TMT250 User Manual
v0.6

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1 INTRODUCTION

1.1 Attention

Operate the device in suitable conditions

Do not use the device where mobile connectivity is forbidden.

Road safety first

Comply with local traffic laws, always hold your hands on a steering wheel when using a device. Your safety is of utmost importance when you drive.

Interference

All wireless devices are sensitive to electromagnetic interference, as a result wireless devices affect the performance of each other.

Limit the use of device in hospitals

Please follow all restrictions. Turn off the device in the vicinity of medical devices when required.

Limit the use of device in vehicles

Please follow all restrictions. Wireless devices can interfere with other electronic equipment in vehicles.

Be cautious near flammable materials and liquids

Charging precautions

SELV LPS chargers, personal computers or laptops that device will be connected to must comply with the requirements of IEC 60950:2005 standard.

Use only original batteries

Using uncertified manufacturer or different type batteries may cause an explosion.

Use batteries safely

Protect batteries from moisture. Place them in a cool and dry place when storing. Avoid extensive operation at high temperatures. Do not attempt charging battery directly from the electrical mains. All utilised batteries shall comply with IEC 62133.

Power supplies

Power supply circuits used to charge the device connection must have safeguards, which prevent power leakage, short circuits or incorrect electrical grounding. Any used switches ought to be installed in a readily accessible location. Power must be uninterrupted and the distance between the contacts must be 3 mm or larger.

Remove device safely

Device must be disconnected from computer or charger by unplugging the magnetic USB cable from the device.

Other

In order to prevent device from mechanical damage it is advisable to transport it in a shock–resistant packaging. If device stopped working properly regardless of the settings only a qualified specialist can help. It is recommended to contact your local seller or your UAB Teltonika manager in such case.

1.2 Brief description

TMT250 is a handheld tracking device with built-in functions and characteristics of a mobile phone. This device is intended for the surveillance and protection of people, cargo and valuables. GNSS receiver is able to identify current location and send it to an operations center or a person. In case of an emergency the device can activate the alarm function. TMT250 can also be used as a real-time navigator if the computer has special software installed. Device is able to execute various tasks through GSM network and GNSS system. Easy installation and operation, small size and user friendly design will help perform the user's desired tasks easier.

1.3 Legal Notice

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1.4 About document

This document contains information about the architecture, possibilities, mechanical characteristics, and configuration of the TMT250 device.

Acronyms and terms used in this document:

- *AC/DC* – Alternating Current/Direct Current
- *ACC* – Accessories
- *AVL* - Automatic vehicle location: means for automatically determining and transmitting the geographic location of a vehicle.
- *AVL packet*: Data packet which is being sent to the server during data transmission.
- *APN* - Access Point Name: the name of a gateway between 3GPP mobile network and Internet or another computer network.
- *CAN* - Controller Area Network: a vehicle bus standard designed to allow microcontrollers and devices to communicate with each other in applications without a host computer.
- *CNG* - Compressed Natural Gas: methane stored at high pressure.
- *COM port* - serial communication interface that is used to transfer information to/from devices such as modems, terminals and various peripherals.
- *DTC* - Diagnostic Trouble Code
- *ESP* - Electronic Stability Program: is a technology that improves a vehicle's stability by detecting and reducing loss of traction (skidding).
- *ETA* - Estimated Time of Arrival
- *FAP* - Particulate Filter
- *FOTA* - Firmware-Over-The-Air

- *GNSS* – Global Navigation Satellite System: a system with global coverage that uses satellites to provide autonomous geo-spatial positioning.
- *GPS* – Global Positioning System: a worldwide satellite navigational system formed by 24 satellites orbiting the earth and their corresponding receivers on the earth.
- *GPRS* – General Packet Radio Service: a standard for wireless communications which runs at speeds up to 115 kilobits per second.
- *GSM* – Global System for Mobile Communications: one of the leading digital cellular systems. GSM uses narrowband TDMA, which allows eight simultaneous calls on the same radio frequency.
- *I/O* – Input/Output
- *ICCID* - Integrated Circuit Card Identifier: a unique serial number that is stored on the SIM card.
- *IMEI* - International Mobile Equipment Identity: is a unique number that is used to identify 3GPP mobile phones.
- *LED* - Light Emitting Diode
- *MAC* – Media Access Control. Hardware address which uniquely identifies each node of the network. In IEEE 802 networks, the Data Link Control (DCL) layer of the PSO Reference Model is divided into two sub-layers: the Logical Link Control (LLC) layer and the Media Access Control layer. The MAC layer interfaces directly with the network medium. Consequently, each different type of network medium requires a different MAC layer.
- *MAF* - Mass Airflow Sensor: a device used to measure the mass flow rate of air entering a fuel-injected internal combustion engine.
- *NITZ* - Network Identity and Time Zone: a mechanism for provisioning local time and date, time zone and DST offset, as well as network provider identity information, to mobile devices via a wireless network.
- *NMEA*: a data specification for communication between electronics such as echo sounder, sonars, anemometer, gyrocompass, autopilot, GPS receivers.
- *NTP* - Network Time Protocol: networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks.
- *OBD* - On-board Diagnostics: a vehicle's self-diagnostic and reporting capability, which gives access to the status of the various vehicle subsystems.
- *PC* – Personal Computer
- *PCB* - Printed Circuit Board
- *PIN* - Personal Identification Number
- *RFID* - Radio-Frequency Identification: a method that uses electromagnetic fields to automatically identify and track tags attached to objects.
- *RPM* - Engine Revolutions Per Minute
- *RTC* - Real-Time Clock
- *SELV* - Safety Extra Low Voltage: an electrical system in which the voltage cannot exceed 50 VAC or 120 VDC under normal conditions, and under single-fault conditions, including earth faults in other circuits.
- *SMS* – Short Message Service: the transmission of short text messages to and from a mobile phone, fax machine and/or IP address.
- *SIM* - Subscriber Identification Module: an integrated circuit card that is intended to securely store the information which is used to identify and authenticate subscribers on mobile telephony devices.
- *TCP* – Transmission Control Protocol – one of the main protocols in TCP/IP networks. Whereas the IP protocol deals only with packets, TCP enables two hosts to establish a

connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

- *TMO* - Timeout
- *UDP* – User Datagram Protocol – a connectionless protocol that, like TCP, runs on top of IP networks. Provides very few error recovery services, offering instead a direct way to send and receive datagrams over IP network.
- *Record* – AVL data stored in FMB memory. AVL data contains GNSS and I/O information.

2 BASIC DESCRIPTION

TMT250 is a tracking terminal with GNSS and GSM connectivity, which is able to collect device position parameters and status and transfer them via GSM network to the server. This device is perfectly suitable for applications, which require the acquisition of remote object locations. IP67 waterproof case ensures outside usage in harsh conditions, moreover, large battery's capacity expand application range where long battery lifetime is neded.

2.1 Package contents

The TMT250 device is supplied to the customer in a cardboard box containing all the equipment that is necessary for operation. The package contains:

- TMT250 device;
- 3.8 V 800 mAh rechargeable Li-ion battery (3.04 Wh);
- Magnetic USB cable.

2.2 Basic characteristics

GSM / GPRS / GNSS features:

- Teltonika TM2500 quad band module (GSM 850 / 900 / 1800 / 1900 MHz);
- GPRS class 12 (Up to 240 kbps);
- SMS (text, data);
- Integrated GNSS receiver;
- Up to -165 dBm GNSS receiver sensitivity.

Hardware features:

- Built-in movement sensor;
- Built-in Bluetooth 3.0 (Supports Bluetooth 4.0);
- Internal High Gain GNSS antenna;
- Internal High Gain GSM antenna;
- 800 mAh Li-ion rechargeable 3.8 V battery.

Special features:

- Fast position fix;
- High Quality track even in high density urban canyon;
- Ultra small case;
- Ready for harsh environment due to IP67 ingress protection rating;
- Easy to mount in limited access areas;
- Firmly fasten with TMT250 rubber holder;
- Configurable RGB LED status indication;
- Real time tracking;
- Smart data acquisition based on:
    - Time;
    - Speed;
    - Angle;
    - Distance;
    - Movement or any other I/O event;

- Sending acquired data via GPRS;
- GPRS and SMS I/O events;
- Configurable using Secured SMS Commands.

2.3 Technical features

Part name	Physical specification
LED	1 RGB status LED
USB	Magnetic USB socket
GNSS	Internal GNSS antenna
GSM	Internal GSM antenna
USB	Magnetic USB cable
BUTTON	Configurable Power and Alarm buttons

Technical details
Energy consumption1: GPRS: average 95.57 mA; Nominal: average 44.20 mA; GNSS Sleep: average 8.02 mA; Deep Sleep: average 3.43 mA; Online Deep Sleep: average 3.93 mA; Ultra Deep Sleep: average 1.50 mA. Battery charge current: ⎓ average 700 mA; Operation temperature: -25 °C .. +55 °C Storage temperature: -40 °C .. +70 °C Storage relative humidity: 5 .. 95 % (no condensation)

1 Energy consumption has been tested by running TMT250 on battery (4.2 V).

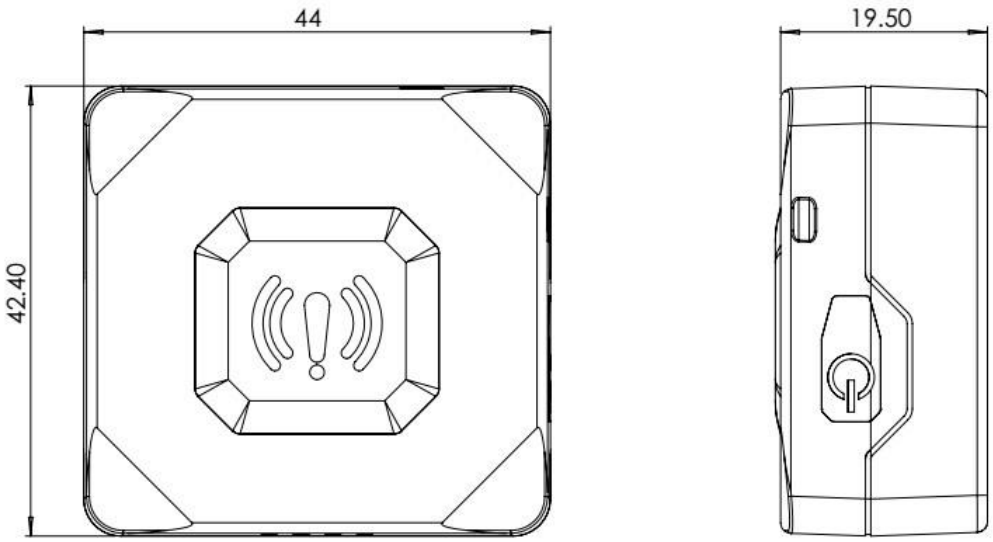


Figure 1 TMT250 top and side view & dimensions (tolerance ±2mm)

2.4 Technical Information about internal battery

Table 1. Li –ion rechargeable battery, 3.8 V, 800 mAh.

Internal back-up battery	Battery voltage V	Nominal capacity (mAh)	Power (Wh)	Charging temperature °C
Li-ion rechargeable battery	3.80	800	3.04	0 – 45

CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

Battery Disposal instructions:

Battery should not be disposed of into general household waste.
Bring damaged or worn-out batteries to your local recycling center or dispose them into a battery recycle bin commonly found in supermarkets.

Warranty: batteries are covered by 6 months warranty support.

2.5 Electrical characteristics

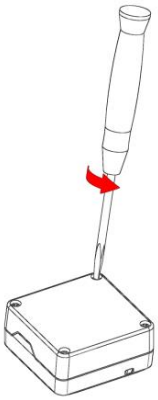
Table 2. TMT250 electrical characteristics

Characteristic description	Value			
Supply Voltage:	Min.	Typ.	Max.	Unit
In recommended operating conditions	4.5	5.0	5.5	V DC

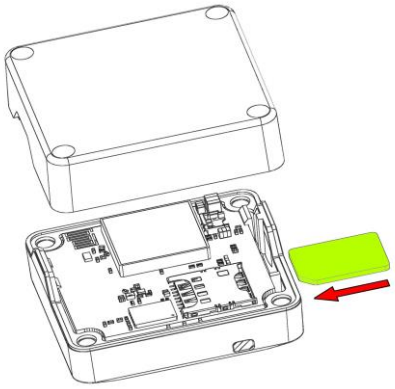
3 CONNECTION

3.1 How to insert micro SIM card into TMT250 device:

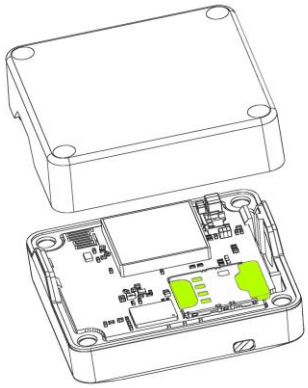
① Remove 4 screws and remove TMT250 cover.



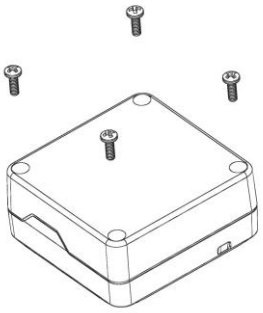
② Insert SIM card as shown. Battery has to be disconnected at this point.



③ Attach cover.



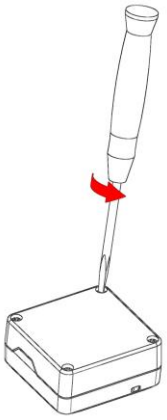
④ Tighten the screws. You can now move to battery connection part.



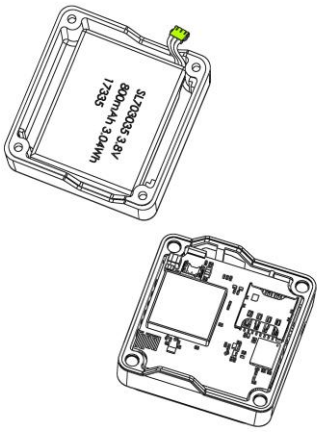
Note: SIM card insertion/removal must be performed when TMT250 device is powered off – with external voltage and battery disconnected. Otherwise SIM card may be damaged.

3.2 How to connect battery to TMT250 device:

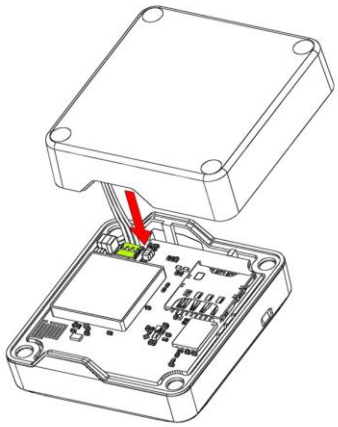
① Remove 4 screws and remove TMT250 cover.



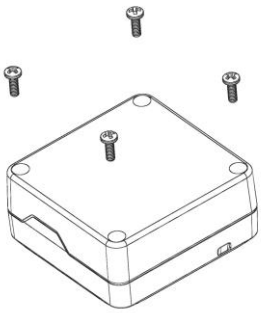
② Find the battery glued to the cover.



③ Connect battery and attach cover.



④ Tighten the screws. Device is ready to use.



3.3 Installing TMT250 drivers

Table 3. Software requirements:

Operating system	Version	MS .NET Framework version
Windows XP with SP3 or later	32 bit and 64 bit 32 bit 64 bit	**MS .NET Framework 4** https://www.microsoft.com/en-US/Download/confirmation.aspx?id=17718 http://avl1.teltonika.lt/downloads/software/Framework/.NET%20Framework%204/dotNetFx40_Full_x86_x64.exe With **MS .NET Framework 4 update KB2468871-v2 update** https://www.microsoft.com/en-us/download/details.aspx?id=3556 http://avl1.teltonika.lt/downloads/software/Framework/.NET%20Framework%204%20update%20KB2468871-v2/ **NDP40-KB2468871-v2-x86.exe** **NDP40-KB2468871-v2-x64.exe** or **NDP40-KB2468871-v2-IA64.exe**
Windows Vista Windows 7 Windows 8.1 Windows 10	32 bit and 64 bit	**MS .NET Framework 4.6.2** https://www.microsoft.com/en-us/download/confirmation.aspx?id=53344 http://avl1.teltonika.lt/downloads/software/Framework/.NET%20Framework%204.6.2/NDP462-KB3151800-x86-x64-AllOS-ENU.exe

Drivers:

Please download COM Port drivers from Teltonika website:
http://avl1.teltonika.lt/downloads/FMB1/MS_USB_ComPort_Driver_exe_v1.1032.3.zip

Installing drivers:

Extract and run MS_USB_ComPort_Driver_exe_v1.1032.3. This driver is used to control TMT250 device connected to the computer. Click ***Next*** in driver installation window: (updated nuotraukas driver installation)

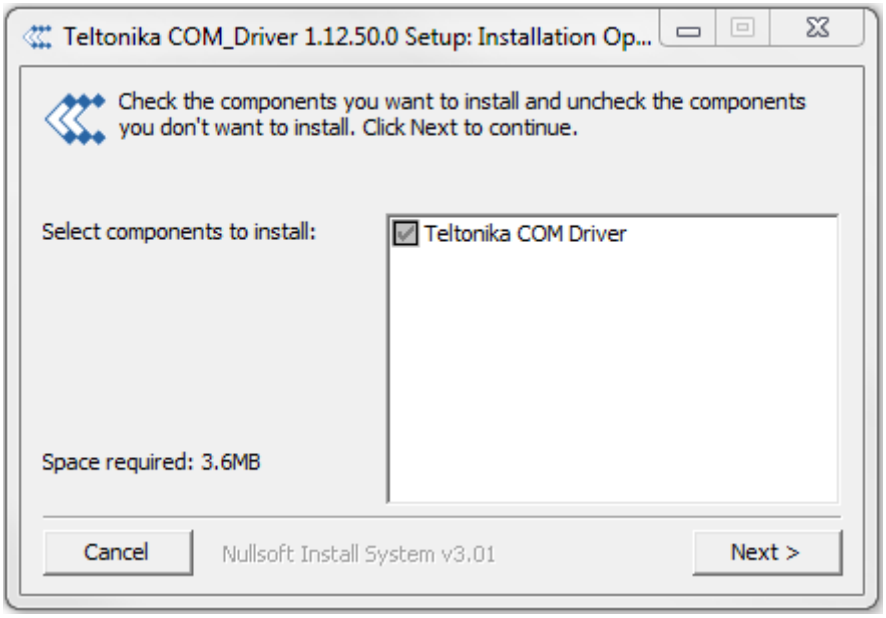


Figure 2 Driver installation window 1

This will launch device driver installation wizard. In the following window click ***Install***:

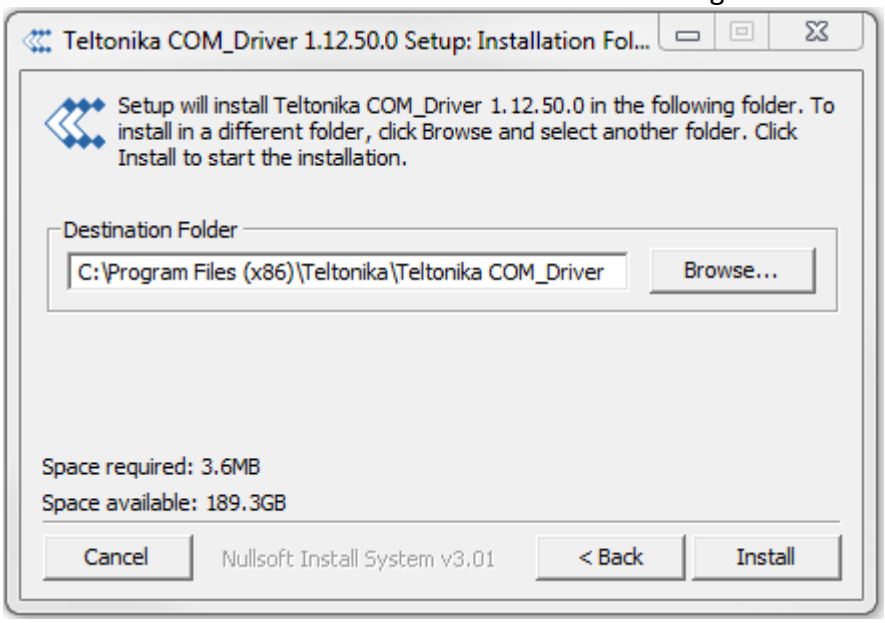


Figure 3 Driver installation window 2

Setup will continue installing drivers and eventually the confirmation window will appear. Click ***Close*** to complete the setup:

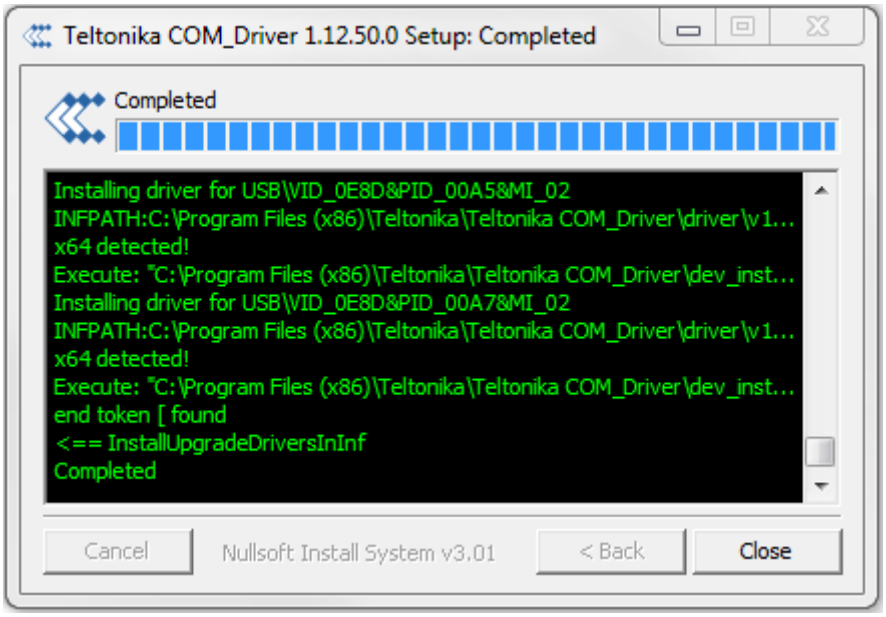


Figure 4 Driver installation window 3

You are now ready to use the device on your computer.

4 OPERATIONAL BASICS

4.1 Operational principles

TMT250 module is designed to acquire records and send them to the server. Records contain GNSS data and I/O information. Module uses GNSS receiver to acquire GNSS data and is run in three (time-based, distance-based and angle-based) acquisition modes. Please note that if TMT250 loses connection to GNSS satellites it continues to make records, however coordinate in these records remains the same (last known coordinate). All data is stored into flash memory and later can be transmitted via GPRS.

GPRS and SMS settings are described in following sections. TMT250 communicates with server using Codec 8 data protocol. TMT250 can be managed by SMS commands, which are described in SMS command section.

4.2 Sleep modes

There are four sleep modes: GPS sleep, Deep sleep, Online Deep sleep and Ultra Deep sleep mode. (Pridėti hyperlinkai į wiki)

4.2.1 GPS Sleep mode

TMT250 is able to go into GPS sleep mode if such mode is enabled.

Sleep mode timeout starts counting when device is in STOP mode. After timeout is reached and all conditions for GPS sleep mode are met, the device goes into sleep mode. When in GPS sleep mode, TMT250 turns GPS module off and continues making new periodic records. (išimtas sakinys apie vehicle battery saving naudojant šitą sleep mode)

TMT250 will enter GPS sleep mode if **ALL** of these conditions are met:

- TMT250 is configured to work in GPS Sleep mode and sleep timeout is reached;
- Device time is synchronized with GNSS satellites and GPS fix is obtained;
- Movement is not detected by the accelerometer;
- Forced wakeup is not set;
- There are no SMS messages being received.

TMT250 exits GPS sleep mode if following condition is true:

- Movement by accelerometer is detected.

4.2.2 Deep Sleep mode

When in deep sleep mode, TMT250 sets the GNSS receiver to sleep mode and turns off GSM/GPRS module (hence it is not possible to wake up device via SMS). Records with last known coordinate being saved and sent to AVL server - GSM/GPRS module is turned on to send data and then it is turned off. Please note that power saving depends on two configurable parameters: *Send Period* and *Minimum Record Saving Period in "X on Stop Mode"*. When records are sent successfully in deep sleep mode, open link timeout counter will be skipped and TMT250 will enter deep sleep mode immediately.

Because a lot of functions are disabled in deep sleep mode following I/O elements are disabled from records that are generated in this mode: GSM Signal, GNSS Status, GNSS PDOP,

GNSS HDOP, GSM CellID, GSM Area Code, Active GSM Operator and ICCID. TMT250 can enter deep sleep mode if ALL of these conditions are met:

- TMT250 is configured in Deep Sleep mode and sleep timeout is reached;
- Device time is synchronized with GNSS satellites and GPS fix is obtained;
- Movement is not detected by the accelerometer;
- *Min. Record Saving Period* (***Data Acquisition Mode*** settings) must be larger than *Open Link Timeout* parameter, so that TMT250 could close GPRS link;
- The difference between Send Period (***Data Acquisition Mode*** settings) and *Open Link Timeout* must be more than 90 seconds, so that TMT250 could close GPRS link within at least 90 seconds;
- Forced wakeup is not set;
- There are no SMS messages being received;
- Data socket(s) are closed;
- Data sending is not in progress;
- FOTA is not in progress.

TMT250 exits deep sleep mode if following condition is true:

- Movement by accelerometer is detected;

4.2.3 Online Deep Sleep mode

In this mode the device works as in deep sleep mode, but without deregistering from GSM network. GSM part stays powered so this increases power consumption. In this mode device should send/receive SMS and make/accept calls. It does not close GPRS context if one was previously opened. Conditions to enter online deep sleep mode are the same as entering deep sleep mode. TMT250 exits online sleep mode if following condition is true. TMT250 exits online sleep mode if following condition is true:

- Movement by accelerometer is detected;

4.2.4 Ultra Deep Sleep mode

Conditions to enter ultra deep sleep mode, where GPS and GSM modem are turned off and device functions are suspended for maximum battery saving, are the same as entering Deep Sleep mode.

TMT250 exits ultra deep sleep mode only when movement is detected by accelerometer. Movement source is not taken into account in this case.

4.3 Features

Using available features can greatly increase TMT250 utilization.

4.3.1 Alarm

Alarm is a feature that can be only triggered by a pressing the configured Power or Alarm button. When the alarm is triggered, an event with IO ID 236 is generated. Following a configured button press to activate the Alarm an SMS can be sent and a call can be performed.

4.3.2 ManDown

ManDown functionality gets current accelerometer data and calculates the angle between offset position. Currently there are two positions: horizontal (when GPS antenna is in horizontal position facing the sky) and vertical (when magnetic contacts are facing the sky). Scanning is performed each second. When calculated angle exceeds the configured angle value for 3 seconds an event is generated with configured priority and an SMS notification is sent, if such is configured. When the angle returns to allowed position an event with same priority is generated.

4.3.3 OverSpeeding

This functionality prevents exceeding fixed speed limits and inspects the driver if required.

4.3.4 Movement Event

Movement Event functionality makes an eventual high priority record (and sends an optional SMS) when device is stationary or in motion (depending on configured "*Mode*") for set *Timeout* (added to "*Movement Start/Stop Delays*" accordingly).

Timeout is a configured amount of time (in seconds) after which an eventual high priority record is generated.

Note: this timeout is added with *Movement Start Delay* if configured *Mode* is *Movement Event* or with *Movement Stop Delay* if configured *Mode* is *No Movement Event*.

Movement Event mode generates a record after the start of movement whereas *No Movement Event* generates a record after the stop of movement.

4.4 Bluetooth

Bluetooth can work in two modes - *slave* or *master*. When in *master* mode Bluetooth can connect to the defined hands free system. When working in *slave* mode - Bluetooth can accept incoming pairing requests from external devices.

NOTE: TMT250 supports ONE connection at a time.
NOTE: TMT250 can see up to 10 available devices. If there are more than 10 devices the scanning list may change.

4.5 Auto Geofence

Auto Geofence is a feature that notifies the user if the object has left the zone that was generated within set radius around the device. This feature is based on the last known position after the movement has stopped. More details about Auto Geofencing can be found in chapter 5.10.

4.6 Manual Geofence

Geofencing is another feature which is highly customizable and can detect whenever car enters or leaves customized areas. More details about Geofencing can be found out in chapter 5.11.

4.7 User Interface

This section allows to configure TMT250's RGB LED and vibration indication for each scenario using the configurator. More information about this can be found in Chapter 5.16

4.8 Keyboard

There are two configurable buttons in TMT250 - Alarm Button and Power Button. More information about this can be found in Chapter 5.17

5 CONFIGURATION

5.1 Configurator

At first TMT250 device will have default factory settings set. These settings should be changed according to the user's needs.

Device can be configured to acquire and send data to server, in this case the GSM settings shall be set in regards with GSM operator's information. If device GSM is unavailable, the device will not be able to send the data and TMT250 will start storing records to flash memory. It is possible to store up to 192000 data records within internal memory (when 100 MB are used to store records). It will send data over GPRS when it is available. Note that TMT250 might reach its full memory capacity. If such case happens, the device will start deleting the oldest records in order to save new ones.

TMT250 configuration is performed via TMT250 Configurator program. Contact sales manager to get the latest TMT250 Configurator version or download from https://teltonika.lt/product/tmt250/#downloads (reikia ikelti naujausia fw nurodytu linku) TMT250 configurator operates on Microsoft Windows OS and uses prerequisite MS .NET Framework.

Module configuration can be performed over magnetic USB cable or using a Bluetooth connection. Configuration process begins by starting TMT250 Configurator software and then connecting to TMT250 device via ***Connect*** button located in ***Online*** menu part. TMT250 has one user editable profile, which can be loaded and saved to the device. After any modification of configuration the changes need to be saved to TMT250 device using *Save to device* button. (atnaujintos visos nuotraukos)

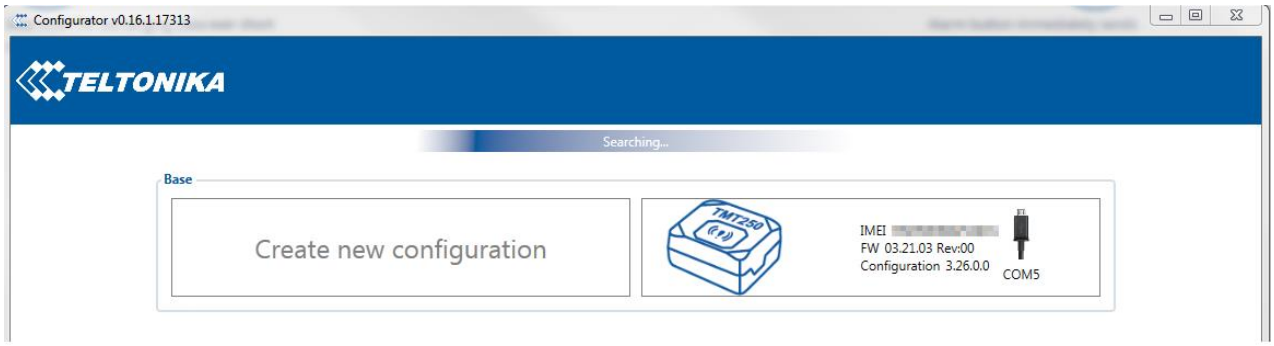


Figure 5 TMT250 configurator window when selecting the connection method

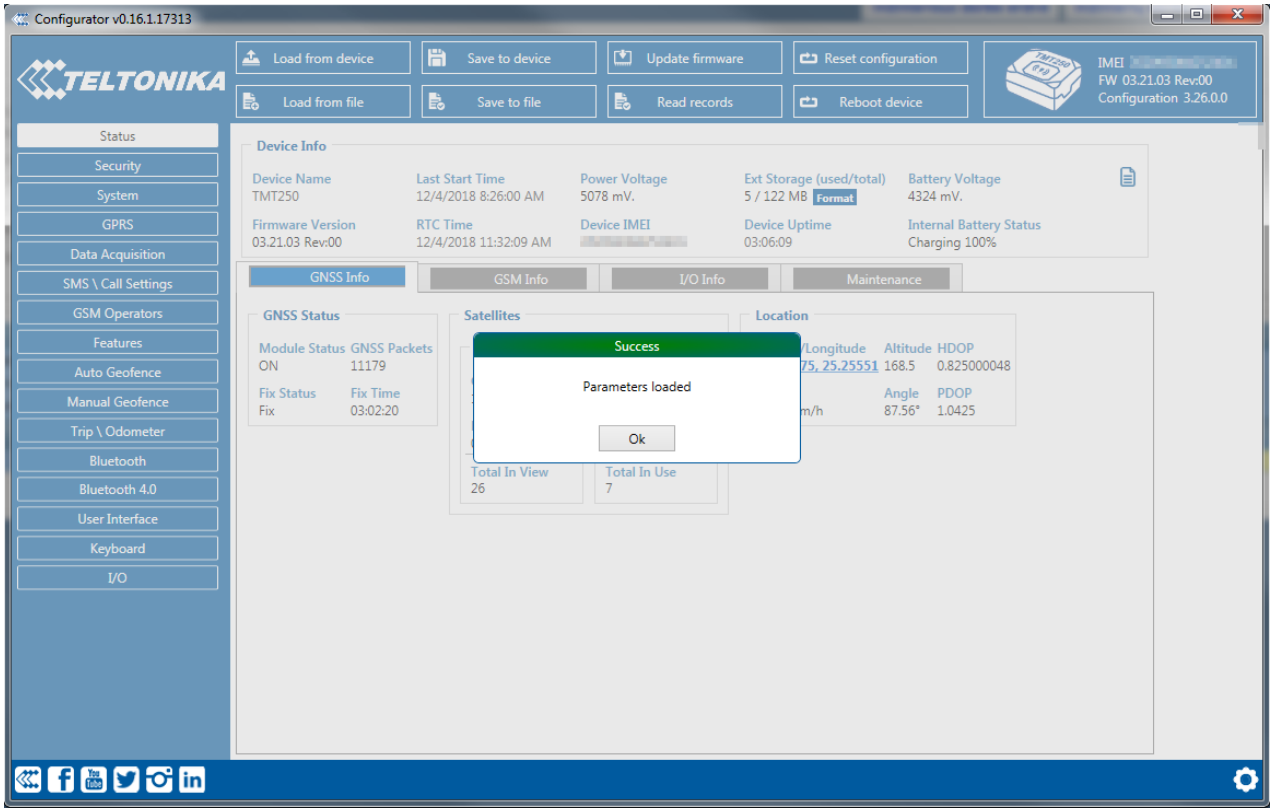


Figure 6 TMT250 configurator main window when connected to it and successfully loaded parameters

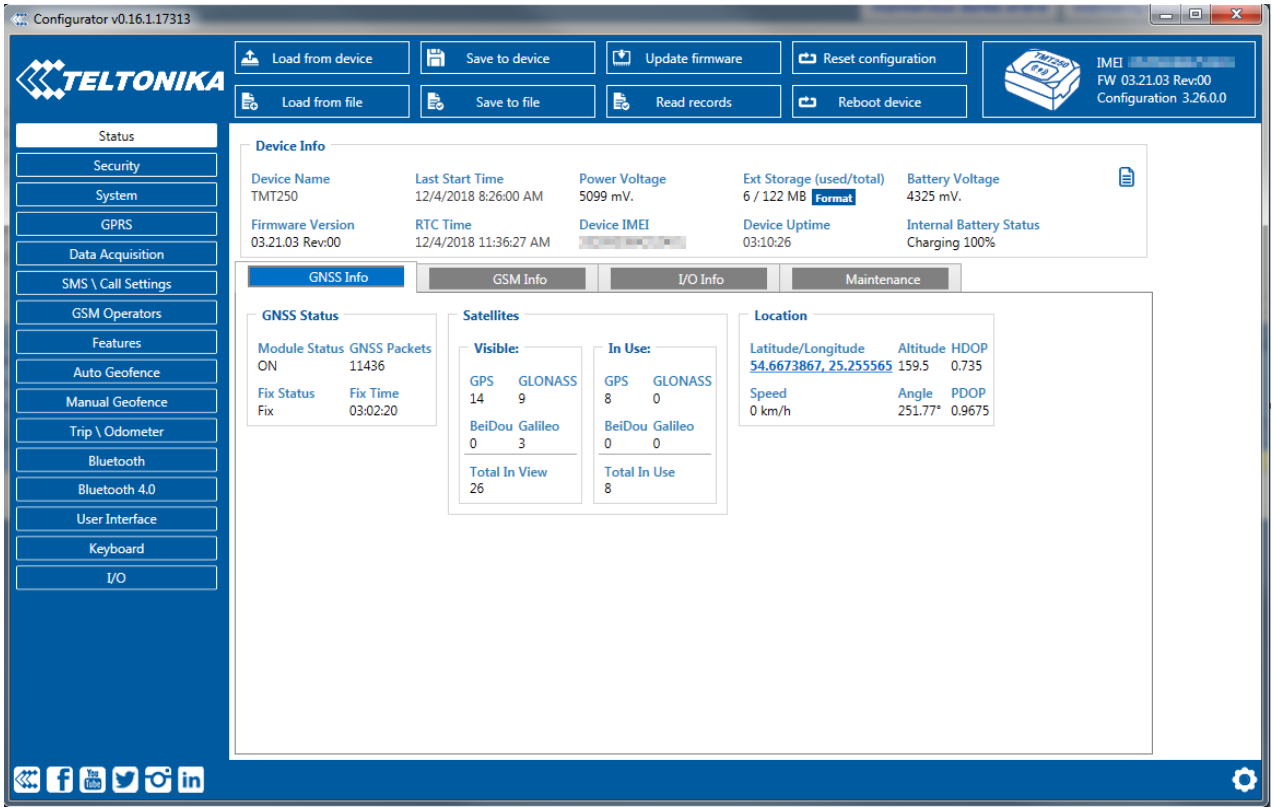


Figure 7 TMT250 status elements

5.1.1 Main Buttons description:

Load from device – loads configuration from device.
Save to device – save configuration to device.
Load from file – load configuration from file.
Save to file – save configuration to file.
Update firmware – update firmware on device.
Reset device – reset device configuration to default.

5.1.2 Keyword SMS (GPRS) commands:

Configuration should not be locked when the user is attempting to set a new keyword, change it or delete it. For example:

Set new keyword (set):
<SMS login>{space}<SMS pass>{space}setkey{space}{space}<newkeyword>

Change old keyword (change):
<SMS login>{space}<SMS pass>{space}setkey{space}<oldkeyword>{space}<newkeyword>

Delete current keyword:
<SMS login>{space}<SMS pass>{space}delkey{space}<keyword>

5.1.3 Keyword configuration with TCP

If keyword is set, it will be saved to configuration file.

If keyword in configuration file does not match keyword in device after TCP configuration, configurator will ask the device keyword. When device is locked, the keyword cannot be changed with TCP configuration.

5.2 Status info

Status info enables the user to monitor real time information of TMT250. Following fields are displayed: *Device Info* field, *GNSS Info* field, *GSM Info* field, *I/O Info* field and *Maintenance* field. User is able to export all of the information to .HTML file using an icon which is at the top right corner of the *Device Info* area.

Device Info shows device name, firmware version, last device start time, RTC Time, power voltage (mV), device IMEI, internal memory free space, device uptime, battery voltage (mV) and internal battery status.

GNSS Info shows:

- Real time GNSS status information: module status (ON, Deep/GPS/Online Sleep mode), the amount of GNSS packets device received from startup, fix status and the last GNSS fix time.
- Satellite information: the amount and type of satellites that are visible, and the amount of satellites used for location positioning.
- Location information: latitude, longitude, altitude, angle, HDOP, PDOP and speed.

GSM Info shows:

- GSM status: modem status, SIM status, GPRS status, actual operator code and GSM signal level.
- GPRS traffic: the amount of data that has been sent and received by the device.
- Sockets information: which server domain and port is used.

- Records: how many records were sent to the server since last data reset, when the last record was sent and when the last server response was.
- SMS count: the amount of SMS messages TMT250 has received and the amount of SMS responses that were sent from the device.

I/O Info shows:

- Values from all configurable I/O elements.

Maintenance shows:

- A "log" option to start capturing log for a set amount of time. Log will be saved to directory set in settings.
- A "Dump" option to start downloading logs from currently connected device. Files will be saved to directory set in settings.
- A "Read" option to start capturing *accelerometer* data for a set amount of time. Log will be saved to directory set in settings.

5.3 Security info

In security section user can see SIM card and configurator keyword security information.

- The state and status of currently inserted SIM card can be observed here. If a SIM card with PIN code is used, user can enter it in this section. The remaining attempts to enter PIN code are shown as well.
- When SIM PIN code is entered correctly user can change PIN code or disable it from the SIM card. When SIM PIN is disabled and user would like to enable it again, user must enter the previously used PIN code.
- Configuration security keyword can be set to configurator. Keyword can be saved in configuration file (.cfg), so there is no need to connect the device to the configurator to configure the keyword. Minimum keyword length is 4 symbols and maximum length is 10 symbols. Only uppercase, lowercase letters and numbers are supported. Keyword can be configured to .cfg configuration file when the device is not connected.

5.4 System settings

System settings have following configurable parameters:

- *Sleep Settings*, where user can choose a sleep mode;
- *Static Navigation Settings*, where user can turn static navigation on or off;
- Records saving settings, where user can enable or disable records when GPS is not available (no time synchronization);
- *GNSS Source* settings, where user can choose the necessary satellite system(s);
- *Power On By USB/Charger* setting. Device supports two working modes: normal mode, where the device works as usual, and charging mode, which is entered when *Power On By USB/Charger* parameter is disabled. To enter normal mode, device can be turned on by power button or by USB charger, if *Power On By USB/Charger* parameter is set to *Enable*.
- *Accelerometer Delay Settings*, where user can configure movement start and stop delay values (in seconds);
- *Time Synchronization* settings, where user can choose which source(s) to use for TMT250 time synchronization. User has a choice to: use only one synchronization source (*Disable (GPS only)*), allow synchronization from both the GNSS and NTP server (*NTP*), select synchronization through GNSS and GSM operator (*NITZ*) or from all three sources (when

NITZ+NTP is selected). User can select which NTP server (it is possible to configure up to two servers) and what time period to use to resynchronize time.

- *Data Protocol* setting – allows user to choose which protocol version to be used for data sending to server.

Power saving mode is present in TMT250. It allows users to choose from two possible options:

1. *Performance mode* – High performance mode, where GNSS module is constantly awake for a maximum track quality (excluding when TMT250 is in sleep mode).
2. *Low Power mode* – Battery saving mode, where GNSS module is woken up only when it is time to acquire position. Standard sleep modes are not available in this mode. For this mode to function properly, *Min Period* in "Data Acquisition" tab has to be >=60 seconds.

Static Navigation mode is a filter, which filters out track jumps when the object is stationary. If static navigation filter is disabled, it will apply no changes to GPS data. If static navigation filter is enabled, it will filter changes in GPS position if no movement (as defined by configured movement source) is detected. It allows filtering GPS jumps when the object is parked (not moving) and GPS position is still traced.

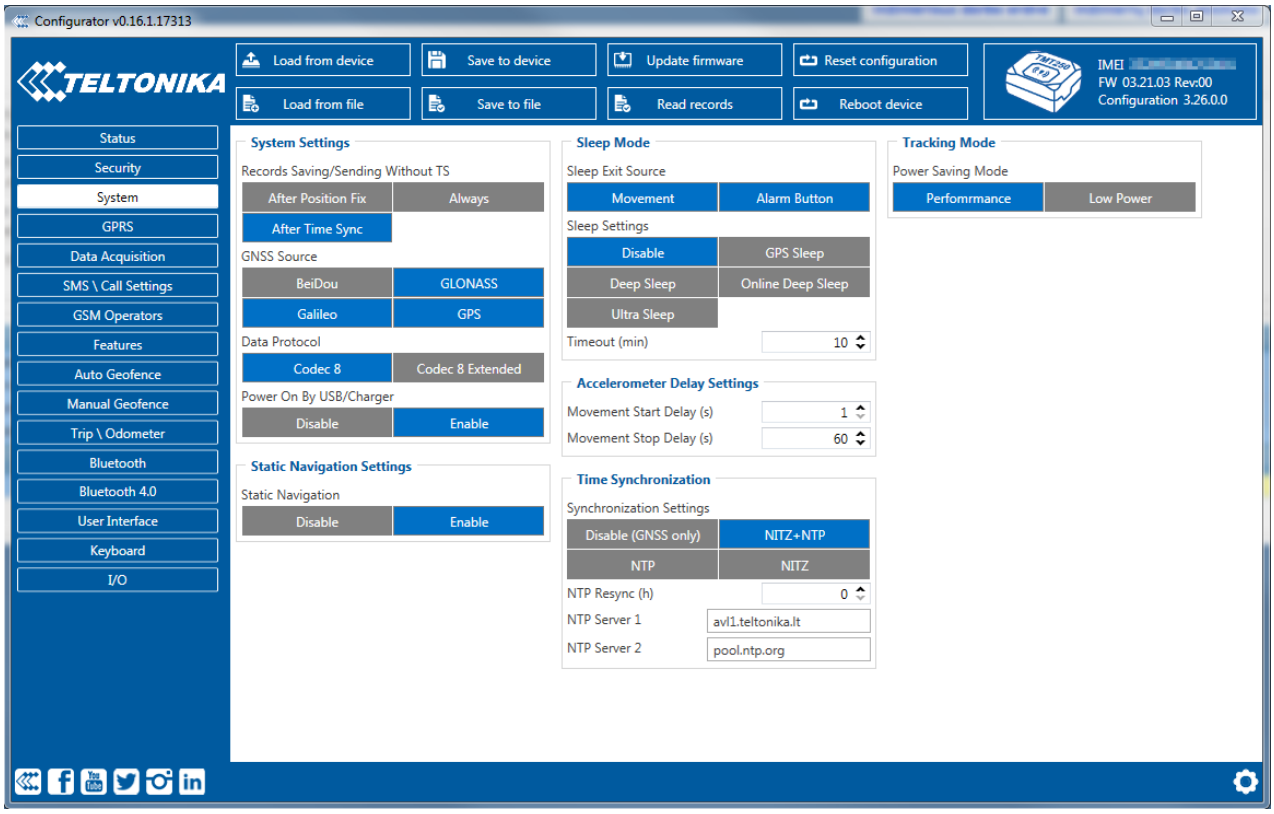


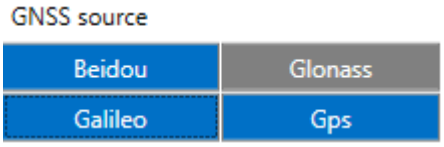
Figure 8 System settings configuration (atnaujinta nuotrauka)

GNSS Source settings allows user to configure which GNSS system(s) to use. User has a choice to use one system between *GPS*, *GLONASS*, *Galileo* or *BeiDou* and it is possible to choose

two or three systems together. One exception is that you cannot combine *BeiDou* and *GLONASS* systems together. Below you will find GNSS source combination examples:

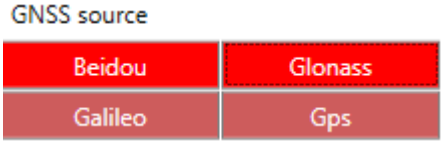
List of **configurable** GNSS sources:

BeiDou only	ID:01
GLONASS only	ID:02
Galileo only	ID:04
Galileo+BeiDou	ID:05
Galileo+GLONASS	ID:06
GPS only	ID:08
GPS+BeiDou	ID:09
GPS+Glonass	ID:10
GPS+Galileo	ID:12
GPS+Galileo+BeiDou	ID:13
GPS+Galileo+GLONASS	ID:14



Example of good configuration

List of **NON–configurable** GNSS sources:
GLONASS+BeiDou
Galileo+GLONASS+BeiDou
GPS+GLONASS+BeiDou
GPS+Galileo+GLONASS+BeiDou



Example of bad configuration

5.5 GPRS

GPRS settings define main parameters for TMT250: GSM operator *APN* and GPRS *Username* and *Password* (optional – depending on operator), destination server IP and port, and allows setting the protocol used for data transfers – *TCP* or *UDP*. Backup server settings can also be selected for *Backup* server.

Backup server has 3 different modes:

- *Disable*: backup server is not used.
- *Backup*: records are sent to backup server if main server is not available (for example fails to open link) or when main server response timeout is reached successively 5 times.
- *Duplicate*: records are sent to both servers (main and backup), records are deleted from SD-card (or RAMS) only if both servers accepted the records.

Some operators use specific type of authentication for GPRS session – *CHAP* or *PAP*. One of these should be selected depending on your GSM operator. Information about APN and authentication type should be provided by your GSM operator as well. (ištrinta pastraipa apie „chap“ ir „pap“ prierašus pries APN, nes konfigūratoriuje dabar galima pasirinkti vieną iš dviejų nevedant jų prieš APN)

TMT250 device will send the newest records first when *Newest* is selected in *Records Settings*, which is useful in cases when the most important parameter set is the most recent one, as a result other records will be sent right after the newest records are received by AVL application.

Open Link Timeout is used to set termination timeout for link between TMT250 and AVL application. If TMT250 has already sent all records it waits for the new records before closing the

link (except for *Deep Sleep* mode, for more information refer to Deep Sleep mode). If new record is generated and link is still open, it is sent to server immediately without waiting for send period. This option is useful when GSM operator charges for link activation.

Response Timeout is used to set a period of time waiting for the response from server side.

FOTA WEB settings are used to configure FOTA WEB server connection parameters. *Status* enables or disables FOTA WEB functionality. Address and port number of FOTA website are entered to *Domain* and *Port* fields. *Period* is used to set the timeout of repeat connections to the FOTA WEB server.

The connection to FOTA WEB may be forced without waiting the specified period by sending the following SMS command: <SMS login>{space}<SMS pass>{space}web_connect

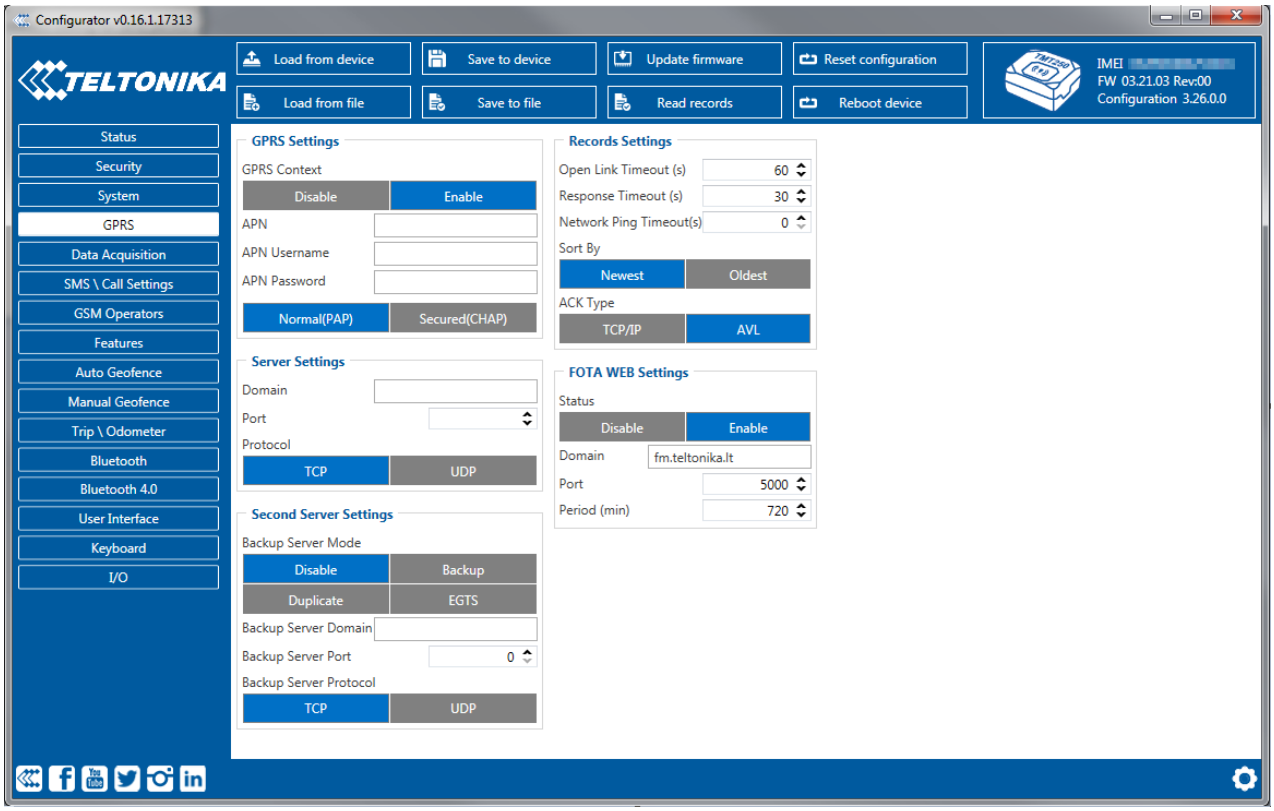


Figure 9 GPRS configuration

5.6 SMS/Call Settings

Essential fields in ***SMS/Call Settings*** are *Login* and *Password*. The login and password are used with every SMS sent to TMT250. If login and password are not set, in every SMS sent to TMT250 device two spaces before command have to be used (<space><space><command>).

Command structure with set login and password:

<SMS login><space><SMS password><space><command>, for example: *"asd 123 getgps"*

Phone numbers have to be written in international standard. Using "+" is optional but not necessary (in both cases number will be recognized, but when number is without "+" symbol, IDD Prefix will not be generated, which depends on location of the phone). If no numbers are entered, configuration and sending commands over SMS are allowed from all GSM numbers.

SMS data sending settings allow sending AVL data using binary SMS. AVL data will be sent by SMS only when there is no GPRS connection. This setting does not affect replies to SMS request messages – answers are always sent back to the sender's telephone number.

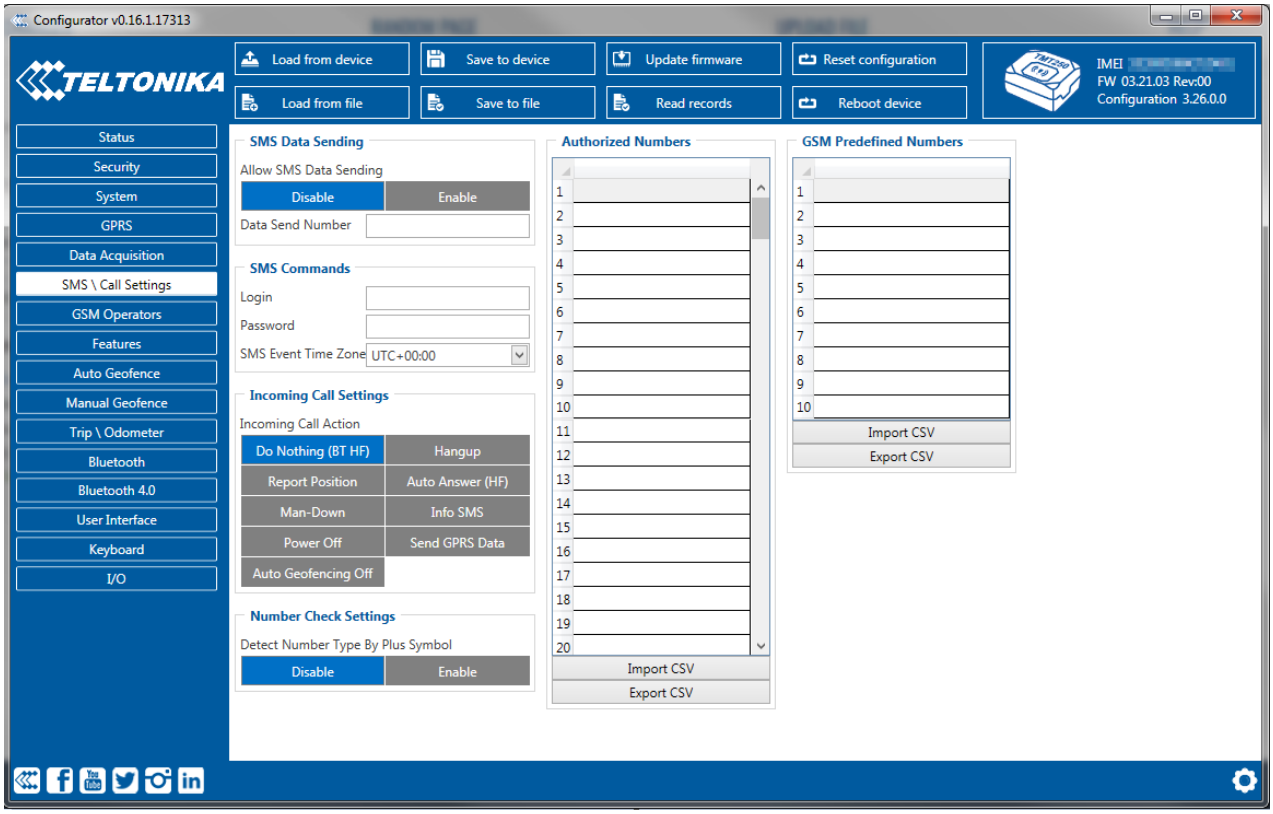


Figure 10 SMS/Call Settings configuration

Incoming call settings parameter defines device action during incoming call:

- *Do Nothing (BT HF)* – Device will ignore incoming call.
- *Hangup* – Automatically hang up an incoming call.
- *Report Position* – Device will send SMS with it's GNSS location to caller number and hang up incoming call.
- *Auto Answer (HF)* – Auto answer an incoming call if device is paired with a hands-free kit.
- *Man-Down* – Auto answer incoming call if Man-Down event is detected
- *Info SMS* – Device will send info SMS to caller number and hang up incoming call.

Info SMS format:

Date: <date> Time: <time>; IMEI: <imei>; Version: <version>; BatLvl: <batlvl>; OpId: <operator_id>; GSMSignLvl: <gsm_signal_level>

- *Power Off* – Hang up incoming call and turn device off.
- *Send GPRS Data* – Hang up incoming call and start sending records to server.
- *Auto Geofencing Off* – Turn off Auto Geofence scenario.

When *Number Check Settings* option is enabled, numbers with "+" symbols will be used as international and numbers without it - as local/unknown.

TMT250 works in synchronized GPS time which is UTC+0, with this option customer can configure the time zone and get SMS messages with correct time.

5.7 GSM Operators, Roaming, Blacklist Operator list

TMT250 can work in different modes (use different settings) according to the operator list defined. Operator list is used for *Data Acquisition* mode switching (see Data Acquisition Mode settings section for more details). Modes are changed based on GSM operator TMT250 is connected to.

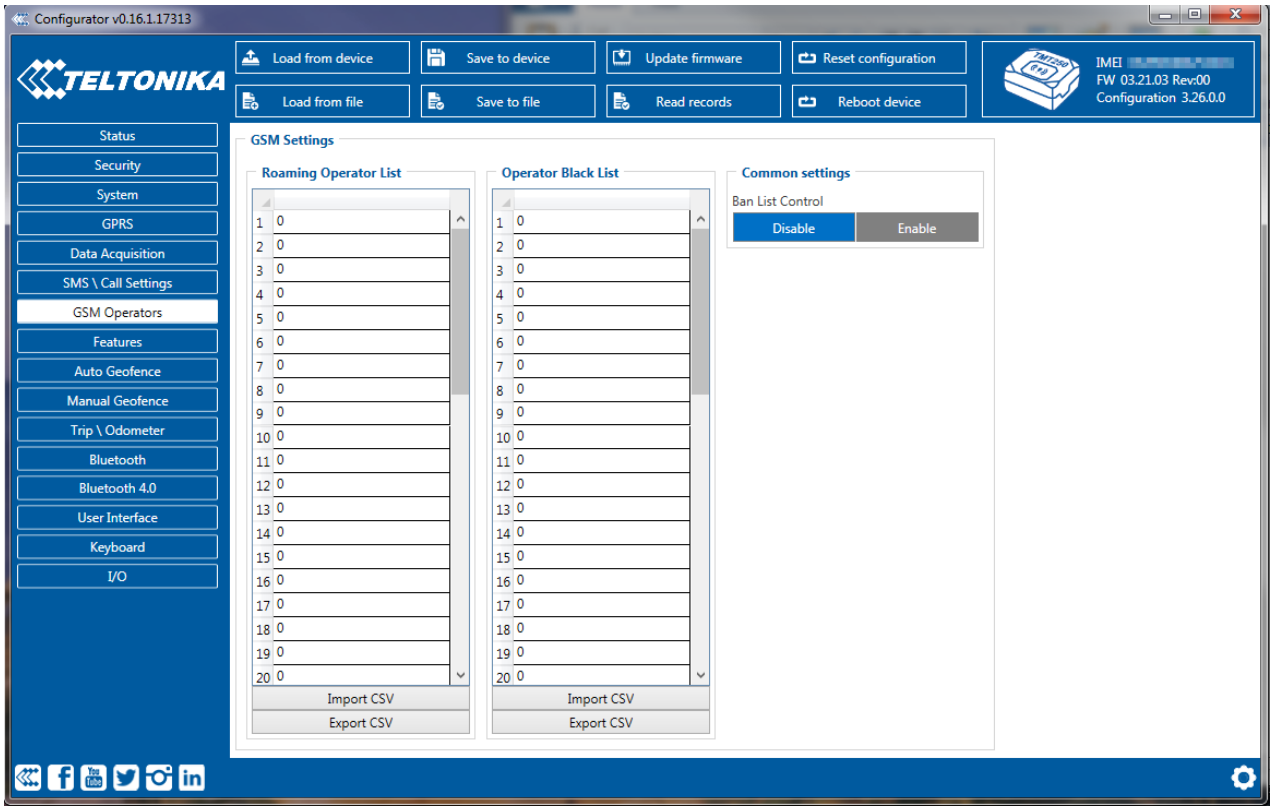


Figure 11 Roaming and Operator BlackList configuration (atnaujinta nuotrauka)

If roaming operator list is left empty, TMT250 will automatically detect home operator. If home operator is written to the roaming operator list, it will still be detected as home operator. Any operator not in the roaming operator list (except the home operator) will be recognized as unknown operator and TMT250 will work in Unknown mode (make sure it is configured to allow data sending – GPRS context is enabled).

If user wants TMT250 to not connect and work with a particular operator it has to be written to *Operator Blacklist*. Up to 50 operators may be entered to this list.

Operator search procedure is initiated as normal every 15 minutes and tries to connect to an operator providing the strongest signal. It will prioritize operators which are specified in the operator list. If no operators from the operator list are available, the device will try to connect to an operator from the blacklist. If device connects to an operator from the blacklist, best operator search procedure is initiated instantly. During the time when device is connected to blacklisted operator no GPRS connection would be initiated and no data would be sent via GPRS. However, the ability to send SMS commands to the device would remain. If no suitable operator is found on both lists, the device will try to connect to a remaining available operator with the strongest signal.

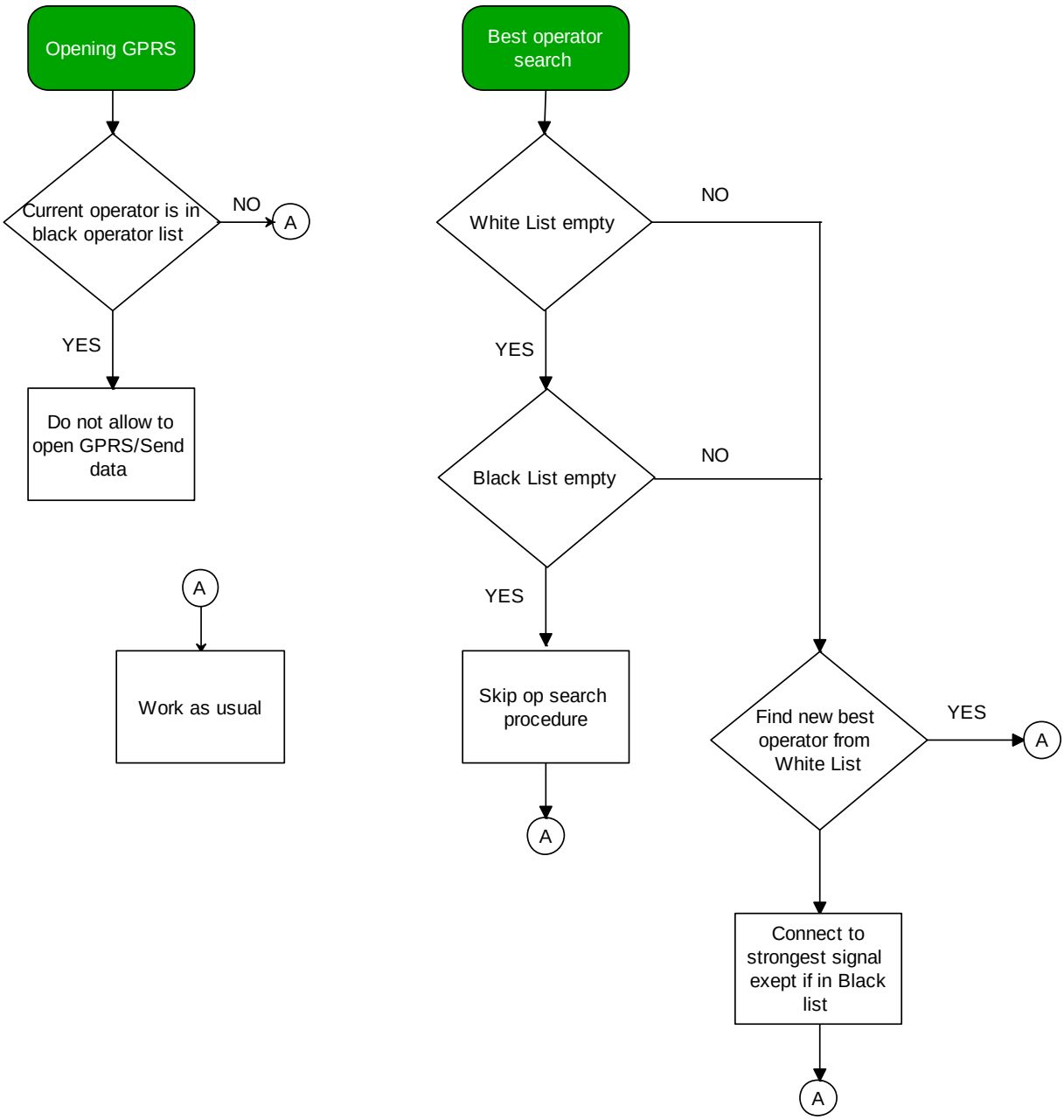


Figure 12 Operator search functionality diagram. White list is Roaming Operator lists

5.8 Data Acquisition Mode settings

Data Acquisition modes are an essential part of TMT250 device, they are also highly configurable.

Through configuration user defines how records will be saved and sent. There are three different modes: Home, Roaming and Unknown. All these modes with configured data acquisition and report frequencies depend on current GSM Operator defined in the Operator list (see section GSM Operators, Roaming, Blacklist Operator list) and are switched when GSM operator changes (e.g. vehicle passes through a country border).

If current GSM operator is defined as Home Operator, device will work in Home Data Acquisition mode, if current operator is defined as Roaming Operator, device will work in Roaming Data Acquisition mode, and if current operator code is not written in the Roaming Operator list, device will work in Unknown mode.

This functionality allows having different AVL records to acquire and send parameter values when object is moving or standing still. TMT250 has 6 different modes. Operational logic is shown in **Figure 13**.

If home operator is written to roaming operator list, it will still be detected as home operator.

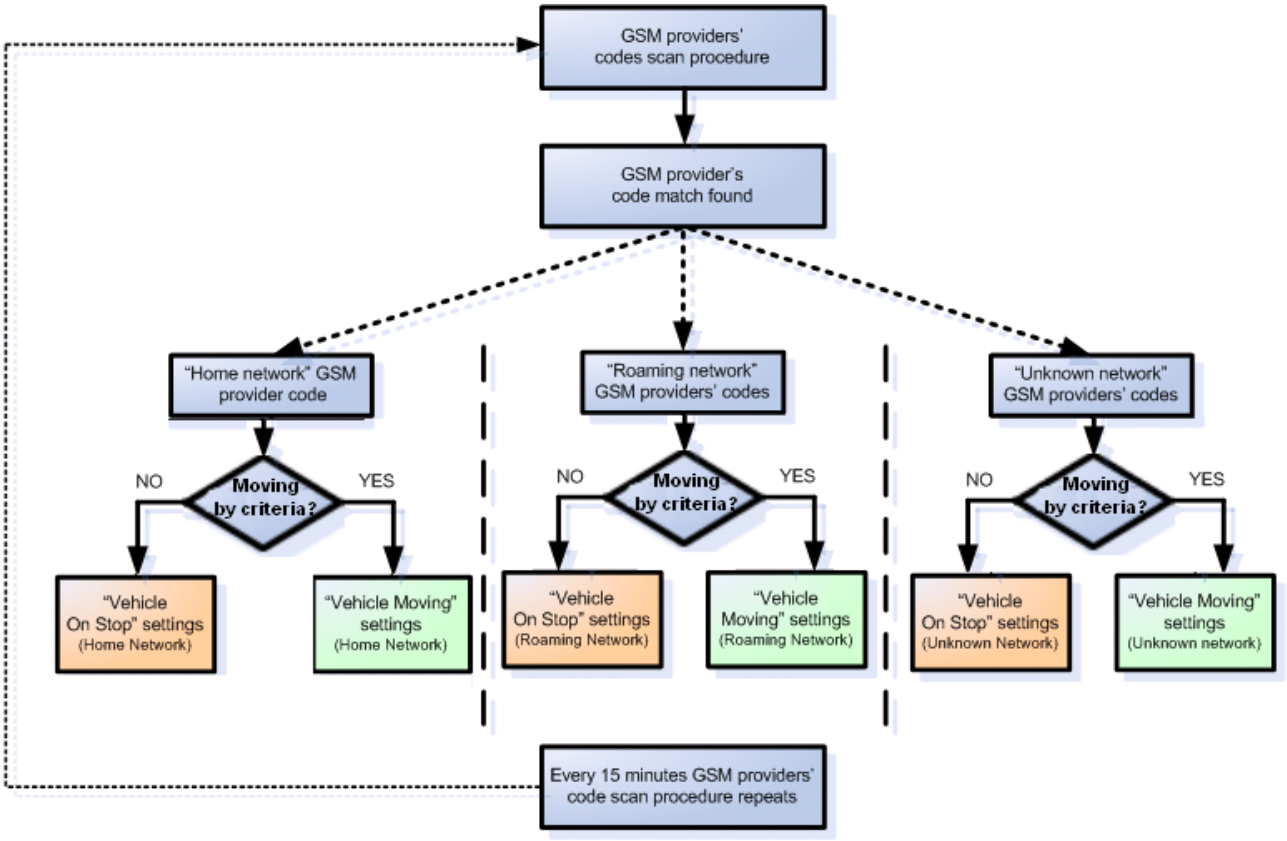


Figure 13 Data Acquisition Mode operational logic

Operator search is performed every 15 minutes. Depending on current GSM operator Home, Roaming or Unknown mode can be changed faster than every 15 minutes. This process is separate from operator search. Movement criteria are checked every second.

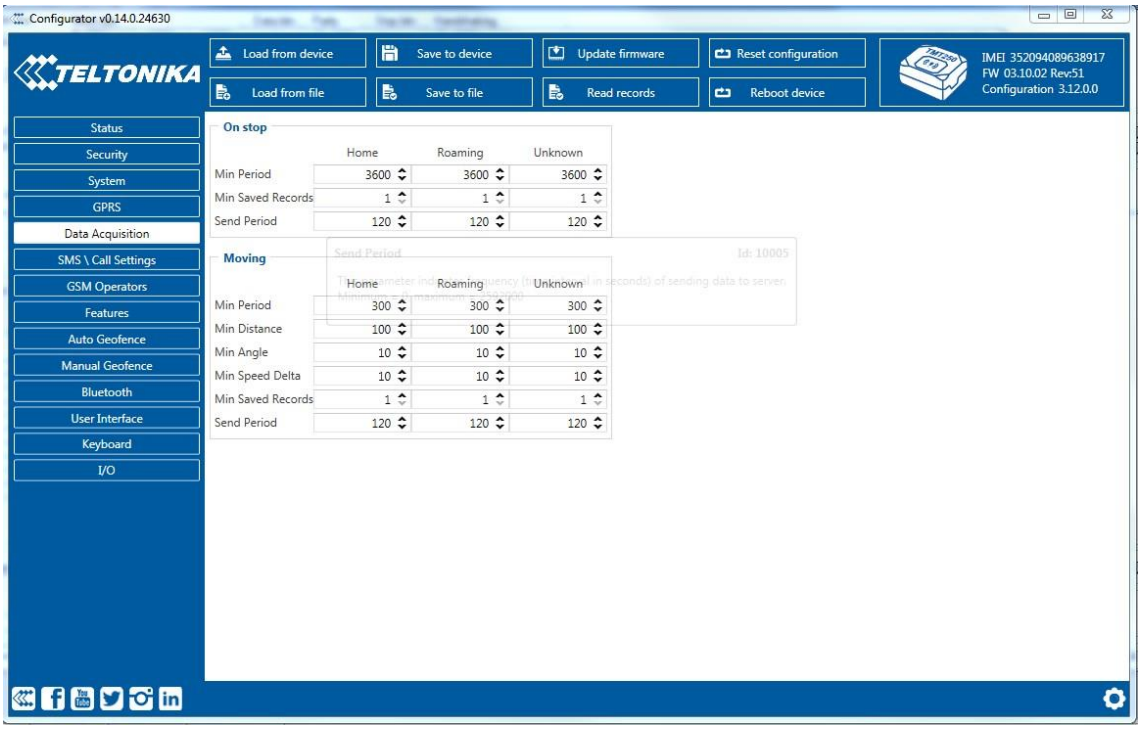


Figure 14 Data Acquisition Mode configuration

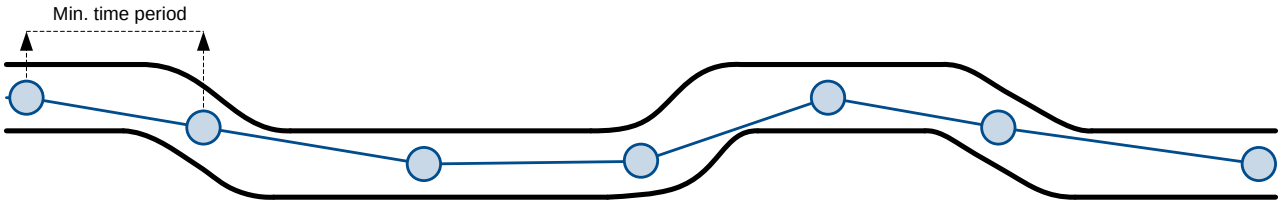
Min Saved Records defines minimum number of coordinates and I/O data that should be transferred within a single connection to the server. If TMT250 does not have enough coordinates to send to the server, it will check again after a time interval defined in *Send Period* field.

Send period controls the frequency of GPRS data being sent to server. Module makes attempts to send collected data to the server every defined period of time. If it does not have enough records (depends on the parameter *Min. Saved Records* described above), it tries again after the defined time interval.

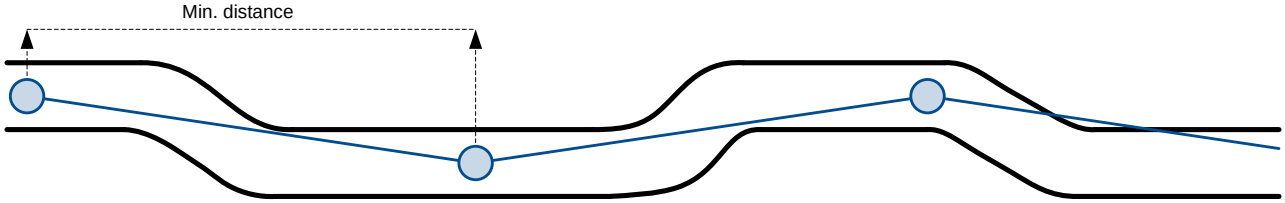
Note: Keep in mind that TMT250 operates in GMT:0 time zone, without daylight saving.

TMT250 is able to collect records using four methods at the same time: time, distance, angle and speed based data acquisition:

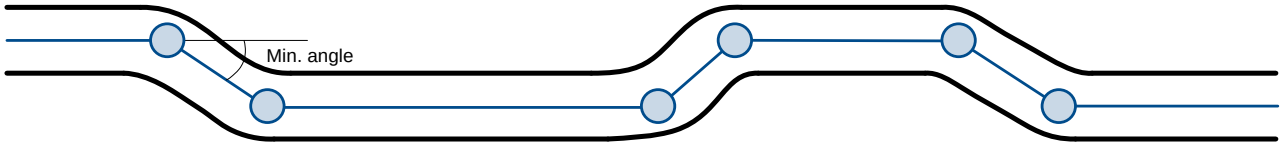
1. Time based data acquisition (*Min Period*) – records are acquired every time when a defined interval of time passes. Entering zero disables data acquisition based on time.



2. Distance based data acquisition (*Min Distance*) – records are acquired when the distance between previous coordinate and current position is greater than a defined parameter value. Entering zero disables data acquisition based on distance.



3. Angle based data acquisition (*Min Angle*) – records are acquired when the angle difference between last recorded coordinate and current position is greater than a defined value. Entering zero disables data acquisition based on angle.



4. Speed based data acquisition (*Min Speed Delta*) – records are acquired when the speed difference between last recorded coordinate and current position is greater than a defined value. Entering zero disables data acquisition based on speed.

5.9 *Features settings*

Three different scenarios can be selected in *Features* window.

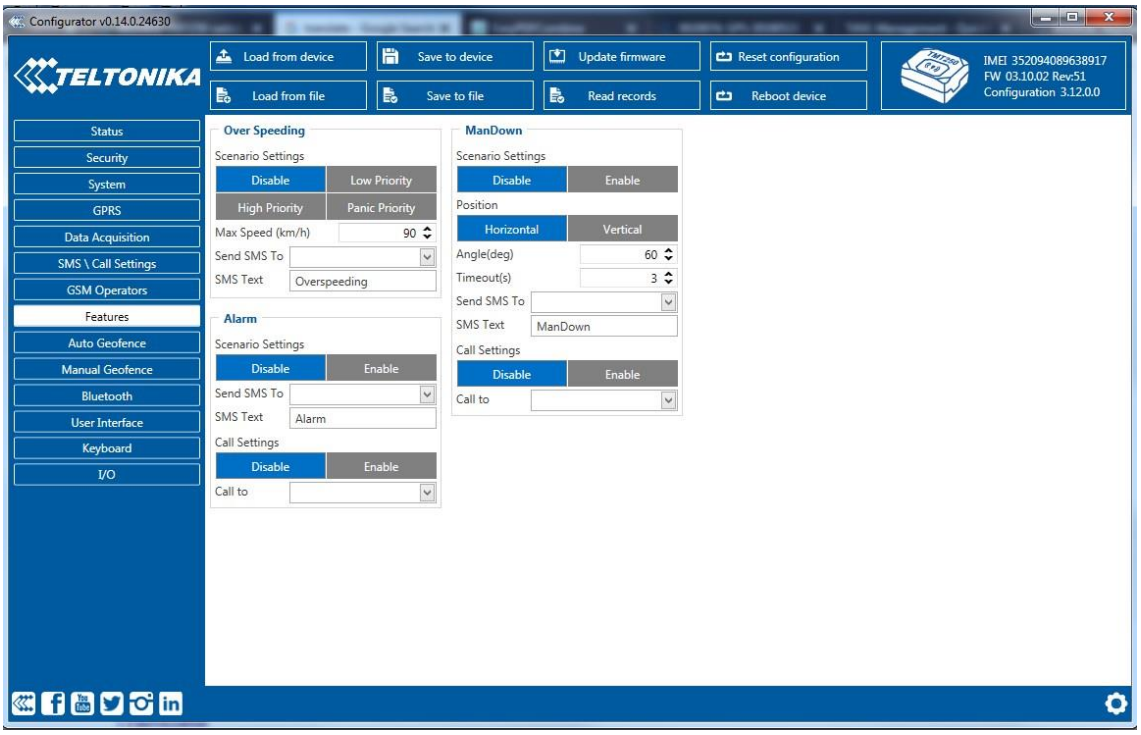


Figure 15 Scenarios configuration

5.9.1 Alarm

This function can be only triggered by a button (Power Button or Alarm Button). When the alarm is triggered, an event with IO ID 236 is generated. Eventually an SMS will be sent and a call can be performed.

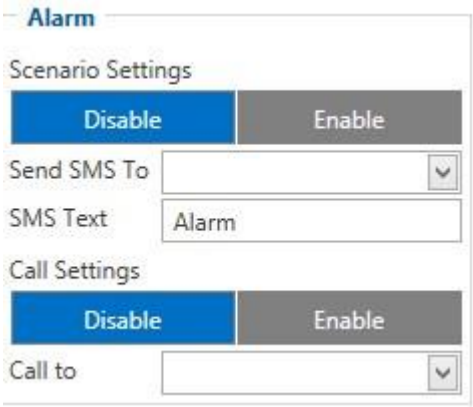


Figure 16 Alarm parameters

5.9.2 Over Speeding

This feature is used to prevent the driver from exceeding fixed speed and inspects the driver if needed. When vehicle speed exceeds maximum configured speed value the scenario is activated, and a record is generated. Scenario is activated until speed value decreases below the set parameter value.

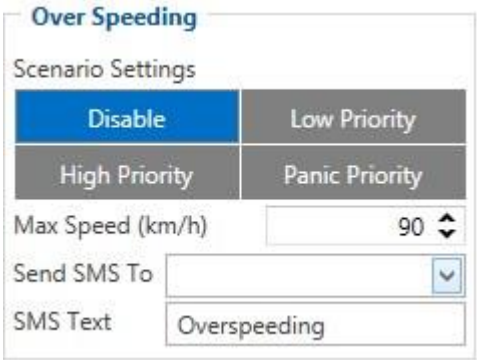


Figure 17 Over Speeding parameters

5.9.3 ManDown

This feature gets current accelerometer data and calculates angles between offset positions. Currently there are two positions: horizontal (when GPS antenna is in horizontal position facing the sky) and vertical. Scanning is performed each second. When calculated angle exceeds configured angle for 3 seconds, an event is generated with configured priority and an SMS event takes place, if it is configured. When angle returns to allowed position, an event with the same priority is generated, an SMS can be sent and a call can be performed, if it is configured.

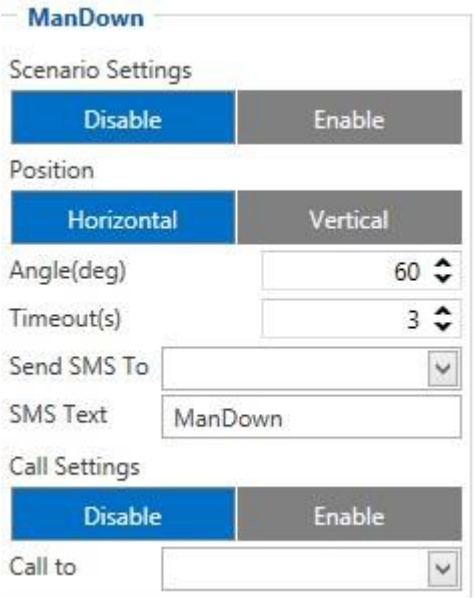


Figure 18 ManDown parameters

5.9.4 Movement Event

Movement Event functionality makes an eventual high priority record (and sends an optional SMS) when device is stationary or in motion (depending on configured "*Mode*") for set *Timeout* (added to "*Movement Start/Stop Delays*" accordingly).

Timeout is a configured amount of time (in seconds) after which an eventual high priority record is generated.

Note: this timeout is added with *Movement Start Delay* if configured *Mode* is *Movement Event* or with *Movement Stop Delay* if configured *Mode* is *No Movement Event*.

Movement Event mode generates a record after the start of movement whereas *No Movement Event* generates a record after the stop of movement.

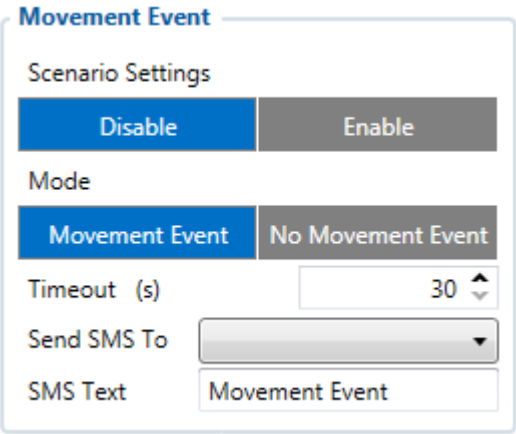


Figure 19 Movement Event parameters

5.10 AutoGeofencing settings

AutoGeofence is based on the last known position after the movement has stopped. You can be notified using this feature if the object has left the generated zone. The size of Geofence zones are set by parameters. AutoGeofencing options can be configured by following parameters as depicted in **Figure 19** below.

AutoGeofence zone is generated *immediately* within set *Radius* value around tracker's most recent position, when Auto Geofencing is enabled over *Keyboard*. Scenario can also be activated through a SMS/GPRS command and can be disabled by SMS/GPRS, configured button or a call. To disable Auto Geofencing scenario with a call, configure *Incoming Call Settings* to Auto Geofence Off and set authorized numbers if such are used.

Note that AutoGeofencing does not require entering coordinates, instead it requires GPS visibility.

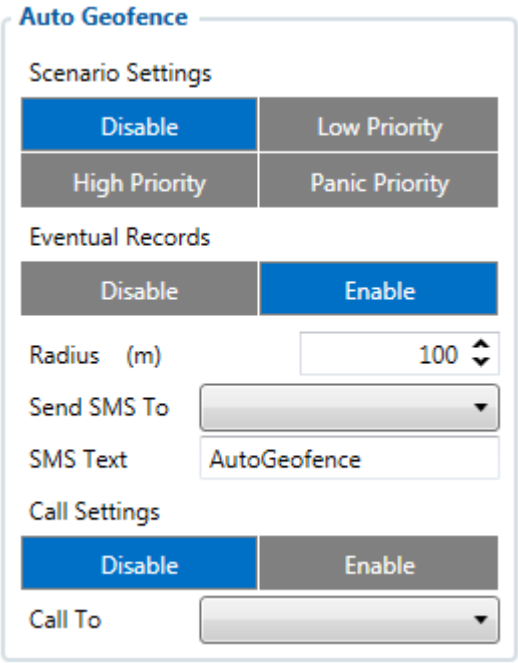


Figure 20 Auto Geofence configuration

5.11 Manual Geofence

TMT250 has 50 configurable Geofence zones and it can generate an event when a defined Geofence zone border is crossed. Frame border is an additional border around Geofence zone used to prevent false events when object stops on the border of the area and as a result records are made inside and outside the defined area because of GNSS errors. The event is generated only when both (Geofence and frame) borders are crossed. See **Figure 20** for details: blue track is considered to have entered the area whereas red track is not.

Shape can be a rectangle or a circle as defined by the user.

Priority of Geofence event is categorized into Low, High or Panic levels. These levels define the priority of event information that is sent to the server. For more details about priorities look in I/O settings section.

Generate event allows to choose when record will be generated.

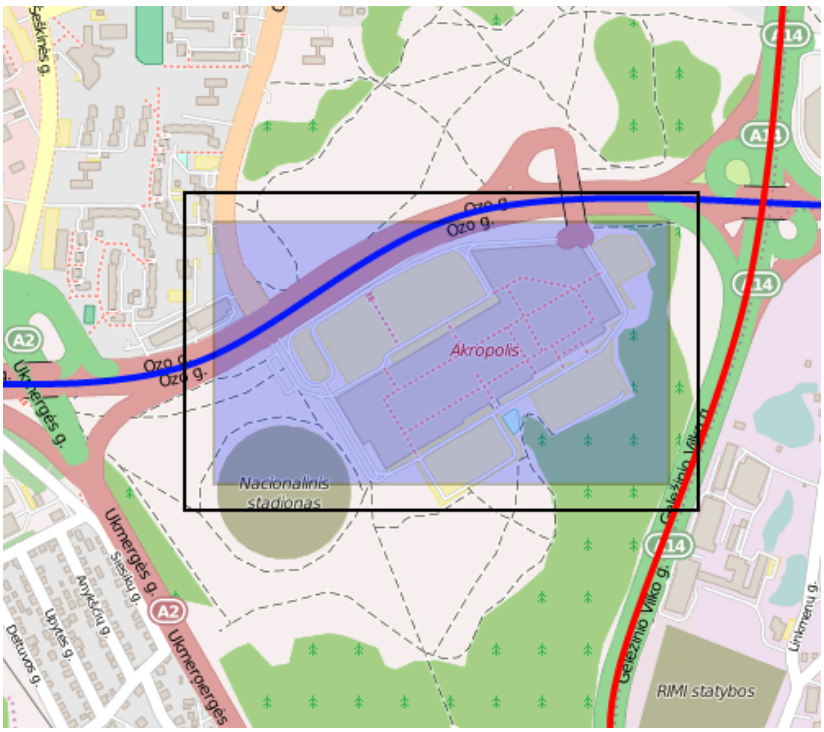


Figure 21 Geofence border

Eventual records controls where scenario status value appears: when disabled it will exist in each AVL record and when enabled the value will be appended only to eventual records.

OverSpeeding helps to configure *OverSpeeding* scenarios separately for each different Geozone. Regular *OverSpeeding* and geozones' *OverSpeeding* function independently. If digital output control is enabled in a regular *OverSpeeding* scenario, geozones *OverSpeeding* scenario will control it too i.e when the device is in more than one geozone and *OverSpeeding* is detected in any zone then the digital output turns on. Digital output turns off only when *OverSpeeding* is not detected anywhere.

X1 is used to set geofence zone left bottom corner X coordinate (longitude) whereas *Y1* is used to set Y coordinate (latitude).

X2 or *R* are used to set accordingly geofence zone upper right corner X coordinate (longitude) when Rectangular zone is used or circle radius when Circular zone is used. *Y2* sets geofence zone upper right corner Y coordinate (latitude) for a Rectangular zone.

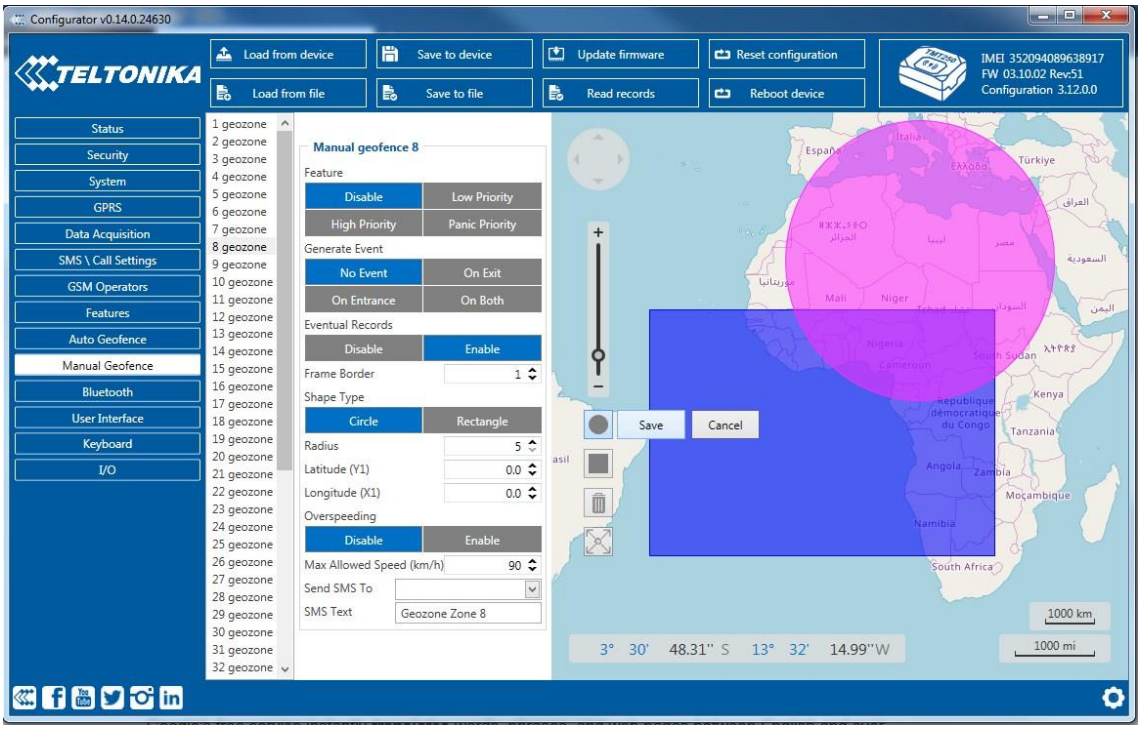


Figure 22 Geofence configuration

5.12 Bluetooth

5.12.1 General functionality

General functionality configures Bluetooth to work in slave mode. This mode allows any external device to connect to TMT250.

Parameter *BT Radio* allows enabling or disabling Bluetooth. There are three different settings:

- *Disabled* – Bluetooth functionality will be disabled.
- *Enable (hidden)* – Bluetooth functionality will be enabled, external devices will be able to connect to TMT250, but no devices will be able to detect it.
- *Enable (visible)* – Bluetooth functionality will be enabled and any external device will be able to detect and connect to TMT250.

Local Name parameter lets user declare a visible name of TMT250 to external devices.
Local PIN parameter lets user configure Bluetooth PIN of TMT250 device.

TMT250 Bluetooth has several different *Security Modes*:

- *PIN only* – only Local PIN will be reacquired to complete connection to TMT250.
- *PIN + MAC list* – PIN and *Authorized Devices MAC List* will be checked against to allow connection to TMT250. If the external device MAC ID is in the list and correct *Local PIN* is entered then connection will be established, otherwise TMT250 will reject connection.
- *MAC list only – only Authorized Devices MAC List* will be checked when trying to connect to TMT250. If external device MAC ID is in the list then connection will be established, otherwise TMT250 will reject connection.
- None – neither *Local PIN* nor *Authorized Device MAC List* will be checked.

Auto connection functionality configures TMT250 as master device, which allows connecting TMT250 to an external device. TMT250 currently supports these modes:

- None – disables auto connection functionality.
- Hands Free – TMT250 starts searching for an external hands free headset. If TMT250 finds a device which matches user defined *External MAC* or *External Name* then TMT250 will try to pair with that external device. If the external device asks for PIN then TMT250 will send user defined *External PIN*. After successfully pairing TMT250 will connect to paired device.
- Data Link – BT Data link mode is enabled by Configurator *Data Link* parameter: when *Data Link* is configured and TMT250 has a link with the server, paired device can send messages via Bluetooth SPP profile directly to the server. Messages will be encoded by codec12.

Figure 23 Bluetooth

TMT250 supports ONE connection at a time.
TMT250 can see up to 10 available devices. If there are more than 10 devices, the list may change with each new scan.

External Name parameter works as a substring, which allows user to enter a part of the full external device name. For example, if external device name is "HandsFreeHeadset" and user enters "HandsFree" in *External Name* parameter window, then TMT250 will be allowed to connect to an external device named "HandsFreeHeadset".

5.12.2 How to connect Bluetooth Hands Free adapter to TMT250 device

5.12.2.1 Bluetooth settings configuration

These are instructions on how to easily create a connection between a Bluetooth Hands Free device and TMT250 device. First the TMT250 device Bluetooth settings need to be configured. These are the required steps:

- Connect TMT250 device to PC using USB cable.
- Launch TMT250 Configurator and connect to the device as shown in **Figure 23**.

Figure 24 TMT250 configurator connected devices window

- After successful connection to the device wait a few moments while the device loads the current configuration, then nagivate to Bluetooth section as shown on **Figure 24**.

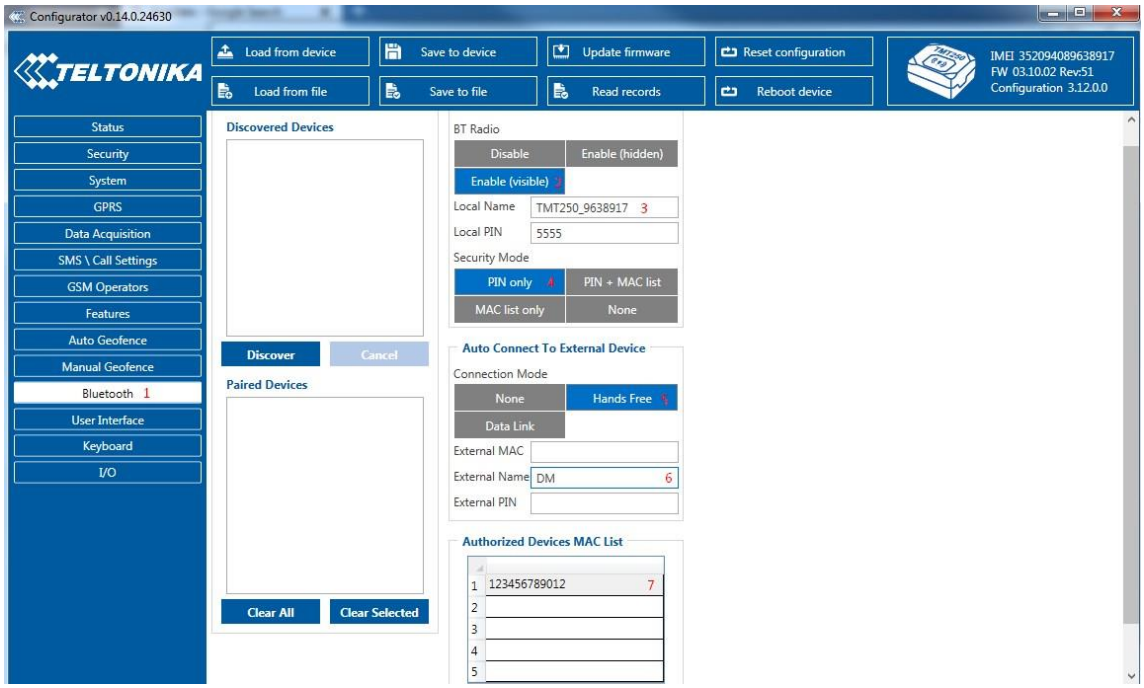


Figure 25 1 – Bluetooth settings; 2 – Enable Bluetooth; 3 – Bluetooth local name; 4 – Bluetooth security mode; 5 – Hands Free connection mode; 6 – External BT device name; 7 – Authorized Devices MAC list

- When device configuration is loaded press ***Bluetooth*** settings (**Figure 24** position 1).
- Turn on BT Radio by pressing Enable (visible) (**Figure 24** position 2). Local name (**Figure 24** position 3) will be "TMT250_last 7 imei digits" by default, which can be changed.
- Set *Security Mode* (**Figure 24** position 4) to *PIN only* or *None*. *PIN + MAC list* or *MAC list only* security modes could also be selected, but in that case external device MAC address is required to be entered to *Authorized Devices MAC List* (**Figure 24** 7 position).
- Set connection mode to *Hands Free* (**Figure 24** position 5).
- Set *External Name* (**Figure 24** position 6) as your hands-free device name for proper identification. In the given example hands-free headset name is "DMH10" but at least 2 characters are required to recognize it and connect to it. For better and quicker adapter identification on the network you could enter a full device name. You could check your hands-free adapter Bluetooth name by scanning nearby Bluetooth devices using a mobile phone or a computer with Bluetooth adapter.
- Go to ***SMS/Call Settings*** in main menu and set *Incoming Call Action* to *Do Nothing* as shown on **Figure 25**.

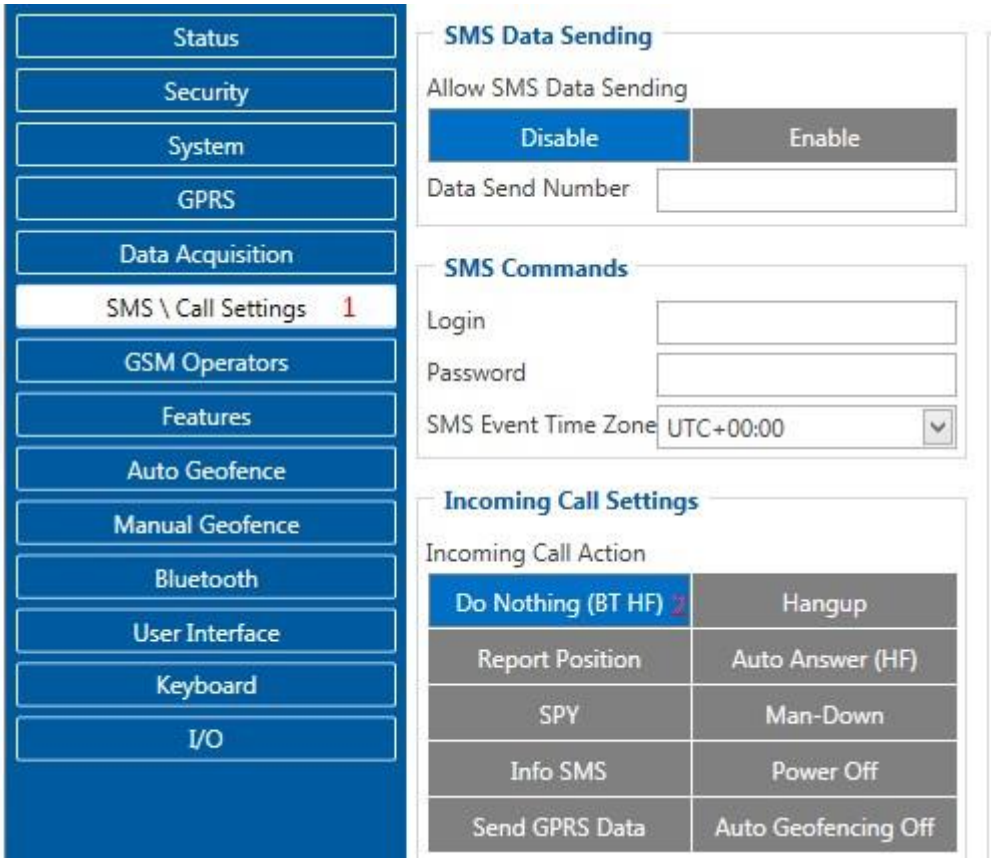


Figure 26 Incoming Call Action settings

- After all these steps press *Save to device* to save configuration.
- Now TMT250 device can be disconnected from the configurator.

5.12.2.2 Connecting Bluetooth Hands Free adapter

Turn on hands-free device and then turn on its Bluetooth connection for pairing following your model instructions. Hands-free adapter should make a specific sound in the speakers or its LED identification should inform about successful connection. To check if the adapter is successfully connected, dial the TMT250 device phone number and the hands-free device should start ringing. If you later restart TMT250 device it will automatically reconnect to this adapter.

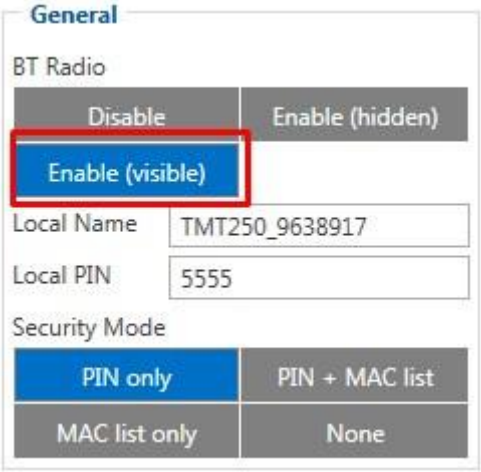
5.12.3 Logging the TMT250 device using your mobile phone

Bluetooth starts automatically when TMT250 device is on. Take your mobile phone, go to ***Settings->Bluetooth*** and turn it on. Scan for nearby devices, find the device in the list, distinguish the device by last IMEI digits on device module. Press pair, wait until device asks to enter pairing password, type: "5555" (as in the example on the **Figure 24**). Paired device will show up in the paired device list. Download a terminal for Bluetooth e.g. *BlueTerm* from *Play Store/App store*. Run app, click ***Find->Connect*** to your paired device. Now we need to send a command to TMT250 from Bluetooth terminal, type: ".log:1". Device will respond with "Debug enabled" and TMT250 log will show up. Do not forget to save the log file to mobile phone.

5.12.4 Device debug over Android smartphone

In order to pair FMB device with Android smartphone, make sure that BT radio is enabled (visible) in device configuration. It can be checked via SMS command too:

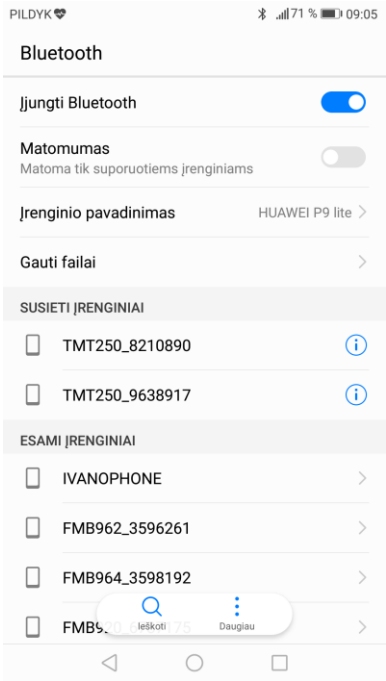
getparam 800



The answer has to be ***2***, which means *Enabled (visible)*.

- Scan for visible BT devices using your Android smartphone and connect to your TMT250 device.

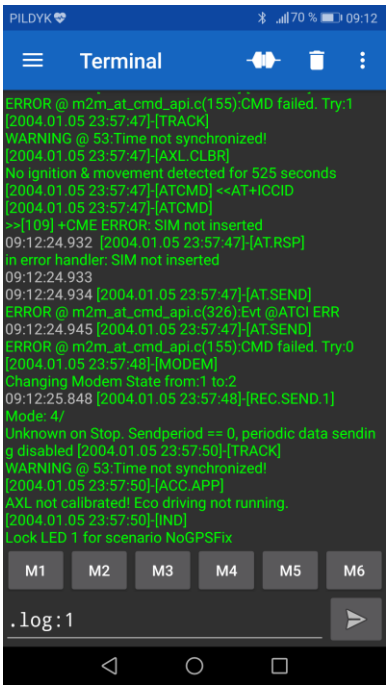
Default TMT250 BT name is: ***TMT250_last_7_imei_digits***
Default PIN code is: ***5555***



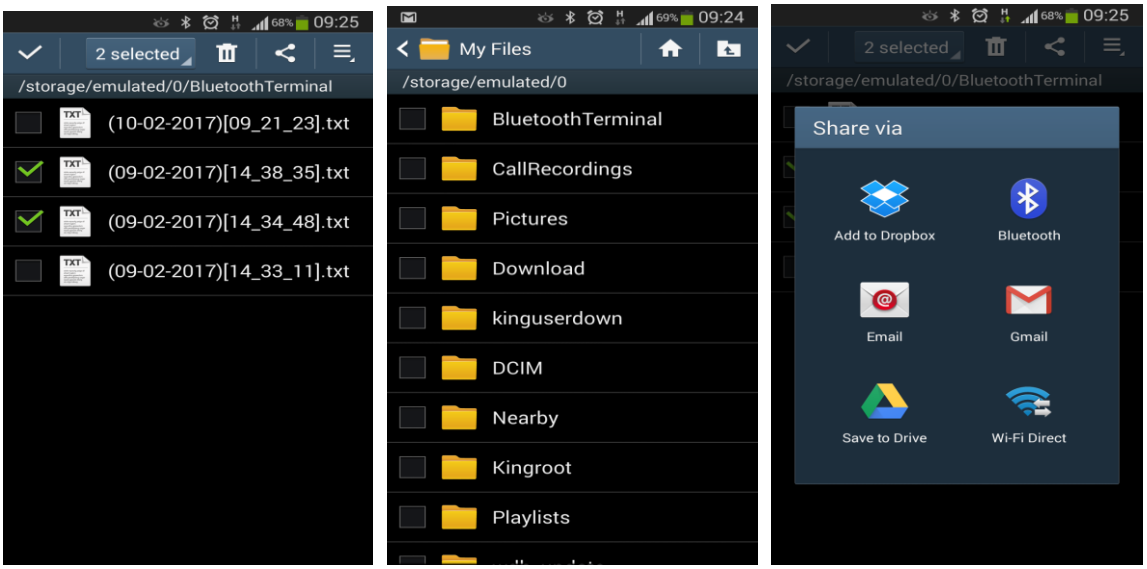
- Download *Bluetooth Terminal* application. Following link can be used:

https://play.google.com/store/apps/details?id=com.hatflabs.btt

- Run *Bluetooth Terminal*. In menu press ***Connect*** button and select paired TMT250 device. To start log check ***CR*** and enter the command into terminal: ***.log:1***



Wait ~10 minutes and press ***Save*** button in menu. You will find the saved log file in device folder ***My Files/Bluetooth Terminal***, select log files, press ***Share via Email*** and send them to Teltonika support.



Note: Unfortunately it is not possible to perform debug the same way on iPhone, because there is no native SPP Bluetooth profile support on iPhone.

5.13 SMS events

SMS events functionality allows TMT250 to send a configured SMS when an event is triggered. This event can be triggered by every I/O element.

When any of the I/O elements is triggered, TMT250 sends a configured SMS message to a defined phone number. If SMS events are activated but there are no numbers defined in *GSM Predefined Numbers* list (similarly as in **Figure 26**), then the device will not send any messages.

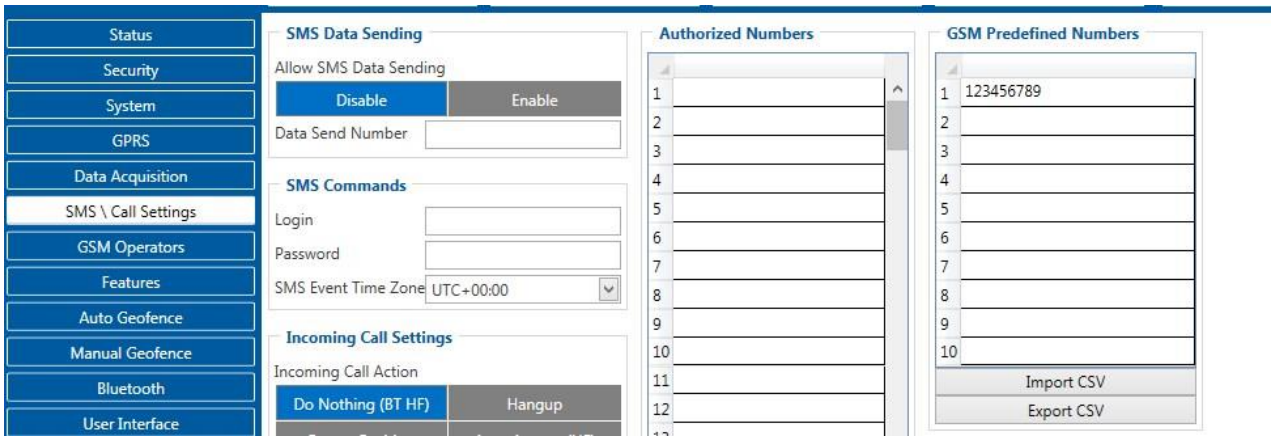


Figure 27 GSM PreDefined Numbers list

The sent SMS messages format is following:

"Date Time Current Coordinate Event Text"

For example, if TMT250 is configured to send an SMS, when Movement reaches high level while configured with *High priority* and event generation on both range entrance and exit (as **Figure 27**), then the sent SMS is:

"2017/06/13 13:52:18 Lon:25.255537 Lat:54.667193 Movement 1"

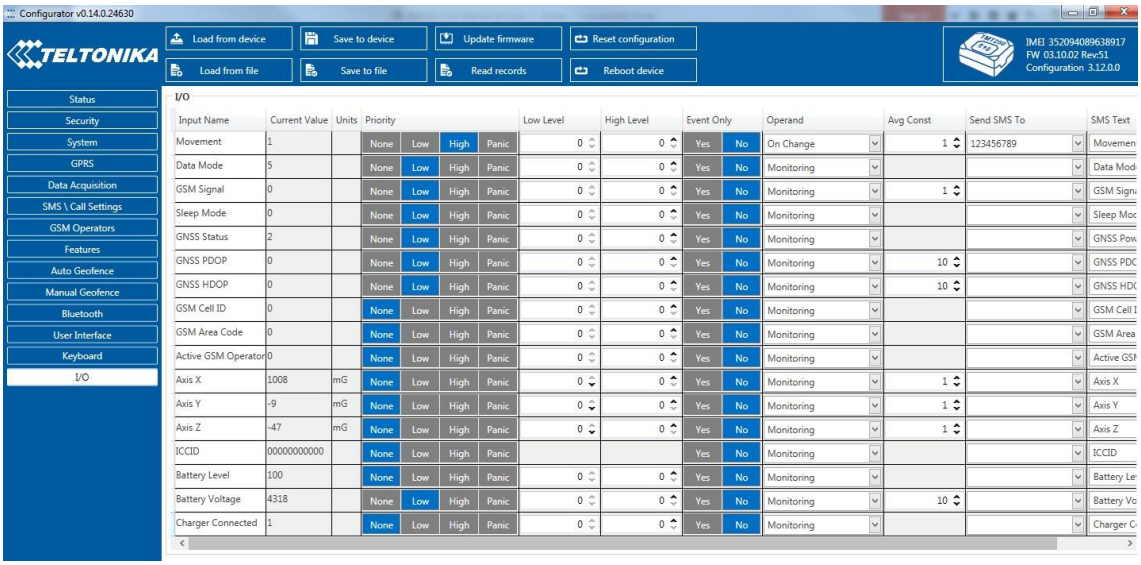


Figure 28 Configured Movement SMS event

5.14 SMS Text

The SMS Text field can be altered and any text can be entered. Maximum message length is 160 symbols (numbers, letters and symbols in ASCII, except for comma symbol ",").

SMS Event Text may be either in default or composed format.

Default format:

Date, time, longitude, latitude, 'SMS text', value

Example:

2018/11/02 12:00:00 Lon:0.000000 Lat:0.000000 Alarm 1

Composed format:

Composed format may consist of text and defined commands which start with **%** symbol.

Supported commands:

Command	Description
imei	Device IMEI
fw	Firmware version
fullfw	Full Firmware version
modem	Modem Firmware version
gnss	GPS Firmware version
lat	Latitude (non-float value)
lon	Longitude (non-float value)
sat	Satellites in use
time	Timestamp
pdp	PDOP
hdp	HDOP
mov	Movement
op	GSM Operator
spd	Speed
sig	GSM Signal
slp	Sleep Mode
cel	Cell ID
lac	Area Code
datetime	Time in hh:mm:ss format
val	Eventual IO value
Io'par_id'	Element value by parameter ID
gmap	Google Maps link

Composed text example:

%imei Movement %io50010

Event SMS text:

352094082828606 Movement 1

ATTENTION!
If TMT250 is in *Deep Sleep* mode and an SMS event occurs with *Low* priority (which does not wake up TMT250), then the device does not send the message. It is saved to device memory until it wakes up from *Deep Sleep* mode and GSM modem starts working normally. After it wakes up, all the messages that are saved to memory will be sent, but keep in mind that only 10 messages can be saved to memory – all other messages will not be saved, until there is free memory space.

5.15 I/O settings

When no I/O element is enabled, AVL packet comes with GNSS information only. After enabling I/O element(s) AVL packet contains current value(s) of enabled I/O element(s) along with GNSS information.

If the device is connected to configurator all current I/O values are displayed in *Current Value* column.

Priority field allows enabling I/O elements and setting them a priority so they are added to the data packet, which is sent to the server. By default 8 I/O elements with low priority are enabled: *Movement*, *Data Mode*, *GSM Signal*, *Sleep Mode*, *GNSS Status*, *GNSS PDOP*, *GNSS HDOP* and *Battery Voltage*. *Priority* level (AVL packet priority) can be *Low*, *High* or *Panic*. All records made by TMT250 are regular, and regular packets are sent as low priority records. When *Low priority* event is triggered, TMT250 makes an additional record with an indication that the event was caused by an I/O element change (depending on *Operand* configuration). When *High priority* is selected, module makes an additional record with high priority flag and sends event packet immediately to the server using GPRS. *Panic priority* triggers same actions as *High priority*, but if GPRS fails, it sends an AVL packet using SMS data if SMS data sending is enabled and the number is provided in ***SMS/Call Settings***.

High and *Low* levels define I/O value range. If I/O value enters or exits this range, TMT250 generates an event. Operand parameter defines when to generate event: *On Exit*, *On Entrance*, *On Both*, *On Hysteresis* or *On Delta Change*.

When *Event Only* is selected, I/O element status value will be appended only to eventual records, otherwise I/O element status value will appear in each AVL record.

5.15.1 Operand On Exit

Record is generated when input value leaves a range between low and high level limits.

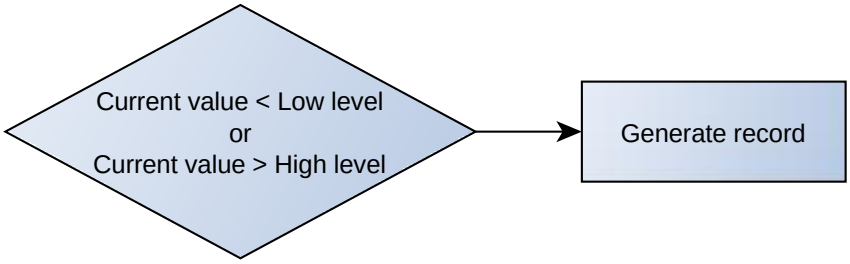


Figure 29 On Exit operand logic

5.15.2 Operand On Entrance

Record is generated when input value enters a range between low and high level limits.

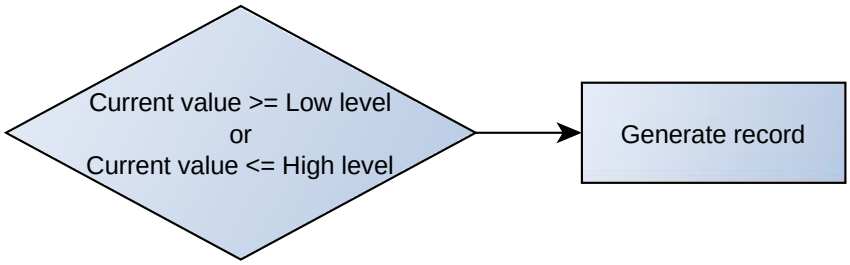


Figure 30 On Entrance operand logic

5.15.3 Operand On Both

Record is generated by both *On Exit* and *On Entrance* operands' logic at same time.

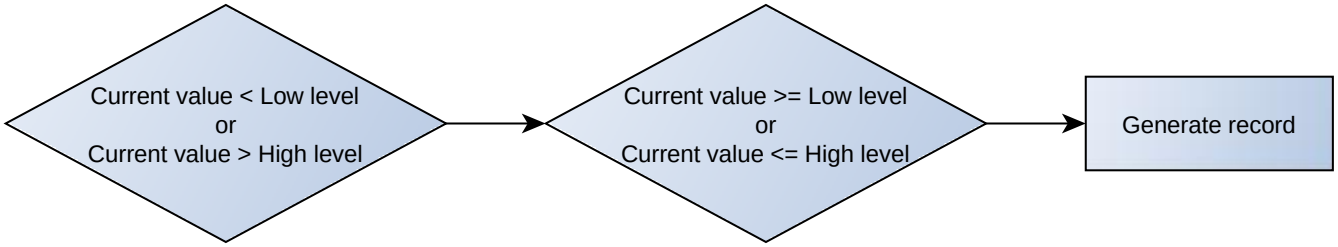


Figure 31 On Both operand logic

5.15.4 Operand Monitoring

No event at all. Values are recorded only when other triggers worked.

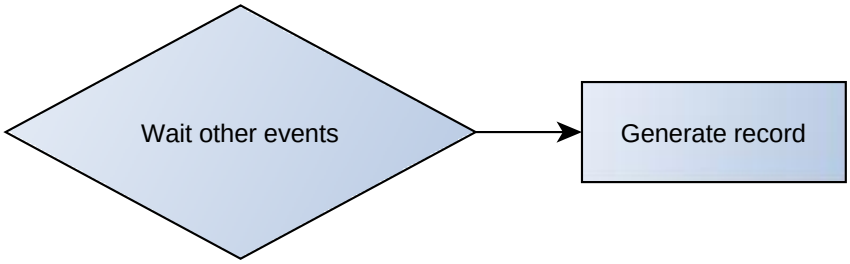


Figure 32 Monitoring operand logic

5.15.5 Operand On Hysteresis

Record is generated when input value crosses the high limit value from below the low limit value or vice versa.

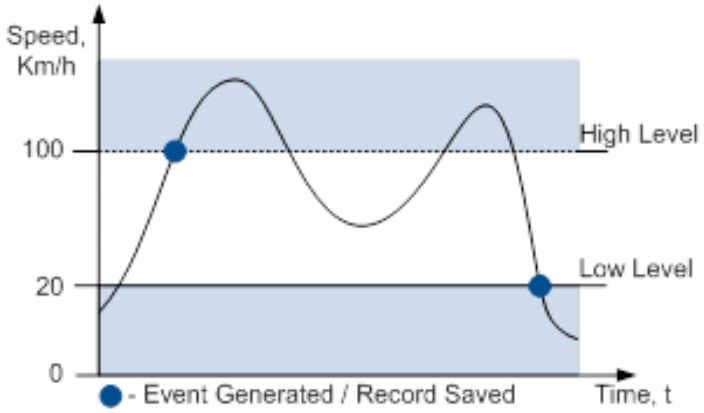


Figure 33 Hysteresis operand logic

5.15.6 Operand On Change

Record is generated when input value changes.

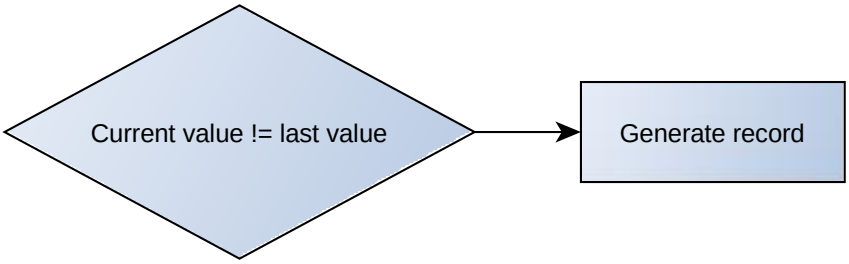


Figure 34 On change operand logic

5.15.7 Operand On Delta Change

Record is generated when input value changes and the absolute change becomes equal to or higher than the limit value.

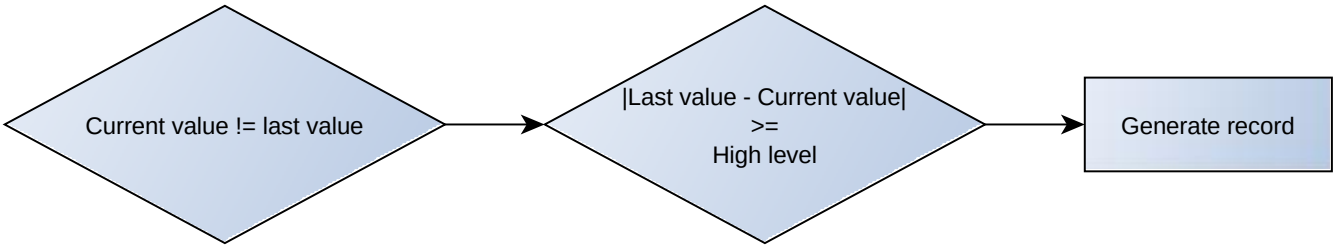


Figure 35 On Delta Change operand logic

5.15.8 Avg const (Averaging parameter description)

If *Avg Const* value is 10, new value must be present for 1 second to register the change to a new value. Internal sampling is done every 40 ms, so 25 samples are taken per second. To configure 5 seconds of averaging multiply 10 by 5 yielding 50 as *Avg Const* value. The same logic works if the device is in Deep Sleep mode.

Averaging follows RC exponential curve, see image below:

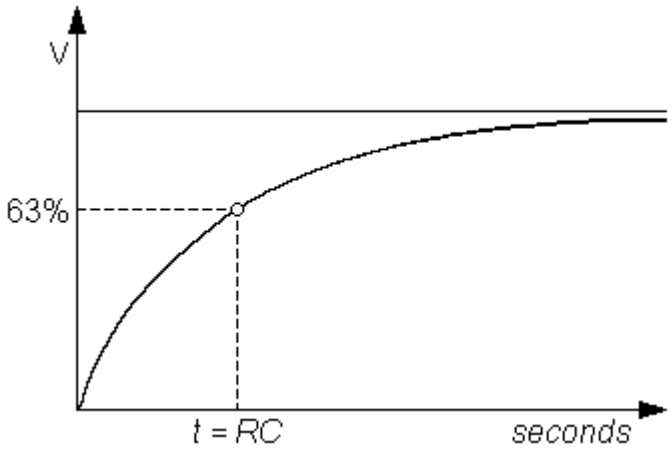


Figure 36 Averaging counting explanation

For Boolean values 5τ, values is used, that means value change is taken when new values is averaged to more then 99.3%.

5.16 User Interface

Indication is configurable in ***User Interface*** tab of configurator or via

Features ParametersID. Each 100 ms device checks if any indication is enabled in response to triggered scenarios. If two scenarios need to indicate on the same indication source (*LED* or *Vibration*) then the active indicating scenario needs to be finished first (with exception of *Alarm*, *Power Key Pressed* and *Device Off* scenarios, which can override the control of indication sources). An example of indication configuration is given in the picture shown below. Period setting is indicative of *Periodic* scenarios (refer to the table below) and if *Period* is set to 0 the indication will take place immediately. When indication is periodic and *On* parameter value is set to 0, the indication source will stay on until the scenario is finished. Triggered scenarios will turn on LED and/or vibration for a configured *On* duration and then keep them off for a configured *Off* period of time. In case the configured Repeat value is higher than 0 the device continues a periodic on/off cycle.

Name	Type	Trigger Reason
GSM Error	Periodic	SIM is not inserted, blocked, failed to connect to an operator or jammed
GSM Registering	Periodic	Trying to register to GSM network
SMS Send/Received	One Off	SMS is being received or sent

Name	Type	Trigger Reason
Outgoing Call	Periodic	Outgoing call is in process
Remote Connection	Periodic	Device is connected to the server
Event	One Off	An event record is saved
Panic Event	One Off	A panic event record is saved
No GPS Fix	Periodic	Device tries to obtain valid GPS fix
GPS Fix	Periodic	Device has valid GPS fix
Device Off	One Off	Device is turning off
Device On	One Off	Device is turning on
Power Key Pressed	Periodic	Alarm button is pressed and held down
Power Key Pressed	Periodic	Power button is pressed and held down
Function Activated	One Off	Configured functionality was activated by pressed button
Function Deactivated	One Off	Configured functionality was deactivated by pressed button
Charging	Periodic	Device is charging
Fully Charged	Periodic	Device is fully charged
Pre Alarm	Periodic	ManDown functionality starts counting down to an event
Sleep Mode	Periodic	Device is in sleep mode
I Am Alive	Periodic	Set indication period passed

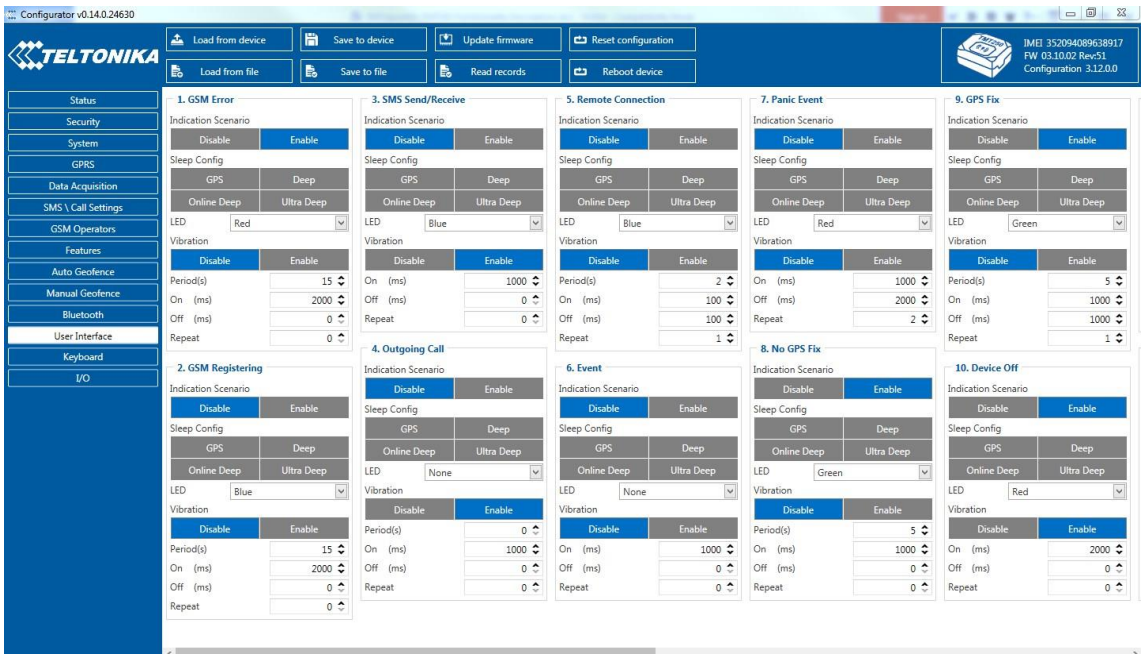


Figure 37 Indication settings

5.17 Keyboard

A virtual keyboard is based on two buttons: *Alarm Button* and *Power Button*. Each button has three click combinations and one *Power Button*-specific combination for power off:

- *1 Click* – button is pressed once for no longer than two seconds.
- *Clicks* – button is pressed for no more than two times. Time between clicks has to be shorter than one second.
- *Long Click* – button in pressed and held down for two seconds.
- 5 second-long click on *Power Button* - the device is turned off.

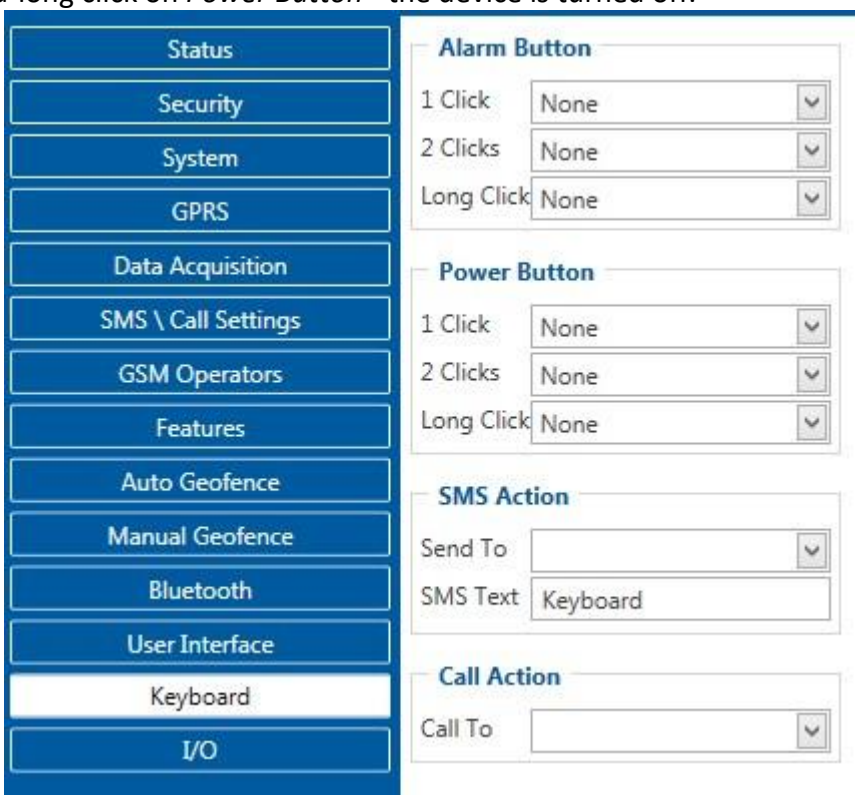


Figure 38 Keyboard settings

Name	**Trigger Reason**
None	Do nothing when button is triggered
Alarm	Activate Alarm scenario
ManDown On	Enable ManDown scenario
ManDown Off	Disable ManDown scenario
ManDown Toggle	Activate/Deactivate ManDown scenario
Auto Geofence On	Enable Auto Geofence scenario
Auto Geofence Off	Disable Auto Geofence scenario
Auto Geofence Toggle	Activate/Deactivate Auto Geofence scenario
Call/Hang Up	Hangup when incoming call is in progress/Call to number selected in *Call Action*

6 SMS/GPRS COMMAND LIST[2]

All commands are case sensitive. When user tries to send SMS/GPRS message to TMT250 that operates in Deep Sleep mode, it cannot arrive to TMT250 device because the GSM/GPRS module is disabled most of the time. TMT250 will receive the SMS/GPRS message when it exits Deep Sleep mode. If TMT250 is in GPS Sleep or Online Deep Sleep mode, sent SMS/GPRS message will arrive to the device.

6.1 SMS/GPRS command list

Table 4. Common SMS/GPRS commands

Command	Description	Response
getinfo	Returns device runtime system information	Yes
getver	Returns code version, device IMEI, modem app version, RTC time, Init time, Uptime and BT MAC address	Yes
getstatus	Returns modem status information	Yes
getgps	Returns current GPS data, date and time	Yes
getio	Reads out analog input, digital input and output	Yes
ggps	Returns location information with Google maps link	Yes
readio #	Returns IO status, # AVL ID	Yes
cpureset	Resets the device	No
getparam #	Returns selected parameter value, # param ID	Yes
setparam #:#	Sets selected parameter value 1.# - first ID value 2.# - New first Parameter Value 3.# - second ID value 4.# - New second Parameter Value 5.# - third ID value 6.# - New third Parameter Value SMS command is limited to 160 characters	Yes
setparam #:#;#:#;…		
flush #,#,#,#,#,#,#	Redirects device to other server 1.# - IMEI 2.# - APN 3.# - LOGIN 4.# - PASS 5.# - IP 6.# - PORT	Yes

2 GPRS commands require Codec 12 protocol

Command	Description	Response
	7.# - MODE (0-TCP/1-UDP)	
countrecs	Returns records number	Yes
deleterecords	Deletes all records from SD card	Yes
battery	Returns battery state info	Yes
wdlog	Returns all information about *watchdog* restarts	Yes
defaultcfg	Loads default configuration	Yes
setkey # #	Adds a new configuration keyword or changes the current one. If device is locked, keyword cannot be changed 1.# - old keyword 2.# - new keyword	Yes
delkey #	Removes existing keyword (If the device is locked, the keyword cannot be changed) # - old keyword	Yes
bbread #	Returns black box information (HEX value of event ID and HEX value of custom data field (optional)). 1.# - returns entered number of latest events. When # is omitted the latest events are packed into a single SMS message	Yes
bbinfo #	Returns the same information as bbread command but additionally all events timestamps are written in HEX. 1.# - returns entered number of latest events. When # is omitted the latest events are packed into a single SMS message	Yes
sdformat	Formats NAND	Yes

Table 5. SMS commands related to Bluetooth

Command	Description	Response
btgetlist #	Returns requested Bluetooth list # - 0,1 or 2 (0 – Discovered, 1 – Paired, 2 – Connected)	Yes
btscan	Starts Bluetooth scan	Yes
btvisible #	Sets Bluetooth to visible with TMO # - visibility TMO (from 1 to 255 seconds).	Yes
btrelease #	Disconnects from current device and pauses auto connect functionality for a TMO duration # - none or TMO (from 1 to 255 seconds).	Yes
btunpair #	Unpairs Bluetooth device # - all, BT address (all – unpair all devices, BT address – unpair only specified MAC address)	Yes

Parameter ID consists of 3 or 5 digits. Detailed list of parameters and IDs can be found in Parameter list.

For example: '**username password setparam 2001:wap**' will change configured APN.

As another example: '**username password setparam 2001:wap;2002:user;2003:pass**' will change configured APN name, APN username and APN password. SMS command is limited to 160 characters.

6.1.1 getinfo

Response details	Description
RTC	RTC Time
Init	Device initialization time
UpTime	Total up time (in seconds)
PWR	Last restart reason
RST	Total restarts count
GPS	GPS receiver state. 0 – OFF, 1 – ON without fix, 2 – ON with fix, 3 – In sleep mode.
SAT	Average satellites
TTFF	Time To First Fix
TTLF	Time To Last Fix
NOGPS	How much time no GPS fix (h:min)
SR	Number of Sent Records
FG	Failed GPRS counter
FL	Failed link counter
SMS	Sent SMS Counter
REC	Records Found – number of records stored in the memory
MD	Data Mode state. 0 – Home and Stop, 1 – Home and Moving, 2 – Roaming and Stop, 3 – Roaming and Moving, 4 – Unknown and Stop, 5 – Unknown and Moving

Example: "RTC:2017/6/16 7:13 Init:2017/6/16 5:44 UpTime:4744s PWR:PwrVoltage RST:0 GPS:1 SAT:0 TTFF:0 TTLF:0 NOGPS: 1:18 SR:0 FG:200 FL:0 SMS:3 REC:42 MD:1".

6.1.2 getver

Response details	Description
Ver	Firmware version
GPS	Version of GPS module
Hw	Version of hardware
Mod	HW version modification
IMEI	Device IMEI
Init	Device initialization time
Uptime	Total up time (in seconds)
BT	Device MAC address

*Example: "Ver:02.00.01_06 GPS:AXN_3.80_3333_16070400,0000,, Hw:*TMT250 *Mod:4 IMEI:352094082042885 Init: 2017-6-16 5:54 Uptime: 16574 BT:31F5BFE66261".*

6.1.3 getstatus

Response details	Description
Data Link	Indicates module connection to server at the moment: 0 – Not connected, 1

Response details	Description
	– Connected
GPRS	Indicates if GPRS is available at the moment
Phone	Voice Call status: 0 – Ready, 1 – Unavailable, 2 – Unknown, 3 – Ringing, 4 – Call in progress, 5 – Asleep
SIM	SIM Status: 0 – Ready, 1 – PIN, 2 – PUK, 3 – PIN2, 4 – PUK2
OP	When connected to GSM Operator: numerical ID of operator
Signal	GSM Signal Quality [0-5]
NewSMS	Indicates if new message has been received
Roaming	0 – Home Network, 1 – Roaming
SMSFull	Indicates whether SMS storage is full. 0 – OK, 1 – SMS storage is full
LAC	GSM Tower Location Area Code
Cell ID	GSM Tower Cell ID Code

Example: "Data Link: 0 GPRS: 1 Phone: 0 SIM: 0 OP: 24602 Signal: 5 NewSMS: 0 Roaming: 0 SMSFull: 0 LAC: 1 Cell ID: 3055".

6.1.4 getgps

Response details	Description
GPS	Indicates valid (1) or invalid (0) Gps data
Sat	Provides currently available satellites'count
Lat	Latitude (Last good Latitude)
Long	Longitude (Last good Longitude)
Alt	Altitude
Speed	Ground speed, km/h
Dir	Ground direction, degrees
Date	Current date
Time	Current GMT time

Example: "GPS:1 Sat:0 Lat:54.666042 Long:25.225031 Alt:0 Speed:0 Dir:0 Date: 2017/6/16 Time: 12:52:30".

6.1.5 ggps

Response details	Description
D	Date
T	Time
S	Actual Speed
C	Latitude (Last good Latitude), Longitude (Last good Longitude)
Url	Google Maps Link

Example (if no GNSS FIX): "GPS Data not Available. No GPS signal".

Example: D:17/1/9 T:12:52:30 S:0.00 C:54.666042, 25.225032 Url: http://maps.google.com/?q=54.666042,25.225032&om=1speed:0

6.1.6 getparam

Reads parameter value for given ID that consists of 3 or 5 digits. A detailed list of parameters and identifiers can be found in the following chapter.

For example: ***getparam 2001*** command will request APN name.
Example answer: Param ID:2001 Value:wap

6.1.7 setparam

Reads parameter value for a given ID that consists of 3 or 5 digits. A detailed list of parameters and identifiers can be found in the following chapter.

For example: ***setparam 2001:wap*** will change configured APN name.
Answer: Param ID:2001 Value:wap2

Another example: ***setparam 2001:wap;2002:user;2003:pass*** will change configured APN name, APN username and APN password. SMS command of limited to 160 characters.

6.1.8 flush #,#,#,#,#,#,#

Initiates all data transfer by GPRS to a specified target server. Comma separated parameters go in following order:

1.# - IMEI
2.# - APN
3.# - GPRS LOGIN
4.# - GPRS PASSWORD
5.# - IP
6.# - PORT
7.# - MODE (0 – TCP/1 – UDP)

Parameters are separated by comma (no spaces needed). In case you do not need to enter parameter (APN Login/ APN Pass) – do not use space, simply enter comma and write next parameter.

Example: opa opa flush 353976012555151,banga,,,212.47.99.62,12050,0

Response details	Description
FLUSH SMS Accepted	FLUSH SMS Accepted
# records found on FLASH	Number of records found on FLASH
Minimum Records to Send: #	Number of minimum saved records to send
GPRS Enabled: #	State of the GPRS connection: 0 – Disabled; 1 – Enabled
Time Sync: #	Indicates time synchronization on the device: 0 – Not synchronized; 1 – Synchronized

Example: "FLUSH SMS Accepted. 11 records found on FLASH. Minimum Records to Send: 1. GPRS Enabled: 1. Time Sync: 1."

6.1.9 countrecs

Returns current number of records stored in the device memory.
Example (if more than 100): "more than 100 records found"
Example: "25 records found"

6.1.10 deleterecords

Deletes all records from the device memory.

6.1.11 battery

Response details	Description
BatState	Battery connected (1) or disconnected (0) from device
FSMState	Current battery state
ChargerIC	Battery charging status
ExtV	External Voltage
BatV	Battery voltage
BatI	Battery charging current

Example: "BatState: 1 FSMState: ACTIVE ChargerIC: OFF ExtV: 11796 BatV: 3942 BatI: 0"

6.1.12 btgetlist

btgetlist command needs argument what list should be printed!
btgetlist 0; device will respond with BT_LIST_Discovered.
btgetlist 1; device will respond with all paired devices.
btgetlist 2; device will respond with connected blutetooth device.

Note: Without argument it is always 0 i.e **BT_LIST_Discovered**. In FW 01.00.23 btgetlist (without args) will not respond (as unknown command).

6.1.13 setkey #

"setkey <oldkeyword> <newkeyword>" - Set new or change the keyword. Configuration should be not locked.

Example: New keyword (set)
<name>{space}<pass>{space}setkey{space}{space}<newkeyword>

Another example: Change keyword (change)
<name>{space}<pass>{space}setkey{space}<oldkeyword>{space}<newkeyword>

6.1.14 delkey #

"delkey <keyword>" - Deletes current keyword. Configuration keyword should be configured and not locked.

Example: <name>{space}<pass>{space}delkey{space}<keyword>

6.1.15 bbread

describes start offset and is an optional field. For example, value of 20 means that blackbox data is requested starting from 20th latest event. When # is omitted the most recent events are packet into a single SMS.

Example: X1:Y1,X2:Y2,…,Xn:Yn, where Xn – HEX value of event ID. Yn – HEX value of custom data field (optional).

6.1.16 bbinfo

describes start offset and is an optional field. For example, value of 20 means that blackbox data is requested starting from 20th latest event. When # is omitted the most recent events are packet into a single SMS.

Example: X1-Y1:Z1,X2-Y2:Z2,…,Xn-Yn:Zn, where Xn – timestamp in HEX. Yn – HEX value of event ID. Zn – HEX value of custom data field (optional).

6.1.17 sdformat

Format device memory (deletes all information from device memory).

7 PARAMETER LIST

7.1 System parameters

7.1.1 Sleep Mode (ID=102)

Device has three sleep modes: GPS sleep, Deep Sleep and Online Deep Sleep mode. When sleep is disabled (value 0) module will never enter sleep mode, in sleep mode (value 1) module reduces level of power usage by turning GPS module to sleep, in deep sleep mode (value 2) module turns GPS module to sleep and device is deregistered from network (note, that TMT250 do not receive SMS when in deep sleep), online Deep Sleep mode (value 3) device works as in Deep Sleep mode, but without deregistering from GSM network. GSM part stays powered, so this increases power consumption. In this mode, device should received/send SMS and make/receive calls. Also not closes GPRS context, if previously opened.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	4	2	Sleep timeout (ID=103)	Uint8

7.1.2 Sleep timeout (ID=103)

Sleep timeout is time after which TMT250 goes into GPS sleep, Deep Sleep or Online Deep Sleep if other requirements are met. Its parameter is set in minutes.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	3000	10	Sleep Mode (ID=102)	Uint8

7.1.3 Static Navigation (ID=106)

When static navigation is enabled, TMT250 filters out GPS jumps, when it is not moving. When it is disabled, it does not make any changes to collected GPS data.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	1		Uint8

7.1.4 Saving/Sending without time synchronization (ID=107)

When this feature is enabled (value = 1), then records can be saved and sent to server without time synchronization.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2	0		Uint8

7.1.5 GNSS Source (ID=109)

This parameter sets satellite system(s), available values are:

0 – Undefined
1 – BeiDou only
2 – GLONASS only
3 – Galileo + BeiDou
4 – Galileo only
5 – Galileo + BeiDou
6 – Galileo + GLONASS
8 – GPS only
9 – GPS + BeiDou
10 – GPS + GLONASS
12 – GPS + Galileo
13 – GPS + Galileo + BeiDou
14 – GPS + Galileo + GLONASS
15 – GPS,Galileo, GLONASS and BeiDou and not allowed

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	15	10		Uint8

7.1.6 Synchronization settings (ID=900)

Sets the source used for device internal time synchronization: 0 – GPS only; 1 – NITZ and NTP; 2 – NTP; 3 – NITZ.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	1	NTP Resync (ID=901) NTP server 1 (ID=902) NTP server 2 (ID=903)	Uint8

7.1.7 NTP Resync (ID=901)

Periodical time synchronization parameter. TMT250 will resynchronize once set period (not 0) expires.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	24	0	Synchronization settings (ID=900) NTP server 1 (ID=902) NTP server 2 (ID=903)	Uint8

7.1.8 NTP server 1 (ID=902)

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	55 char string	avl1.teltonika.lt	Synchronization settings (ID=900) NTP Resync (ID=901) NTP server 2 (ID=903)	S8[55]

7.1.9 NTP server 2 (ID=903)

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	55 char string	pool.ntp.org	Synchronization settings (ID=900) NTP Resync (ID=901) NTP server 1 (ID=902)	S8[55]

7.2 GPRS parameters

7.2.1 Sorting (ID=1002)

Record sorting parameter is responsible for record sorting order. Value of 0 results in arranging data starting from newest record, another option is to sort by oldest record.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	Open Link Timeout (ID=1000) Server Response Timeout (ID=1001)	Uint8

7.2.2 Open Link Timeout (ID=1000)

Defines how many seconds device will keep connection to the server after successful data transfer while waiting for a new record.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
30	259200	30	Sorting (ID=1002) Server Response Timeout (ID=1001)	Uint32

7.2.3 Server Response Timeout (ID=1001)

Defines time period in seconds for server response to sent records.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
5	300	30	Sorting (ID=1002) Open Link Timeout (ID=1000)	Uint16

ATTENTION! Some GSM operators may disconnect the device from an active data link if the device does not send any data for a very long duration, even if the active data link timeout is set to maximum value. The amount of time that an operator keeps the link open depends solely on the operator. For example, if active data link timeout is set to maximum of 259200 seconds (72 hours) and the device sends data to server every 86400 seconds (24 hours), the operator might disconnect the link earlier and the device will have to connect to the server again. This may cost extra, depending on the operator GPRS data charges. When using active data link timeout, it is strongly recommended that data sending to the server is not rare (24 hours or less).

7.2.4 SIM GPRS content activation (ID=2000)

Parameter allows or does not allow GPRS usage with SIM, value of 0 disallows GPRS.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	1	SIM APN Name (ID=2001) SIM SIM APN Username (ID=2002) SIM SIM APN Password (ID=2003)	Uint8

7.2.5 SIM APN Name (ID=2001)

Parameter defines SIM GPRS Access Point Name.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	32 char string	Empty	SIM SIM GPRS content activation (ID=2000) SIM SIM APN Username (ID=2002) SIM SIM APN Password (ID=2003)	S8[32]

7.2.6 SIM APN Username (ID=2002)

Parameter defines SIM APN username. In case operator does not use username for login, value should be empty.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	30 char string	Empty	SIM GPRS content activation (ID=2000) SIM APN Name (ID=2001) SIM APN Password (ID=2003)	S8[30]

7.2.7 SIM APN Password (ID=2003)

Parameter defines SIM APN password. In case operator does not use password for login, value should be empty.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	30 char string	Empty	SIM GPRS content activation (ID=2000) SIM APN Name (ID=2001) SIM APN Username (ID=2002)	S8[30]

7.2.8 Domain (ID=2004)

Parameter defines data destination server IP address. *Example: 212.47.99.62*

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	55 char string	Empty	SIM GPRS content activation (ID=2000)	S8[55]

7.2.9 Target Server Port (ID=2005)

Parameter defines data destination server port number. *Example: 12050*

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	0	SIM GPRS content activation (ID=2000)	Uint16

7.2.10 Protocol (ID=2006)

Parameter defines GPRS data transport protocol. Module can use TCP or UDP transport protocol to send data to the server. For TCP protocol use value of 0, for UDP protocol value is 1.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	SIM GPRS content activation (ID=2000)	Uint8

7.2.11 Backup Server Domain (ID=2007)

This parameter defines data destination backup server IP address. *Example: 212.47.99.61*

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	55 char string	Empty	SIM GPRS content activation (ID=2000) Backup Server Mode (ID=2010)	S8[55]

7.2.12 Backup Server Port (ID=2008)

Parameter defines data destination backup server port number. *Example: 12051*

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	0	SIM GPRS content activation (ID=2000) Backup Server Mode (ID=2010)	Uint16

7.2.13 Backup Server Protocol (ID=2009)

Parameter defines GPRS data transport protocol. Module can use TCP or UDP transport protocol to send data to backup server. For TCP protocol use 0, for UDP protocol value is 1.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	SIM GPRS content activation (ID=2000) Backup Server Mode (ID=2010)	Uint8

7.2.14 Backup Server Mode (ID=2010)

Sets backup server mode: 0 – Disable (backup server not used); 1 – Backup (sent to backup server if main server not available); 2 – Duplicate (send records to both servers).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2	0	SIM GPRS content activation (ID=2000)	Uint8

7.2.15 FOTA WEB status (ID=13003)

This parameter allows or disallows connection to FOTA WEB server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	1	FOTA WEB Domain (ID=13000) FOTA WEB port (ID=13001) FOTA WEB Period (min) (ID=13002)	Uint8

7.2.16 FOTA WEB Domain (ID=13000)

FOTA WEB server IP or DNS address.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	55 char string	85.206.140.106	FOTA WEB status (ID=13003) FOTA WEB port (ID=13001) FOTA WEB Period (min) (ID=13002)	S8[55]

7.2.17 FOTA WEB port (ID=13001)

FOTA WEB server port.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	5000	FOTA WEB status (ID=13003) FOTA WEB Domain (ID=13000) FOTA WEB Period (min) (ID=13002)	Uint16

7.2.18 FOTA WEB Period (min) (ID=13002)

This parameter defines how often device connects to the server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
30	65535	720	FOTA WEB status (ID=13003) FOTA WEB Domain (ID=13000) FOTA WEB port (ID=13001)	Uint16

7.3 SMS/Call settings

7.3.1 SMS data sending settings (ID=3000)

Parameter controls sending AVL data using binary SMS. It is equal to 1 when it is allowed.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	Data send number (ID=3001)	Uint8

7.3.2 Data send number (ID=3001)

This parameter defines a GSM number which is ready to receive Data SMS.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
Empty	16 digits	-	SMS data sending settings (ID=3000)	S8[16]

7.3.3 Authorized phone numbers (ID=4000-4199)

If at least one number is entered then only those number can send messages to device.
Example: +37060012346

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
Empty	16 digits	-	SMS Login (ID=3003) SMS Password (ID=3004)	S8[16]

7.3.4 GSM Predefined Numbers (ID=6000-6009)

These IDs contain GSM numbers, which are used to send "Event SMS" text messages.
Example: +37060012346

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
Empty	16 digits	-	Over Speeding Send SMS To (ID=7032) AutoGeofence Send SMS to (ID=7030) Send SMS to #1-5 Geozone (ID=7025-7029), #6-50 Geozone (ID=7071-7115) Alarm send SMS to (ID=7245) ManDown Send SMS (ID=7222) I/O#1 send SMS (ID=7000)	S8[16]

7.3.5 SMS Login (ID=3003)

User login is used to ensure module security. Used in every SMS that is sent to device.
Example: ba321

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
Empty	5 char	-	SMS Password (ID=3004) SMS Event Time Zone (ID=3006)	S8[5]

7.3.6 SMS Password (ID=3004)

User password is used to ensure module security. Used in every SMS that is sent to device.
Example: ab123

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
Empty	5 char	-	SMS Login (ID=3003) SMS Event Time Zone (ID=3006)	S8[5]

7.3.7 Incoming call action (ID=3005)

This parameter defines the device's response to a call: 0 - Do nothing (BT HF); 1 - Hang up; 2 - Report position; 3 - Auto Answer (HF); 4 – SPY; 5 – ManDown; 6 - Info SMS; 7 - Power Off; 8 - Send GPRS Data; 9 - Auto Geofence Off.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	9	0		Uint8

7.3.8 SMS Event Time Zone (ID=3006)

Time zone which will be used in event SMS messages.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
-720	840	0	SMS Password (ID=3004) SMS Login (ID=3003)	Uint16

7.3.9 Detect Number Type By Plus Symbol (ID=4999)

When enabled, numbers with "+" symbols will be used as international and numbers without it - as local/unknown. 0 – Disable; 1 – Enable.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	Authorized Numbers (ID=4000-4199) GSM Predefined Numbers (ID=6000-6009)	Uint8

7.4 GSM Operators

7.4.1 SIM Roaming Operator List (ID=5000-5049)

This parameter list defines a roaming operator list for SIM. An operating profile is selected ccording to this list. If roaming operator list is left empty, TMT250 will automatically detect a home operator. If home operator is written to any part of the roaming operator list, it will still be detected as a home operator. All other written operators are Preferred Roaming Operator Codes. More information about operator search functionality can be found in GSM Operators Roaming and Blacklist Operator list.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	999999	0	Black List (ID=5500-5549)	Uint32

7.4.2 Black List (ID=5500-5549)

If it is required that TMT250 does not connect to a particular operator it must be written to the Operator BlackList. Refer to GSM Operators Roaming and Blacklist Operator list for more information.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	999999	0	Roaming Operator List (ID=5000-5049)	Uint32

7.5 Data Acquisition Modes parameters

7.5.1 Home Network GSM operator code "Vehicle on STOP" parameters

7.5.1.1 Min Period (ID=10000)

This parameter indicates time interval in seconds in order to acquire a new record. If value is 0 it means no records by min period will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	3600	Min Saved Records (ID=10004) Send Period (ID=10005)	Uint32

7.5.1.2 Min Saved Records (ID=10004)

This parameter defines minimum number of records in one data packet that can be sent to server. It has higher priority than Data Send Period (ID=10005).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	255	1	Min Period (ID=10000) Send Period (ID=10005)	Uint8

7.5.1.3 Send Period (ID=10005)

This parameter indicates frequency (time interval in seconds) of sending data to server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	120	Min Period (ID=10000) Min Saved Records (ID=10004)	Uint32

7.5.2 Home Network GSM operator code "Vehicle MOVING" parameters

7.5.2.1 Min Period (ID=10050)

This parameter indicates time interval in seconds in order to acquire a new record. If value is 0 no records by min period will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	300	Min Distance (ID=10051) Min Angle (ID=10052) Min Speed Delta (ID=10053) Min Saved Records (ID=10054) Send Period (ID=10055)	Uint32

7.5.2.2 Min Distance (ID=10051)

This parameter indicates distance in meters in order to acquire a new record. Record is stored when the distance between previous records is greater than parameter's value. If value is 0 it means no records by min distance will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	100	Min Period (ID=10050) Min Angle (ID=10052) Min Speed Delta (ID=10053) Min Saved Records (ID=10054) Send Period (ID=10055)	Uint16

7.5.2.3 Min Angle (ID=10052)

This parameter indicates angle in degrees in order to acquire a new record. If angle difference between last recorded coordinate and current position is greater than defined value, new record is stored. This parameter is operational, when speed is higher than 10km/h. If value is 0 it means no records by min angle will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	180	10	Min Period (ID=10050) Min Distance (ID=10051) Min Speed Delta (ID=10053) Min Saved Records (ID=10054) Send Period (ID=10055)	Uint8

7.5.2.4 Min Speed Delta (ID=10053)

This parameter indicates speed difference in order to acquire a new record. If speed difference between last recorded coordinate and current position is greater than defined value, new record is stored. If value is 0 it means no records by min speed delta will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	255	10	Min Period (ID=10050) Min Distance (ID=10051) Min Angle (ID=10052) Min Saved Records (ID=10054) Send Period (ID=10055)	Uint8

7.5.2.5 Min Saved Records (ID=10054)

This parameter defines minimum number of records in one data packet that can be sent to server. It has higher priority than Data Send Period (ID=10055).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	255	1	Min Period (ID=10050) Min Distance (ID=10051) Min Angle (ID=10052) Min Speed Delta (ID=10053) Send Period (ID=10055)	Uint8

7.5.2.6 Send Period (ID=10055)

This parameter indicates frequency (time interval in seconds) of sending data to server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	120	Min Period (ID=10050) Min Distance (ID=10051) Min Angle (ID=10052) Min Speed Delta (ID=10053) Min Saved Records (ID=10054)	Uint32

7.5.3 Roaming Network GSM operator code "Vehicle on STOP" parameters

7.5.3.1 Min Period (ID=10100)

This parameter indicates time interval in seconds in order to acquire a new record. If value is 0 it means no records by min period will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	3600	Min Saved Records (ID=10104) Send Period (ID=10105)	Uint32

7.5.3.2 Min Saved Records (ID=10104)

This parameter defines minimum number of records in one data packet that can be sent to server. It has higher priority than Data Send Period (ID=10105).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	255	1	Min Period (ID=10100) Send Period (ID=10105)	Uint8

7.5.3.3 Send Period (ID=10105)

This parameter indicates frequency (time interval in seconds) of sending data to server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	120	Min Period (ID=10100) Min Saved Records (ID=10104)	Uint32

7.5.4 Roaming Network GSM operator code "Vehicle MOVING" parameters

7.5.4.1 Min Period (ID=10150)

This parameter indicates time interval in seconds in order to acquire a new record. If value is 0 it means no records by min period will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	300	Min Distance (ID=10151) Min Angle (ID=10152)	Uint32

			Min Speed Delta (ID=10153) Min Saved Records (ID=10154) Send Period (ID=10155)	

7.5.4.2 Min Distance (ID=10151)

This parameter indicates distance in meters in order to acquire a new record. Record is stored when the distance between previous records is greater than parameter's value. If value is 0 it means no records by min distance will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	100	Min Period (ID=10150) Min Angle (ID=10152) Min Speed Delta (ID=10153) Min Saved Records (ID=10154) Send Period (ID=10155)	Uint16

7.5.4.3 Min Angle (ID=10152)

This parameter indicates angle in degrees in order to acquire a new record. If angle difference between last recorded coordinate and current position is greater than defined value, new record is stored. This parameter is operational, when speed is higher than 10km/h. If value is 0 it means no records by min angle will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	180	10	Min Period (ID=10150) Min Distance (ID=10151) Min Speed Delta (ID=10153) Min Saved Records (ID=10154) Send Period (ID=10155)	Uint8

7.5.4.4 Min Speed Delta (ID=10153)

This parameter indicates speed difference in order to acquire a new record. If speed difference between last recorded coordinate and current position is greater than defined value, new record is stored. If value is 0 it means no records by min speed delta will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	255	10	Min Period (ID=10150) Min Distance (ID=10151) Min Angle (ID=10152) Min Saved Records (ID=10154) Send Period (ID=10155)	Uint8

7.5.4.5 Min Saved Records (ID=10154)

This parameter defines minimum number of records in one data packet that can be sent to server. It has higher priority than Data Send Period (ID=10105).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	255	1	Min Period (ID=10150)	Uint8

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
			Min Distance (ID=10151) Min Angle (ID=10152) Min Speed Delta (ID=10153) Send Period (ID=10155)	

7.5.4.6 Send Period (ID=10155)

This parameter indicates frequency (time interval in seconds) of sending data to server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	120	Min Period (ID=10150) Min Distance (ID=10151) Min Angle (ID=10152) Min Speed Delta (ID=10153) Min Saved Records (ID=10154)	Uint32

7.5.5 Unknown Network GSM operator code "Vehicle on STOP" parameters

7.5.5.1 Min Period (ID=10200)

This parameter indicates time interval in seconds in order to acquire a new record. If value is 0 it means no records by min period will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	3600	Min Saved Records (ID=10204) Send Period (ID=10205)	Uint32

7.5.5.2 Min Saved Records (ID=10204)

This parameter defines minimum number of records in one data packet that can be sent to server. It has higher priority than Data Send Period (ID=10205).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	255	1	Min Period (ID=10200) Send Period (ID=10205)	Uint8

7.5.5.3 Send Period (ID=10205)

This parameter indicates frequency (time interval in seconds) of sending data to server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	120	Min Period (ID=10200) Min Saved Records (ID=10204)	Uint32

7.5.6 Unknown Network GSM operator code "Vehicle MOVING" parameters

7.5.6.1 Min Period (ID=10250)

This parameter indicates time interval in seconds in order to acquire a new record. If value is 0 it means no records by min period will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	300	Min Distance (ID=10251) Min Angle (ID=10252) Min Speed (ID=10253) Min Saved Records (ID=10254) Send Period (ID=10255)	Uint32

7.5.6.2 Min Distance (ID=10251)

This parameter indicates distance in meters in order to acquire a new record. Record is stored when the distance between previous records is greater than parameter's value. If value is 0 it means no records by min distance will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	100	Min Period (ID=10250) Min Angle (ID=10252) Min Speed (ID=10253) Min Saved Records (ID=10254) Send Period (ID=10255)	Uint16

7.5.6.3 Min Angle (ID=10252)

This parameter indicates angle in degrees in order to acquire a new record. If angle difference between last recorded coordinate and current position is greater than defined value, new record is stored. This parameter is operational, when speed is higher than 10km/h. If value is 0 it means no records by min angle will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	180	10	Min Period (ID=10250) Min Distance (ID=10251) Min Speed (ID=10253) Min Saved Records (ID=10254) Send Period (ID=10255)	Uint8

7.5.6.4 Min Speed (ID=10253)

This parameter indicates speed difference in order to acquire a new record. If speed difference between last recorded coordinate and current position is greater than defined value, new record is stored. If value is 0 it means no records by min speed delta will be saved.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	255	10	Min Period (ID=10250) Min Distance (ID=10251)	Uint8

			Min Angle (ID=10252) Min Saved Records (ID=10254) Send Period (ID=10255)	

7.5.6.5 Min Saved Records (ID=10254)

This parameter defines minimum number of records in one data packet that can be sent to server. It has higher priority than Data Send Period (ID=10105).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
1	255	1	Min Period (ID=10250) Min Distance (ID=10251) Min Angle (ID=10252) Min Speed (ID=10253) Send Period (ID=10255)	Uint8

7.5.6.6 Send Period (ID=10255)

This parameter indicates frequency (time interval in seconds) of sending data to server.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2592000	120	Min Period (ID=10250) Min Distance (ID=10251) Min Angle (ID=10252) Min Speed (ID=10253) Min Saved Records (ID=10254)	Uint32

7.6 Features Parameters

7.6.1 Alarm

7.6.1.1 Scenario Settings (ID=11710)

Scenario: 0 – Disabled; 1 – Enable.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.6.1.2 Send SMS To (ID=7245)

Enables/disables SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.6.1.3 SMS Text (ID=8245)

Configures alarm SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	160 char	Alarm		S8[160]

7.6.1.4 Call Settings (ID=11711)

Scenario: 0 – Disabled; 1 – Enable.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.6.1.5 Call to (ID=11712)

Enables/disables the call event. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.6.2 Overspeeding scenario parameters

7.6.2.1 Overspeeding priority (ID=11100)

Defines priority of overspeeding scenario: 0 – Disabled; 1 – Low; 2 – High; 3 – Panic.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	0	Max allowed Speed (ID=11104) Over Speeding Send SMS To (ID=7032) Over Speeding SMS Text (ID=8032)	Uint8

7.6.2.2 Max Speed (ID=11104)

Maximum allowed speed, an event will occur when this value is exceeded.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	260	90	Overspeeding priority (ID=11100) Over Speeding Send SMS To (ID=7032) Over Speeding SMS Text (ID=8032)	Uint16

7.6.2.3 Overspeeding Send SMS To (ID=7032)

Enables/disables SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	Overspeeding priority (ID=11100) Max allowed Speed (ID=11104)	UInt8

			Over Speeding SMS Text (ID=8032) GSM Predefined Numbers (ID=6000-6009)	

7.6.2.4 Overspeeding SMS Text (ID=8032)

Configures over speeding SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	160 char	Overspeeding	Overspeeding priority (ID=11100) Max allowed Speed (ID=11104) Over Speeding Send SMS To (ID=7032)	S8[160]

7.6.3 ManDown scenario parameters

7.6.3.1 Scenario Settings (ID=12100)

Scenario settings: 0 – Disable; 1 – Enable.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0		Uint8

7.6.3.2 Position (ID=12100)

0 – Horizontal; 1 – Vertical.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0		Uint8

7.6.3.3 Angle (ID=12102)

Angle in degrees from 30 to 150.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
30	150	60		Uint8

7.6.3.4 Timeout (ID=12103)

Timeout in seconds before ManDown is detected.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65500	3		Uint16

7.6.3.5 Send SMS To (ID=7222)

Enable/disable SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Int32

7.6.3.6 SMS Text (ID=8222)

Configures ManDown SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	160 char	ManDown	GSM Predefined Numbers (ID=6000-6009)	S8[160]

7.6.3.7 Call Settings (ID=12104)

Sets time period, that DOUT will be on.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	Eventual records (ID=11701) Send SMS to (ID=7140) SMS text (ID=8140)	Uint8

7.6.3.8 Call to (ID=12105)

Enables/disables call. 0 – Disable; 1-10 – SMS will be sent to a configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.7 AutoGeofencing scenario parameters

7.7.1 AutoGeofencing priority (ID=20000)

Defines priority of autogeofencing scenario:
0 – Disabled; 1 – Low; 2 – High; 3 – Panic.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	0	Eventual Records (ID=20002) AutoGeofence event generating (ID=20001) Radius (ID=20004) Send SMS to (ID=7030) SMS Text (ID=8030)	Uint8

7.7.2 Eventual Records (ID=20002)

0 – Disabled, include parameter to all records; 1 – Enabled, include parameter to record only if event was generated.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	1	AutoGeofencing priority (ID=20000) AutoGeofence event generating	Uint8

			(ID=20001) Radius (ID=20004) Send SMS to (ID=7030) SMS Text (ID=8030)	

7.7.3 AutoGeofence event generating (ID=20001)

Generate event: 0 – On exiting zone; 1 – On entering zone; 2 – On both.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2	0	AutoGeofencing priority (ID=20000) Eventual Records (ID=20002) Radius (ID=20004) Send SMS to (ID=7030) SMS Text (ID=8030)	Uint8

7.7.4 Radius (ID=20004)

This parameter represents the radius of a circle with device coordinates after activating AutoGeofence feature.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1000000	100	AutoGeofencing priority (ID=20000) Eventual Records (ID=20002) AutoGeofence event generating (ID=20001) Send SMS to (ID=7030) SMS Text (ID=8030)	Uint32

7.7.5 AutoGeofence Send SMS to (ID=7030)

Enables/disables SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	AutoGeofencing priority (ID=20000) Eventual Records (ID=20002) AutoGeofence event generating (ID=20001) Radius (ID=20004) SMS Text (ID=8030) GSM Predefined Numbers (ID=6000-6009)	Uint64

7.7.6 SMS Text (ID=8030)

Configures AutoGeofence SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	160	AutoGeofence	AutoGeofencing priority (ID=20000) Eventual Records (ID=20002) AutoGeofence event generating (ID=20001) Radius (ID=20004) Send SMS to (ID=7030)	S8[180]

7.7.7 Call Settings (ID=12104)

Sets time period, that DOUT will be on.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	Eventual records (ID=11701) Send SMS to (ID=7140) SMS text (ID=8140)	Uint8

7.7.8 Call to (ID=12105)

Enables/disables call. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.8 Manual Geofence

7.8.1 First Geozone parameters

An example of first Geozone parameters is given here. All 50 geozones are configured with a similar logic.

7.8.1.1 #1 Geozone Manual Geofencing priority (ID=20100):

0 – Disabled; 1 – Low; 2 – High; 3 – Panic.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	0	#1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Eventual Records (ID=20102) #1 Geozone Frame border (ID=20103) #1 Geozone Shape type (ID=20104) #1 Geozone Radius (ID=20105) #1 Geozone X1 (ID=20106) #1 Geozone Y1 (ID=20107)	Uint8

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
			#1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	

7.8.1.2 #1 Geozone Manual Geofence event generating (ID=20101)

Generate event: 0 – No event; 1 - On exiting zone; 2 – On entering zone; 3 – On both.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	0	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Eventual Records (ID=20102) #1 Geozone Frame border (ID=20103) #1 Geozone Shape type (ID=20104) #1 Geozone Radius (ID=20105) #1 Geozone X1 (ID=20106) #1 Geozone Y1 (ID=20107) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	Uint8

7.8.1.3 #1 Geozone Eventual Records (ID=20102)

0 – Disabled, include parameter to all records; 1 – Enabled, include parameter to record only if event was generated.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	1	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Frame border (ID=20103) #1 Geozone Shape type (ID=20104) #1 Geozone Radius (ID=20105) #1 Geozone X1 (ID=20106) #1 Geozone Y1 (ID=20107) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding	Uint8

			(ID=20110) #1 Geozone Max allowed speed (ID=20111)	

7.8.1.4 #1 Geozone Frame border (ID=20103)

Frame border is an additional border around Geofence zone.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1000000	1	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Eventual Records (ID=20102) #1 Geozone Shape type (ID=20104) #1 Geozone Radius (ID=20105) #1 Geozone X1 (ID=20106) #1 Geozone Y1 (ID=20107) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	Uint32

7.8.1.5 #1 Geozone Shape type (ID=20104)

Shape type: 0 – Circle; 1 - Rectangle.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Eventual Records (ID=20102) #1 Geozone Frame border (ID=20103) #1 Geozone Radius (ID=20105) #1 Geozone X1 (ID=20106) #1 Geozone Y1 (ID=20107) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	Uint8

7.8.1.6 #1 Geozone Radius (ID=20105)

Radius of circle (in metres) when circular zone is used.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
5	1000000	5	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Eventual Records (ID=20102) #1 Geozone Frame border (ID=20103) #1 Geozone Shape type (ID=20104) #1 Geozone X1 (ID=20106) #1 Geozone Y1 (ID=20107) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	Uint32

7.8.1.7 #1 Geozone X1 (ID=20106)

Geofence zone left bottom corner X coordinate (longitude).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
-180	180	0	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Eventual Records (ID=20102) #1 Geozone Frame border (ID=20103) #1 Geozone Shape type (ID=20104) #1 Geozone Radius (ID=20105) #1 Geozone Y1 (ID=20107) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	Double

7.8.1.8 #1 Geozone Y1 (ID=20107)

Geofence zone left bottom corner Y coordinate (latitude).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
-90	90	0	#1 Geozone Manual Geofencing priority (ID=20100) #1 Geozone Manual Geofence event generating (ID=20101) #1 Geozone Eventual Records (ID=20102) #1 Geozone Frame border (ID=20103) #1 Geozone Shape type (ID=20104) #1 Geozone Radius (ID=20105) #1 Geozone X1 (ID=20106) #1 Geozone X2 (ID=20108) #1 Geozone X1 (ID=20109) #1 Geozone OverSpeeding (ID=20110) #1 Geozone Max allowed speed (ID=20111)	Double

7.8.2 Other Geozones

Other Geozone's parameters have a similar logic as given for Geozone #1.

GeoFence Zone Number	Geofence Zone's parameter IDs
1	20100-20111
2	20120-20131
3	20140-20151
…	…
49	21060-21071
50	21080-21091

7.8.2.1 Send SMS to #1-5 Geozone (ID=7025-7029), #6-50 Geozone (ID=7071-7115)

Enables/disables SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009) SMS Text #1-5 Geozone (ID=8025-8029), #6-50 Geozone (ID=8071-8115)	Uint8

7.8.2.2 SMS Text #1-5 Geozone (ID=8025-8029), #6-50 Geozone (ID=8071-8115)

Configures geozone # SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	160	Geozone Zone #	Send SMS to #1-5 Geozone (ID=7025-7029), #6-50 Geozone (ID=7071-7115)	S8[160]

7.9 User Interface

7.9.1 Indication Scenario (12500)

0 – Disabled; 1 – Enabled.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	1		Uint8

7.9.2 Sleep Config (12501)

0 – Undefined; 1 – GPS; 2 – Deep; 3 – Online Deep; 4 - Ultra Deep; 5 – GPS + Online Deep; 6 – Deep + Online Deep; 7 – GPS + Deep + Online Deep; 8 – Ultra Deep; 9 – GPS + Ultra Deep; 10 – Deep + Ultra Deep; 11 – GPS + Deep + Ultra Deep; 12 – Online Deep + Ultra Deep; 13 – GPS + Online Deep + Ultra Deep; 14 – Deep + Online Deep + Ultra Deep; 15 – GPS + Deep + Online Deep + Ultra Deep.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	15	0		Uint8

7.9.3 Led (12502)

0 – Red; 1 – Green; 2 – Blue; 3 – None.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	0		Uint8

7.9.4 Vibration (12503)

0 – Disabled; 1 – Enabled.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0		Uint8

7.9.5 Period (12504)

LED and vibration period in seconds.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3600	15		Uint8

7.9.6 On (ms) (12505)

LED and vibration switching in milliseconds.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10000	2000		Uint32

7.9.7 Off (ms) (12506)

LED and vibration shutdown in milliseconds.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10000	0		Uint32

7.9.8 Repeat (12507)

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	100	0		Uint32

Table 6. Parameters for TMT250 User Interface

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
12500	Uint8	1	0	1	GSM Error Setting
12501	Uint8	0	0	15	GSM Error Config
12502	Uint8	0	0	3	GSM Error LED
12503	Uint8	0	0	1	GSM Error Vibration
12504	Uint8	15	0	3600	GSM Error Period
12505	Uint32	2000	0	10000	GSM Error On (ms)
12506	Uint32	0	0	10000	GSM Error Off (ms)
12507	Uint32	0	0	100	GSM Error Repeat
12510	Uint8	1	0	1	GSM Registering Setting
12511	Uint8	0	0	15	GSM Registering Config
12512	Uint8	0	0	3	GSM Registering LED
12513	Uint8	0	0	1	GSM Registering Vibration
12514	Uint8	15	0	3600	GSM Registering Period
12515	Uint32	2000	0	10000	GSM Registering On (ms)
12516	Uint32	0	0	10000	GSM Registering Off (ms)
12517	Uint32	0	0	100	GSM Registering Repeat
12520	Uint8	1	0	1	GSM Send/Receive Setting
12521	Uint8	0	0	15	GSM Send/Receive Config
12522	Uint8	0	0	3	GSM Send/Receive LED
12523	Uint8	0	0	1	GSM Send/Receive Vibration
12525	Uint32	2000	0	10000	GSM Send/Receive On (ms)
12526	Uint32	0	0	10000	GSM Send/Receive Off (ms)
12527	Uint32	0	0	100	GSM Send/Receive Repeat
12530	Uint8	1	0	1	Outgoing Call Setting
12531	Uint8	0	0	15	Outgoing Call Config

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
12532	Uint8	0	0	3	Outgoing Call LED
12533	Uint8	0	0	1	Outgoing Call Vibration
12534	Uint8	15	0	3600	Outgoing Call Period
12535	Uint32	2000	0	10000	Outgoing Call On (ms)
12536	Uint32	0	0	10000	Outgoing Call Off (ms)
12537	Uint32	0	0	100	Outgoing Call Repeat
12540	Uint8	1	0	1	Remote Connection Setting
12541	Uint8	0	0	15	Remote Connection Config
12542	Uint8	0	0	3	Remote Connection LED
12543	Uint8	0	0	1	Remote Connection Vibration
12544	Uint8	15	0	3600	Remote Connection Period
12545	Uint32	2000	0	10000	Remote Connection On (ms)
12546	Uint32	0	0	10000	Remote Connection Off (ms)
12547	Uint32	0	0	100	Remote Connection Repeat
12550	Uint8	1	0	1	Event Setting
12551	Uint8	0	0	15	Event Config
12552	Uint8	0	0	3	Event LED
12553	Uint8	0	0	1	Event Vibration
12555	Uint32	2000	0	10000	Event On (ms)
12556	Uint32	0	0	10000	Event Off (ms)
12557	Uint32	0	0	100	Event Repeat
12560	Uint8	1	0	1	Panic Event Setting
12561	Uint8	0	0	15	Panic Event Config
12562	Uint8	0	0	3	Panic Event LED
12563	Uint8	0	0	1	Panic Event Vibration
12565	Uint32	2000	0	10000	Panic Event On (ms)
12566	Uint32	0	0	10000	Panic Event Off (ms)
12567	Uint32	0	0	100	Panic Event Repeat
12570	Uint8	1	0	1	No GPS Fix Setting
12571	Uint8	0	0	15	No GPS Fix Config
12572	Uint8	0	0	3	No GPS Fix LED
12573	Uint8	0	0	1	No GPS Fix Vibration
12574	Uint8	15	0	3600	No GPS Fix Period
12575	Uint32	2000	0	10000	No GPS Fix On (ms)
12576	Uint32	0	0	10000	No GPS Fix Off (ms)
12577	Uint32	0	0	100	No GPS Fix Repeat
12580	Uint8	1	0	1	GPS Fix Setting
12581	Uint8	0	0	15	GPS Fix Config
12582	Uint8	0	0	3	GPS Fix LED
12583	Uint8	0	0	1	GPS Fix Vibration
12584	Uint8	15	0	3600	GPS Fix Period
12585	Uint32	2000	0	10000	GPS Fix On (ms)
12586	Uint32	0	0	10000	GPS Fix Off (ms)
12587	Uint32	0	0	100	GPS Fix Repeat
12590	Uint8	1	0	1	Device Off Setting
12591	Uint8	0	0	15	Device Off Config

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
12592	Uint8	0	0	3	Device Off LED
12593	Uint8	0	0	1	Device Off Vibration
12595	Uint32	2000	0	10000	Device Off On (ms)
12596	Uint32	0	0	10000	Device Off Off (ms)
12597	Uint32	0	0	100	Device Off Repeat
12600	Uint8	1	0	1	Device On Setting
12601	Uint8	0	0	15	Device On Config
12602	Uint8	0	0	3	Device On LED
12603	Uint8	0	0	1	Device On Vibration
12605	Uint32	2000	0	10000	Device On On (ms)
12606	Uint32	0	0	10000	Device On Off (ms)
12607	Uint32	0	0	100	Device On Repeat
12610	Uint8	1	0	1	Alarm Key Pressed Setting
12611	Uint8	0	0	15	Alarm Key Pressed Config
12612	Uint8	0	0	3	Alarm Key Pressed LED
12613	Uint8	0	0	1	Alarm Key Pressed Vibration
12614	Uint8	15	0	3600	Alarm Key Pressed Period
12615	Uint32	2000	0	10000	Alarm Key Pressed On (ms)
12616	Uint32	0	0	10000	Alarm Key Pressed Off (ms)
12617	Uint32	0	0	100	Alarm Key Pressed Repeat
12620	Uint8	1	0	1	Power Key Pressed Setting
12621	Uint8	0	0	15	Power Key Pressed Config
12622	Uint8	0	0	3	Power Key Pressed LED
12623	Uint8	0	0	1	Power Key Pressed Vibration
12624	Uint8	15	0	3600	Power Key Pressed Period
12625	Uint32	2000	0	10000	Power Key Pressed On (ms)
12626	Uint32	0	0	10000	Power Key Pressed Off (ms)
12627	Uint32	0	0	100	Power Key Pressed Repeat
12630	Uint8	1	0	1	Function Activated Setting
12631	Uint8	0	0	15	Function Activated Config
12632	Uint8	0	0	3	Function Activated LED
12633	Uint8	0	0	1	Function Activated Vibration
12635	Uint32	2000	0	10000	Function Activated On (ms)
12636	Uint32	0	0	10000	Function Activated Off (ms)
12637	Uint32	0	0	100	Function Activated Repeat
12640	Uint8	1	0	1	Function Deactivated Setting
12641	Uint8	0	0	15	Function Deactivated Config
12642	Uint8	0	0	3	Function Deactivated LED
12643	Uint8	0	0	1	Function Deactivated Vibration
12645	Uint32	2000	0	10000	Function Deactivated On (ms)
12646	Uint32	0	0	10000	Function Deactivated Off (ms)
12647	Uint32	0	0	100	Function Deactivated Repeat
12650	Uint8	1	0	1	Charging Setting
12651	Uint8	0	0	15	Charging Config
12652	Uint8	0	0	3	Charging LED
12653	Uint8	0	0	1	Charging Vibration

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
12654	Uint8	15	0	3600	Charging Period
12655	Uint32	2000	0	10000	Charging On (ms)
12656	Uint32	0	0	10000	Charging Off (ms)
12657	Uint32	0	0	100	Charging Repeat
12660	Uint8	1	0	1	Fully Charged Setting
12661	Uint8	0	0	15	Fully Charged Config
12662	Uint8	0	0	3	Fully Charged LED
12663	Uint8	0	0	1	Fully Charged Vibration
12664	Uint8	15	0	3600	Fully Charged Period
12665	Uint32	2000	0	10000	Fully Charged On (ms)
12666	Uint32	0	0	10000	Fully Charged Off (ms)
12667	Uint32	0	0	100	Fully Charged Repeat
12670	Uint8	1	0	1	Pre Alarm Setting
12671	Uint8	0	0	15	Pre Alarm Config
12672	Uint8	0	0	3	Pre Alarm LED
12673	Uint8	0	0	1	Pre Alarm Vibration
12674	Uint8	15	0	3600	Pre Alarm Period
12675	Uint32	2000	0	10000	Pre Alarm On (ms)
12676	Uint32	0	0	10000	Pre Alarm Off (ms)
12677	Uint32	0	0	100	Pre Alarm Repeat
12680	Uint8	1	0	1	Sleep Mode Setting
12681	Uint8	0	0	15	Sleep Mode Config
12682	Uint8	0	0	3	Sleep Mode LED
12683	Uint8	0	0	1	Sleep Mode Vibration
12684	Uint8	15	0	3600	Sleep Mode Period
12685	Uint32	2000	0	10000	Sleep Mode On (ms)
12686	Uint32	0	0	10000	Sleep Mode Off (ms)
12687	Uint32	0	0	100	Sleep Mode Repeat
12690	Uint8	1	0	1	I Am Alive Setting
12691	Uint8	0	0	15	I Am Alive Config
12692	Uint8	0	0	3	I Am Alive LED
12693	Uint8	0	0	1	I Am Alive Vibration
12694	Uint8	15	0	3600	I Am Alive Period
12695	Uint32	2000	0	10000	I Am Alive On (ms)
12696	Uint32	0	0	10000	I Am Alive Off (ms)
12697	Uint32	0	0	100	I Am Alive Repeat

7.10 Keyboard

7.10.1 Alarm Button

7.10.1.1 1 Click (13004)

0 – None; 1 - Alarm; 2 - ManDown On; 3 - ManDown Off; 4 - ManDown Switch; 5 - Auto Geofence On; 6 - Auto Geofence Off; 7 - Auto geofence Switch; 8 - Call/Hang-Up; 9 – SMS

Minimum	Maximum	Default value	Goes with (depends on)	Value type

value	value		parameters	
0	9	0		Uint8

7.10.1.2 2 Click (13005)

0 - None; 1 - Alarm; 2 - ManDown On; 3 - ManDown Off; 4 - ManDown Switch; 5 - Auto Geofence On; 6 - Auto Geofence Off; 7 - Auto geofence Switch; 8 - Call/Hang-Up; 9 - SMS

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	9	0		Uint8

7.10.1.3 Long Click (13006)

0 - None; 1 - Alarm; 2 - ManDown On; 3 - ManDown Off; 4 - ManDown Switch; 5 - Auto Geofence On; 6 - Auto Geofence Off; 7 - Auto geofence Switch; 8 - Call/Hang-Up; 9 - SMS

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	9	0		Uint8

7.10.2 Power Button

7.10.2.1 1 Click (13007)

0 - None; 1 - Alarm; 2 - ManDown On; 3 - ManDown Off; 4 - ManDown Switch; 5 - Auto Geofence On; 6 - Auto Geofence Off; 7 - Auto geofence Switch; 8 - Call/Hang-Up; 9 - SMS

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	9	0		Uint8

7.10.2.2 2 Click (13008)

0 - None; 1 - Alarm; 2 - ManDown On; 3 - ManDown Off; 4 - ManDown Switch; 5 - Auto Geofence On; 6 - Auto Geofence Off; 7 - Auto geofence Switch; 8 - Call/Hang-Up; 9 - SMS

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	9	0		Uint8

7.10.2.3 Long Click (13009)

0 - None; 1 - Alarm; 2 - ManDown On; 3 - ManDown Off; 4 - ManDown Switch; 5 - Auto Geofence On; 6 - Auto Geofence Off; 7 - Auto geofence Switch; 8 - Call/Hang-Up; 9 - SMS

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	9	0		Uint8

7.10.3 SMS Action

7.10.3.1 SMS Send to (7249)

Enables/disables SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Int32

7.10.3.2 SMS Text (8249)

Configures Keyboard SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	160 char	Keyboard	GSM Predefined Numbers (ID=6000-6009)	S8[160]

7.10.4 Call Action

7.10.4.1 Call to (13010)

Enables/disables call. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009)	Uint8

7.11 Bluetooth

7.11.1.1 BT Radio (ID=800)

Enables/disables Bluetooth. 0 – Disabled; 1 – Enabled (hidden); 2 – Enabled (visible).

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2	0	Local name (ID 801) Local PIN (ID=802) Security mode (ID=803) External MAC (ID=804) External name (ID=805) External PIN (ID=806) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	Uint8

7.11.1.2 Local name (ID 801)

This parameter defines the visible name of TMT250 device.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0 Symbols	30 Symbols	TMT250_(last 7 IMEI numbers)	BT Radio (ID=800) Local PIN (ID=802)	S8[30]

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
			Security mode (ID=803) External MAC (ID=804) External name (ID=805) External PIN (ID=806) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	

7.11.1.3 Local PIN (ID=802)

Parameter allows configuring Bluetooth PIN.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0 Symbols	4 Symbols	5555	BT Radio (ID=800) Local name (ID 801) Security mode (ID=803) External MAC (ID=804) External name (ID=805) External PIN (ID=806) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	String

7.11.1.4 Security mode (ID=803)

Parameter defines a security mode of TMT250 device. 0 – PIN only; 1 – PIN and MAC; 2 - MAC only; 3 – None.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	0	BT Radio (ID=800) Local name (ID 801) Local PIN (ID=802) External MAC (ID=804) External name (ID=805) External PIN (ID=806) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	Uint8

7.11.1.5 External MAC (ID=804)

Defines external device's MAC, for TMT250 to auto connect to.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0 symbols	12 symbols	0	BT Radio (ID=800) Local name (ID 801) Local PIN (ID=802) Security mode (ID=803)	String

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
			External name (ID=805) External PIN (ID=806) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	

7.11.1.6 External name (ID=805)

Defines external device's name, for TMT250 to auto connect to.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0 symbols	30 symbols	0	BT Radio (ID=800) Local name (ID 801) Local PIN (ID=802) Security mode (ID=803) External MAC (ID=804) External PIN (ID=806) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	String

7.11.1.7 External PIN (ID=806)

Defines external device's PIN, for TMT250 to auto connect to.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0 symbols	8 symbols	0	BT Radio (ID=800) Local name (ID 801) Local PIN (ID=802) Security mode (ID=803) External MAC (ID=804) External name (ID=805) Connection mode (ID=807) Authorized devices MAC list (ID=830 - 834)	String

7.11.1.8 Connection mode (ID=807)

Defines a mode in which TMT250 will connect to external devices. 0 – None, 1 – TMT250 will connect to Hands Free Headset; 2 – Data Link.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	2	0	BT Radio (ID=800) Local name (ID 801) Local PIN (ID=802) Security mode (ID=803) External MAC (ID=804) External name (ID=805)	Uint8

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
			External PIN (ID=806) Authorized devices MAC list (ID=830 - 834)	

7.11.1.9 Authorized devices MAC list (ID=830 - 834)

This parameter allows adding an authorized devices MAC for connection to TMT250.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0 symbols	12 symbols	-	BT Radio (ID=800) Local name (ID 801) Local PIN (ID=802) Security mode (ID=803) External MAC (ID=804) External name (ID=805) External PIN (ID=806) Connection mode (ID=807)	String

7.12 I/O parameters

I/O properties are additional data sources which are recorded along with usual GPS data.

7.12.1 I/O#1 property parameter priority (ID=50010)

This parameter defines I/O property priority: 0 – Disabled; 1 – Low; 2 – High; 3 - Panic.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	3	2	I/O#1 operand (ID=50011)I/O#1 High level (ID=50012) I/O#1 Low level (ID=50013) I/O#1 Event only (ID=50014) I/O#1 averaging length (ID=50015) I/O#1 send SMS (ID=7000) I/O#1 SMS text (ID=8000)	Uint8

7.12.2 I/O#1 operand (ID=50011)

This parameter defines when event is sent: 0 – On range exit; 1 – On range entrance; 2 – Both; 3 – Monitoring; 4 – Hysteresis; 5 – On changes; 6 – On delta change.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	6	5	I/O#1 property parameter priority (ID=50010)I/O#1 High level (ID=50012) I/O#1 Low level (ID=50013) I/O#1 Event only (ID=50014) I/O#1 averaging length (ID=50015) I/O#1 send SMS (ID=7000)	Uint8

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
			I/O#1 SMS text (ID=8000)	

7.12.3 I/O#1 High level (ID=50012)

This parameter defines high value of triggered I/O property. This parameter is used to set thresholds for I/O properties to generate events.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	I/O#1 property parameter priority (ID=50010) I/O#1 operand (ID=50011) I/O#1 Low level (ID=50013) I/O#1 Event only (ID=50014) I/O#1 averaging length (ID=50015) I/O#1 send SMS (ID=7000) I/O#1 SMS text (ID=8000)	Uint8

7.12.4 I/O#1 Low level (ID=50013)

This parameter defines low value of triggered I/O property. This parameter is used to set thresholds for I/O properties to generate events.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	1	0	I/O#1 property parameter priority (ID=50010) I/O#1 operand (ID=50011)I/O#1 High level (ID=50012) I/O#1 Event only (ID=50014) I/O#1 averaging length (ID=50015) I/O#1 send SMS (ID=7000) I/O#1 SMS text (ID=8000)	Uint8

7.12.5 I/O#1 Event only (ID=50014)

This parameter defines when I/O element value is sent: 0 – With every AVL packet; 1 – On event only. On event means that I/O element value is included to AVL packet only when this particular event happens. With regular, periodic records such I/O element value is not included.

Minimal value	Maximum value	Default value	Goes with (depends on) parameters	Value type

0	1	0	I/O#1 property parameter priority (ID=50010) I/O#1 operand (ID=50011)I/O#1 High level (ID=50012) I/O#1 Low level (ID=50013) I/O#1 averaging length (ID=50015) I/O#1 send SMS (ID=7000) I/O#1 SMS text (ID=8000)	Uint8

7.12.6 I/O#1 averaging length (ID=50015)

This parameter defines I/O property sample length used for averaging.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	65535	1	I/O#1 property parameter priority (ID=50010) I/O#1 operand (ID=50011)I/O#1 High level (ID=50012) I/O#1 Low level (ID=50013) I/O#1 Event only (ID=50014) I/O#1 send SMS (ID=7000) I/O#1 SMS text (ID=8000)	Uint16

7.12.7 I/O#1 send SMS (ID=7001)

Enables/disables SMS. 0 – Disable; 1-10 – SMS will be sent to configured GSM number.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type
0	10	0	GSM Predefined Numbers (ID=6000-6009) I/O#1 property parameter priority (ID=50010) I/O#1 operand (ID=50011)I/O#1 High level (ID=50012) I/O#1 Low level (ID=50013) I/O#1 Event only (ID=50014) I/O#1 SMS text (ID=8000)	Uint8

7.12.8 I/O#1 SMS text (ID=8001)

Configures I/O#1 SMS event text.

Minimum value	Maximum value	Default value	Goes with (depends on) parameters	Value type

0	160	Movement	I/O#1 property parameter priority (ID=50010) I/O#1 operand (ID=50011)I/O#1 High level (ID=50012) I/O#1 Low level (ID=50013) I/O#1 Event only (ID=50014) I/O#1 send SMS (ID=7000)	S8[160]

7.12.9 I/O elements parameters and types

Priority: 0 – Disabled; 1 – Low; 2 – High; 3 – Panic.

Operand: 0 – On Exit; 1 – On Entrance; 2 – On Both; 3 – Monitoring; 4 – On Hysteresis; 5 - On Change; 6 – On Delta Change.

Event only: 0 – No; 1 – Yes.

Table 7. Parameters for TMT250 devices

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
50010	Uint8	1	0	3	Movement Priority
50011	Uint8	5	0	6	Movement Operand
50012	Uint8	0	0	1	Movement High level
50013	Uint8	0	0	1	Movement Low level
50014	Uint8	0	0	1	Movement Event only
50015	Uint16	1	0	65535	Movement Average
7001	Uint8	0	0	10	Send SMS
8001	String	0	0	160	SMS Text
50020	Uint8	1	0	3	Data Mode Priority
50021	Uint8	3	0	6	Data Mode Operand
50022	Uint8	0	0	5	Data Mode High level
50023	Uint8	0	0	5	Data Mode Low level
50024	Uint8	0	0	1	Data Mode Event only
7002	Uint8	0	0	10	Send SMS
8002	String	0	0	160	SMS Text
50030	Uint8	1	0	3	GSM Signal Priority
50031	Uint8	3	0	6	GSM Signal Operand
50032	Uint8	0	0	5	GSM Signal High level
50033	Uint8	0	0	5	GSM Signal Low level
50034	Uint8	0	0	1	GSM Signal Event only
50035	Uint16	1	0	65535	GSM Signal Average
7003	Uint8	0	0	10	Send SMS
8003	String	0	0	160	SMS Text
50040	Uint8	1	0	3	Sleep Priority
50041	Uint8	3	0	6	Sleep Operand
50042	Uint8	0	0	2	Sleep High level

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
50043	Uint8	0	0	2	Sleep Low level
50044	Uint8	0	0	1	Sleep Event only
7004	Uint8	0	0	10	Send SMS
8004	String	0	0	160	SMS Text
50050	Uint8	1	0	3	GNSS Status Priority
50051	Uint8	3	0	6	GNSS Status Operand
50052	Uint8	0	0	5	GNSS Status High level
50053	Uint8	0	0	5	GNSS Status Low level
50053	Uint8	0	0	1	GNSS Status Event only
7005	Uint8	0	0	10	Send SMS
8005	String	0	0	160	SMS Text
50060	Uint8	0	0	3	GNSS PDOP Priority
5061	Uint8	3	0	6	GNSS PDOP Operand
5062	Uint16	0	0	1000	GNSS PDOP High level
5063	Uint16	0	0	1000	GNSS PDOP Low level
5064	Uint8	0	0	1	GNSS PDOP Event only
5065	Uint16	10	0	65535	GNSS PDOP Average
7006	Uint8	0	0	10	Send SMS
8006	String	0	0	160	SMS Text
50070	Uint8	1	0	3	GNSS HDOP Priority
50071	Uint8	3	0	6	GNSS HDOP Operand
50072	Uint16	0	0	1000	GNSS HDOP High level
50073	Uint16	0	0	1000	GNSS HDOP Low level
50074	Uint8	0	0	1	GNSS HDOP Event only
50075	Uint16	10	0	65535	GNSS HDOP Average
7007	Uint8	0	0	10	Send SMS
8007	String	0	0	160	SMS Text
50100	Uint8	0	0	3	GSM Cell ID Priority
50101	Uint8	3	0	6	GSM Cell ID Operand
50102	Uint32	0	0	999999	GSM Cell ID High level
50103	Uint32	0	0	999999	GSM Cell ID Low level
50104	Uint8	0	0	1	GSM Cell ID Event only
7010	Uint8	0	0	10	Send SMS
8010	String	0	0	160	SMS Text
50110	Uint8	0	0	3	GSM Area Code Priority
50111	Uint8	3	0	6	GSM Area Code Operand
50112	Uint32	0	0	999999	GSM Area Code High level
50113	Uint32	0	0	999999	GSM Area Code Low level
50114	Uint8	0	0	1	GSM Area Code Event only
7011	Uint8	0	0	10	Send SMS
8011	String	0	0	160	SMS Text
50120	Uint8	1	0	3	Battery Voltage Priority
50121	Uint8	3	0	6	Battery Voltage Operand
50122	Uint16	0	0	5000	Battery Voltage High level
50123	Uint16	0	0	5000	Battery Voltage Low level
50124	Uint8	0	0	1	Battery Voltage Event only

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
50125	Uint8	0	0	10	Battery Voltage Average
7012	Uint8	0	0	10	Send SMS
8012	String	0	0	160	SMS Text
50660	Uint8	0	0	3	Battery Level Priority
50661	Uint8	3	0	6	Battery Level Operand
50662	Uint16	0	0	1000	Battery Level High level
50663	Uint16	0	0	1000	Battery Level Low level
50664	Uint8	0	0	1	Battery Level Event only
7013	Uint8	0	0	10	Send SMS
8243	String	0	0	160	SMS Text
50140	Uint8	0	0	3	Active GSM Operator Priority
50141	Uint8	3	0	6	Active GSM Operator Operand
50142	Uint32	0	0	999999	Active GSM Operator High level
50143	Uint32	0	0	999999	Active GSM Operator Low level
50144	Uint8	0	0	1	Active GSM Operator Event only
7014	Uint8	0	0	10	Send SMS
8014	String	0	0	160	SMS Text
50150	Uint8	0	0	3	Charger Connected Priority
50151	Uint8	3	0	6	Charger Connected Operand
50152	Uint32	0	0	1	Charger Connected High level
50153	Uint32	0	0	1	Charger Connected Low level
50154	Uint8	0	0	1	Charger Connected Event only
7014	Uint8	0	0	10	Send SMS
8244	String	0	0	160	SMS Text
50160	Uint8	0	0	3	Total Odometer Priority
50161	Uint8	3	0	6	Total Odometer Operand
50162	Uint32	0	0	10000000	Total Odometer High level
50163	Uint32	0	0	10000000	Total Odometer Low level
50164	Uint8	0	0	1	Total Odometer Event only
7016	Uint8	0	0	10	Send SMS
8016	String	0	0	160	SMS Text
50170	Uint8	0	0	3	Digital Input 1 Priority
50171	Uint8	3	0	6	Digital Input 1 Operand
50172	Uint8	0	0	1	Digital Input 1 High level
50173	Uint8	0	0	1	Digital Input 1 Low level
50174	Uint8	0	0	1	Digital Input 1 Event only
50175	Uint16	1	0	65535	Digital Input 1 Average
7017	Uint8	0	0	10	Send SMS
8017	String	0	0	160	SMS Text
50180	Uint8	0	0	3	Analog Input 1 Priority
50181	Uint8	3	0	6	Analog Input 1 Operand
50182	Uint16	0	0	30000	Analog Input 1 High level
50183	Uint16	0	0	30000	Analog Input 1 Low level
50184	Uint8	0	0	1	Analog Input 1 Event only
50185	Uint16	10	0	65535	Analog Input 1 Average
7018	Uint8	0	0	10	Send SMS

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
8018	String	0	0	160	SMS Text
50190	Uint8	0	0	3	Digital Output 1 Priority
50191	Uint8	0	0	6	Digital Output 1 Operand
50192	Uint8	0	0	1	Digital Output 1 High level
50193	Uint8	0	0	1	Digital Output 1 Low level
50194	Uint8	0	0	1	Digital Output 1 Event only
50195	Uint16	1	0	65535	Digital Output 1 Average
7019	Uint8	0	0	10	Send SMS
8019	String	0	0	160	SMS Text
50200	Uint8	0	0	3	Fuel Used GPS Priority
50201	Uint8	3	0	6	Fuel Used GPS Operand
50202	Uint32	0	0	1000000	Fuel Used GPS High level
50203	Uint32	0	0	1000000	Fuel Used GPS Low level
50204	Uint8	0	0	1	Fuel Used GPS Event only
50205	Uint16	1	0	65535	Fuel Used GPS Average
7020	Uint8	0	0	10	Send SMS
8020	String	0	0	160	SMS Text
50210	Uint8	0	0	3	Fuel Rate GPS Priority
50211	Uint8	3	0	6	Fuel Rate GPS Operand
50212	Uint32	0	0	1000000	Fuel Rate GPS High level
50213	Uint32	0	0	1000000	Fuel Rate GPS Low level
50214	Uint8	0	0	1	Fuel Rate GPS Event only
50215	Uint16	1	0	65535	Fuel Rate GPS Average
7021	Uint8	0	0	10	Send SMS
8021	String	0	0	160	SMS Text
50220	Uint8	0	0	3	Axis X Priority
50221	Uint8	3	0	6	Axis X Operand
50222	Uint16	0	-8000	8000	Axis X High level
50223	Uint16	0	-8000	8000	Axis X Low level
50224	Uint8	0	0	1	Axis X Event only
50225	Uint16	1	0	65535	Axis X Average
7022	Uint8	0	0	10	Send SMS
8022	String	0	0	160	SMS Text
50230	Uint8	0	0	3	Axis Y Priority
50231	Uint8	3	0	6	Axis Y Operand
50232	Uint16	0	-8000	8000	Axis Y High level
50233	Uint16	0	-8000	8000	Axis Y Low level
50234	Uint8	0	0	1	Axis Y Event only
50235	Uint16	1	0	65535	Axis Y Average
7023	Uint8	0	0	10	Send SMS
8023	String	0	0	160	SMS Text
50240	Uint8	0	0	3	Axis Z Priority
50241	Uint8	3	0	6	Axis Z Operand
50242	Uint16	0	-8000	8000	Axis Z High level
50243	Uint16	0	-8000	8000	Axis Z Low level
50244	Uint8	0	0	1	Axis Z Event only

Parameter ID	Parameter Type	Default value	Value range		Parameter name
			Min	Max	
50245	Uint16	1	0	65535	Axis Z Average
7024	Uint8	0	0	10	Send SMS
8024	String	0	0	160	SMS Text
50250	Uint8	0	0	3	ICCID Priority
50251	Uint8	3	0	6	ICCID Operand
50254	Uint8	0	0	1	ICCID Event only
7069	Uint8	0	0	10	Send SMS
8069	String	0	0	160	SMS Text

8 DEBUG MODE

TMT250 device is able to provide its debug trace when it is connected to PC using the magnetic USB cable. This trace can be used to detect errors and provide debug information if the device functions not as expected. Required Terminal application can be downloaded using: http://avl1.teltonika.lt/Downloads/Software/Terminal.zip

When powered on TMT250 device is connected to PC, two ports are created:

MTK USB Modem Port is used for modem trace;

MTK USB Debug Port is used for Terminal log.

If connected TMT250 device is not recognized by PC, please install the required drivers. Following link can be used: http://avl1.teltonika.lt/Downloads/FMB1/

After selecting your port click ***Connect*** and then click on ***Start Log*** button. If the log is not running, please send **.log:1** command (see picture below).

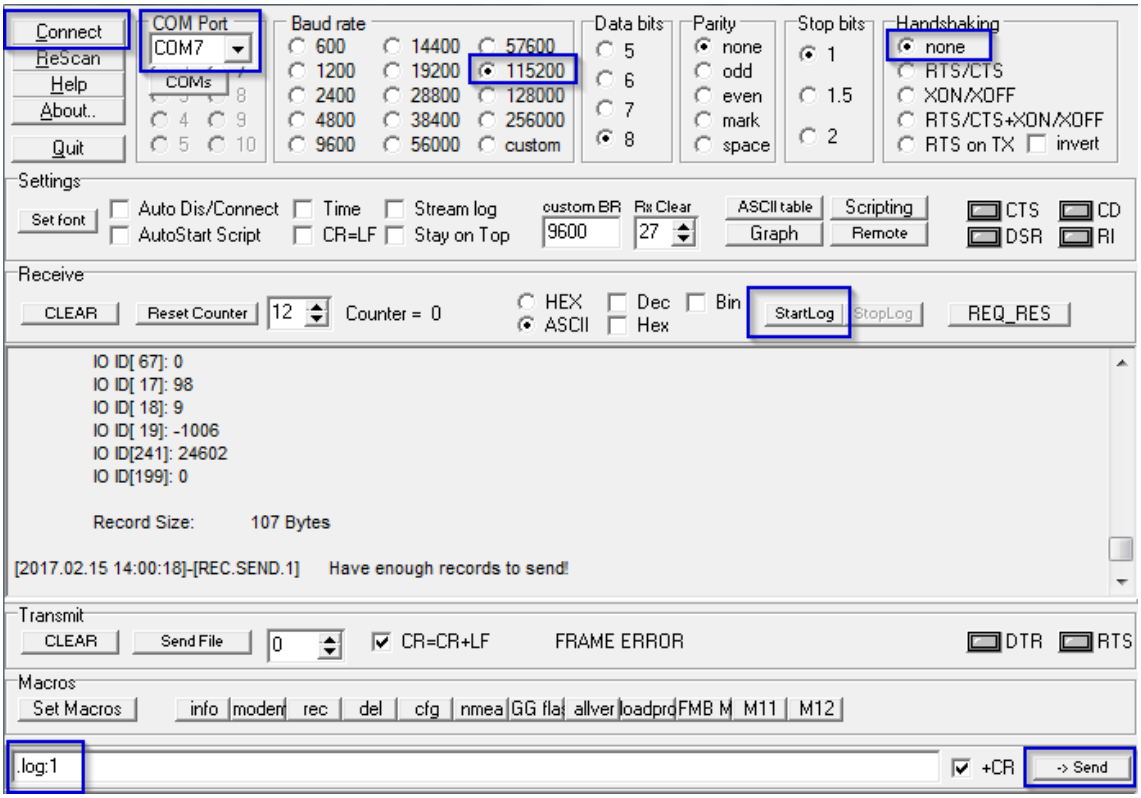


Figure 38 Terminal.exe window

9 CHANGE LOG

Nr.	Date	Version	Comments
1	2018-07-11	0.1	Preliminary draft release.
2	2018-07-27	0.2	Minor changes to grammar and formatting.
3	2018-08-22	0.3	Removed last 'Ignition' references.
4	2018-10-18	0.4	Clarified Auto Geofencing scenario description.
5	2018-11-06	0.5	Added 'Movement Event' feature description. Added new content "SMS Text" with supported commands