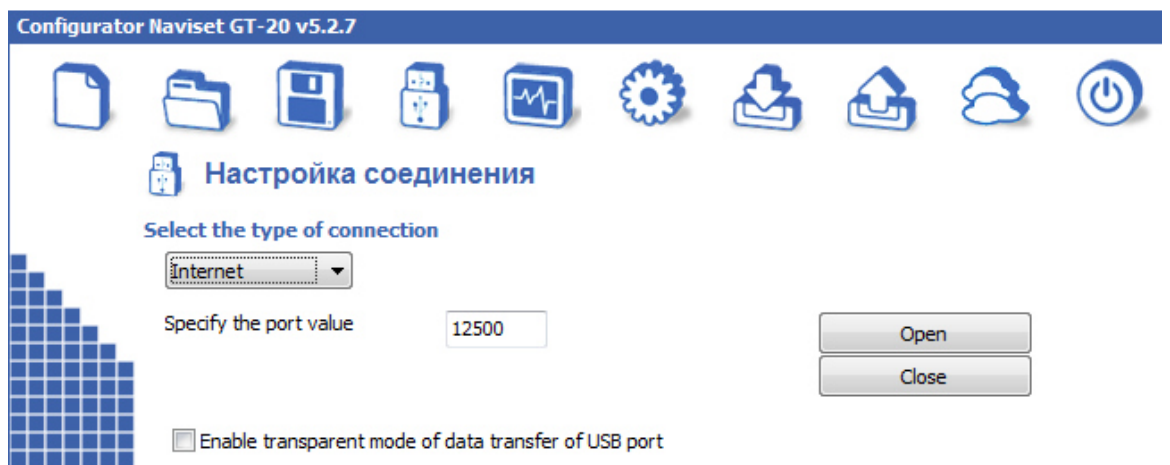
1. Direct connection via USB interface.

To do this, you need to connect the device to the PC, where the CONFIGURATOR program is installed, with a standard mini USB cable. A driver of the device is installed automatically during the installation of the program or manually from the DRIVERS directory, so when connecting NAVISET devices, there is no need to install an additional driver. If the configurator program in automatic mode, has not established a connection to the device, then click "Setting of connections" and select the virtual COM port, which the NAVISET device is connected to.



2. Remote connection to the device via GPRS.

It completely replaces the direct cable connection to the device without restriction of the CONFIGURATOR program functionality. To establish the connection, click "setting of connections," in the drop-down list of COM ports select "Internet." In the appeared window enter the port number through which IP connection will be produced. For example, 12500.



If the computer has a firewall or Windows Firewall is enabled, you should enable the transfer of data to the IP port specified in the Configurator. In this mode, the configurator program is configured as a server to accept incoming connections (connection of NAVISET devices). The devices must be informed about the IP address and port of the PC where the program is installed. To do this, the command is sent via SMS from the phone, the number which is included in the list of the trusted connections. The command format is COM5 PASS, IP, PORT. Example: COM5 1234,203.151.20.2,5001. Where 1234 – is an access password, 203.151.20.2 - IP

address of the PC where the Configurator is installed, 12500 - the IP port specified in the settings of the configurator connections. After the above actions, the device will independently connect to the configurator via the Internet and will be available for the remote configuration. To make a remote re-connection, you need to send the COM5 command again

Please note that the PC's IP address must be real and visible from the Internet. It can be both dynamic and static. To check the IP address all you need is to carry out the check from any PC connected to the Internet via another connection. Click Start -> Run, enter the PING command and specify your IP address. For example, PING 203.151.20.2:5001. If you see a response - IP address is real and visible from the Internet, if it is absent - the operator granting access to the Internet provides IP from the virtual subnet, and in this case, to make a remote connection to the device is impossible. In this case, use DYNDNS proxy to get a real IP address.

3. Configuring when starting up for the first time.

When the power is on for the first time, the device does not have a configuration and tries to connect to the configuration server. If the configuration has been previously uploaded to the cloud for this device IMEI, automatic loading is performed, and after reboot, the device works in accordance with the loaded configuration.

NOTE!!! By default, the device is set to work with MTS SIM cards. This operation is possible only when the MTS SIM cards are installed. Installation of the another operator's SIM card is possible if this operator does not require a specific APN.

Information about configuration upload to the cloud See the section of operation with the configurator "CLOUD PANEL."

7.2. RUNNING THE CONFIGURATOR PROGRAM

7.2.1. «STATE MONITORING» PANEL

The configurator has an opportunity to display in real time the current state of all values measured by the device and the current state of work.

In addition to the parameters display, the diagnosis of the device is also displayed in real time. This window allows you to see what actions the device is taking and in the case of failure, you can quickly find the cause.

All data are displayed in the dynamic mode. If a parameter is changed, it is immediately displayed on the corresponding panel.

The parameter "Connection to the Server" assesses work of the communication channel. The first sign of the parameter indicates the server with which the device (no. 1 and no.2) works, a second one - connection to the specified server.

Evaluation of the data transmission is performed by the parameter "Data for transmission." If the value differs from zero, there are data for transmission.

Only inputs enabled in the settings are displayed. Depending on the input type, the displayed data will be different. For example, if the input is analog, the voltage measured in V is displayed, if the input is frequency - the frequency in Hz is displayed, if the input is counter - the number of pulses is displayed, if the input is discrete - an active/inactive state is displayed.

The outside temperature is taken from the connected digital sensors by 1-Wire bus. 8 is a maximum number of sensors. The sensors' addresses are assigned automatically when they are connected. The first connected sensor will display the 1 temperature, the second one - 2 temperature, and so on. Therefore, the sensors shall be connected one by one.

The values of fuel level sensors "Level 1" and "Level 2" are taken from the sensors connected to the PORT 1 and PORT 2 on the RS232 interface, respectively. If sensors with the RS485 interface are connected to the PORT 1, the "Level 1" is responsible for the operation of the sensor with the network address no.1, "Level 2" with the address no.2 and so on till the eighth sensor. If the fuel sensor has an integrated temperature gauge, the sensor's internal temperature is displayed in front of the sensor readings.

Diagnostics window displays the current actions of the device. It is designed to debugging stored configuration operation and detection of the device malfunctions. All actions are displayed in a readable textual format. Therefore, even an inexperienced user can easily understand the information displayed.

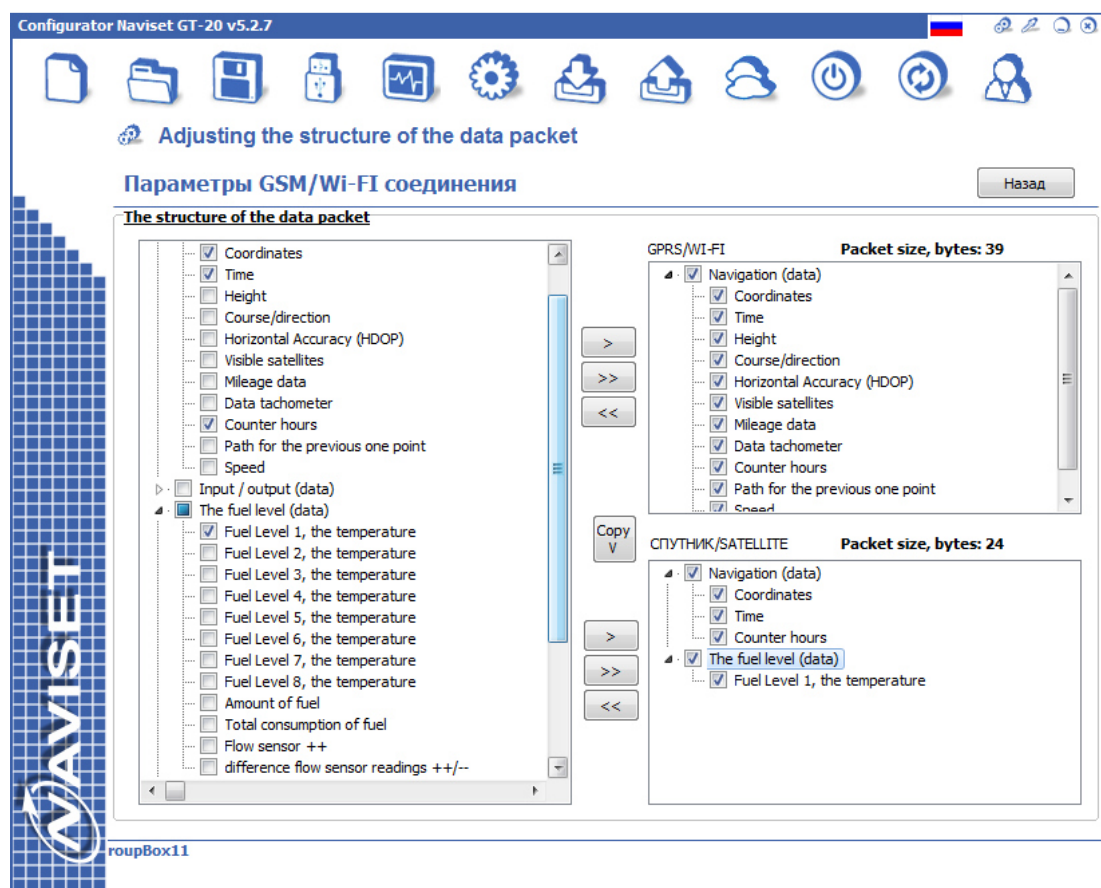
7.2.2. «COMMUNICATION» PANEL

The panel is designed to adjust the parameters of communication channels, the choice of priorities and testing based on the configured parameters.

For various modifications, the data transmitters assigned to the channel are visually displayed on the panel of communication channels. If in the section of "Digital ports" the satellite transmitter of the Inmarsat or GONETS type is selected as a connected device, they will also be displayed on the panel of communication channels.

The basic parameters specify the server addresses with cartographic software and data communication protocol for each of them. The structure of the protocol is configured, one for both servers. Automatic update of the device's software allows you to upload the latest update to the device by the specified date range. The IP address of the upgrade server is not required to change.

Various structures can be selected for GSM/WiFi transmitters and satellite communication channel in the section of "Protocol Structure Setting".



In particular, to save the satellite traffic, it is not recommended to transmit the HDOP level, the number of satellites, speed, course, tachometer data and engine hour indicator via the satellite.

For user convenience, the structure can be copied from the GSM/WiFi panel to the Setillte panel.

By pressing the ">" button, the parameters selected in the left list will be added to the corresponding structure on the right, and using the ">>" button, structure will be completely replaced.

The radiosilence mode is used when it is necessary to hide the installation of the device. In this mode, all radio transmitting components of the device are activated according to schedule. A minimum interval of communication establishment of the device is 1 hour. Option "Sleep after the transmission" takes the device into the radiosilence mode immediately after the data transmission is complete.

For the GSM transmitter, 4 options of "virtual" communication channels are available, each of them is responsible for the operation through a specific SIM card or SIM chip. This virtualization is required to optimize the time spent for the communications test through each SIM card. If you have one SIM card there is no use to check communication through all the 4 available options; it is sufficient to check the box of the actually installed SIM card, which will help save time spent on communications test for this transmitter.

For each transmitter, the number of attempts to connect with the network/server and the time limit for these attempts can be set. The device moves to the next communication channel according to the priority upon the expiry of specified time or after execution of the specified number of attempts to establish a connection. If there is only one transmitter (e.g. only GSM), the process will be performed again.

The priority of communication channels is established from the top block to the bottom. To change the priority, move the block of the desired transmitter with the mouse up or down.

In the modification no.4, there is a possibility to choose combination of the IRIDIUM transmitter (GlobalStar) with the WiFi transmitter on the channel 1 or with GSM on the channel 2. Depending on the logic and conditions of operation the user selects the most optimal configuration of the transmitters. To move IRIDIUM transmitter (GlobalStar) from one channel to another, double click on it.

In order to save power, each transmitter can be switched off. There are two options:

1. Turn off when it is not used – the mode is available in modifications where a one transmitter is used on a one communication channel.
2. Turn off in energy saving mode – the option is available only if this mode is active (it is turned on and tuned in the "Energy Saving" section)..

One transmitter on a channel	Two transmitters on a channel
Never	-
If another channel is used	-
In the mode of energy saving or radiosilence	In the mode of energy saving or radiosilence

For each transmitter a place where it will work can be determined:

1. Everywhere - the transmitter is allowed to work in any mode and on the entire Earth surface
2. Only in the geofences from the list - if the device is in one of the geofences of the list, this channel will be forcibly activated.
3. When startin up the ignition - if the function "Control of ignition" is assigned to one of the inputs, the transmitter is allowed to work only if this input is active.
4. Defined by the events - permission and prohibition of work is set by the integrated logic of the device.

IT IS IMPORTANT!!!

If the transmitters are integrated on one communication channel, the turning on permission functions "never" and "If another channel is used" are not available for them. But if one of them is not activated on the panel selecting channels to be used, these turning on permission functions become available for the second one.

Channel 1	Channel 2	External PORT 1	External PORT 2
GSM SIM1	WIFI	INMARSAT	GONETS
GSM SIM2	IRIDIUM		
Bluetooth			

Transmitters are automatically distributed among the ports. In a modification 4 a range of the communication channels for the IRIDIUM (GLOBAL STAR) transmitter is available. To move to another channel, you must double click on it with the left mouse button.

For each transmitter additional settings responsible conditions of data recording over time, on the move, and other specific conditions, typical for each individual transmitter. These settings allow you to optimize output traffic; it is especially true for satellite communication channels.

Recording parameter for GSM/GPRS/WiFi

[Packages recording period when parking] specifies the time interval, after which the next packet will be recorded, while the vehicle is stationary. It is possible to increase the recording time after a certain time if the subject is stationary for more than this time.

[Switch to the event recording mode] - If the parameter is enabled, after a specified time since the vehicle is stopped, the device stops packets recording to memory. The next data packet will be recorded when appears the event, the source of which is a motion sensor, transition of analog inputs to the active state, the disappearance of an external voltage.

[Sensibility of the accelerometer] - The dimensionless quantity, which determines the threshold. When this threshold is exceeded, a flag denoting moving device is set. The threshold is adjusted experimentally. If there are false responses while the vehicle is stationary with the engine running due to strong vibrations, this parameter should be increased.

[Time of transmission to the stationary mode] - If within the specified time the motion sensor is inactive, the device switches to "stationary" mode.

[Package recording period while driving] - specifies the time interval at which data packets will be recorded when running speed is less than 10 km/h.

[Record packets, in each, m] - When the speed is more than 10 km/h, packet recording interval is determined by the traveled distance, which is proportional to the running speed. For example, at a speed lower than 20 km/h, the parameter is 30 m, when the speed is more than 20 km/h and less than 40 km/h. packets will be recorded every 60 m, at a speed of from 40 km/h to 60 km/h - 90 m.

[Enable filtering on a straight section] - If this parameter is enabled, additional filtering of coordinates is performed on a straight section, which leads to a decrease in the transmitted traffic. When moving in a straight line off-course deviation is checked, and if it does not exceed the specified value, the coordinates are not recorded in the memory of the device.

[The minimum speed at which the drawing on turns is enabled] - determines the speed above which the angle is checked. When speed on turns is lower, the coordinates will not be recorded.

[Minimum angle] - determines an angle above which the packet with the coordinates is recorded to the device memory. The value of this angle should be chosen so that on the one hand, inconsiderable transport maneuvers on a straight section would not result in the data packet recording and on the other hand, the angle should not be large enough to provide opportunity to fix turning.

[Enable filtering with the restructuring] - If this parameter is enabled, there works an algorithm, with the help of which the additional filtering of turns is performed. When fixing the time of turning of transport, coordinate analysis begins. If at the end of the analysis the direction of movement remains the same (car has

changed the lane) or has slightly changed (turning angle did not exceed 30 degrees), the coordinates are not recorded in the memory of the device. When the filtering is anebled, a "minimum angle" may take a smaller value for a more detailed drawing of the turn.

Examples of records for satellite channels (IRIDIUM/GLOBALSTAR/ INMARSAT/ГOHELI)

[Type of transmitter] – Choose one of the transmitters available in the list to make settings.

[Encryption of data] - Selecting the server of an interface of satellite channel and mapping software.

- «*SAT2IP.11.CRYPTO*» provides compression of the transmitted information and its encryption before being sent through the satellite network, the minimum data packet in this case is 11 bytes. In this mode, the device operates in coordination with the SAT2IP.RU data transmission server. When a satellite transmitter is connected (activated) the server address SAT2IP - 81.23.194.44:10889 shall be set from the service provider.

- "*User*" service does not encrypt and does not compress the data, all data are transmitted to the map server directly from a satellite operator in accordance with the standard GPRS protocol (device IMEI and ID are not transmitted).

[Name of the object] – A random name of the object. It is used to reach the desired object quickly by name in the list of objects in the personal account of www.sat2ip.ru server. You can enter the customer's name or any other information in this field.

[IMEI SBD] - IMEI of a satellite transmitter. It is displayed automatically when configuring the local device. When the device is remote, it must be entered manually. In the case of remote configuration via a satellite communication, it is recommended to download the configuration from the cloud. Work with the cloud configuration service is described in the section "Work with the cloud service." If the IMEI is not displayed, click the REFRESH button to force the transmitter polling. If after the forced polling the IMEI is still not displayed, it means either the transmitter is not available, or it is faulty.

[IMEI GSM] – IMEI GSM of a transmitter. It is displayed automatically when configuring the local device. When the device is remote, it must be entered manually. In the case of remote configuration via a satellite communication, it is recommended to download the configuration from the cloud. Work with the cloud configuration service is described in the section "Work with the cloud service." If the IMEI is not displayed, click the REFRESH button to force the transmitter polling.

[Download from SAT2IP] - Download of the current configuration from the cloud SAT2IP. If the configuration has been unloaded before, it can be downloaded without connection of the configurator to the device for further modification and to be saved on the server and sent to the device. If the structure of the protocol was changed, it is strongly required to upload the configuration to the cloud and the device.

[Upload to SAT2IP] – Upload of the current configuration to the cloud, registration, and saving of instrument settings on SAT2IP server. The button shall be pressed after the configuration has been recorded to the device. Before putting the device into operation and testing the satellite link, it is required update SAT2IP. Data destination address (map server) is taken from the GPRS connection settings.

[TEST] - After updating the device settings and when this button is pressed, an extraordinary data packet is formed to be sent via the satellite channel. This function is used to test the transmission of data from the device to the end map server addresses. These are considered to be posted, if answered, "The data packet delivered."

[Transmit data only on the events] – when there is no communication via either GPRS, the device will not automatically switch to the satellite communication channel. The record and transmission of point and the data will be sent to the server exclusively for the event. For example, if the Input 1 responds, the following action is set- "Send the current data to the server." For details, see the setting of the event in the section "8.3.3. Inputs, Outputs, and Events."

[Data Sending Parameters] - Data recorded for transmission via the satellite channel can be transmitted at the time they appear/of points recording or accumulate in the buffer and send a few points at a time. The first variant is used if the GSM/GPRS network and the device occur very rarely, it means that mainly the satellite channel works. It is reasonable to use the second variant if the device occurs within the coverage area of GSM/GPRS, because when the data transmission landline networks are absent, the device will record the points of coordinates to the buffer to send data via the satellite channel, when GSM/GPRS network appears, they will be removed from the transmission, which will result in savings of satellite traffic.

[Parameters of settings to the clipboard to send data] - the points with coordinates can be recorded at appropriate intervals, when an object is moving or at a certain covered distance, which is determined by the built-in odometer. For cars, machinery and other slow-moving vehicles it is recommended to make a record at an interval, for the aviation and marine equipment it is recommended to make a record according to the distance covered.

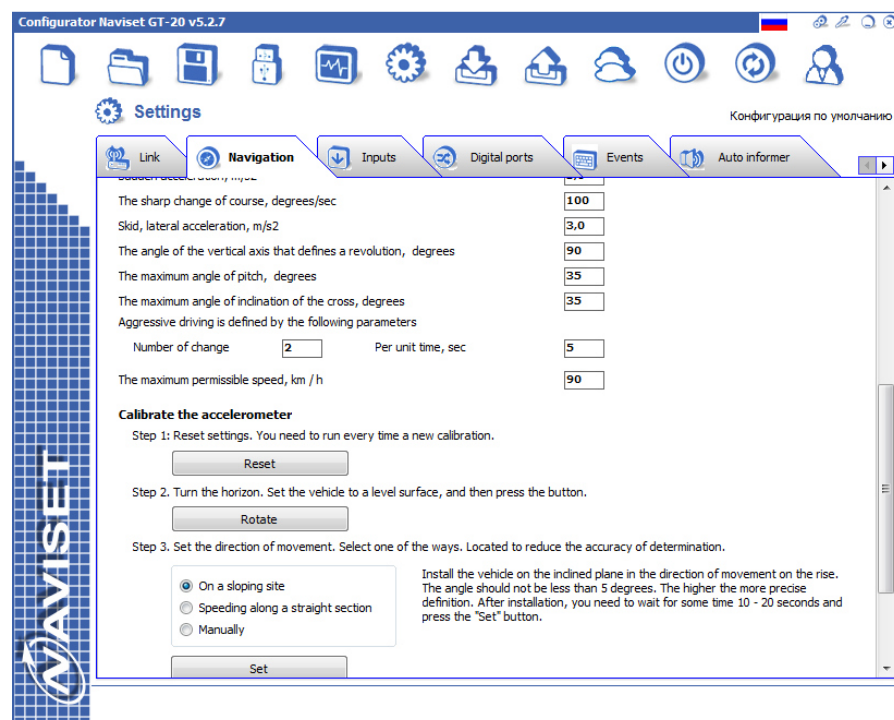
[Historical records when parking] - If the object requires a long parking and at the same time it is necessary to periodically receive telemetry from it, for example from the fuel sensor for drain, you can use this option. It is recommended to set an equal value

[Traffic restriction, month, bytes] – Setting up the limit of the terminating and outgoing traffic (total value). If the specified threshold is exceeded, the transmitter is turned off by 23:59 pm of the last day of the calendar month. This function is used to prevent a possible overrun of satellite traffic and excessive use of the alarm button.

[Control via the satellite] – It is possible to change the configuration and control the device both locally and remotely. The section allows you to make changes in time intervals of data transmission via the satellite and the logic of these packages recording, in this case only a part of the configuration is changed, and the traffic is saved. You can record the new configuration completely (do not abuse this function, since the size of the configuration is 1500 bytes) or restart the device.

7.2.3. «MONITORING» PANEL

In this section, the parameters to filter data received from a satellite receiver are set in the discretion of the user.



The default settings are optimal. Depending on the operating conditions and the type of the antenna used, these parameters can be changed.

Coordinates filtering. If the coordinates filtering is enabled, the stored coordinates are analyzed. If coordinates have not passed the test of any parameter, the latter depending on the mode selected are not stored in memory and therefore will not be transmitted to the server, or the coordinates are reset to zero, in this case, all the other sensors data remain unchanged.

[Maximum HDOP] - sets the maximum value of horizontal accuracy. If the value is greater than the specified one, the coordinates are considered invalid and will not be recorded. The recommended value is 4.

[Minimum speed] – is a speed below which the coordinates are considered invalid and will not be recorded. The recommended value is 3km/h.

[Maximum Speed] – is a speed above which the coordinates are considered invalid and will not be recorded. The recommended value is 150-180km/h.

[The maximum leap of coordinates] - determines the maximum permissible distance between the two coordinates. If the difference between coordinates exceeded the specified value for one second, the coordinates are considered invalid and will not be recorded. The recommended value is 50 meters.

[Maximum Acceleration] is a values of acceleration above which the coordinates are considered invalid and will not be recorded. The recommended value is 3 m/s.

[The minimum interval of points recording into memory] –is the time during which the coordinates are not recorded for any events.

[Minimum number of satellites] - If the number of visible satellites is less than the specified value, the coordinates are considered invalid and are not recorded.

Operating mode of the Receiver - the device operates with two satellite systems: GLONASS and GPS. The user can select one of the systems or a combined mode. In the latter case, positioning accuracy is significantly increased due to the processing of data from more satellites.

The parameters of inertial monitoring – settings of the main maximum permissible parameters of driving quality. If a parameter exceeds the permissible value, an activity flag is set and transmitted to the extraordinary data packet. To transfer these parameters to the server check the box "Status/Settings of tracker/TC" - "Driving" in the packet structure.

Besides the automatic check of limits, the user can control them independently having described the logic of processing in the events section.

When the "Accident" event occurs, based on the set parameters, the device records the every second track of 20 points. Some of them are taken from the past, set by the message parameters in the buffer before the event and some are taken from the future, set by the message parameters in the buffer after the event. A number of messages before and after the event can not exceed 20.

7.2.4. «INPUTS» PANEL

Installation of the handlers for input, selection of the input signal type (analog, frequency, discrete or counter). For the security mode, or to create an event, you can select a range of voltage of active and passive input status.

In addition to measuring properties, the inputs perform predefined functions such as ignition control, hour meter, the input for arming and disarming and so on. A detailed description of the functions is given below.

The inputs can be used both to obtain the values from the connected sensors and to take logical values for further use in the processing of events, reactions of the security mode and to perform logic functions defining the position of the ignition switch, running engine and so on.

TYPE OF INPUT – the selected input operation mode is determined:

[not used] – The input is not used.

[Analog] – is an analog input with a measurement range from 0 to 36 V. If it is necessary to transfer the measured value to the server, in the packet structure in the block "Inputs/Outputs (data)," check the box next to the appropriate input (voltage of input 1 ... 8). Inputs 9-12 do not perform the measurement function; only a discrete value is available for them. To obtain the discrete input status (active/passive) in the packet structure in the block "Input/Output (status)," check the box next to "Discrete status of input 1-8." If outputs 1-4 have been transferred to the INPUT state, to obtain the status on inputs 9-12 in the package structure in the block select "Input / Output (status)," check the box next to "Discrete state of OUTPUTS/INPUTS."

[Frequency] - This input is used to measure the frequency of the signal (square wave). In most cases, it is used to connect the frequency fuel level sensor. To transmit the value to the server in the packet structure in the block "Input/Output (data)," check the box next to the appropriate input (Frequency Input 1 ... 8). For correct calculation of the frequency, set the slider of the lower limit at the level of half the input signal amplitude.

[discrete] - To connect digital sensors with two work position "ON" or "OFF". For example, an alarm button, closing the input to the supply voltage. The "HIGH" active layer is used, and it is recommended to set the upper limit at 6-10V. The input status is transmitted in the block "Inputs/Outputs (Status)" - "Discrete status of inputs 1-8" and "discrete status of Outputs/Inputs"

[Counter] - The input is used as pulse counters for operation composed of flow-through pulse sensors. To transmit the value to the server in the packet structure in the block "Input/Output (data)," check the box next to the appropriate input (Frequency Input 1 ... 8). The counter value is increased when the input changes to the active state.

For all input types the triggering threshold in the active zone available.



Triggering threshold is selected by engines in multiples of 0.1V. The activity area of the input is shown in red. To change the activity area, click the left mouse button on the desired area. The current value of the input voltage is specified at the beginning of the scale. Activity area can take the following ranges:

1. Below the lower – the input is considered active if its voltage value is less than the voltage of the left engine. Within the rest voltage range, the input state is considered not inactive.
2. Average - the input is considered active if the voltage on it is over the left engine voltage, and less than the right engine voltage. Within the rest voltage ranges the input state is considered not inactive
3. Above the upper – the input is considered active if the voltage on it is greater than the right engine voltage. Within the rest voltage range, the input state is considered not inactive.

FILTER – determines the time of the average current value of input, i.e., the time during which no actions performed when the input signal is changed. It is used to eliminate the effect of "contact bounce" and filtering of noise resulted from the impulse induction on the connected conductors. Ranges from 0.1 seconds to 10 seconds.

FUNCTION – for analog and discrete inputs it is possible to choose the functions, which will automatically process and generate actions depending on its purpose. The function sets the appropriate flags, which can be used while processing of events.

[Alarm Button] – the function sets the flag "Pressing the alarm button", this flag is transmitted in the structure of the protocol in the block "Status/Tracker parameters/Vehicle" - "Vehicle Condition." When it is changed to the passive state, the flag is removed. When the input is triggered, the extraordinary packet is formed. If the input is triggered several times, more data packets will be formed. This flag can be processed by events.

[Ignition Control] – the input is connected to the ignition switch to control on/off state of the ignition. The function sets the "Ignition" flag; this flag is transmitted in the structure of the protocol in the block "Status/Tracker parameters/Vehicle" - "Vehicle Condition." By this, you can counter the moto hours or vehicle usage time. This flag can be processed by events.

– the input is connected to the car's tachometer. In the active state starts the second timer counting time, the value of which is transferred to the protocol structure in the block "Monitoring (data)" - "hour meter". The hour meter is reset to zero and starts counting again when overflowed.

– this input change into the active state leads to dialing the first number from the list. If the phone number is not specified, no action is performed. The function sets the "Call Manager" flag; this flag is transmitted in the structure of the protocol in the block "Status/Tracker parameters/Vehicle" - "Vehicle Condition." This flag can be processed by events, for example, dial specific numbers or to send an SMS with the specified text. Repeated change to the active state drops the call (if dialing of a number or a conversation started). When using the NAVISET HF-1 handsfree, this input function is performed by the button on the handsfree amplifier, the effect of which is already provided in the configuration (call by connection number 1).

[Arming/disarming] – the transition of this input to other state changes the state of security, i.e. if the device is secured, disarming takes place, and vice versa. In the UNDER SECURITY mode the device controls all inputs with the selected input function "door limit switch" or "standard alarm output." When one of them goes into an active state, the alarm event is generated that can be processed at the user's discretion in the Event section.

[Control of headlights] – the function sets the "BS Lights" flag, this flag is transmitted in the structure of the protocol in the block "Status/Tracker parameters/Vehicle" - "Vehicle Condition." When going to the passive state, the flag is removed. When the input is triggered, the extraordinary data packet is formed. If the input is triggered several times, more data packets will be formed. This flag can be processed by events.

[Seat belt control] – the function sets the "belt driver" flag, this flag is transmitted in the structure of the protocol in the block "Status/Tracker parameters/Vehicle" - "Vehicle Condition." When going to the passive state, the flag is removed. When the input is triggered, the extraordinary data packet is formed. If the input is triggered several times, more data packets will be formed. This flag can be processed by events.

[Driver presence sensor] - The function does not set any flags, processed only by events.

[Trigger of ABS] - function sets "the ABS" flag, this flag is transmitted in the structure of the protocol in the block "Status/Tracker parameters/Vehicle" - "Vehicle Condition." When going to the passive state, the flag is removed. When the input is triggered, the extraordinary data packet is formed. If the input is triggered several times, more data packets will be formed. This flag can be processed by events.

[Trigger of SRS] - function sets "the SPS" flag, this flag is transmitted in the structure of the protocol in the block Status/Tracker parameters/Vehicle" - "Vehicle Condition." When going to the passive state, the flag is removed. When the input is triggered, the extraordinary data packet is formed. If the input is triggered several times, more data packets will be formed. This flag can be processed by events.

[Door limit switch] - The function does not set any flags, processed only by events. If the device is on SECURITY mode, the transition of the input to the active state generates an alarm event. Then It is processed on a user's discretion.

REGISTER – for all input types, regardless of the selected function, you can choose a record to the internal data storage register. For analog, frequency, and counter inputs the value recorded for the discrete logic state is "1" or "0". Data from the register may be transmitted to the server in the form as they are, for this purpose in the packet structure in the block «CAN/Modbus Data Registers" check the box next to the desired register. The registers also can participate in events? For example, to compare values specified by the user.

1-Wire INTERFACE– the input to connect the contactor of electronic keys. It is used to identify the driver according to the TM electronic key (iButton).

[Keep the key code value when on the contactor] – the function sets the "key on the contactor" flag if the key touches the contactor, and removes it if the key is not on the contactor. If the checkbox is selected, when the key touches the contractor, an extraordinary data packet with a key code will be formed. The key code is transmitted in all subsequent packets while the key is on the contactor.

[Keep iButton code value until the ignition is switched off] - This function is available if the "Control of ignition" function is selected for one of the inputs. After the key touches the contractor, its code will be transmitted in each packet subject to the active input status with the "Control of ignition" function before its transition into a passive mode.

Electronic key numbers can be stored in the device memory or on removable media such as SD Card. The latter variant of storage is recommended if a large number of keys is used.

7.2.5. OUTPUTS

The setting of handlers for the outputs of the device does not have a certain visual version. All outputs are controlled by events.

The sequence of actions caused by any source can turn on, turn off, invert and set pulse sequence at the user's discretion.

The function of speed sensor simulation can be allocated any of the outputs. This function can be used to transmit information about speed on the pulse input to the tachograph. To enable on the panel, check the box "Speed sensor simulation " and select the output that will emulate the work of this sensor from the drop-down list..

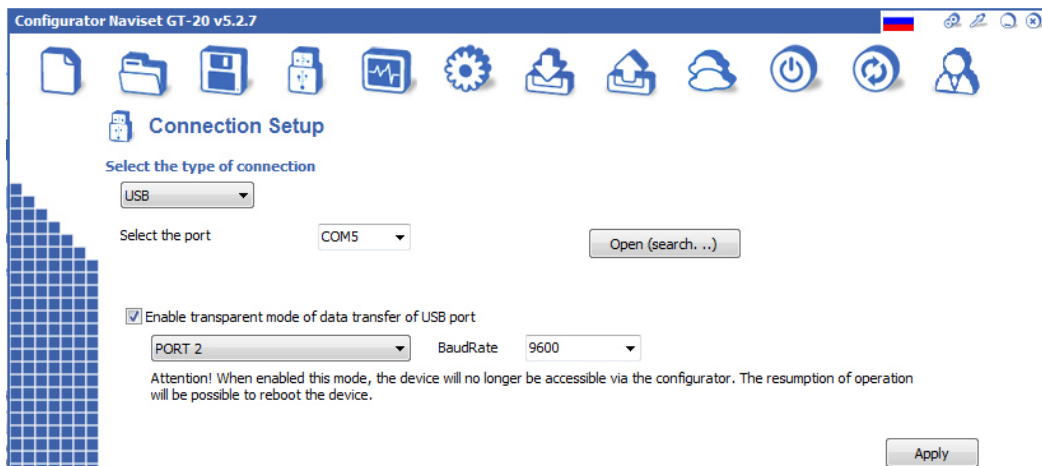
7.2.6. «DIGITAL PORTS» PANEL

The section of configurator is responsible for setting the parameters connected to the device via digital interfaces RS232, RS485, and CAN BUS.

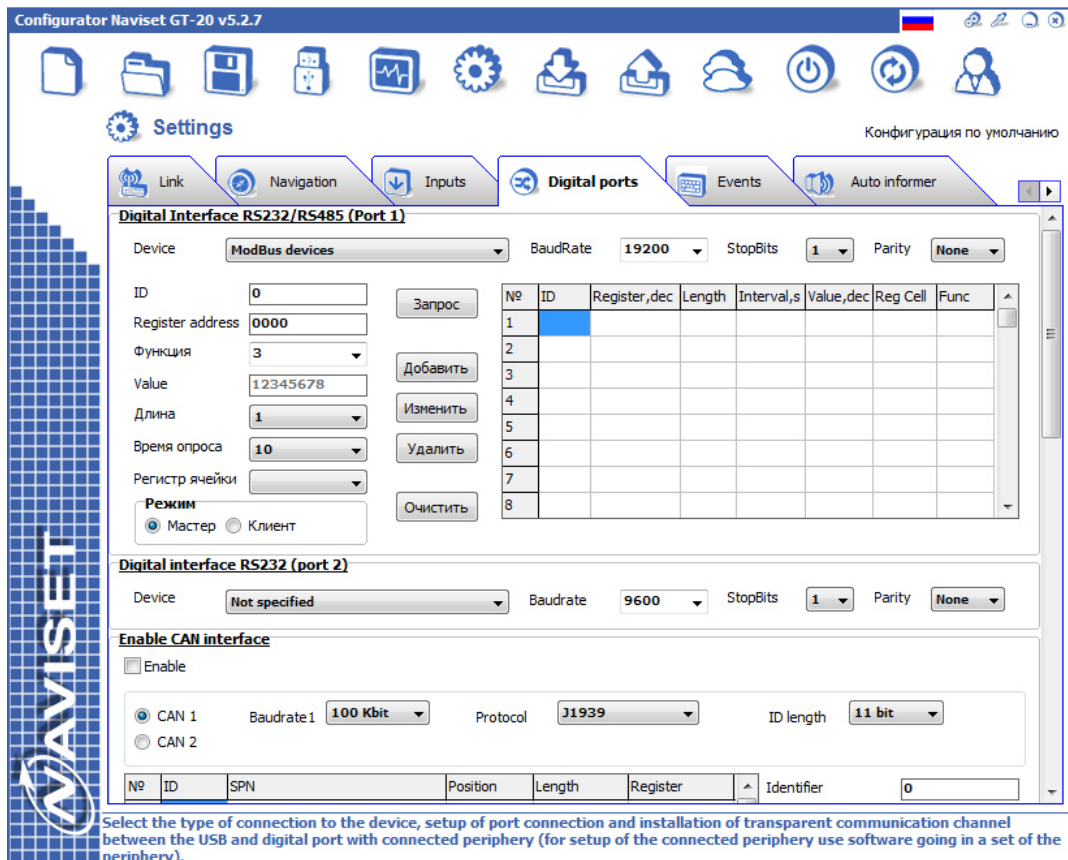
Before connecting an external device to the digital interface, make sure that the unit supports this device. After the connection is completed, select the desired type of the connected device from the dropdown list and set its parameters. If the device or its type is not listed, you can select the generic handler " MODBUS Devices».

For users' convenience, the device has a transparent operation mode with the connected periphery. To avoid separate connection of the sensor to the computer, you can choose the port the sensor is connected to in the section SETUP OF CONNECTION TO THE DEVICE, and click the "Apply" button. Then you can change the settings of the sensor using the regular software via a virtual COM port created by the device. Before starting operation via this port, you need to close the "Configurator" program before opening this port using a third party software.

This mode allows you to use both built-in receivers and transmitters of the device. In this case, instead of an external port, you need to select the built-in type of peripherals in the same drop-down list.



The devices MODBUS and CAN BUS save data in the registers and can operate in the MASTER and SLAVE modes.



Select the type of connection to the device, setup of port connection and installation of transparent communication channel between the USB and digital port with connected periphery (for setup of the connected periphery use software going in a set of the periphery).

To add the necessary parameter to the memory of the device, select it and click the "Add" button. Repeat these steps as many times as you need to add parameters.

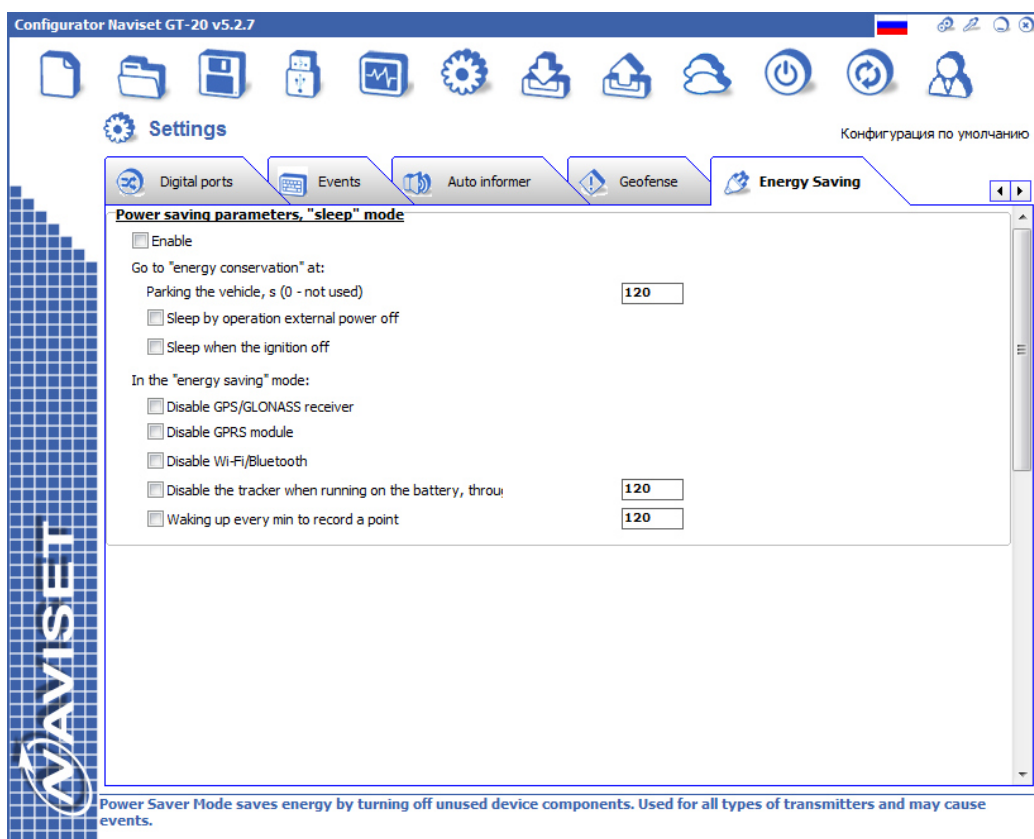
In the poll table you should assign internal data storage register for each identifier. The data read from the CAN bus will be recorded in this register. The data from the register may be transmitted to the server in the form as they are, to do this check the box next to the desired register in the packet structure in the block «CAN/Modbus Data Registers." The register can also participate in the events, for example, for comparison with the value specified by the user.

After the settings are set and reboot is completed, a few parameters will be displayed in the "Value" column.

7.2.7. THE «ENERGY-SAVING» PANEL

There are three options for the automatic transition to the power-saving mode:

1. If the object stopped and has not changed its position over the time specified by the user.
2. Is there is no external power supply – the device goes into sleep mode as soon as it begins working on the built-in battery, and regardless of any factors, extraordinary data packet with the "battery operation" flag is sent
3. When the ignition is switched off - the function is available only if the "ignition control" function is assigned to one of the inputs. The When you turn off the ignition the device automatically goes to the sleep mode.



7.2.8. THE «AUTOINFORMER» PANEL

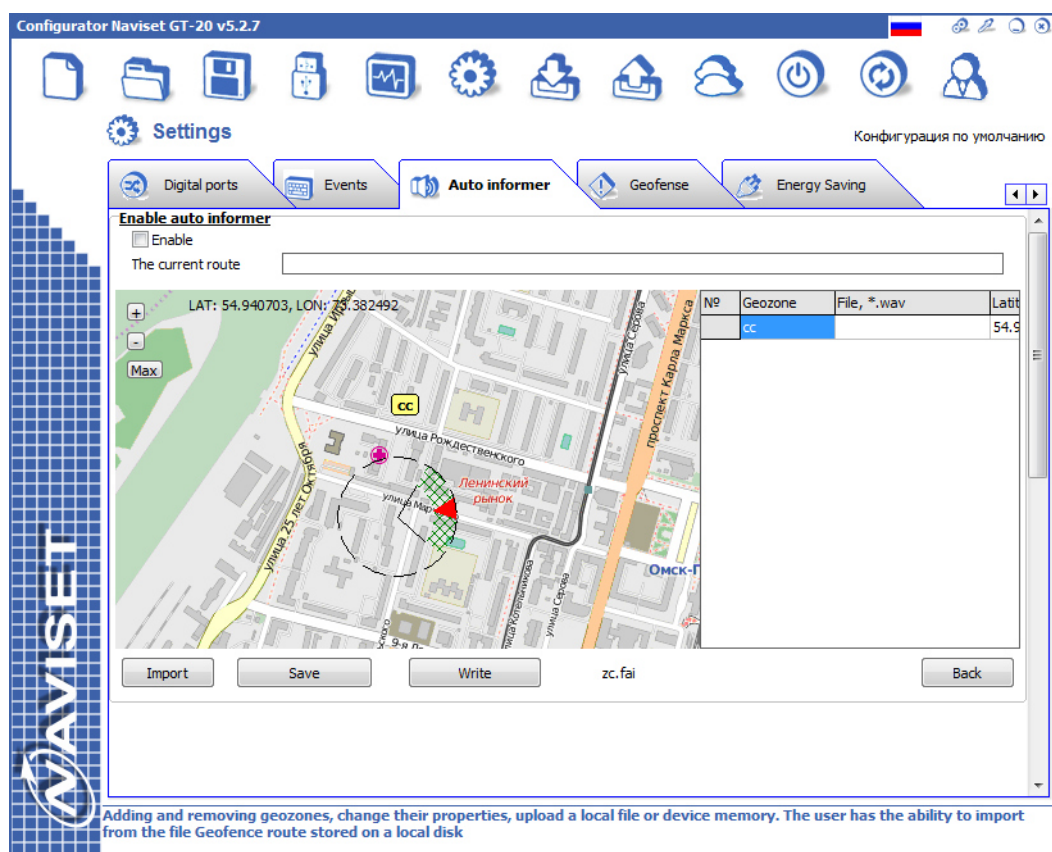
The autoinformers are used to playback voice phrases via the amplifier connected to the output of the "SPK OUT" device at the input or output of the geofence. You can use the amplifier from the Naviset HF-1 handsfree kit as a signal amplifier. The operation interface used to add and edit the routes is intuitive.

The function of the work with an autoinformers is available only in the Naviset GT20 PRO, NAVISET GT50 versions. The operation requires inserting an SD memory card. Before using the device, format the memory card in the FAT32 system on a personal computer. It is recommended to remove and insert a memory card when the device is turned off.

The device can determine the direction of the input to the geofence. You can set a certain voice phrase for each direction of the input. This function is suitable when announcing bus stops. Since in one direction the stops are announced in direct order with the announcement of the next stop along the route, in other direction, the bus stops must be announced in reversed order, therefore different voice phrases are used.

Creating a list of coordinates of geofence in two ways:

1. During the movement of the vehicle along the route and recording the current coordinates, the outer and inner radius of the geofence.
2. In interactive mode, noting the points on the digital map. This method saves the time on construction of the path and allows all the points, the radii, and vehicle movement direction to be worked out in more details.



The device allows you to specify the direction of the input to the geofence. This function is used to announce stops of public transport. For example, in one direction the Stop №6 is announced after the Stop №5, in another direction the Stop №5 follows the Stop №4.

Recorded routes can be saved to a file for duplication, on other devices and thus opened from the existing file of the route.

The operation interface used to add and edit the routes is intuitive and does not require specialized knowledge and training before starting work.

7.2.9. THE «GEOFENCES» PANEL

Geofences are made on the basis of an outoinformer, but are used only in the events and in the operation of transceivers. Event of presence in geofence is called "Geofence List". To enable the transceiver to work in geofences select a number of geofence list from the list on the panel "Communication" - "Modification Parameters" in the drop-down list "enable working".

Geofences are divided into groups (List 1 - List 8), each can contain up to 8 circular geofences.

An event or appointment to a job in geofences is set for the entire list.

Parameters are specified for each geofences list (5 seconds on default, 1 ... 255 seconds range):

- Time of reaction to the input - default is 5 seconds (1 ... 255sec range)

- Time of reaction to the output- the default 10 seconds (1 ... 255sec range)

Dynamic geofence is used to control the displacement of the object beyond the radius specified by the user. The output checks are performed at predetermined time intervals. If the object left the dynamic geofence, update is made and the center is transferred to the current coordinates.

This geofence with radii created by the user, is formed automatically when the first valid coordinates appear. When going out from the geofences, the event "Out of the din. geo-fence ", is generated which can be used at the user's discretion.

7.2.10. THE «CLOUD» PANEL

The configurator program allows you to upload settings (configuration) of the device to the cloud service. This function is very useful to remotely configure or to set up a large number of devices without a connection to a PC.

The function is available if the computer, on which the program configurator is open, has the Internet connection.

The "Send the configuration to the cloud" button works only when the device is directly connected to a PC and the identified IMEI of the device. When clicking the configurator program connects to the Naviset configuration server and saves all the configuration data.

The "Download the configuration from the clouds" button loads the configuration stored on the server. If the device is not connected to the PC, it is necessary to enter the device IMEI in the GSM IMEI field manually before the operation. If it is not connected, IMEI must be considered automatically.

For remote configuring of a large number of devices, you can use the "Send the list to the cloud" function. To do this in the "IMEI list" field enter the IMEI numbers for which this configuration will be uploaded on the server and press the "Send list to the cloud" button. This function should be used in the initial configuration of devices because if there is no configuration when power is on, it automatically turns to the Cloud of configurations and if it is available on the server it loads.

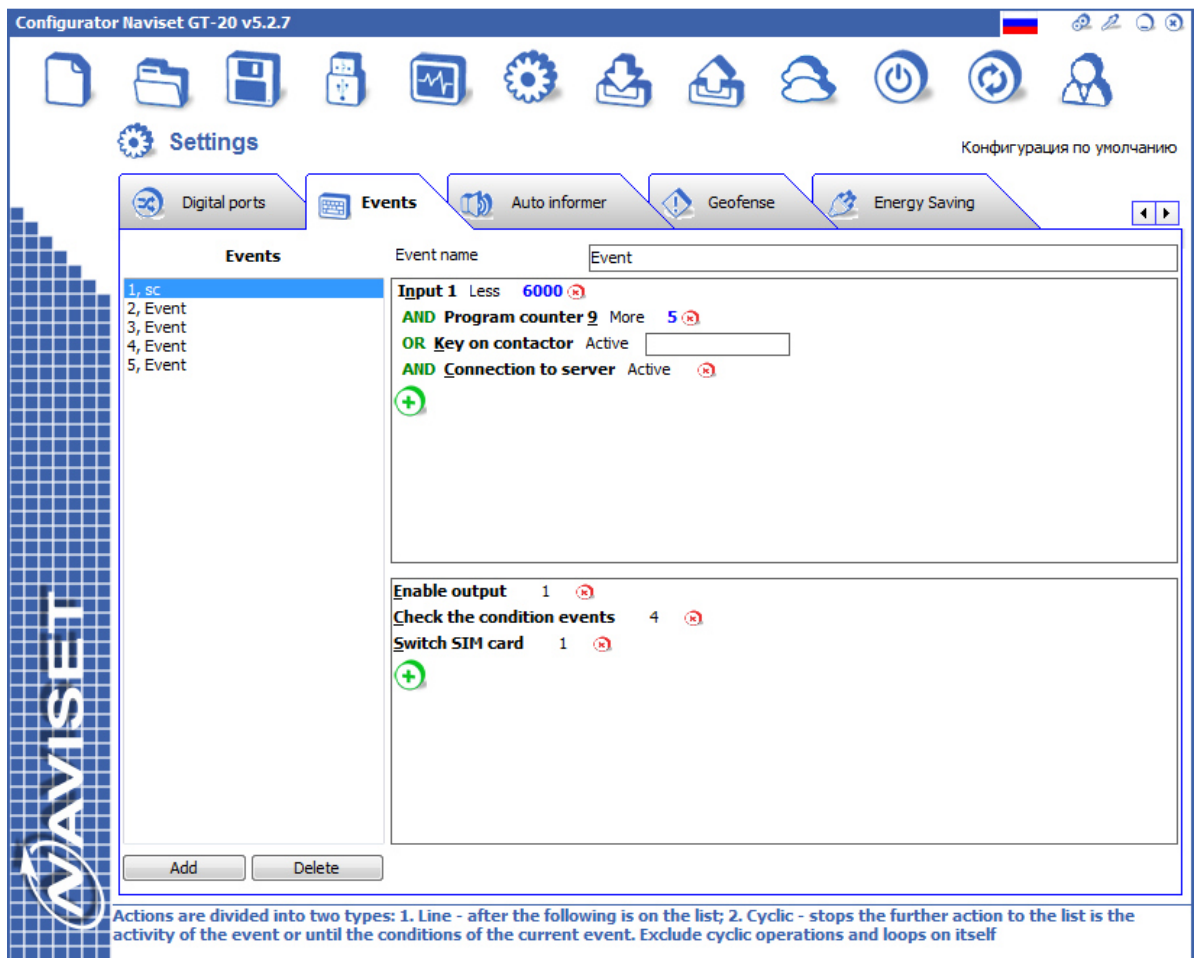
The remote configuration can also be performed on command from the server or SMS command. For details, see Control of the device by SMS commands. The commands from the server via GPRS are sent textually and fully correspond the commands via GPRS.

7.2.11. THE «EVENTS» PANEL

The entire device logic is built on the processing events, which manages the data sending, changes in the internal conditions of the device, and so on. Using the event the user can specify an individual algorithm for operation of the device.

An event –is a set of logical conditions under which the action is performed. All conditions can be combined by the "AND"/"OR" logic. Any parameter of the device(input, timer, acceleration/deceleration, speeding, geofence input, and many others) can be the source (condition) of the event. Action for the event is indicated by a choice from the list of available actions (send an SMS with a specified text to a number, turn out, record the extraordinary packet, change the data transmission channel, start the timer, set a flag and so on).

The device allows recording up to 100 different events that can be interconnected, built in the logical chains, independently changing static parameters.



All the logic is based on three main recommended algorithms:

1. The linear algorithm - as soon as all conditions of the event are fulfilled (the event is active), the device consistently performs all actions. If the event is still active, the actions are repeatedly performed.
2. The cyclic algorithm – is similar to the linear one, but the check of activities of the current or any processed event can be put behind the actions. If the checked event is active, the device will wait for its transition to the passive state, at the same time performing cycle action, and then it will carry out the remaining actions in the list, if any.
3. The pending algorithm – is similar to the cyclic algorithm, but carries out all the actions till the indicator of the "Wait for completion of the event N» function. Then, when the event goes to the passive state, it will perform all actions after the pointer. That is the function is similar to a pause in the action list.

Check for event activity can be applied both to a current event, and other events from the entire list of events. For example, when the event 1 is active, the actions of the event 2 are not carried out.

Program timers, counters, and flags, the values of which can be changed by actions and transmitted in the packet structure to the server.

The used logic under the conditions provides only two logical steps:

1. The "AND" logic- combines conditions. The event will be active when all the conditions combined with this logic are fulfilled.

2. The "OR" logic - The event will be active when any of the conditions combined with this logic is fulfilled.

The combination of logic operations in a single event is allowed, in this case, the "OR" logic combines two adjacent "AND" logics. Do not use "OR" logic twice in succession, if there is an "AND" logic.

Examples of application of logical relationships:

<A> AND AND <C> AND <D> AND <E>

A logical formula $(A + B + C + D + E)$ - the event will be active when all conditions are fulfilled

<A> AND OR <C> OR <D> AND <E>

A logical formula $(A + B) * (C) * (D + E)$ - the event will be active when the conditions <A> AND or Conditions <C> or conditions <D> AND <E> .

<A> OR OR <C> OR <D> OR <E>

A logical formula $A * B * C * D * E$ - The event will be active when any condition is fulfilled

A user can create a necessary number of conditions to carry out the required check algorithm. During construction of the algorithm, special attention should be paid to the cyclical relationships that may lead to the device hang-up. Configurator program is unable to detect mistakes made when preparing the algorithm, so when preparing complex logic operations, it is recommended to increase the structure gradually, testing the total operation of all the events after each stage.

Basic parameters (event sources)

Parameter	Description	Taken values	Operation
Trigger of accelerometer	The presence of movement or shaking.	Logic	Active Inactive
External voltage	The presence of an external voltage.	Logic	Active Inactive
Battery voltage	The voltage value on the battery	0 ... 4,5	
Security state		Logic	Active Inactive
Alarm	It occurs with the active signal on input with function "standard alarm output" when the "security" mode is on	Logic	Active Inactive
Keys on the contactor	It occurs at the moment of reading electronic key code of the iButton or Proximity cards	Logic	Active Inactive
Keys from memory	It occurs if the iButton key is recorded in the memory of the device or removable storage (sdCard)	Logic	Active Inactive
The internal temperature	The value of the temperature in degrees Celsius. Measured by CPU thermal sensor. May differ from the temperature outside the enclosure	Integer-valued, character	
The ambient temperature 1 (2)	The value of temperature obtained from external DS1821 sensors connected by 1Wire bus	Integer-valued, character	
The rate by the pulse sensor		Integer-valued	
Speed on GNSS	The speed determined by the Glonass/GPS receiver. It may differ from the real one at the time of acceleration or deceleration.	Integer-valued	
Acceleration	It occurs if the value of hard acceleration is more than one specified in the "Inertial monitoring" parameters	Logic	Active Inactive
Braking	It occurs if the value of hard braking is more than one specified in the "Inertial monitoring" parameters	Logic	Active Inactive
Incoming call	It occurs at the moment of the incoming call to the number specified in the SIM card device	Logic	Active Inactive
Outgoing call	It occurs at the moment of dialing a number of outside party.	Logic	Active Inactive
The text in the incoming SMS	It triggers if the text in the incoming SMS corresponds to the specified one. Text is desirable to specify in Latin letters.	Text	
Input to the geofence of the route	It occurs at the moment entry into any of geofences of the selected route. It works only when the autoinformant is on	Logic	Active Inactive
Output from the geofence of the route	It occurs at the moment going out any of geofences of the selected route. It works only when the autoinformant is on	Logic	Active Inactive
Input to the geofence of the list 1-10			
Output from the geofence of the list (1..10)			
Battery charge	It occurs at the moment the integrated battery recharging	Logic	Active Inactive

Data packet is recorded	It occurs at the moment of recording the data packet for transmission from any source.	Logic	Active Inactive
Shock sensor	It occurs at when the "the accelerometer sensitivity" value is exceeded of in the track settings for transmission via GPRS / WiFi communication channels	Logic	Active Inactive
Longitudinal tilt	It occurs at when the "the maximum value of the longitudinal tilt" specified in the "Inertial Monitoring" settings is exceeded	Logic	Active Inactive
Lateral tilt	It occurs when the "the maximum value of the lateral tilt" specified in the "Inertial Monitoring" settings is exceeded	Logic	Active Inactive
Speed in the geofence on the route	The speed value when going in geofences of the selected route. Beyond geofences the value is zero.	Целочисленное	
Output from the dynamic geo-fence	It occurs at a time of leaving the dynamic geo-fence at the same time creating a new one.	Logic	Active Inactive
Third-party key	It occurs if the iButton key is recorded in the memory of the device or removable storage (sdCard)	Logic	Active Inactive
Battery operation	It occurs if at the time of the transition to work powered by built-in battery in the absence of external power.	Logic	Active Inactive
Program timer 1-5	It occurs: 1. When the timer value corresponds to the comparison function selected for it. 2. While comparing of the state of running (active)/stopped (not active)	Logic	Active Inactive More Less Equal Not equal More or equal Less or equal
Program counter 1-12	It occurs when the counter value corresponds to the comparison function selected for it	Integer-valued	More Less Equal Not equal More or equal Less or equal
Program flag 1-12	It occurs at the moment of check of the flag state if the comparison function has the proper value		Active Inactive

Main actions (response to an active event):

Parameter	Description	Taken values	Operation
Start events processing	Perform the actions of any of the created events even if the conditions for this event are not fulfilled. ATTENTION! It may lead to an infinite cycle.	Number one of the existing events. For the current one the specified number is 256.	-
Send an extraordinary packet	Record to buffer for transmission of extraordinary data packet	-	-
Play a voice phrase	Plays a voice phrase	The full file name is entered manually	-
Play an audio file	Plays the audio file with the specified name. The file must be located on the SD card in the directory ..\voice\	The full file name is entered manually	
Wait until the call is answered	It works in a group with the action "Dial XXX" or "Dial number from the list"		

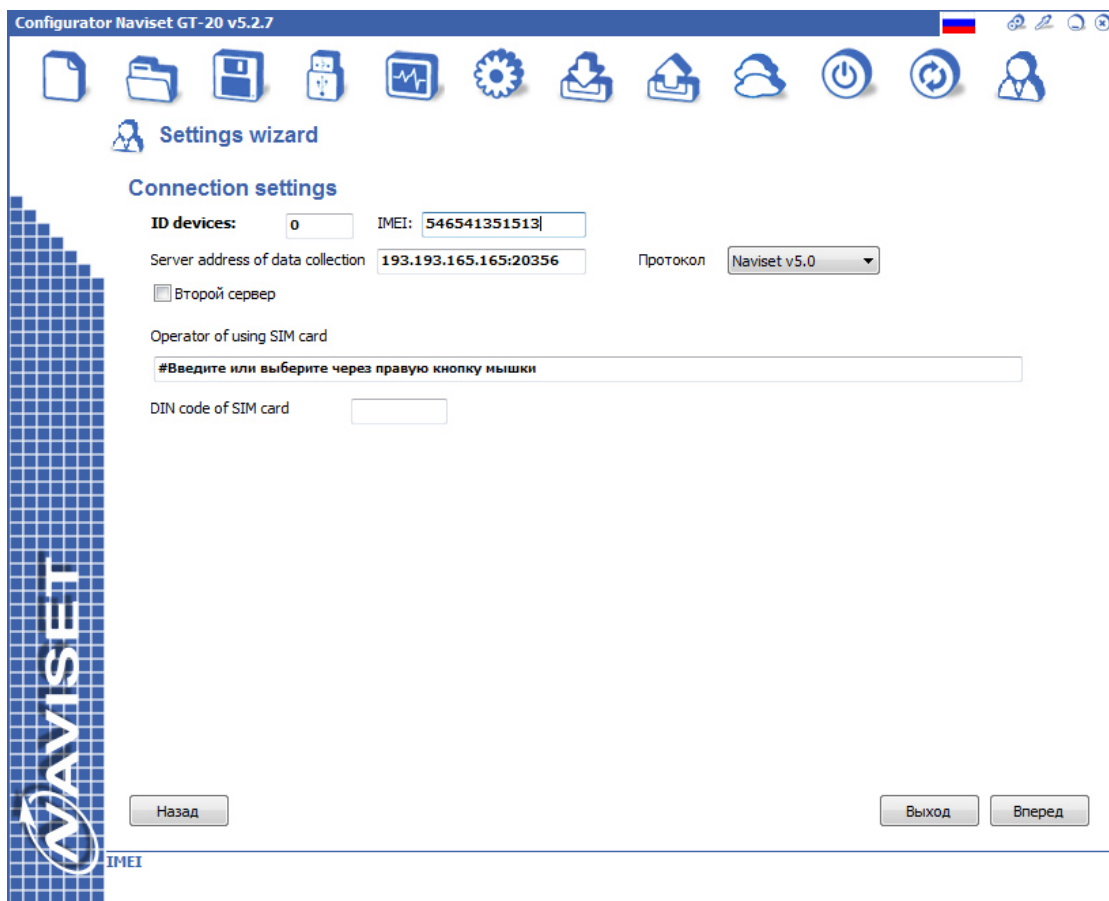
For the convenience of the user, after creating an event, you can go to the emulation mode. In this mode, next each condition its current state is specified. When the action is performed, the action being performed is specified.

8. CONFIGURATION WIZARD

The configurator allows you to set the most common configuration used for this wizard in automatic mode. After you have completed the settings, the connection diagram for specifically-set configuration is displayed.

To make settings you should go from point to point by entering the required parameters:

1. Select the connection parameters - IP address and port of the server, choose the GPRS connection provider and the unique device IDD.
2. To go to the next menu press the "Next" button
3. 2. Selection of the connected peripherals. The setup wizard can automatically configure the following connected peripherals:
4. - FUEL GAUGE - It can be analog, frequency or digital sensor. The necessary interface is installed (See Table 4). After selecting the sensor type, choose an input for analog sensors or a port for digital ones and network address. If the sensor is configured and connected properly, in the current value field a number different from zero will be displayed. After completing the setup wizard, the sensor can be calibrated by the calibration wizard.



- ALARM BUTTON – a usual normally-opened alarm button is used. You should select the input to which the button is connected.

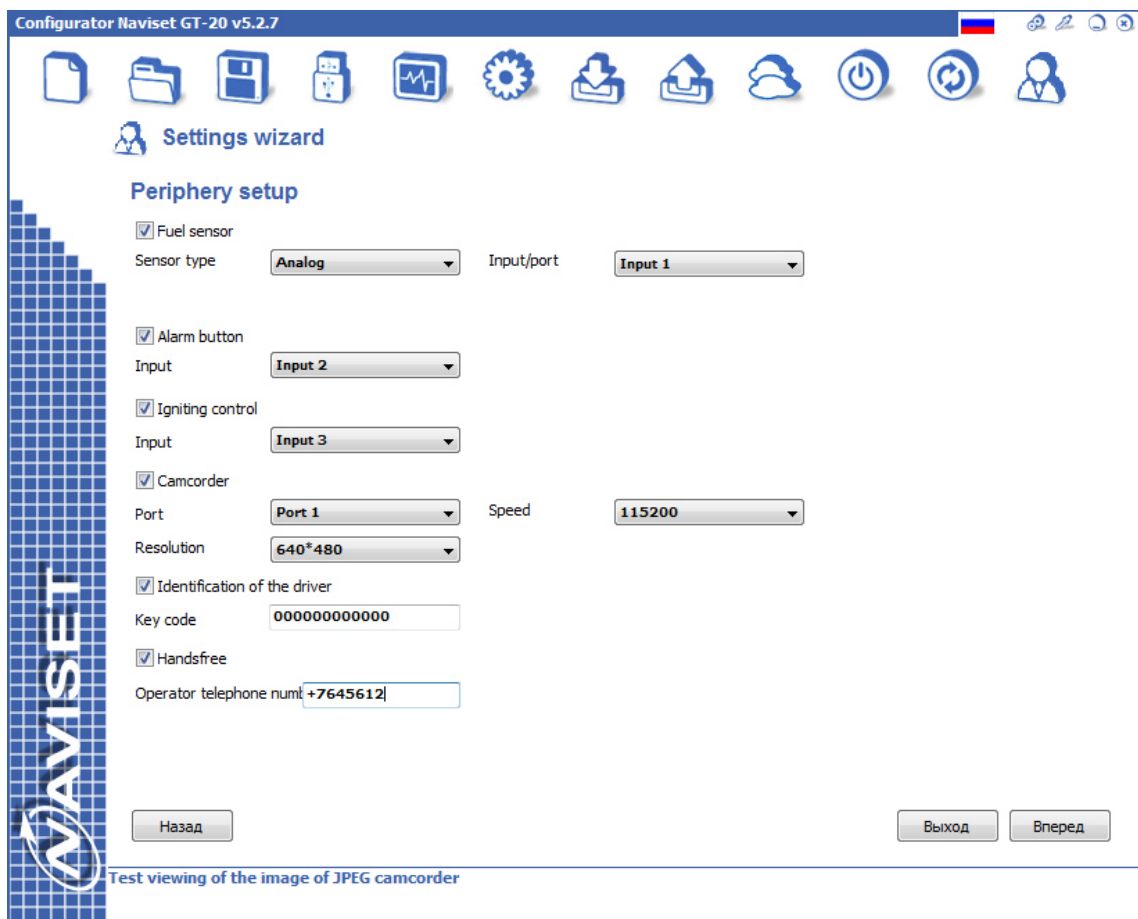
- IGNITION CONTROL - Selection of Input for connection of the started up ignition-contact or a tachometer to determine started engine fact. It is mainly used to control operation time, or a program engine hour counter.

- CAMERA – Connection of a JPEG camera SL-CAM-1 or SL-CAM-2. You should select a digital port to which the camera is connected, the speed (19200bod/s on default) and resolution. Since the camera has an RS232 interface, it is necessary using the switch SW1 (see. Table 3) to allocate the RS232 interface for this port. To check if a video camera is connected properly, click "PREVIEW". If within 10 seconds a video frame appears, the camera is connected correctly, if not, check the connection of the connecting wires between the camera and the device.

DRIVER IDENTIFICATION – A list of electronic keys that are responsible for the identification of the drivers.

- HANDSFREE - When this option is enabled, the device will be configured to work with an external NAVISET HF-1 handsfree button. The use of the voice menu will be impossible. To activate the dispatcher call button function, you must enter the dispatcher's phone number in international format. For example, for Russia +7 xxx xxx xx xx.

To go to the next menu press the **"Next" button**



3. Graphical manual to connect the peripherals selected in the clause 2. It displays the connection diagram to avoid errors during installation of the device. This diagram can be printed and sent to the installer with the device. If the installer make settings on his own and the system uses a fuel gauge, it is recommended to use SENSOR CALIBRATION WIZARD for quick calibration in an automatic or semi-automatic modes.

To go to the next menu press the **"Next" button**

When the settings are saved in the device memory, all previously made manual settings will be lost.

To start up the configuration it is necessary to reboot the device using reset button at the top of the control panel.

If the configuration uses a fuel sensor, check the box "Run the fuel sensor(s) calibration wozard".

9.FUEL SENSORS COLEBRATION WIZARD

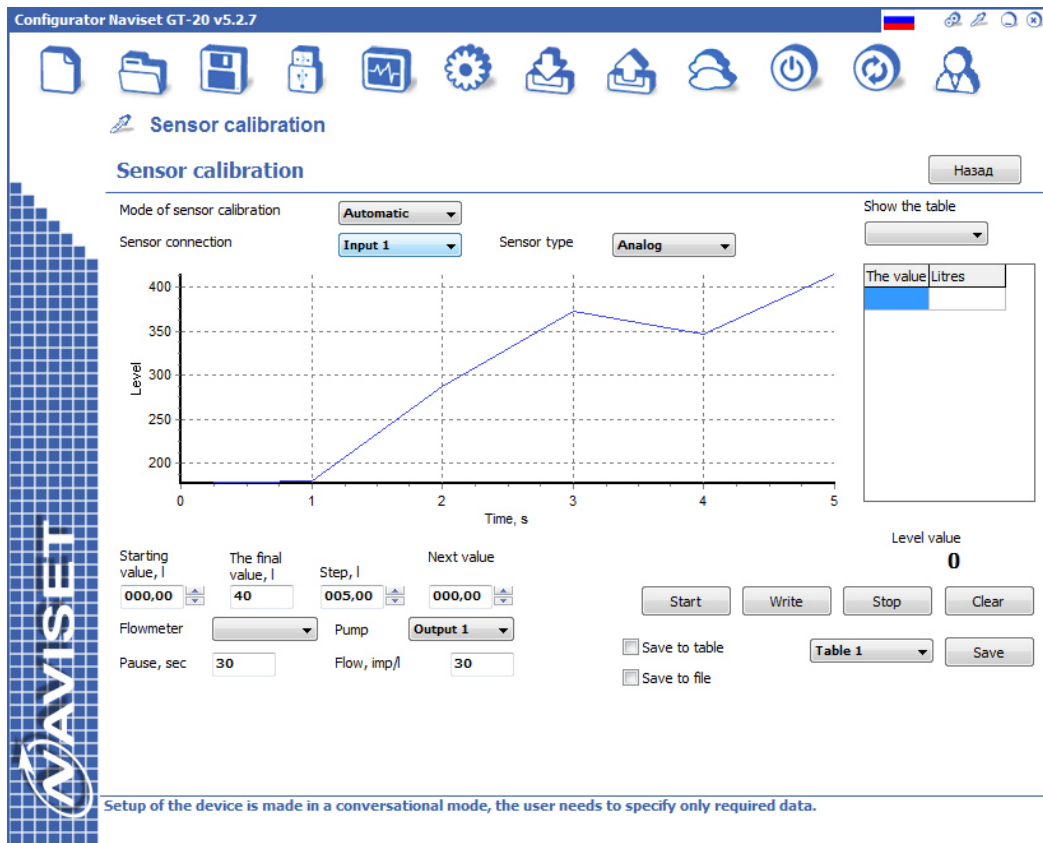
The configurator allows you to make calibration of the fuel sensors connected to device in automatic and manual mode. After Completion of wizard operation, the user receives a calibration table, which can be printed out, saved in a file or in one of two built-in calibration tables. The built-in calibration tables allow the device to issue values of the fuel level not in nominal units, but already converted to liters. Also when using the built-in tables, you can create events when draining and filling fuel.

The whole process of calibration is displayed in graphical form, the user can visually observe the filling of the fuel tank and the time spent on calibration. These parameters allow you to assess labor costs for a specific calibration of the fuel tank and calculate the job cost.

Algorithms of the fuel sensors calibration wizard use:

1. Manual mode of calibration , actions:

- Choose the "MANUAL" sensor calibration mode
- Select the data source connected to the sensor. INPUT1 ... INPUT4 - for analog or frequency sensors, DUT1 or DUT2 – for digital sensors connected to the ports PORT1 or PORT2 respectively
- Choose the sensor type: analog, frequency or digital
- Specify the initial fuel level if the tank has been already filled with fuel or calibration process has been interrupted and it shall be resumed.
- Specify the volume of fuel that shall be poured for 1 time (portion). Another value in the calibration process will indicate how many liters have already been in the tank. If another portion has less or more fuel than specified, the value can be corrected before entering into to the calibration table
- Press the "START" button and fill the tank with the first portion equal to the portion value specified in the preceding paragraph.
- Press the "RECORD" button. In the table of values the sensor readings corresponding to the amount of fuel poured in the tank will appear.
- Continue to pour fuel intill the tank is completely filled by pressing the "Save" button after each portions.
- When filling the tank, press the "STOP" and save the table into a file, or one of the two calibration tables in the memory of the device.
- Press the "Clear" button before starting the next calibration of fuel gauge.



2. Automatic calibration mode. The calibration is carried out fully automatically without a user. In this mode, a pump, which is controlled by the NAVISET device based on the data from the flow meter and the pauses between meals, is used for fuel filling. Before starting the calibration process, it is necessary to make or buy a ready-made stand. To make a stand the following components are required: sparkless pumps for liquids, a pump control relay (selected on the basis of the capacity of the pump), fuel flow meter, a button with fixation with normally-closed contacts (for emergency shutdown of the pump in the event of a failure in the process of calibration) and a resistor of 1 kOhm.

The principle of action: after starting the calibration process by pressing the "START" button the device turns on a pump, a flow fuel sensor counts the number of liters passed through it, and when it reaches the value specified in item "portion," turns off the pump. A given pause is held, to let the fuel level be stabilized and fuel foam be settled. After that, the current value of the fuel sensor is entered into the table, and the pump is started to fill the new portion. The process is repeated until you press the "STOP" button. In the case of failure for the stand provides a pump cutout button. As the pump cutout button, any normally closed self-locking switch can be used.

After connecting the calibration stand to the device, perform the following actions in the configurator:

- Choose the "MANUAL" sensor calibration mode
- Select the data source connected to the sensor. INPUT1 ... INPUT4 - for analog or frequency sensors, DUT1 or DUT2 – for digital sensors connected to the ports PORT1 or PORT2 respectively
- Choose the sensor type: analog, frequency or digital
- Specify the initial fuel level if the tank has been already filled with fuel or calibration process has been interrupted and it shall be resumed.
- Specify the volume of fuel that shall be poured for 1 time (portion). Another value in the calibration process will indicate how many liters have already been in the tank.
- Specify the input that is connected to the fuel flow meter. In the example, in the picture the fuel flow meter is connected to the INPUT 2.
- Specify output for pump control. In the example, in the picture the fuel flow meter is connected to the INPUT 3.
- Specify the pause between the portions
- Specify the number of flow meter pulses per 1 liter of fuel. This value is taken from the flow meter passport.
- Press the "Start" button, the automatic calibration of the fuel level sensor will start. After another cycle of fuel filling the sensor readings corresponding to the amount of fuel poured in the tank will appear in the table of values.
- Visually observing the filling of the tank, press the "STOP" button when you reach the top level of the fuel tank. If the tank is suddenly overfilled, press the button of the emergency shutdown of the pump, located at the stand.
- Save the table in a file or one of the two calibration tables in the memory of the device.
- Press the "Clear" button before starting the next calibration of fuel gauge

The calibration process records the current state and portions before and after each event and in the case of hangup of the program, PC or connection, the program will continue the calibration at the next startup from the same moment. If there is an incomplete calibration, the configurator should notify the user about it immediately after going to the CALIBRATION tab.

