THE DEVICE CAPABILITIES

- ✓ GSM / GPRS / TCP / HTTP / FTP
- ✓ GPS / GLONASS / GALILEO / BEIDOU
- ✓ memory 200 000 messages
- ✓ integrated 3-axis motion sensor
- ✓ power saving mode
- ✓ ECO driving
- ✓ LBS detector
- ✓ setting via SMS, GPRS, USB, WEB
- ✓ the built-in adapter CAN (two lines)
- ✓ 1-WIRE interface
- ✓ serial ports RS232 and RS485
- ✓ backup battery
- ✓ open protocol server exchange
- ✓ integration with tachographs

THE MONITORING TERMINAL DTM2 Tacho

DTM2 Tacho - the functional device is a convenient and reliable tool for monitoring of vehicles, has features and functionality to best meet the needs of the client.

Expansion interfaces

The device has support for multiple digital interfaces:

• serial ports RS232 or RS485 interface for connecting peripheral devices (digital fuel SENSORS, photo camera, etc.).

• built-in adapter, CAN bus interface and reads transfers the state of the engine and its characteristics, such as temperature, speed, mileage, fuel consumption and fault codes and much more to provide a real picture of the status of the vehicle in real time.

• 1-WIRE interface allows you to connect temperature sensors or readers of identification keys.

• equipped with led indicators to display the current status of the work modules, external power and charge the internal battery.

Tachograph functionos - DDD upload files on a schedule, the status of the driver and much more.

Flexibility

The product is built on modern element base and has a flexible architecture that allows you to steadily increase the functionality of both device and system. The versatility and technical features give the ability to create effective solutions for clients, regardless of their area of employment.

Application

In addition to classic vehicle monitoring device can be used as a security system of your car or the control and management of a remote object, including from a mobile phone owner.

Support

Our technical service team will provide support throughout the cycle of operation of the equipment installed at Your facility

DEVICE SPECIFICATION

Table 1. Specifications.

Fig 1. top view of the device.

MODIFICATION OPTIONS	B	C	D
Overall dimensions, mm (excluding antenna and harness)	70x50x22		
The voltage, V	7 .. 40		
Protection in excess of the supply voltage, V	50		
Protection against incorrect power	есть		
Protection from impulse surges, V	600		
Current consumption when the supply voltage is 12V, mA	50		
Backup power source	Li-Pol (380-800 mA)		
Digital inputs (selectable, pulse, frequency)	2		
Digital outputs (open collector)	2		
Analog inputs (0 -32 V and 0-10 V)	2		
USB interface	+		
RS485 interface	+		
1-WIRE interface	+		
GSM modem (Quectel GC10)	850/900/1800/1900 MHz		
Navigation module (Quectel L76 / Ublox MAX-M8)	72 of the channel, the sensitivity-167dB		
3-axis motion sensor (accelerometer)	+		
Built-in memory, MB	4		
MicroSD slot	+		
Number of slots for SIM card	1		
The antenna connectors (GSM, GPS/GLONASS)	SMA		
Temperature range without reserve battery, °C	от –40 до + 85		
RS232 interface	-	+	+
CAN interface (expansion card)	-	-	+

Описание интерфейсов и разъема

Рис 2. The front panel of the device

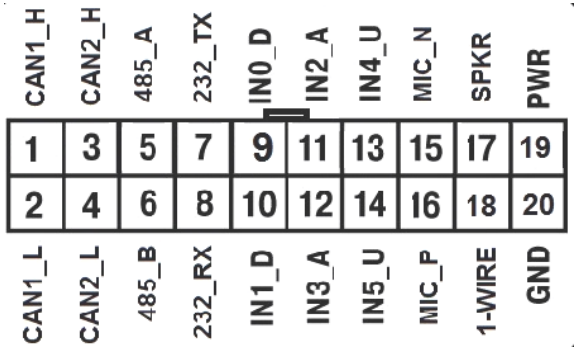

Fig. 3 presents the pinout of the main connector, and table 2 purpose

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Table 2. Pin assignment.

№ конт	Назначение	Обозначение	Применение
1	Digital interface CAN1	CAN1_H	For CAN bus connect vechicle
2	Digital interface CAN1	CAN1_L	For CAN bus connect vechicle
3	Digital interface CAN2	CAN2_H	For CAN bus connect vechicle
4	Digital interface CAN2	CAN2_L	For CAN bus connect vechicle
5	Digital interface RS485	485_A	Digital sensors (LLS and e.t.c.)
6	Digital interface RS485	485_B	Digital sensors (LLS and e.t.c.)
7	Digital interface RS232	232 TX	Digital sensors (LLS and e.t.c.)
8	Digital interface RS232	232_RX	Digital sensors (LLS and e.t.c.)
9	Discrete input «0» by minus	IN0_D	Discrete, frequency, impuls sensors
10	Discrete input «1» by minus	IN1_D	Discrete, frequency, impuls sensors
11	Analog input «0» (**от 0 до 32 V**)	IN2_A	Ignition, analog sensors
12	Analog input «1» (**от 0 до 10 V**)	IN3_A	Analog sensors
13	Discrete out «0»	IN4_U	LED indication
14	Discrete out «1»	IN5_U	Block engine
15	Microphone +	MIC_P	Audio chanel
16	Microphone -	MIC_N	Audio chanel
17	Speaker	SPKR	Audio chanel
18	Digital bus 1-wire	1- WIRE	Digital termosensors, identifaction keys
19	«Main power + »	PWR	7 .. 40 V
20	«Main power -»	GND	

GSM **-** connector for connecting an external GSM antenna.
NAV **-** connector for external antenna GPS/GLONASS
USB **-** miniUSB connector (for diagnostic and settings device).
PWR **-** led external power and battery power (in Fig. 3 - to the left of the USB connector):

- Green – external power connected
- Green and red at the same time (it turns yellow) – external power is connected, charging the internal battery.

MODE – blue LED - the status indicator (Fig. 3 - the right of the USB connector): GSM, GLONASS/GPS, see description in table 3.

Table 3. Indication of work

Number of flashes	**GSM – long flash**	**NAV (GPS/GLONASS) - short flash**
turn off	GSM module is turned off	GPS module is turned off
1	The module is enabled, there is a registration in the network	The module is enabled, search for satellites
2	Set GPRS connection to the server	Satellites are found, good reception quality (5-8 satellites)
3	The data is transferring, there are server responses	Satellites are found, excellent reception quality (more than 8 satellites)

Device setup

Minimum firmware version: 0.65

Changing the settings is performed by sending the appropriate commands to the device.

There are several options available:

- ✓ SMS
- ✓ through the monitoring server (in Wialon: "Sending messages to the driver")
- ✓ locally through the program via USB interface (DTM_logger.exe )
- ✓ through a remote server WEB configurator (available to corporate clients)

The message structure for settings commands next: <device_password>*SETP*<list_of_arguments>

Default value for field <device_password> is 123456

Field of <list_of_arguments> contains the number and the value of one or more parameters that you can edit.
Each element from the list of changeable parameters has the following structure:

#<number_parametr>=<value>
< number_parametr > - the numeric index of the parameter
<value> - the new value of the parameter, can be simple or complex.

The list items are delimited: a sign of the end of one element is the beginning of the next (sign #).

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

The following is a description of the formats to change each parameter.

Note: ***to understand the beginning and end of the last message enclosed in single quotes (').***
No need to use quotation marks when sending messages to the device.

❖ **Parametr_number: 1 – Address & port for monitoring server**

Command format:

'#1=<server_address>,<server_port>'

Arguments:

<server_address> - string up to 32 characters. Contains the DNS name or IP address of the server.

<server_port> - a number from 1 to 65535. Not a mandatory parameter: in the absence of the need to change the server port setting can not convey.

Examples:

*'123456*SETP**#1=193.193.165.165,20897' – set the IP address and port of the server

'*123456*SETP**#1=m2m.duotec.ru,20897' – to set the DNS name and port of the server

'*123456*SETP**#1=example.org' – only change the server address, server port is left unchanged

❖ **Parametr_number: 2 – APN settings GSM operator**

Command format:

'#2=<APN_string>,<APN_login>,<APN_password>'

Arguments:

<APN_settings> - string up to 32 characters. Contains the access point name

<APN_login> - string up to 32 characters. Contains the user name of the access point

<APN_password> - string up to 32 characters. Contains the password of the access point

Examples:

*'123456*SETP**#2=internet,gdata,gdata' – to set the APN settings operator "MegaFon"

'*123456*SETP**#2=,,' – to clear the APN settings

❖ **Parametr_number: 3– Device password**

Command format:

'#3=<new_device_password>'

Arguments:

<new_device_password> - string up to 8 characters. Contains the new password to access the device. An empty string means that access to the device will be made without a password

Examples:

*'123456*SETP**#3=13571' – to set an access password 13571

'*123456*SETP**#3=' – to disable password protection of the device

❖ **Parametr_number: 4 – The PIN code of the SIM card**

Command format:

'#4=<pin_code>'

Arguments:

<pin_code> - string up to 8 characters. Contains the code that will be entered if the SIM card has a PIN code request.

ATTENTION! This command stores the PIN in the memory device and does NOT switch/change of PIN code on the SIM card. Therefore, if the SIM card is already enabled PIN, then the names in this parameter has a bad value will lock the card. An empty string means that the PIN is not set.

Examples:

*'123456*SETP**#4=2468' – when you request a SIM card PIN code is entered 2468

'*123456*SETP**#4=' – erase PIN

❖ **Parametr_number: 5 – Development trajectory**

Command format:

'#5=<distance>,<angle>,<speed>,<interval>'

Arguments:

<distance> - the number from 100 to 65535 or 0. If the distance between the last position sent to the server, and the current position exceeds the specified value, then the current position will be sent to the server. The unit of measure is the meter. Is not required: if there is no need of changing the distance parameter can not convey. A value of 0 disables the condition is sent to the server by distance.

<angle> - a number from 0 to 180. If the change of the angle between the course of the last position sent to the server, and the current rate exceeds the specified value, then the current position will be sent to the server. The unit of measure is degrees. Is not required: if there is no need of changing the angle parameter can not convey. A value of 0 disables the condition is sent to the server in the corner.

<speed> - the number 5 or 0 to 65535. If the change between the speed at the time the last position sent to the server, and the current speed exceeds the specified value, then the current position will be sent to the server. The unit is kilometer per hour. Not a mandatory parameter: in the absence of the need to change the speed setting can not convey. A value of 0 disables the condition is sent to the server by the change of speed.

<interval> - the number 5 or 0 to 65535. If the interval between the time of the last send the coordinates to the server and the current time exceeds the specified value, then the current position will be sent to the server. The unit of measurement is seconds. Not a mandatory parameter: in the absence of the need to change the sending interval setting can not convey. A value of 0 disables the condition is sent to the server at the interval.

Examples:

*'123456*SETP**#5=400,18,20,150' – set all processing parameters of the trajectory

*'123456*SETP**#5=,,35,300' - only change the speed and spacing, the distance and angle to remain unchanged

*'123456*SETP**#5=,15' – only change the angle, the other parameters are left unchanged

*'123456*SETP**#5=,,0' – disable the condition of sending messages by the change of speed

❖ **Parametr_number: 6 – Power saving mode**

Command format:

'#6=<mode>, <sleep_time>,<active_time>'

Arguments:

<mode> - number of mode:

0 – power saving mode turn off: device always active (work);

1 – deep sleep: all nodes of the device are turned off except the accelerometer, the processor core is not active. Exit from deep sleep mode is possible by triggering the accelerometer and timer. Not a mandatory parameter: in the absence of the need to change the sleep mode setting can not convey.

<sleep_time> - a number from 0 to 65535. Specifies the time spent by the device in sleep mode in minutes if sleep mode is activated (see power saving Mode). If the parameter is 0, then exit from sleep mode is only possible by triggering the accelerometer. Not a mandatory parameter: in the absence of the need to change the sleep time setting can not convey.

<active_time>- a number from 0 to 65535. Specifies the time spent by the device in the active mode in minutes after cessation of exposure to the accelerometer, if the sleep mode is activated (see power saving mode). Once the impact on the accelerometer stops, at the expiration of this time the unit will go into sleep mode. Not a mandatory parameter: in the absence of the need to change the active time parameter can not convey.

Examples:

*'123456*SETP**#6=1,60,5' – to enable sleep mode, set the time of exit from sleep 1 hour (the device may get out of bed earlier - triggered accelerometer), go into sleep mode after 5 minutes after cessation of exposure to an accelerometer.

*'123456*SETP**#6=1,0,10' – to enable sleep mode, disable sleep mode on timer off sleep is only possible by triggering the accelerometer), go into sleep mode after 10 minutes after cessation of exposure to an accelerometer.

*'123456*SETP**#6=,,3' – change the transition time to the sleep mode after the cessation of exposure to the accelerometer, the parameters 'mode' and 'sleep_time' to leave unchanged

'*123456*SETP**#6=0' – to turn off power saving mode

❖ **Parametr_number: 9 – Discrete pins (inputs & outputs)**

Command format:

'#9=<mode_IN0>,<mode_IN1>,<mode_IN2>,<mode_IN3>>,<mode_IN4>,<mode_IN5>'

Arguments:

<mode_IN0> - a character indicating the mode IN0:

N – not use;
D – discrete (shorted to minus (GND) - active, otherwise inactive);
C – impuls (counting the number of pulses);
F – frequency (measuring the frequency of pulses);
G – control the "massa-GND" (closed in "a minus (GND)" - "massa (GND)" is enabled, otherwise disabled)

Not a mandatory parameter: in the absence of the need to change the operation mode IN0 parameter can not convey.

< mode _IN1> - a character indicating the mode IN1:

N – not use;
D – discrete (shorted to minus (GND) - active, otherwise inactive);
C – impuls (counting the number of pulses);
F – frequency (measuring the frequency of pulses);

Not a mandatory parameter: in the absence of the need to change the operation mode IN1 parameter can not convey.

< mode _IN2> - a character indicating the mode IN2:

N – not use;
D – discrete (if the voltage is above 5.0 V - active or – inactive);
A – analog (measurement of voltage 0-32 V).

Not a mandatory parameter: in the absence of the need to change the operation mode IN2 parameter can not convey.

< mode _IN3> - a character indicating the mode IN3:

N – not use;
D – discrete (if the voltage is above 2.0 V - active or – inactive);
A – analog (measurement of voltage 0-10 V).

Not a mandatory parameter: in the absence of the need to change the operation mode IN3 parameter can not convey.

< mode _IN4> - a character indicating the mode IN4:

N – not use;
O - output (open drain 500 mA) with state saving in non-volatile memory.

Not a mandatory parameter: in the absence of the need to change the operation mode IN4 parameter can not convey.

< mode _IN5> - a character indicating the mode IN5:

N – not use;
O - output (open drain 500 mA) with state saving in non-volatile memory.

Not a mandatory parameter: in the absence of the need to change the operation mode IN5 parameter can not convey.

Examples:

*'123456*SETP*#9=D,D,D,D,O,O'* – to set the operating mode IN0-IN3 – discrete, IN4-IN5 – out

'*123456*SETP*#9=,C,,A*' – change the mode IN1 counting on, IN3 – analogue, other modes of contact to remain unchanged.

'*123456*SETP*#9=F*' – change the mode IN0 frequency, modes other contacts to remain unchanged.

- **Parametr_number: 10 – CAN bus data**

Command format:

'#10=<parametr 1>,< parametr 2>, … ,< parametr N >'

Arguments:

< parametr **1>…<** parametr **N> -** the number of parameters to be transferred:

1 – state flags;
2 – total time of engine operation;
3 – full mileage of the vehicle;
4 – full fuel consumption;
5 – the level of fuel in the tank;
6 – the engine speed;
7 – the temperature of the engine;
8 – the speed of the vehicle;
9 – the axle load;
10 – controllers accidents;
11 – instantaneous fuel consumption;
12 – the level of AdBLUE liquid.

Examples:

*'123456*SETP*#10=3,5,2,12'* – transfer with CAN-bus complete vehicle mileage, fuel level in tank (%), total time of engine operation, the level of AdBLUE liquid (%)

'*123456*SETP*#10=*' – not convey with CAN-bus nothing

❖ **Parametr_number: 11 – Digital inputs (RS232 / RS485 / INT_MODE / TACHO_MODE)**

Command format:

'#11=<mode_RS232>,<mode_RS485>,<internal_mode>,<tacho_mode>'

Arguments:

<mode_RS232> - number indicating the mode of the RS232 interface:

0 – not use;
2 – external module CAN (CANLOG, DTA_CAN);
3 – fuel level sensor (protocol LLS);
14 – foto camera;
15 – satellite modem Iridium.

Not a mandatory parameter: in the absence of the need to change the mode of the RS232 interface option can not convey.

<mode_RS485> - number that specifies the mode of the RS485 interface:

0 – not use;
5 – fuel level sensor (protocol LLS). up to 8 sensors inclusive; the sensors must have a network address from 1 to 8.

Not a mandatory parameter: in the absence of the need to change the mode of the RS485 interface option can not convey.

<internal_mode> - number indicating the mode of operation of the communication interface with plugins:

0 – not use;
2 – external module CAN (CANLOG, DTA_CAN);

Not a mandatory parameter: in the absence of the need to change the mode of the Internal_mode interface option can not convey.

<tacho_mode> - the number indicating the mode of operation of the tachograph interface:

0 – not use;
1 – tachograph Atol Drive5

Not a mandatory parameter: in the absence of the need to change the mode of the Internal_mode interface option can not convey.

Examples:

*'123456*SETP**#11=3,5,2,0' – to set the modes of all digital interfaces
'*123456*SETP**#11=0' – disable the RS232 interface, modes other interfaces to remain unchanged.
'*123456*SETP**#11=,,0,0' – to disable the communication interface with plugins, modes other interfaces to remain unchanged.

- **Parametr_number: 12 – The program number for CAN**

Command format:

'#12=<CAN_number>'

Arguments:

<**CAN_number**> число от 0 до 65535.

Examples:

*'123456*SETP**#12=188' – to install the program number 188

'*123456*SETP**#12=111' – to install the program number 111

- **Parametr_number: 15 – Roaming**

Command format:

'#15=<mode>'

Arguments:

<**mode**> **-** mode of operation in international roaming:

0 – the data roaming is prohibited, when returning to a home network, all data will be unloaded;

1 – the data roaming is allowed.

Examples:

*'123456*SETP**#15=1' – the data roaming is allowed.

'*123456*SETP**#15=0' – the data roaming is prohibited, when returning to a home network, all data will be unloaded.

- **Parametr_number: 20 - The interval for automatic uploading of DDD files**

Command format:

'#20=<interval of uploading>'

Arguments:

< interval of uploading > from 1 to 28 days.

Examples:

*'123456*SETP**#20=7' – to set the interval for automatic downloading of ddd files not less than once in 7 days

❖ **Default settings (factory settings)**

Номер параметра	Описание	Значение по умолчанию
1	The address of the monitoring server	s1.duotec.ru,20897 (hosting.wialon.com)
2	The APN settings mobile operator	the settings are not set
3	Device password	123456
4	PIN code	the settings are not set
5	The parameters of the trajectory	400,18,20,150 (transfer to the server the point when passing the 400m distance, changing the course of 18 degrees or changing speed on 20 km/h, and not less frequently than once every 150 seconds)
6	Power saving mode	0,60,5 (Power saving mode off, time of sleep – 1 hour, active time – 5 min)
9	Discrete pins settings	D,F,D,A,O,O (IN0-discrete, IN1-frequency, IN2-discrete, IN3-analog, IN4-out, IN5-out)
10	CAN bus data	1,2,3,4,5,6,7,8,9,10,11,12 (transfer all parameters)
11	Digital inputs settings	0,5,0 (turn on only RS485 in mode LLS)

❖ **An example of the variation of several parameters in a single message**

123456*SETP*#1=s1.duotec.ru,20897#5=400,18,20,150#9=F,D,D,N#11=2

The query device settings

By analogy with the SETP command (setting) the GETP command allows to get the current settings of the device in the SMS message.
The message structure with the query command settings: <**device_password**>*<**GETP**>*<**phone_number_interview**>
To obtain settings on the SIM card the device must be enabled for sending SMS messages.
Example:
*'123456*GETP*+79261234567'*

Information SMS messages

The device is capable of transmitting a set of SMS messages with information about the work. To obtain the information you need to send the appropriate request:
< device_password >*SMSI*<phone_number_interview > - receive SMS with IMEI;
< device_password >*SMSK*<phone_number_interview > - receive SMS with coordinates and map reference;
< device_password >*SMSW*<phone_number_interview > - receive SMS with numbers and addresses of sensors on the 1-wire bus.
To receive information messages on the SIM card the device must be enabled for sending SMS messages.

Output controls

The outputs of the device can be changed by sending the following messages:
< device_password >*OUTS*x.y
x – the output number (0 – IN4_U, 1 – IN5_U); y – new state (0 to disable, 1 – enable).
Example:
*'123456*OUTS*1.1'* – to activate out 1 (IN5_U)

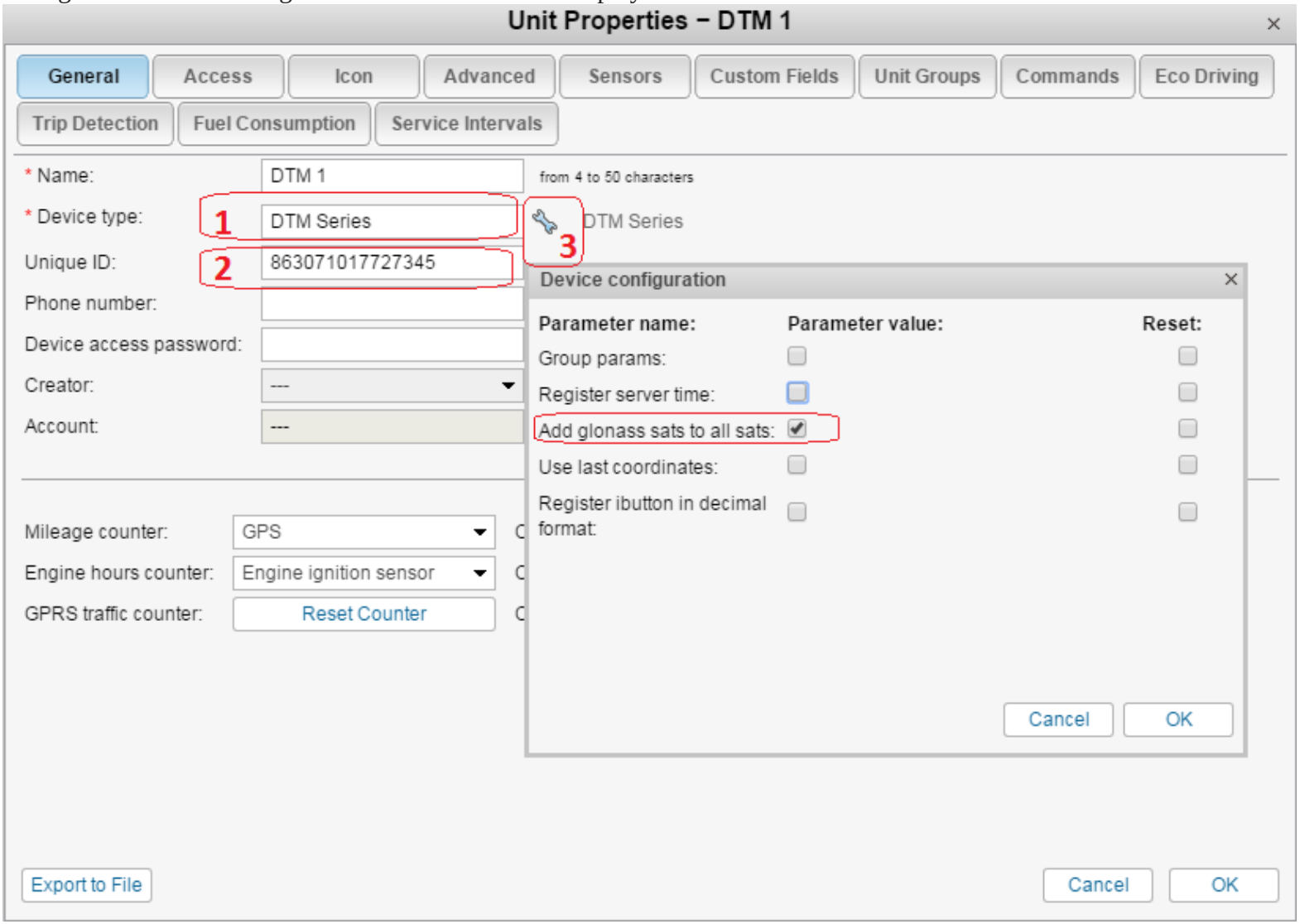
Service commands

The device is able to perform the following service commands:
< device_password >*SERV*1.1 – the package to send coordinates to the server immediately;
< device_password >*SERV*1.4 – to upgrade firmware using the WEB configurator;
< device_password >*SERV*1.5 – to upgrade firmware using the WEB configurator, if the designated version differs from the current one;
< device_password >*SERV*1.6 – to clear the black box;
< device_password >*SERV*1.7 – restart device;
< device_password >*SERV*1.8 – to upgrade settings using the WEB configurator;
< device_password >*SERV*1.9 – send current settings to the WEB configurator;
< device_password >*SERV*32.0 – начать выгрузку ddd-файла из тахографа;
< device_password >*SERV*33.x.y – take a photo (x = 1..4 - the number of pictures, y = 0..2 - resolution: 0-160x120, 1-320x240, 2-640x480).

Integration with Wialon (gurtam.com)

For places the device in the monitoring system Wialon (Gurtam will need to perform three simple operations:

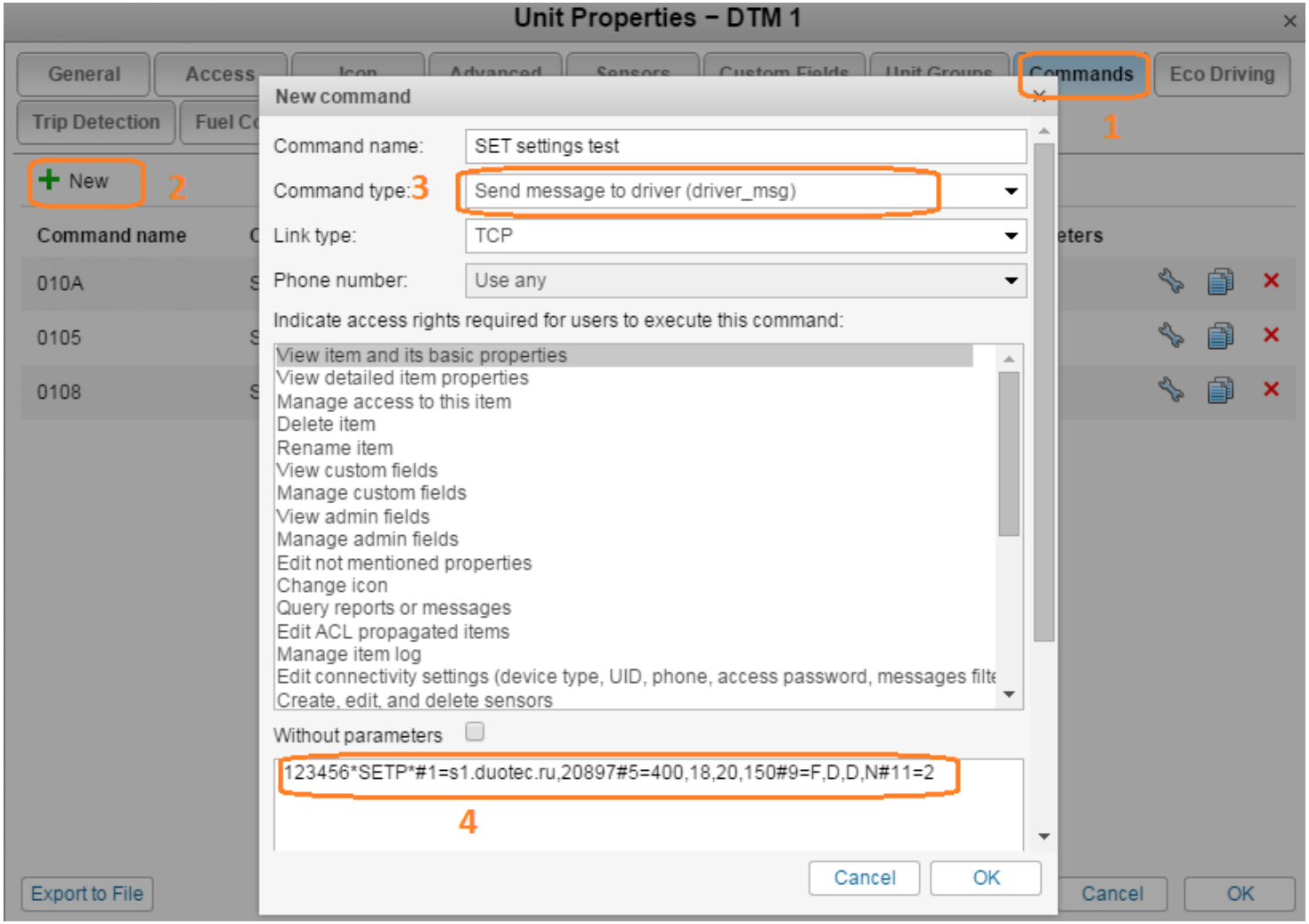
- to choose the Type of device DTM series
- to register a Unique ID as ID use IMEI GSM modem
- in the device configuration to tick Add glonass sats to all sats will display the full number of available satellites



Specify the following settings in configuration software or file of the DTM Series for use in Wialon Hosting:

	Wialon Hosting
Server IP:	193.193.165.165
Server port:	20897

- **Sending commands - change settings**



Installation recommendations

Install the device
The device is made in monoblock form and requires a minimal amount of connections for normal operation. The minimum set of connections for the operation of the device is as follows:
• Connect the antenna GLONASS/GPS and GSM to the corresponding connectors
• Connect the power (red and black wire main connector)
• The other main wire connector connect as needed
We recommend you to install the terminal in dust and moisture proof place, such as in the cab.

Antenna installation GPS/GLONASS
GPS/GLONASS antenna is connected to the connector labeled "NAV", tighten the nut of the connector should be firmly, but without excessive force. The placement of the GPS/GLONASS antenna fully determines the quality of the GPS/GLONASS receiver, so the antenna must be installed in a well available for the signal. No sudden bends antenna cables.

Installation of GSM antenna
GSM antenna is connected to the connector labeled "GSM", tighten the nut of the connector should be firmly, but without excessive force.
Do not place the antenna in the ground, shielded metal part of the vehicle. We recommend that, at the time of setting of the system not to mount the antenna permanently, and do it only after You are completely satisfied with the normal operation of the system.
Attention. Do not attempt to increase the antenna cable.

Power connection

Install a pre-configured device (SIM card and the internal battery should be already installed) in selected taking into account the specific conditions of use space on the car.
Connect to the terminal external GSM and GPS/Glonass antenna installed on the object.
Connect power to the device is performed using the primary harness supplied in the kit. To protect the wires of the supply circuit from short-circuit, use a fuse of value A. 2 Connection must provide reliable contact and be carefully insulated.
Power supply input terminal is designed for vehicle voltage from 7 to 32 V.
Connect the power connector to the wires. To the red wire (19 pin connector) – plus Board voltage, the black wire (20 pin connector) minus the voltage of the vehicle electrical system (mass).
Attention. The fuse should be placed at the minimum possible distance from the point of connection of the device to the vehicle electrical system.

The contents of device package

The device DTM2 Tacho comes with following equipment (see table 4).

Table 4..

№	Name	Quantity
1	DTM device	1
2	Main socket with wires	1
3	GSM antenna	1
4	GLONASS/GPS antenna	1
5	Internal back-up power source (battery)	1