



FMB010 User Manual V0.17

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1 INTRODUCTION

1.1 Attention



Do not disassemble the device. If the device is damaged, before unplugging the power supply, do not touch the device.



All wireless data transferring devices produce interference that may affect other devices which are placed nearby.



Please consult representatives of your vehicle model regarding OBD II location on your vehicle. In case you are not sure of proper connection, please consult qualified personnel.



The programming must be performed using a second class PC (with autonomic power supply).



The device is susceptible to water and humidity.



Any installation and/or handling during a lightning storm are prohibited.



FMB010 has USB interface;
Teltonika is not responsible for any harm caused by using wrong cables for PC <-> FMB010 connection.



Warning! Do not use FMB010 device if it distracts driver or causes inconvenience due to OBD II placement. Device must not interfere with driver.

1.2 Instructions of safety

This chapter contains information on how to operate FMB010 safely. By following these requirements and recommendations, you will avoid dangerous situations. You must read these instructions carefully and follow them strictly before operating the device!

The device uses a 10 V...30 V DC power supply. The nominal voltage is 12 V DC. The allowed range of voltage is 10 V...30 V DC.

To avoid mechanical damage, it is advised to transport the FMB010 device in an impact-proof package.

Before dismounting the device from the vehicle, ignition must be off.

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 FMB010 device.

Acronyms and terms used in document:

PC – Personal Computer;

GPS – Global Positioning System;

GPRS – General Packet Radio Service;

GNSS – Global Navigation Satellite System;

GSM – Global System for Mobile Communications;

SMS – Short Message Service;

AC/DC – Alternating Current/Direct Current;

I/O – Input/Output;

Record – AVL data stored in FMB010 memory. AVL data contains GNSS and I/O information;

AVL packet - data packet which is being sent to the server during data transmission.

2 BASIC DESCRIPTION

FMB010 is tracking terminal with GNSS and GSM connectivity, which is able to collect device coordinates and transfer them via GSM network to server. This device is perfectly suitable for applications, which need location acquirement of remote objects. . FMB010 also has a USB port for device status log output and entering configurations.



Note: Monitorable basic vehicle parameters depend on vehicle mark and model.

Package contents¹

The FMB010 device is supplied to the customer in a cardboard box containing all the equipment that is necessary for operation. The package contains:

Already implemented FMB010 device into case;

Top and bottom device cover parts;

OBD II power supply adapter.

¹ Package content depends on Order Code, and can be customized by customer needs.

2.1 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 Blue-tooth 4.0;
- Internal High Gain GNSS antenna;
- Internal High Gain GSM antenna;
- 170 mAh Li-ion rechargeable 3.7 V battery;

Interface features:

- Power supply: 10 ÷ 30V;
- 1 digital input;
- USB port
- 2 LEDs indicating device status.

Special features:

- Fast position fix;
- High Quality track even in high density urban canyon;
- Small case;
- High gain internal GNSS and GSM antennas;
- 2 LED status indication;
- Real-Time tracking;
- Smart data acquisition based on:
 - Time;
 - Angle;
 - Distance;
 - Ignition or any other I/O event;
- Sending acquired data via GPRS;
- GPRS and SMS I/O events;
- Virtual odometer;
- Jamming detection;
- Configurable using Secured SMS Commands;
- Voice call;
- Overvoltage protection.

2.2 Technical features

| Part name | Physical specification | Technical details |
|------------------|---------------------------|---|
| Navigation LED | LED | Power supply 10...30 V DC 2 W Max Energy consumption ¹ : GPRS: --- 70 mA r.m.s Max., Nominal: --- average 28 mA r.m.s, GPS Sleep: --- average 8 mA, Deep Sleep: --- average 6.6 mA ² Online Deep Sleep: --- average 7.2 mA Ultra Deep Sleep: --- average 5 mA Battery charge current: --- average 120 mA, Rated current: --- 250 mA, Operation temperature: -25 °C ... +55 °C Storage temperature: -40 °C ... +70 °C Storage relative humidity 5 ... 95 % (no condensation) Internal fuse: 3A, 125V Weight: 63 g. |
| Modem LED | LED | |
| OBD-II connector | Standard OBD-II connector | |
| USB | Mini USB socket | |

Table 1. FMB010 specifications

¹ Energy consumption has been tested at 12V voltage with no battery charging.

²When in Deep Sleep mode no data storing and sending is activated.

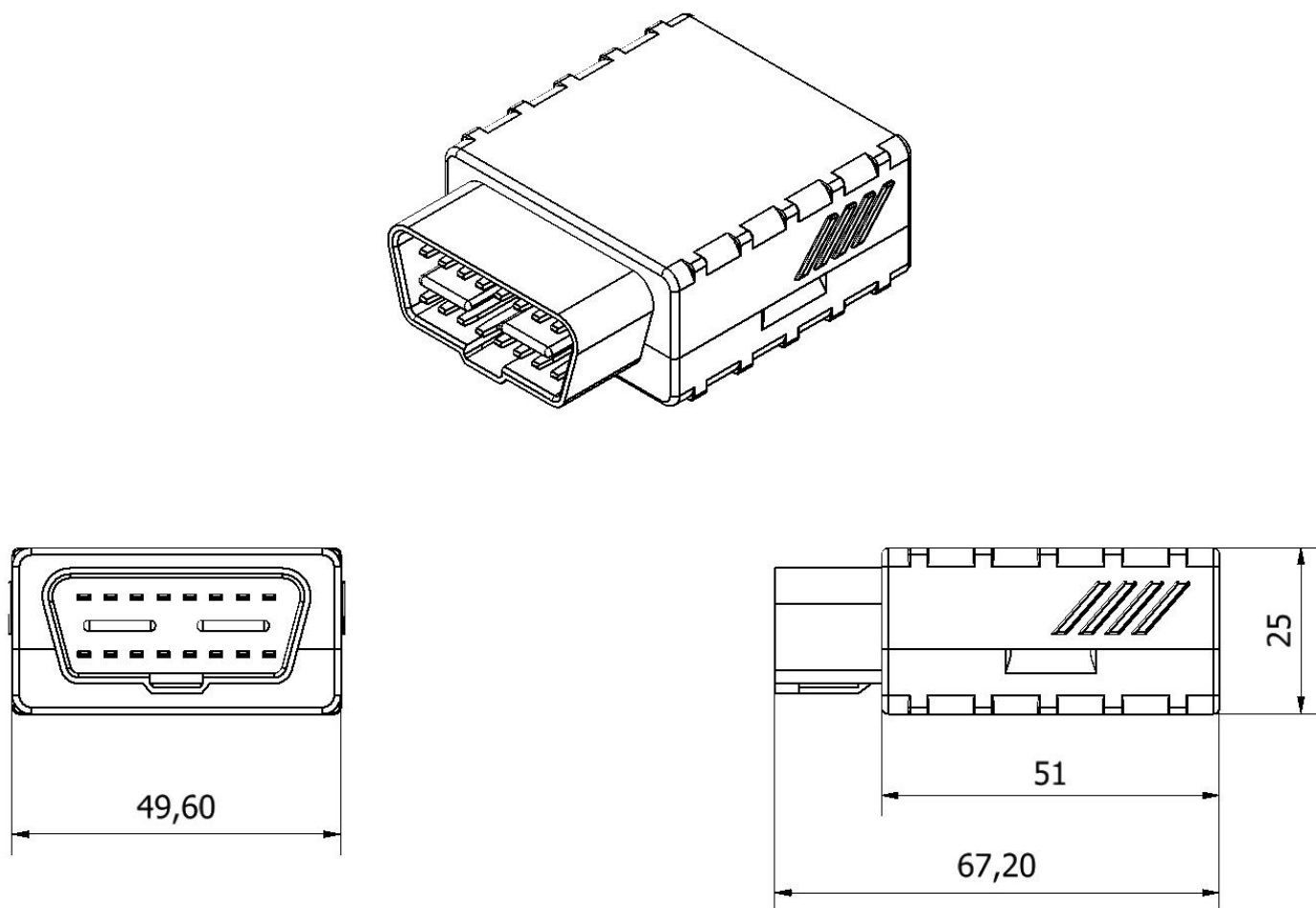


Figure 1 FMB010 view & dimensions (tolerance $\pm 2\text{mm}$)

2.3 Technical Information about internal battery

Li-Polymer rechargeable battery, 3.7 V, 170 mAh.

| Internal back-up battery | Battery voltage V | Nominal capacity (mAh) | Power(Wh) | Charging temperature °C |
|---------------------------------|-------------------|------------------------|-------------|-------------------------|
| Li-Polymer rechargeable battery | 3.75~3.90 | ≥ 170 | 0.64 - 0.66 | 0 – 45 |

Table 2 Battery specifications

FMB010 internal battery is used for detecting external voltage disconnection.



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

2.4 Electrical characteristics

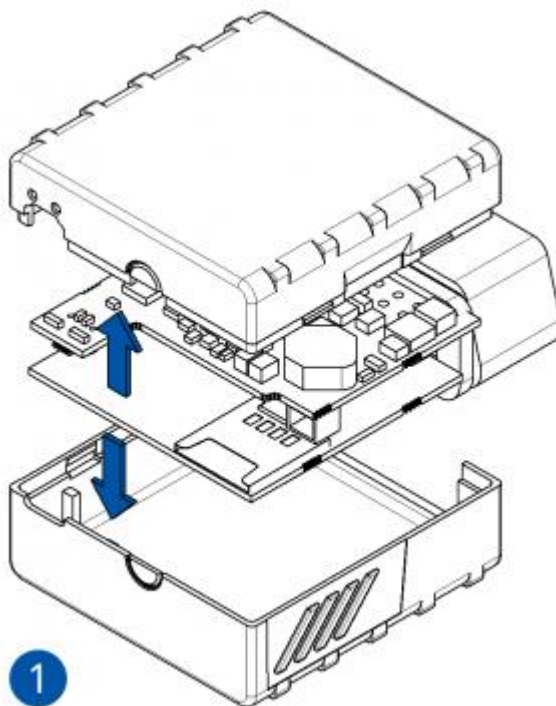
| CHARACTERISTIC DESCRIPTION | VALUE | Min. | Typ. | Max. | Unit |
|---|-------|------|------|----------------|------|
| | | | | | |
| Supply Voltage: | | | | | |
| Supply Voltage (Recommended Operating Conditions) | | 10 | | 30 | V |
| Digital Input: | | | | | |
| Input resistance (DIN1) | | 15 | | | kΩ |
| Input Voltage (Recommended Operating Conditions) | | 0 | | Supply voltage | V |
| Input Voltage threshold (DIN1) | | | 5 | | V |

2.5 Absolute Maximum Ratings

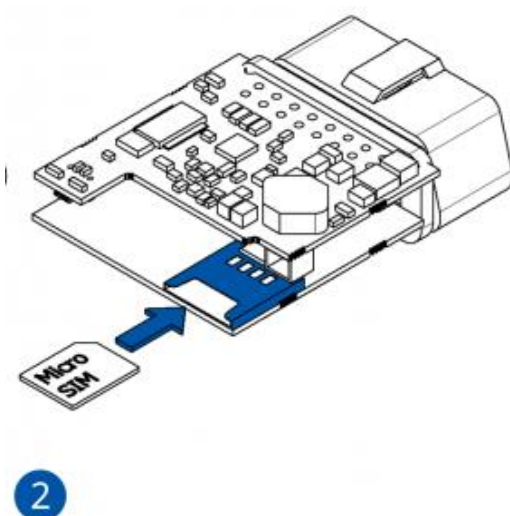
| CHARACTERISTIC DESCRIPTION | VALUE | Min. | Typ. | Max. | Unit |
|--|-------|------|------|------|------|
| | | | | | |
| Supply Voltage (Absolute Maximum Ratings) | | -32 | | 32 | V |
| Digital Input Voltage (Absolute Maximum Ratings) | | -32 | | 32 | V |

3 CONNECTION, PINOUT, ACCESSORIES

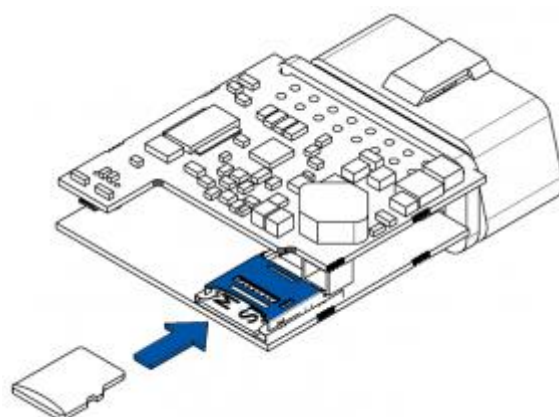
3.1 How to insert micro SIM card into FMB010 device:



Remove FMB010 cover

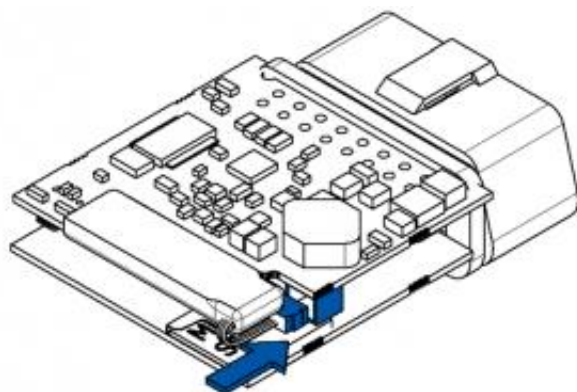


Insert micro SIM card as shown (bottom slot)



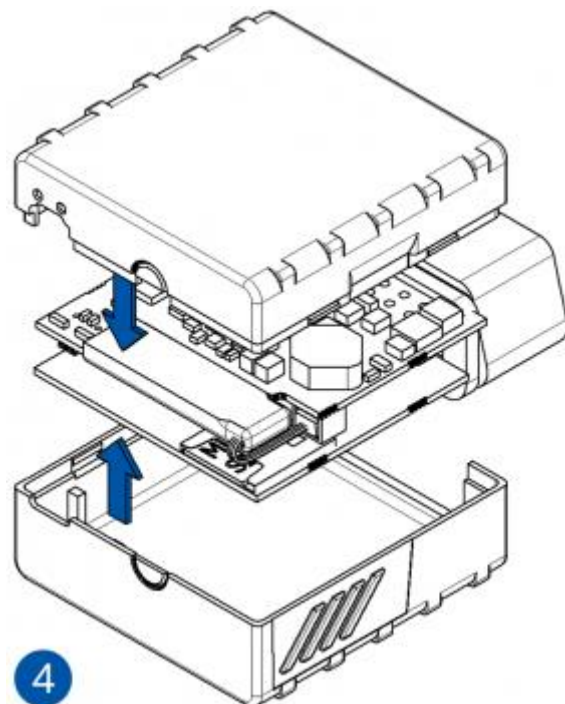
Insert SD card as shown (top slot).

*Available for devices manufactured before 2018-04



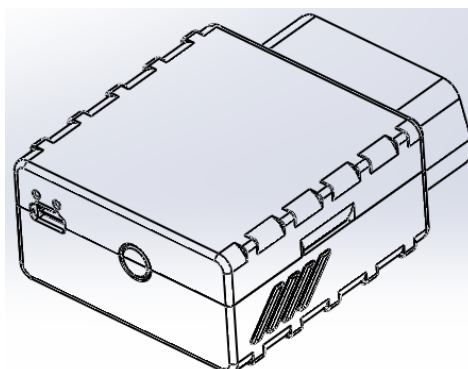
3

Connect battery as shown to device



4

Attach cover



Device is ready

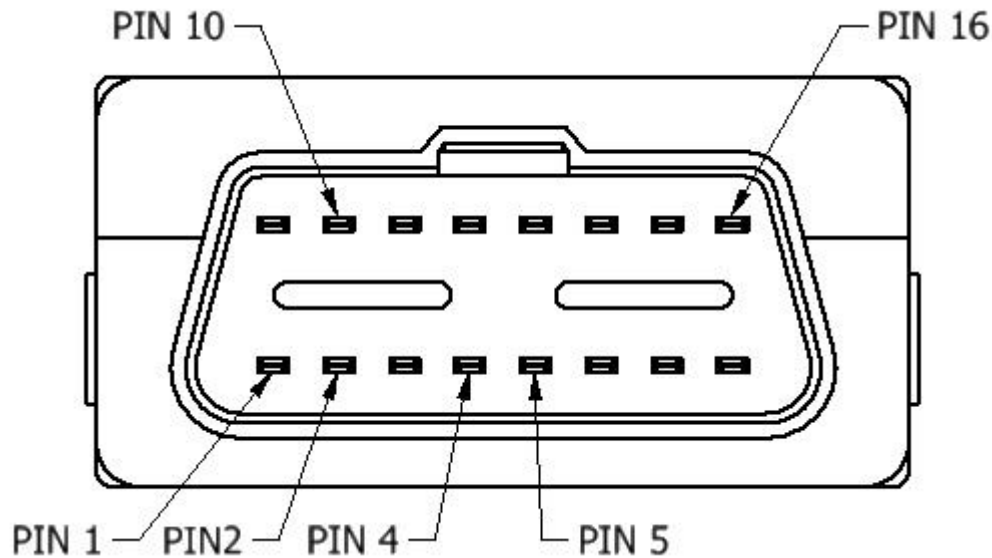
3.2 Installing FMB010 drivers

Software requirements:

- Operating system 32-bit and 64-bit: Windows XP with SP3 or later, Windows Vista, Windows 7.
- MS .NET Framework V3.5 or later (<http://www.microsoft.com> or <http://av11.teltonika.lt/downloads/tav/Framework/dotnetfx35setupSP1.zip>).

Drivers:

Please download MediaTek inbox COM Port drivers from Teltonika website:
<https://teltonika.lt/downloads/en/fmb120/TeltonikaCOMDriver.zip>



Installing drivers:

Extract and run FP_INBOX_InstallDriver_v1.1032.3.exe. This driver is used to detect FMB010 device connected to the computer. Click 'Next' in driver installation window (figures below):

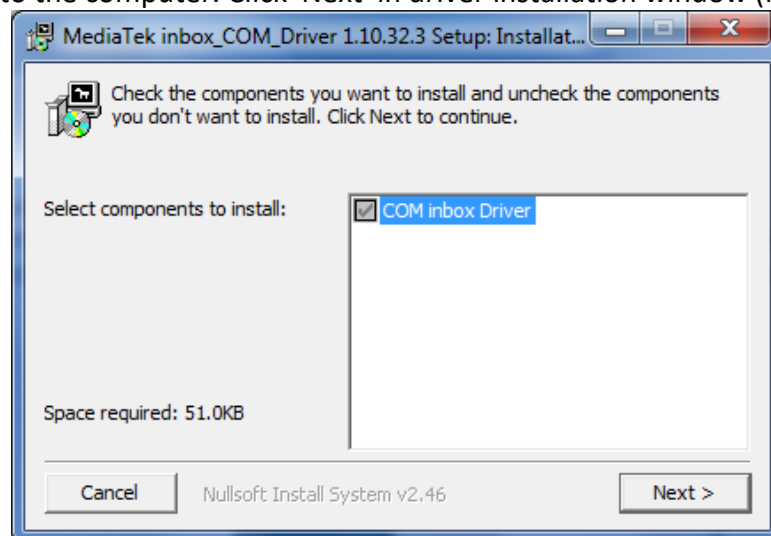


Figure 2 Driver installation window

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

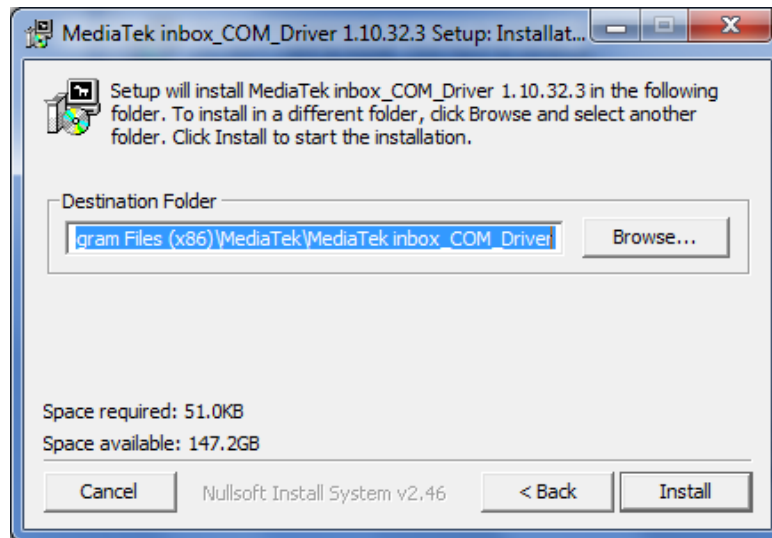


Figure 3 Driver installation window

Setup will continue installing drivers and will display a window about successful process at the end. Click 'Finish' to complete setup:

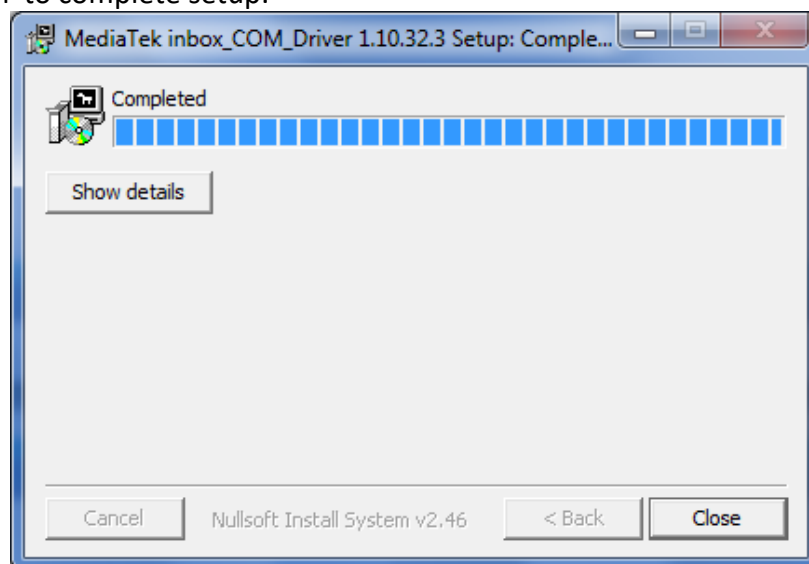


Figure 4 Driver installation window

You have now installed drivers for FMB010 device successfully.

3.3 OBD II

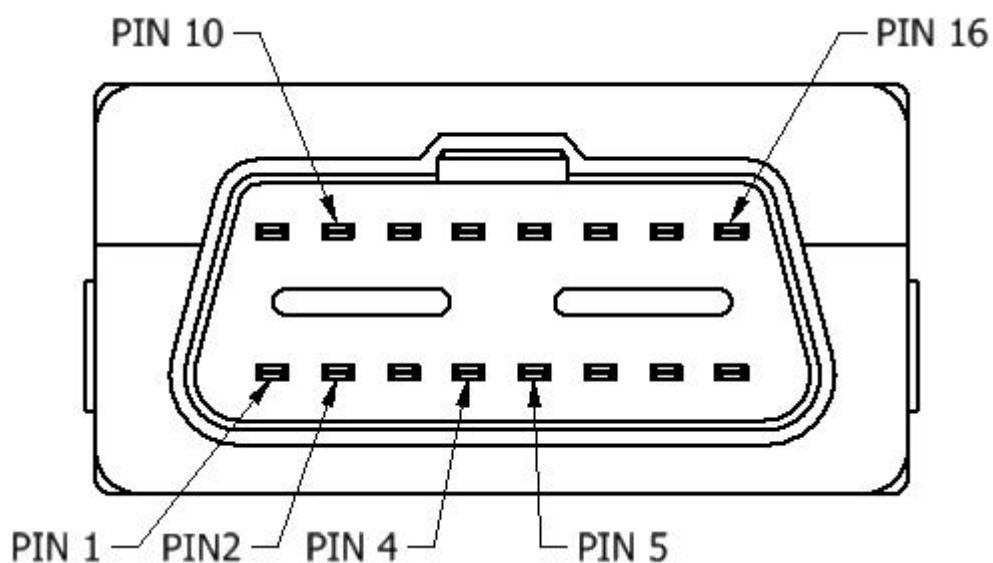


Figure 5 OBD II pinout

| Pin Nr. | Pin Name | Description |
|---------|---------------------|---------------------------------------|
| 1 | Ignition input | |
| 2 | PWM_BUS+/VPW | |
| 3 | - | |
| 4 | GND (-) | Ground pin. |
| 5 | GND (-) | Ground pin. |
| 6 | - | |
| 7 | - | |
| 8 | - | |
| 9 | - | |
| 10 | PWM_BUS- | |
| 11 | - | |
| 12 | - | |
| 13 | - | |
| 14 | - | |
| 15 | - | |
| 16 | Power +(10÷30) V DC | Power range +(10...30) V DC to ground |

Table 3 FMB010 pinout description

3.4 Navigate LED

| Behavior | Meaning |
|-------------------------|---|
| Permanently switched on | GNSS signal is not received |
| Blinking every second | Normal mode, GNSS is working |
| Off | GNSS is turned off because: <ul style="list-style-type: none"> • Deep sleep mode Or <ul style="list-style-type: none"> • GNSS antenna short circuited |

3.5 Status LED

| Behavior | Meaning |
|--------------------------------|--|
| Blinking every second | Normal mode |
| Blinking every 2 seconds | Deep sleep mode |
| Blinking fast for a short time | Modem activity |
| Blinking fast constantly | Boot mode |
| Off | <ul style="list-style-type: none"> • Device is not working Or <ul style="list-style-type: none"> • Device firmware being flashed |

4 OPERATIONAL BASICS

4.1 Operational principals

FMB010 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 powered with three data acquiring methods: time-based, distance-based and angle-based. Note, that if FMB010 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 in flash memory and later can be sent via GPRS.

GPRS and SMS settings are described in later sections. FMB010 communicates with server using special data protocol.

FMB010 can be managed by SMS commands. SMS Command list is described in SMS COMMAND LIST section. Module configuration can be performed only via SMS.

4.2 Sleep mode

4.2.1 Sleep mode

FMB010 is able to go to sleep mode if such mode is enabled.

This timeout (defined period) starts counting when device is in STOP mode. After timeout is reached and all conditions for sleep mode are met, device goes to sleep mode. While in sleep mode, FMB010 turns GPS module off and it is still making new periodic records. As a result power usage decreases, in turn saving vehicle battery.

FMB010 can enter sleep mode if **ALL** of these conditions are met:

- FMB010 has to be configured to work in Sleep mode and start sleep timeout is reached;

- Device must have synchronized time with GNSS satellites;
- No movement by movement sensor is detected;
- Ignition (configured Ignition Source) is off.

FMB010 exits sleep mode when if **ONE** of following conditions are true:

- Movement by movement sensor is detected;
- Ignition (configured Ignition Source) is turned on.

4.2.2 Deep Sleep mode

While in deep sleep mode, FMB010 sets GNSS receiver to sleep mode and turns off GSM/GPRS module (it is not possible to wake up device via SMS). Despite records with last known coordinate are being saved and send to AVL server (GSM/GPRS module is turned on to send data and after that it is turned off again), power usage is decreased to save vehicle's battery. Note, that power saving depends on two configurable parameters: send period and min. record saving period in "X on Stop Mode".

FMB010 can enter deep sleep mode if **ALL** of these conditions are met:

- FMB010 has to be configured to work in Deep Sleep mode;
- Device must be synchronized time with GNSS satellites;
- FMB010 has to be in „X on Stop Mode“ (Configured by Mode switch parameter);
- Movement by accelerometer is not detected;
- Ignition (Configured to be detected by Power Voltage, Ignition or Accelerometer) is off;
- Min. Record Saving Period (Data Acquisition Mode settings) must be bigger than Active Data Link Timeout parameter, that FMB010 could close GPRS link.
- Send period (Data Acquisition Mode settings) minus Active Data Link Timeout must be more than 90 sec., that FMB010 could close GPRS link for at least 90 sec.
- Sleep timeout is reached;
- Have no sms to read;
- Data socket(s) are closed;

FMB010 exits deep sleep mode when if **ONE** of following conditions are true:

- Movement by accelerometer is detected;
- Ignition (Configured to be detected by Power Voltage, Ignition or Accelerometer) is turned on.

4.2.3 Online Sleep mode

In this mode device works as in Deep Sleep mode, but without turning off 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.

4.2.4 ULTRA Deep Sleep mode

Ultra battery save mode, where GNSS and GSM modems are turned off and device functions are suspended for maximum battery saving.

NOTE! Only DIN1 and movement, detected by accelerometer, will wake device up from Ultra Deep Sleep. Movement Source and Ignition Source configuration is not taken into account in this case. There is no Crash buffer in Ultra Deep sleep.

4.3 Virtual odometer

Virtual odometer is used to calculate traveled distance in FMB010 as a separate I/O element. When FMB010 detects movement, it starts counting distance using GNSS signal: every second it checks current location and calculates distance between current and previous point. It keeps adding these intervals until it is time to make a record, then FMB010 records its location and adds odometer value, which is equal to the sum of all distances, measured every second. User can choose Odometer mode: 0 – Normal mode, or 1 – Continuous.

At Normal mode, when record is made, odometer resets to zero and distance calculation starts all over again.

Continuous odometer mode requires ignition (configured Ignition source) to be turned on. Odometer counts all distance calculations from records and sums them to one distance. Continuous odometer stops counting, when vehicle is at stop and ignition is turned off.

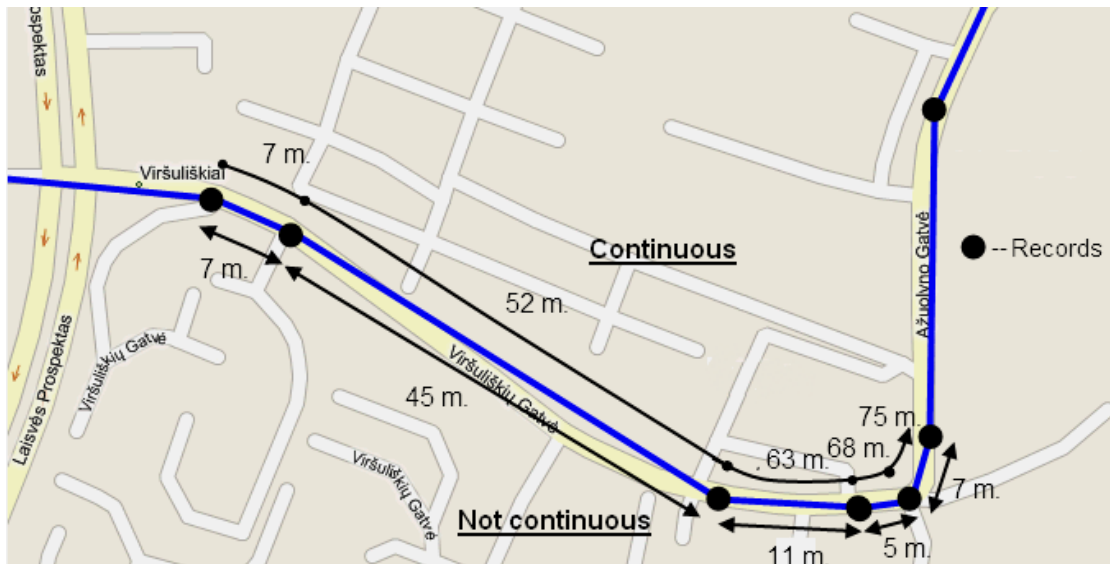


Figure 6 Odometer continuous and Not continuous distance counting parameter example

4.4 Features

Using available features can greatly increase FMB010 usability options.

4.4.1 Green Driving/Eco Driving Scenario.

Helps to prevent and inspect driver about harsh driving. Scenario continuously monitors: accelerating force, braking force and cornering angles.

To prevent generating false events, harsh acceleration and harsh braking is monitored only when following conditions are fulfilled:

- Ignition is ON (DIN1 = 1)
- Vehicle speed is equal or higher than 10km/h

Harsh cornering is monitored only when following conditions are fulfilled:

- Ignition is ON (DIN1 = 1)
- Vehicle speed is equal or higher than 30km/h

Eco Driving or Green Driving? Eco driving works depending on accelerometer data and Green driving uses GPS data.



Note: Green Driving and Eco Driving Scenarios are a factor on various cars and various drivers testing phase and can be subject to changes. Teltonika is constantly working on improvement of the functionality of the devices, and strongly recommends using the latest version of the firmware.

4.4.2 Over Speeding Scenario.

Helps to prevent from exceeding fixed speed and inspects driver if needed.

4.4.3 Excessive Idling

Informs you if your vehicle is stationary but engine is on for selected period of time to help you to save fuel

4.4.4 Jamming detection

Jamming detection shows when GSM signal jamming occurs.

4.4.5 Trip

Trip customizable feature enables user extended monitoring of performed trips (from engine start at present location to engine stop at arrived location), log their start and stop points, view driven total distance³. Event will be **generated (included into send records) only** when trip starts and finishes.



Note: Scenarios and Trip feature are activated only if DIN1=1 (ignition is on).

4.5 Accelerometer scenarios

4.5.1 Excessive Idling

Informs you if your vehicle is stationary but engine is on for selected period of time to help you to save fuel

³ Continuous odometer – total driven distance, works only in TRIP mode. Continues distance is counted only for ONE trip. If trip is finished (stop point is detected), odometer resets to 0 (zero). Next trip will start counting from the beginning.

4.5.2 Towing Detection

Towing detection scenario helps to inform driver about car departing. FMB010 generates event when car is being towed or raised, for example in case of vehicle evacuation.

FMB010 activates towing function when these conditions are met:

- Ignition (configured Ignition Source) is OFF
- Activation Timeout (set in Towing detection features) is reached

When Activation Timeout is reached and Ignition is still in OFF state, FMB010 monitors accelerometer data. If Acceleration or Angle value reaches configured threshold for configured Duration (in ms), check Ignition state. If Ignition is still OFF during configured "Ignition check after Event Timeout" time, then event is generated. If configured - sends sms event or makes a call.

Function will be reactivated after FMB010 again detects change of Ignition state from ON to OFF.

4.5.3 Unplug Detection

Unplug detection Scenario generates event when FMB010 is unplugged from OBD socket.

4.5.4 Crash Detection

If Crash detection is enabled, it monitors acceleration on each axis, if acceleration exceeds configured value for longer then configured duration, event with value "1" is generated.

4.5.4.1 Crash Trace operation

If trace is enabled FMB will collect acceleration data every 40 msec.

4.5.4.2 Blue-tooth

Blue-tooth can work in two modes - *slave* or *master*.

While working as *master* mode - Blue-tooth can connect to defined "*hand free*" or "*OBDII*" system.

While working as *slave* mode - Blue-tooth can accept incoming connection from external device.

4.6 Blue-tooth

Blue-tooth can work in two modes - *slave* or *master*.

While working as *master* mode - Blue-tooth can connect to defined "*hand free*" or "*OBDII*" system.

While working as *slave* mode - Blue-tooth can accept incoming connection from external device.

5 CONFIGURATION

5.1 Configurator

New FMB010 module has default factory settings. Settings should be changed according to your application and your GSM operator information.

FMB010 configuration may be performed via SMS commands or configurator.

FMB010 has one user editable profile.

It can be configured to acquire and send data to server. If device is not able to send data to server, GSM is not available FMB010 will start storing records to flash memory. It is possible to store up to 2.900 000 data records with 128mb SD memory card. It will send data later when GPRS is available again. Note that FMB010 can have memory full of records. In such case it will start deleting oldest records in order to save new ones. Sending all data records to server may take some time.

FMB010 configuration is performed via FMB010 Configurator program. Contact sales manager to get the latest FMB010 Configurator version. FMB010 configurator operates on Microsoft Windows OS and uses MS .Net Framework 3.5 or higher. Please ensure that MS .Net Framework 3.5 or later is installed on your PC before starting configurator. Latest MS .Net Framework version can be downloaded from official Microsoft web page.

Module configuration is performed over USB cable or Blue-tooth connection. Configuration process starts from starting FMB010 Configurator program and then connecting to FMB010 device via Connect button located in Online menu part. FMB010 has one user editable profile, which can be loaded from device, and saved. User can also revert to default settings, by pressing Reset to defaults button. After any modification of configuration settings it has to be saved to FMB010 device, otherwise it will not be written to device.



Note: It is not recommended to downgrade firmware. We can't guarantee that all functions will be working correctly - it is possible that in old firmware versions there won't be some functions.

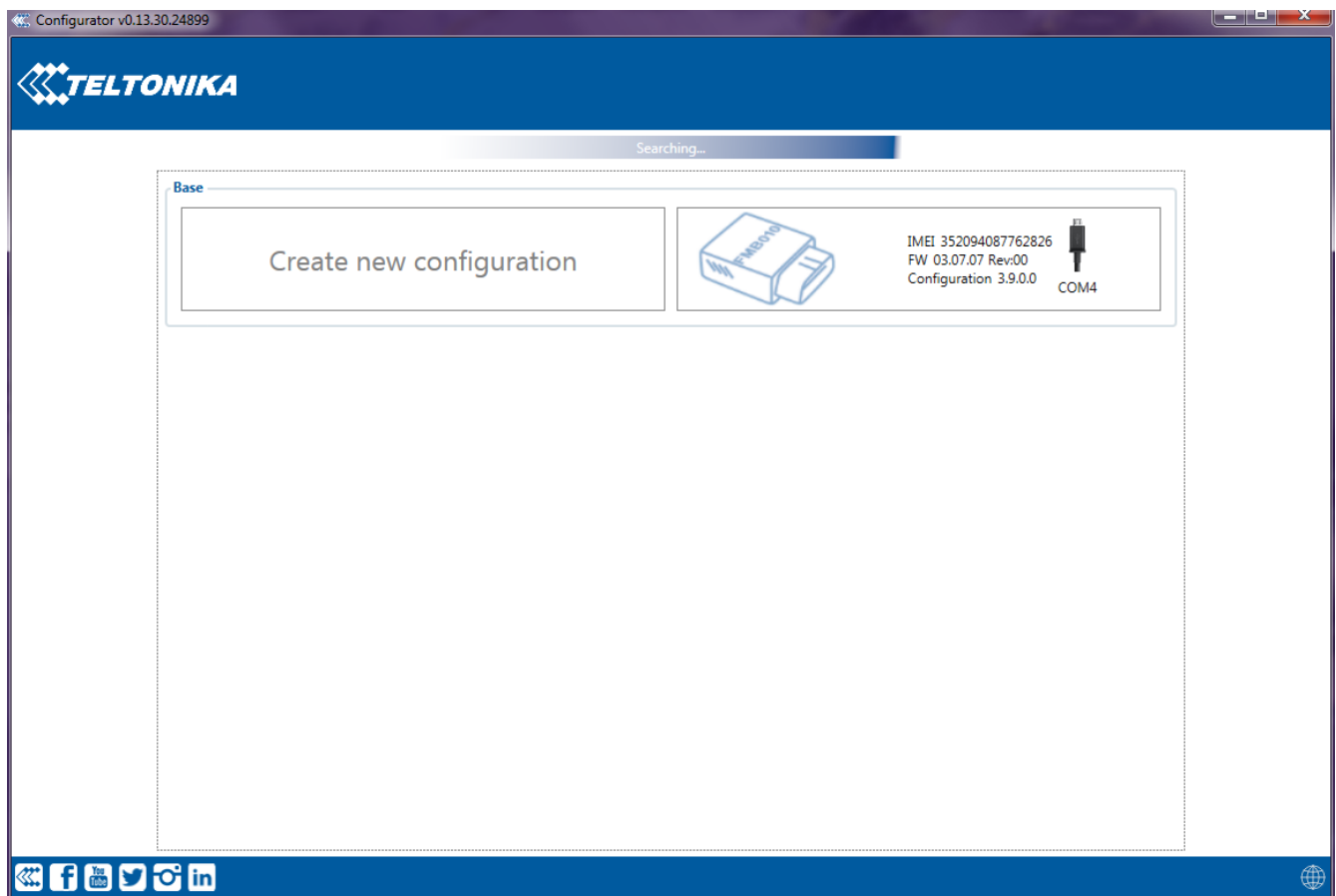
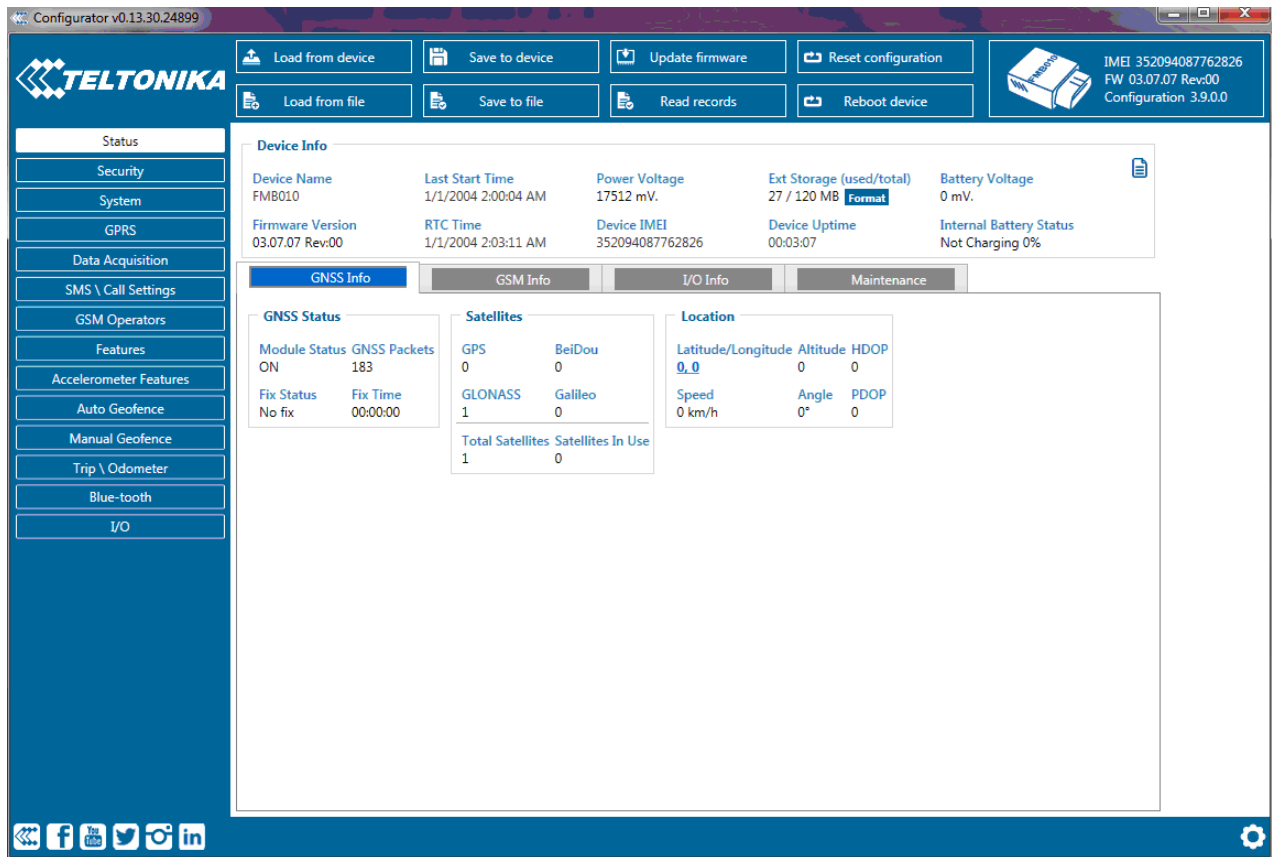


Figure 8 Configurator main window

5.2 Status tab



The screenshot shows the TELTONIKA Configurator v0.13.30.24899 Status tab. The interface includes a top toolbar with buttons for 'Load from device', 'Save to device', 'Update firmware', 'Reset configuration', 'Load from file', 'Save to file', 'Read records', and 'Reboot device'. A top right panel displays device information: IMEI 352094087762826, FW 03.07.07 Rev:00, and Configuration 3.9.0.0. The main content area is divided into several sections:

- Device Info:** A table showing device details.

| | | | | |
|------------------|---------------------|-----------------|------------------------------------|-------------------------|
| Device Name | Last Start Time | Power Voltage | Ext Storage (used/total) | Battery Voltage |
| FMB010 | 1/1/2004 2:00:04 AM | 17512 mV. | 27 / 120 MB Format | 0 mV. |
| Firmware Version | RTC Time | Device IMEI | Device Uptime | Internal Battery Status |
| 03.07.07 Rev:00 | 1/1/2004 2:03:11 AM | 352094087762826 | 00:03:07 | Not Charging 0% |
- GNSS Info:** A tabbed interface with sub-sections:
 - GNSS Status:**

| | |
|---------------|--------------|
| Module Status | GNSS Packets |
| ON | 183 |
| Fix Status | Fix Time |
| No fix | 00:00:00 |
 - Satellites:**

| | |
|------------------|-------------------|
| GPS | BeiDou |
| 0 | 0 |
| GLONASS | Galileo |
| 1 | 0 |
| Total Satellites | Satellites In Use |
| 1 | 0 |
 - Location:**

| | | |
|--------------------|----------|------|
| Latitude/Longitude | Altitude | HDOP |
| 0, 0 | 0 | 0 |
| Speed | Angle | PDOP |
| 0 km/h | 0° | 0 |
- GSM Info, I/O Info, and Maintenance:** These tabs are currently inactive.

The left sidebar contains a menu with options: Status, Security, System, GPRS, Data Acquisition, SMS \ Call Settings, GSM Operators, Features, Accelerometer Features, Auto Geofence, Manual Geofence, Trip \ Odometer, Blue-tooth, and I/O. The bottom of the window features social media icons and a settings gear.

Main Buttons description:

- 'Load from file' – loads saved configuration.
- 'Load from device' – loads configuration from device.
- 'Save to file' – saves configuration.
- 'Save to device' – saves configuration to device.
- 'Update firmware' – updates firmware button.
- 'Read records' – saves records from device to *.bin file.
- 'Reset configuration' – reset device's configuration to default.
- 'Reboot device' – reboots device.

In Status bar, there is also 4 tabs available:

- GNSS info;
- GSM info;
- I/O info;
- Maintenance. – Log from SD/internal memory and accelerometer is available here.

| | | | | | |
|------------------------|---|--|--------------------------------|---|--|
| Status | Device Info | | | | |
| Security | Device Name FMB001 | Last Start Time 1/1/2004 2:00:12 AM | Power Voltage 15034 | Ext Storage (used/total) 6 / 122 MB Format | Battery Voltage 0 |
| System | Firmware Version 03.18.15 Rev:00 | RTC Time 1/1/2004 3:00:03 AM | Device IMEI 352093084698173 | Device Uptime 00:59:49 | Internal Battery Status Not Charging 0% |
| GPRS | GNSS Info GSM Info OBD I/O Info Maintenance | | | | |
| Data Acquisition | Log / Dump | | | | |
| SMS \ Call Settings | Log Open directory | | | | |
| GSM Operators | Dump Open directory | | | | |
| Features | Accelerometer | | | | |
| Accelerometer Features | Read Open directory | | | | |
| Auto Geofence | | | | | |
| Manual Geofence | | | | | |
| Trip \ Odometer | | | | | |
| Bluetooth | | | | | |
| Bluetooth 4.0 | | | | | |
| I/O | | | | | |
| OBD II | | | | | |

Log/Dump

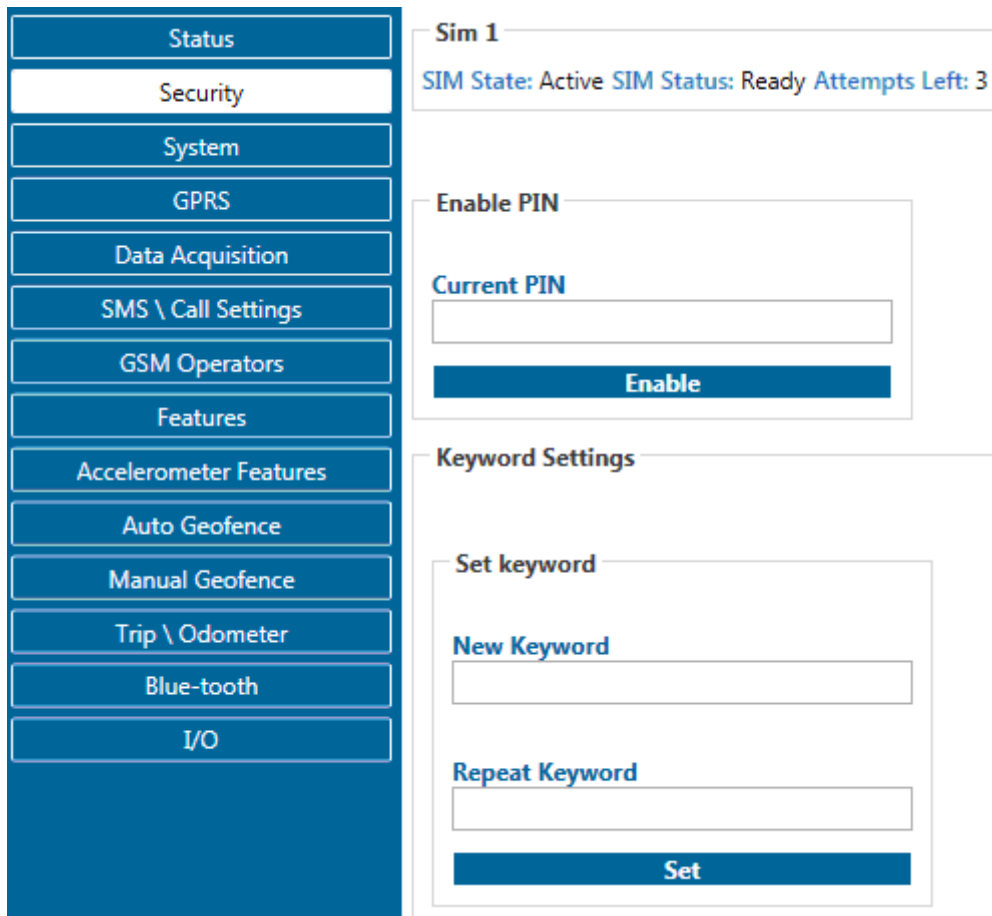
To make a log, just press on “Log” button in the Maintenance tab and device will start to collect log for 10 minutes. After that – it will save it into “My Documents” on your PC, “Open directory” button will guide you to the file.

“Dump” button will download all the Dump files from device memory and save them into the folder, “Open directory” button will guide you to the file.

Accelerometer

Readout accelerometer data for a second with 25 Hz frequency. “Open directory” button will guide you to the file.

5.3 Security tab



Keyword SMS (GPRS) commands:

"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}{space}<newkeyword>

Change keyword (change):

<name>{space}<pass>{space}setkey{space}<oldkeyword>{space}<newkeyword>

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

Example:

<name>{space}<pass>{space}setkey{space}<keyword>

Keyword configuration with TCP

Param ID 10 used for keyword configuration. Configuration should not be locked. Send empty if want delete the keyword, or not empty if want change/set

Param ID 10 config reading from SMS/GPRS forbidden.

5.4 System settings

System settings 9 configurable parameters:

1. Sleep settings, where user can choose sleep mode;

2. Ignition source, where user can choose between power voltage, digital input 1 and accelerometer ignition sources
3. Object Motion Detection Settings, where user can configure 3 ways how FMB010 will detect stopped movement, and change its working mode (for working modes, read section 5.8);
4. Static navigation settings, where user can turn static navigation on or off;
5. Static navigation source, where user can choose according to which source static navigation will work.
6. Records Settings, where user can enable or disable records when GPS is not available (no time synchronization);
7. GNSS source Settings, where user can choose satellite system.
8. LED indication, where user can turn on or off indication LEDs.
9. Battery charge mode, where user can choose when battery charger is turned on.

Functional purpose

Battery charge mode “On Need” - Enable battery charger any time when needed.
 “After Ignition ON” - Charger can be enabled after ignition is turned on, except if battery is fully charged or 10 minute timeout has not passed since device was turned on for faster FIX receiving.

10. Time synchronization mode, where you can choose how time synchronization is done. Possible values:
 - a) Disable (GPS only) – time is synchronized only from GNSS satellites
 - b) NITZ – time is synchronized from GNSS satellites or GSM operator (not all GSM operators support this functionality)
 - c) NTP – time is synchronized from GNSS satellites or NTP servers.
 - d) NITZ+NTP – time can be synchronized from GNSS satellites, GSM operator or NTP server

If necessary, you can configure your NTP servers and how often device should resynchronize time from NTP (NTP Resync parameter).

Table 5 Configuration parameters

| Movement Source | Vehicle on Stop mode | Vehicle Moving mode |
|-------------------------------|---|--|
| Ignition (recommended) | If ignition (DIN1) is logic low | If ignition (DIN1) is logic high |
| Movement (movement sensor) | Internal movement sensor does not detect movement | Internal movement sensor detects movement |
| GPS | GPS fix is available and vehicle speed is lower than 5 km/h | GPS fix is available and vehicle speed is higher than 5 km/h |
| | While GPS fix is unavailable, Object Motion Detection Settings are working like in Msensor mode | |

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 on GPS data. If Static navigation filter is enabled, it will filter changes in GPS position if no movement is detected

(depends on Object Motion Detection Settings). It allows filtering GPS jumps when object is parked (is not moving) and GPS position is still traced.

System Settings

Movement Source

| | |
|----------|-----------------|
| Ignition | Movement |
| GPS | |

Records Saving/Sending Without TS

| | |
|---------------------------|--------|
| After Position Fix | Always |
| After Time Sync | |

LED Indication

| | |
|---------|---------------|
| Disable | Enable |
|---------|---------------|

GNSS Source

| | |
|---------|----------------|
| BeiDou | GLONASS |
| Galileo | GPS |

Battery Charge Mode

| | |
|----------------|-------------------|
| On Need | After Ignition ON |
|----------------|-------------------|

Sleep Mode

Sleep Settings

| | |
|-------------------|-------------------|
| Disable | GPS Sleep |
| Deep Sleep | Online Deep Sleep |
| Ultra Sleep | |

Timeout (min)

Ignition Source

Ignition Settings

| | |
|----------------------|---------------|
| DIN 1 | Accelerometer |
| Power Voltage | |

High Voltage (mV)

Low Voltage (mV)

Movement Start Delay (s)

Movement Stop Delay (s)

Static Navigation Settings

Static Navigation

| | |
|---------|---------------|
| Disable | Enable |
|---------|---------------|

Static Navigation Source

| | |
|------------------------|-----------------|
| Movement Source | Ignition Source |
|------------------------|-----------------|

Time Synchronization

Synchronization Settings

| | |
|--------------------|-----------------|
| Disable (GPS only) | NITZ+NTP |
| NTP | NITZ |

NTP Resync (h)

NTP Server 1

NTP Server 2

Figure 9 System settings configuration

In GNSS source Settings user can configure which GNSS system or systems to use.

User has choice to use only one system of GPS, Glonass, Galileo or Beidou. Also it is able to choose two or three systems together. One exception is that you can not combine Beidou and Glonass systems together.

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 |

List of **NON**–configurable GNSS sources:

Glonass+Beidou
Galileo+Glonass+Beidou
Gps+Glonass+Beidou
GPS+Galileo+Glonass+Beidou

GNSS source

| | |
|---------|---------|
| Beidou | Glonass |
| Galileo | Gps |

Example of a good configuration

GNSS source

| | |
|---------|---------|
| Beidou | Glonass |
| Galileo | Gps |

Example of a bad configuration

5.5 GSM settings, GPRS part

'GPRS' defines main parameters for FMB010: GSM operator APN and GPRS username and password (optional – depending on operator), destination server IP and port, and allows to set protocol used for data transfers – TCP or UDP. Also all server setting and backup server mode can be selected for backup server configuration.

Backup server has 3 different modes:

- Disable: backup server is not used.
- Backup: send to backup server if main server not available (Failed to open Link) or, main server response timeout is detected 5 times in row.
- Duplicate: send records to both servers (main and backup), delete record from sd card (or RAMS) only if both servers accepted records.

Some operators use specific authentication for GPRS session – CHAP or PAP. If any of these is used, APN should be entered as 'chap:<APN>' or 'pap:<APN>'. I.e. if operator is using APN 'internet' with CHAP authentication, it should be entered as 'chap:internet'. Information about APN and authentication type should be provided by your GSM operator.

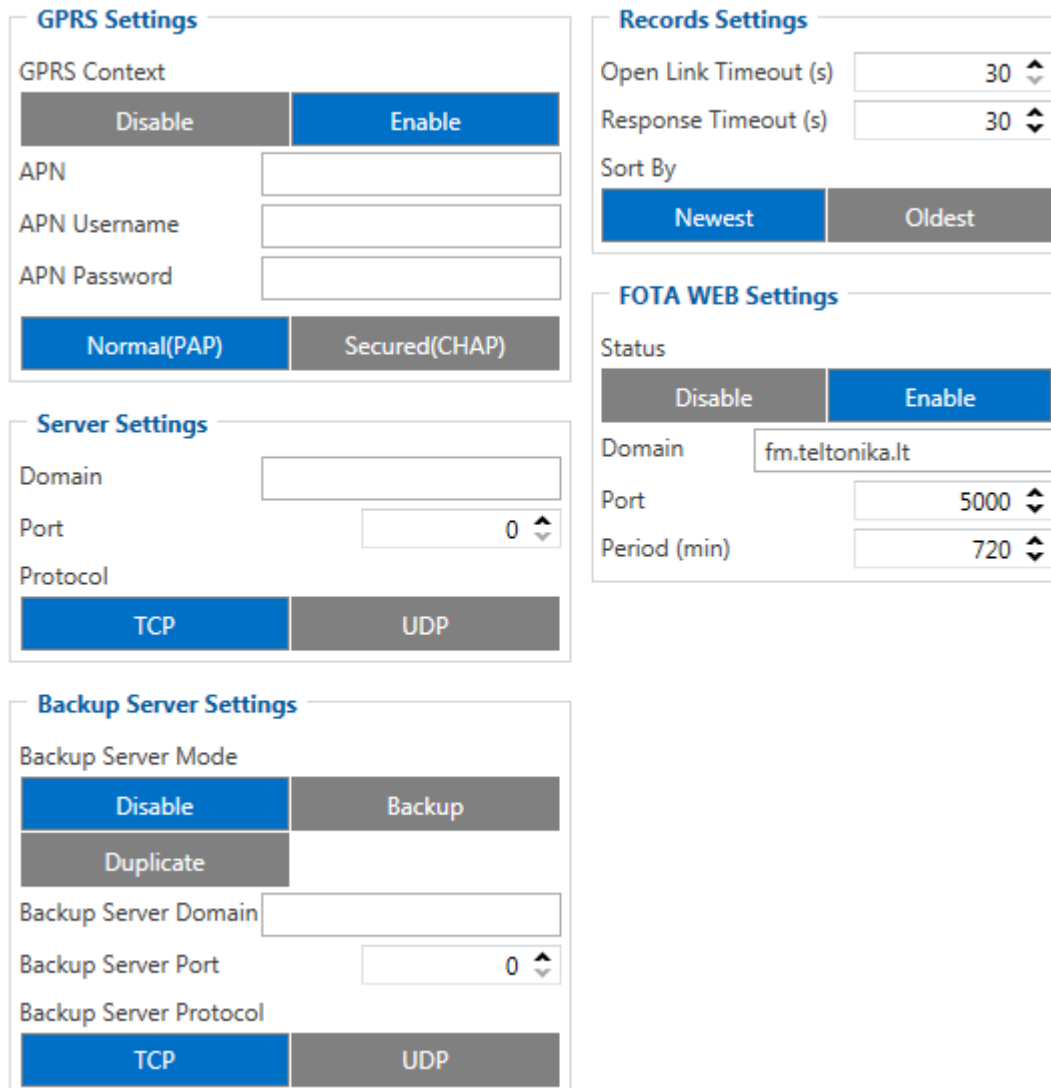
Records settings. Here user can modify if FMB010 device will send newest records first, meaning, that the most important thing is to know recent position of car, older records are being sent right after newest records arrive to AVL application.

Activate Data Link Timeout is used to set timeout of link between FMB010 and AVL application termination. If FMB010 has already sent all records it waits for new records before closing link (except Deep Sleep mode, more information in Deep Sleep mode chapter). If new

records are generated in the period of this timeout, and minimum count to send is reached, they are sent to AVL application. This option is useful when GSM operator charge for link activation.

Server Response Timeout is used to set time period waiting for response from server side.

FOTA WEB settings are used for FOTA WEB server connection parameters configuration. Status enables or disables FOTA WEB functionality. In domain and port user can enter address and port number of FOTA website. Period is used for timeout of repeating connection to FOTA WEB server.



The screenshot displays a web-based configuration interface for GPRS settings, organized into five distinct panels:

- GPRS Settings:** Includes a 'GPRS Context' section with 'Disable' and 'Enable' buttons (currently 'Enable' is selected). Below are input fields for 'APN', 'APN Username', and 'APN Password'. At the bottom, there are buttons for 'Normal(PAP)' and 'Secured(CHAP)'.
- Server Settings:** Contains input fields for 'Domain' and 'Port' (set to 0), and a 'Protocol' section with 'TCP' and 'UDP' buttons (currently 'TCP' is selected).
- Backup Server Settings:** Features a 'Backup Server Mode' section with 'Disable', 'Backup', and 'Duplicate' buttons. Below are input fields for 'Backup Server Domain' and 'Backup Server Port' (set to 0), and a 'Backup Server Protocol' section with 'TCP' and 'UDP' buttons (currently 'TCP' is selected).
- Records Settings:** Includes 'Open Link Timeout (s)' and 'Response Timeout (s)' both set to 30, and a 'Sort By' section with 'Newest' and 'Oldest' buttons (currently 'Newest' is selected).
- FOTA WEB Settings:** Contains a 'Status' section with 'Disable' and 'Enable' buttons (currently 'Enable' is selected). Below are input fields for 'Domain' (set to 'fm.teltonika.lt'), 'Port' (set to 5000), and 'Period (min)' (set to 720).

Figure 11 GPRS configuration

5.6 SMS/Call Settings

Essential fields in 'SMS' part are 'Login' and 'Password'. The login and password are used with every SMS sent to FMB010. If login and password are not set, in every SMS sent to FMB010 device two spaces before command have to be used (<space><space><command>).

Command structure with set login and password:

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

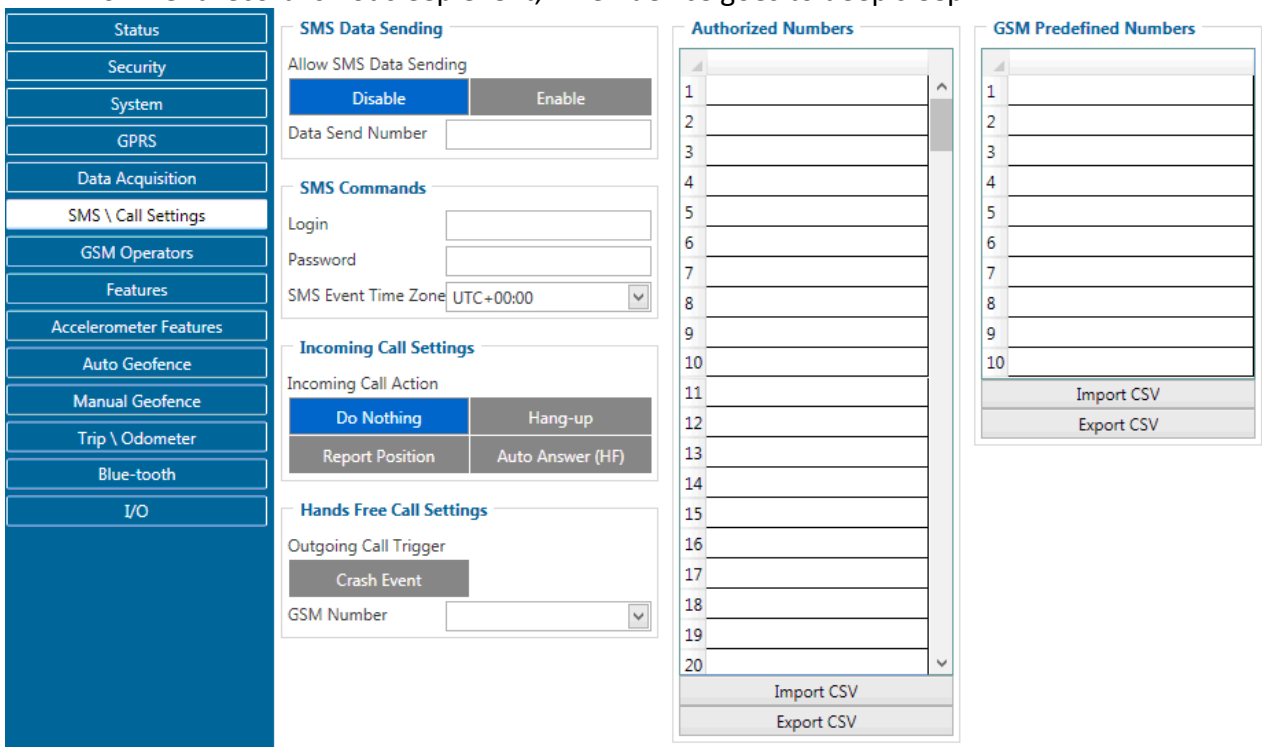
Phone numbers have to be written in international standard, without using "+" or without using it (in both cases number will be recognized, but when number is without "+" symbol, it will

not generate IDD Prefix, which depends on location of phone). If no numbers are entered, configuration and sending commands over SMS are allowed from all GSM numbers.

SMS data sending settings – enable or disable **periodic** data and event SMS usage. This setting does not affect replies to SMS request messages – answers are always sent back to sender telephone number.

Device will send periodical or event record via sms to server, when these conditions are met:

1. Panic event is generated;
2. Modem ready and connected to operator;
3. GSM number, to which data will be sent, is configured in device;
4. Sms data sending is enabled;
5. no connection with server via GPRS;
6. Event record is not sleep event, when device goes to deep sleep.



The screenshot displays the 'SMS \ Call Settings' configuration page. On the left is a vertical menu with options: Status, Security, System, GPRS, Data Acquisition, SMS \ Call Settings (selected), GSM Operators, Features, Accelerometer Features, Auto Geofence, Manual Geofence, Trip \ Odometer, Blue-tooth, and I/O.

The main content area is divided into several sections:

- SMS Data Sending:** Includes a toggle for 'Allow SMS Data Sending' (currently set to 'Disable'), a 'Data Send Number' input field, and a 'Disable' button.
- SMS Commands:** Includes 'Login' and 'Password' input fields, and an 'SMS Event Time Zone' dropdown menu set to 'UTC+00:00'.
- Incoming Call Settings:** Includes an 'Incoming Call Action' section with buttons for 'Do Nothing', 'Hang-up', 'Report Position', and 'Auto Answer (HF)'. The 'Do Nothing' button is highlighted.
- Hands Free Call Settings:** Includes an 'Outgoing Call Trigger' dropdown menu set to 'Crash Event' and a 'GSM Number' input field.
- Authorized Numbers:** A list of 20 input fields for authorized numbers, with 'Import CSV' and 'Export CSV' buttons at the bottom.
- GSM Predefined Numbers:** A list of 10 input fields for predefined numbers, with 'Import CSV' and 'Export CSV' buttons at the bottom.

Figure 12 SMS/Call configuration

Incoming call Settings

This parameter defines device's actions on incoming calls. Possible options:

Do Nothing – device will ignore incoming calls.

Hang-up – device hand up incoming calls.

Report position – device will send sms with it's GNSS position to caller number and hand up the call.

Auto answer – device will answer the call with paired Hands Free device. No need to press the button on.

Hands free call functionality

When FMBXX is connected to hands free headset it can call to user defined GSM numbers.

Outgoing Call Trigger parameter determines which event will triggers call. FMBXX supports four different call triggers:

- Crash Event – crash event triggers call to user selected GSM number.

SMS Event Time Zones

FMB010 works with synchronized GPS time which is UTC+0, with this option customer can configure his time zone and get SMS with correct time.



Note: Please do not set Data Send Number to some cell phone number, because it will not understand binary SMS. When sending a binary SMS to a phone number, which is a server phone number, the server can interpret and understand binary code, so the data can be read and you can view it on the server.



SMS login and password and authorized number list are used to protect FMB010 module from unauthorized access. Module accepts messages only from a list of authorized numbers and with proper module login and password. Numbers must be without “+” or “00” prefix. If no authorized numbers are entered, module accepts messages from all numbers.

SMS events

SMS events functionality allows FMB010 to send a configured SMS when an event is triggered. This event can be triggered by ever I/O element.

Then any of the I/O elements is triggered, FMB010 sends a configured SMS message to a defined phone number. If SMS events is activated, but there are no numbers defined in SMS events PreDefined Numbers list (figure 20), then the device will not send any messages.

The sent SMS messages format is according to:

“Date Time EventText”

For example, if FMB010 is configured to send an SMS, when Ignition reaches High level, with priority High and configured to generate event on both, range enter and exit (figure 21), then the sent SMS is:

“2012/6/7 12:00:00 Ignition 1”

| Status | I/O | Input Name | Current Value | Units | Priority | Low Level | High Level | Event Only | Operand | Avg Const | Send SMS To | SMS Text |
|------------------------|-----|---------------------|---------------|-------|---------------------|-----------|------------|------------|------------|-----------|-------------|---------------------|
| Security | | Ignition | 1 | | None Low High Panic | 0 | 0 | Yes No | On Change | 10 | | Ignition |
| System | | Movement | 1 | | None Low High Panic | 0 | 0 | Yes No | On Change | 1 | | Movement |
| GPRS | | Data Mode | 1 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | | | Data Mode |
| Data Acquisition | | GSM Signal | 5 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | 1 | | GSM Signal |
| SMS \ Call Settings | | Sleep Mode | 0 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | | | Sleep Mode |
| GSM Operators | | GNSS Status | 2 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | | | GNSS Power |
| Features | | GNSS PDOP | 0 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | 10 | | GNSS PDOP |
| Accelerometer Features | | GNSS HDOP | 0 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | 10 | | GNSS HDOP |
| Auto Geofence | | External Voltage | 16001 | mV | None Low High Panic | 0 | 0 | Yes No | Monitoring | 10 | | External Voltage |
| Manual Geofence | | Speed | 0 | km/h | None Low High Panic | 0 | 0 | Yes No | Monitoring | 1 | | Speed |
| Trip \ Odometer | | GSM Cell ID | 3055 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | | | GSM Cell ID |
| Blue-tooth | | GSM Area Code | 1 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | | | GSM Area Code |
| I/O | | Battery Voltage | 0 | mV | None Low High Panic | 0 | 0 | Yes No | Monitoring | 10 | | Battery Voltage |
| | | Battery Current | 0 | mA | None Low High Panic | 0 | 0 | Yes No | Monitoring | 10 | | Battery Current |
| | | Active GSM Operator | 24602 | | None Low High Panic | 0 | 0 | Yes No | Monitoring | | | Active GSM Operator |
| | | Trip Odometer | 0 | m | None Low High Panic | 0 | 5 | Yes No | Monitoring | | | Trip Odometer |

Figure 21 Configured Ignition SMS event

The SMS Text field can be altered and any text can be entered. Maximum message length is 90 symbols (numbers, letters and symbols in ASCII, except for comma “,”).



ATTENTION!

If FMB010 is in Deep Sleep mode and SMS event occurs with LOW priority (which does not wake up FMB010), then the device does not send the message. It is saved in 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 in memory will be sent, but keep in mind that only 10 messages can be saved in memory – all other messages will not be saved, until there is room in device memory.

5.7 GSM settings, Operator list

Operators list – FMB010 can work in different modes (use different settings) according to the operator list defined. Operator list is used for Data Acquisition Mode switching (see chapter 5.8 Data Acquisition Mode settings for more details). Modes are changed based on GSM operator FMB010 is connected to.

Operator Blacklist - if user wants that FMB010 do not connect and work with a particular operator it must be written to Operator BlackList. Total 50 operators can be written to this list. Operator Blacklist working: operator search procedure is initiated as normal every 15 minutes and tries to connect to an operator with 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 operator from black list – best operator search procedure is initiated instantly. During the time when device is connected to Black list operator - no GPRS connection would be initiated and no data would be send via GPRS. The ability to send SMS commands to the device remains. If no suitable operator is found on both lists, the device will try to connect to a remaining available operator with the strongest signal.

Status

Security

System

GPRS

Data Acquisition

SMS \ Call Settings

GSM Operators

Features

Accelerometer Features

Auto Geofence

Manual Geofence

Trip \ Odometer

Blue-tooth

I/O

Roaming Operator List

| | |
|----|---|
| 1 | 0 |
| 2 | 0 |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 0 |
| 9 | 0 |
| 10 | 0 |
| 11 | 0 |
| 12 | 0 |
| 13 | 0 |
| 14 | 0 |
| 15 | 0 |
| 16 | 0 |
| 17 | 0 |
| 18 | 0 |
| 19 | 0 |
| 20 | 0 |

Import CSV

Export CSV

Operator Black List

| | |
|----|---|
| 1 | 0 |
| 2 | 0 |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 0 |
| 9 | 0 |
| 10 | 0 |
| 11 | 0 |
| 12 | 0 |
| 13 | 0 |
| 14 | 0 |
| 15 | 0 |
| 16 | 0 |
| 17 | 0 |
| 18 | 0 |
| 19 | 0 |
| 20 | 0 |

Import CSV

Export CSV

Figure 6 Operators list configuration

If operator list is left empty, it will allow using GPRS to any GSM operator. Please note that FMB010 will work in **Unknown mode only** (make sure it is configured to allow data sending – GPRS context is enabled).

5.8 Features settings

In Features window five different scenarios are available.

34

| |
|------------------------|
| Status |
| Security |
| System |
| GPRS |
| Data Acquisition |
| SMS \ Call Settings |
| GSM Operators |
| Features |
| Accelerometer Features |
| Auto Geofence |
| Manual Geofence |
| Trip \ Odometer |
| Blue-tooth |
| I/O |

Green Driving

Scenario Settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Max Acceleration (m/s²)

Max Braking (m/s²)

Max Cornering (m/s²)

Source

| | |
|-----|---------------|
| GPS | Accelerometer |
|-----|---------------|

Green Driving Duration

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Send SMS To

SMS Text

Over Speeding

Scenario Settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Max Speed (km/h)

Send SMS To

SMS Text

Jamming

Scenario Settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Eventual Records

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Time Until Jamming Event Detection (s)

GNSS Fuel Counter

City Consumption (L/100km)

Highway Consumption (L/100km)

Average Consumption (L/100km)

City Speed (km/h)

Highway Speed (km/h)

Average Speed (km/h)

Correction Coefficient

Fuel Consumption On Idling (L/h)

Higher Speeds Add (%)

Highway Consumption Every (km/h)

Figure 16 Scenarios configuration

5.8.1 Eco/Green Driving

Scenario is activated, when vehicle exceeds one of Max. Acceleration, Max Braking or Max Cornering parameters value. You can configure Max. Acceleration and Max. Braking parameters in m/s² (meter/second²) units and Max. Cornering parameter in rad/s units, the source of data and Duration. Scenario is activated until current Acceleration, Braking or Cornering value decreases below parameter value. Parameters used with ECO driving/Green driving functionality.

| ECO driving/Green driving configuration parameter name | Description |
|--|--|
| ECO driving/Green driving | Enable/Disable ECO driving/Green driving functionality |
| Max Acceleration Force | Value which can be reached while accelerating without triggering harsh acceleration event. |
| Max Braking Force | Value which can be reached while braking without triggering harsh braking event. |
| Max Cornering Force | Value which can be reached while cornering without triggering harsh cornering event. |
| Source | From which source, GNSS or Accelerometer, data will be collected. |

| | |
|----------------------------|--|
| Green/Eco Driving Duration | If enabled, additional record with Green/Eco Driving event duration (ms) will be saved and sent to server. |
|----------------------------|--|

Data Output.

ECO driving/Green driving functionality generates events on three cases. If vehicles:

- Acceleration exceeds defined parameter value
- Deceleration (braking) exceeds defined value
- Cornering force exceeds defined value

Program continuously monitors and process data from accelerometer than decides whether harsh event is detected or not. If any of three cases are satisfied event is generated. Record is saved and sent to server (FMB010 must be configured properly). Event value is multiplied by 10 before sending/saving record to get more precision when displaying **data***.

***Example.** If acceleration harsh event of 3.55 m/s² detected. Record with value 3.55*10 = 35.5 ≈ 36 will be saved and sent to server.
1 m/s² = 0.101972 G; 1 G = 9.80665 m/s²

5.8.2 Accelerometer calibration:

Accelerometer auto calibration functionality has one purpose - determine how FMB device is mounted in a vehicle. After the calibration process "eco driving" functionality becomes active and calibration data will be used to determine harsh acceleration, braking and cornering events.

There are two conditions when auto calibration takes place:

- If on device startup no calibration was detected;
- If the device receives an SMS/GPRS message with "auto_calibrate:set" text.

After functionality has started FMB device periodically checks current appliance GNSS, ignition and movement source parameters and if the conditions match:

- *position fix got;*
- *GNSS speed is zero;*
- *ignition is ON;*
- *first calibration vector was not saved yet;*

Then first vector is taken. Saved vector will be considered as ground vector and it will be used at further calibration calculations.

Note: When FMB device saves first ground vector vehicle must be parked on flat ground. Crooked vector may have an impact on further calculations.

Afterwards first ground vector was taken, device analyses conditions:

- *position fix got;*
- *GNSS speed is at least 20 km/h;*
- *ignition is ON;*

- *second vector was not saved yet;*
- *vehicle driving in the same direction with 5° tolerance;*
- *vehicle speed increase by 7km/h within 1 second.*

For next vector. Second vector will be taken if all conditions match. Immediately after second vector is received, it will be multiplied by first (*ground*) vector, the result of these vectors is vector multiplication cross product which is the right side of a car. By using same vector multiplication method, device front, left side will be calculated. At this point calibration is successfully ended as indication device sends an SMS/GPRS message with *"Device is calibrated, to recalibrate send:auto_calibrate:set"*.

Note: SMS/GPRS message will be sent only if auto calibration functionality was triggered by SMS/GPRS message.

For user convenience in case auto calibration functionality fails then notification message will be sent. For exact messages, check algorithm section.

Note: SMS/GPRS message will be sent only if auto calibration functionality was triggered by SMS/GPRS message.

To get current calibration status *"auto_calibrate:get"* SMS/GPRS command must be sent to the device. If device is calibrated it will respond with *"Calibration state: calibrated"* or otherwise *"Calibration state: not calibrated"*. Also this command returns saved Ground and Side vectors.

After every TRIP START event, device starts shadow calibration. This type of calibration is running in parallel with already saved vectors (this means that vectors does not reset until shadow calibration have both new vectors). After shadow calibration is done, device updates the vector values to the new ones. There are two conditions when shadow calibration does not run at TRIP start event:

- Normal calibration is still running.
- Shadow calibration is still running from previous TRIP event.

To take ground vector these conditions should be met:

- Ignition is ON
- Device got GPS FIX
- Vehicle speed = 0km/h

Device will check these conditions every 1sec until they will pass.

To take side vector these conditions should be met:

- Vehicle speed ≥ 20 km/h
- Device got GPS FIX
- Ignition is ON
- Device angle does not change more than 5 degrees in past 1 sec
- Speed need to increase by 7km/h in 1s period.

Device will check these conditions every 1 sec until they will pass.

5.8.3 Over Speeding

Scenario is activated, when vehicle speed exceeds parameter value. Scenario is activated until current speed decreases below parameter value.

5.8.4 Jamming

Scenario is activated(event sent to server), when jamming is detected.

5.8.5 GPS Fuel Counter

Configuration of Fuel Consumption (Figure 7)

1. To configure these parameters use fuel consumption data, which is stated in your car technical documentation. By default speeds for this fuel consumption norms are: City – 30 km/h, Average – 60 km/h, Highway - 90 km/h. If you want, you can change it.

2. When speed is higher than highway speed, FMB010 adds highway fuel consumption x % of highway fuel consumption every y km/h, by default FMB010 adds 20% every 50 km/h. It means that fuel consumption is (1.2 * Highway Fuel Consumption) on 140 km/h speed, (1.4 * Highway Fuel Consumption) on 190 km/h speed.

3. Correction coefficient is used for correction of every fuel consumption value which is sent to server (Used Fuel * Correction coefficient). By default it is 1, min 0.01 and max 2. For example when correction coefficient is 1 and FMB010 calculates that used fuel for 35 m distance is 20 ml, sent value will be 20 ml; if correction coefficient is 1.2, sent value will be 20 * 1.2 = 24 ml.

4. Fuel consumption on idling is used to calculate fuel consumption when ignition is on, but vehicle speed is 0 km/h. By default it is 1 l/h, min 0 and max 5 l/h. Almost in all diesel cars this parameter is less than 1.0 l/h. In gasoline cars this parameter is about 1.5 – 2.0 l/h.

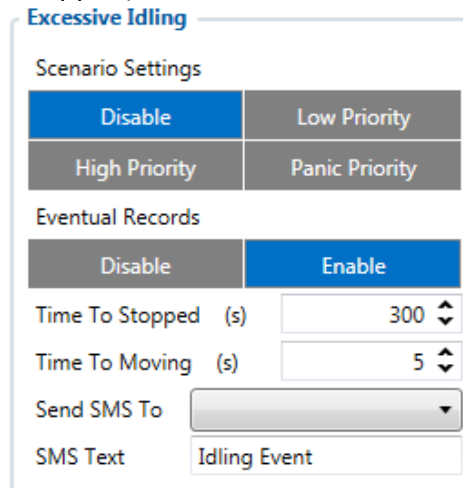
| GNSS Fuel Counter | |
|----------------------------------|----|
| City Consumption (l/100km) | 0 |
| Highway Consumption (l/100km) | 0 |
| Average Consumption (l/100km) | 0 |
| City Speed (km/h) | 30 |
| Highway Speed (km/h) | 90 |
| Average Speed (km/h) | 60 |
| Correction Coefficient | 1 |
| Fuel Consumption on Idling (l/h) | 1 |
| Higher Speeds add (%) | 20 |
| Highway Consumption every (km/h) | 50 |

Figure 7 GPS fuel counter settings

5.9 Scenarios Accelerometer

5.9.1 Excessive Idling

Scenario is activated, when vehicle stops for specific amount of time. You can configure time it takes to turn on this scenario (Time to Stopped). Scenario is activated until vehicle starts moving and keeps moving for amount of time that is configured. You can configure time it takes to turn OFF this scenario (Time to Stopped).



The image shows a configuration window titled "Excessive Idling". It contains two sections: "Scenario Settings" and "Eventual Records".

Scenario Settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Eventual Records

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Time To Stopped (s)

Time To Moving (s)

Send SMS To

SMS Text

Figure 8 Excessive Idling

5.9.2 Towing detection

FMB010 activates towing function when these conditions are met:

- Ignition (configured Ignition Source) is OFF
- Activation Timeout (set in Towing detection features) is reached

When Activation Timeout is reached and Ignition is still in OFF state, FMB010 monitors accelerometer data. If Acceleration or Angle value reaches configured threshold for configured Duration (in ms), check Ignition state. If Ignition is still OFF during configured "Ignition check after Event Timeout" time, then event is generated. If configured - sends sms event or makes a call. Function will be reactivated after FMB010 again detects change of Ignition state from ON to OFF.

Towing Detection

Scenario settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Eventual Records

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Activation Timeout (min)

5

Event Timeout (s)

0

Make Call (Sms Event Number ID)

0

Treshold (mg)

0.22

Angle (deg)

1

Duration (ms)

1000

Figure 9 Towing detection configuration

Activation timeout – Activation timeout is time after which FMB010 turns ON Towing detection function if other requirement is met (Ignition OFF state detected). It is measured in minutes.

Ignition check after event – defines time period (in seconds) to check ignition state when Acceleration or Angle value reach. If towing event is generated during this time period, it is skipped. It allows to filter out redundant towing events while entering the car.

Make Call to – if function enabled makes call to specified phone number (configured in pre defined numbers)

Acceleration, Angle – values used to detect towing when ignition is OFF

Duration – defines time period to check Acceleration, Angle values.

5.9.3 Unplug Detection

Eventual event will be generated when FMB010 is unplugged from OBD socket.

Unplug Detection

Scenario settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Eventual Records

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Unplug Detection Mode

| | |
|---------|--------|
| Disable | Simple |
|---------|--------|

Figure 10 Unplug detection

5.9.4 Crash detection

Crash Detection

Scenario Settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Duration (ms)

Threshold (mg)

Send SMS To

SMS Text

Crash Trace

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Figure 11 Crash Detection

Crash Detection functionality can be set according to these settings:

- Threshold (mg)
- Duration (ms)

If accident happens and FMB010 detects acceleration value higher than set threshold value during set time period, then device will generate an event. Threshold and duration values are set depending of accident power which you want to detect. FMB010 can detect a slight tapping on the device (Threshold=100mg, Duration=1ms) or can detect severe accident (Threshold=4000mg, Duration=5ms)..

5.9.5 Crash Trace operation

If trace is enabled FMB will collect acceleration data every 40 msec. Buffer is big enough to hold data for 5 seconds and on Crash Event detection, records will be generated from this buffer, following these conditions:

- Every second
- Acceleration changed more then > 50mG

Data will be collected and records generated 5 seconds after the event using the same conditions.

Every generated record will have accelerometer X Y Z values included. Each record will have accurate timestamps in milliseconds (for detailed crash trace record structure refer to FMB010 protocol document).

Usually between 20 to 30 records is generated on crash event detection.

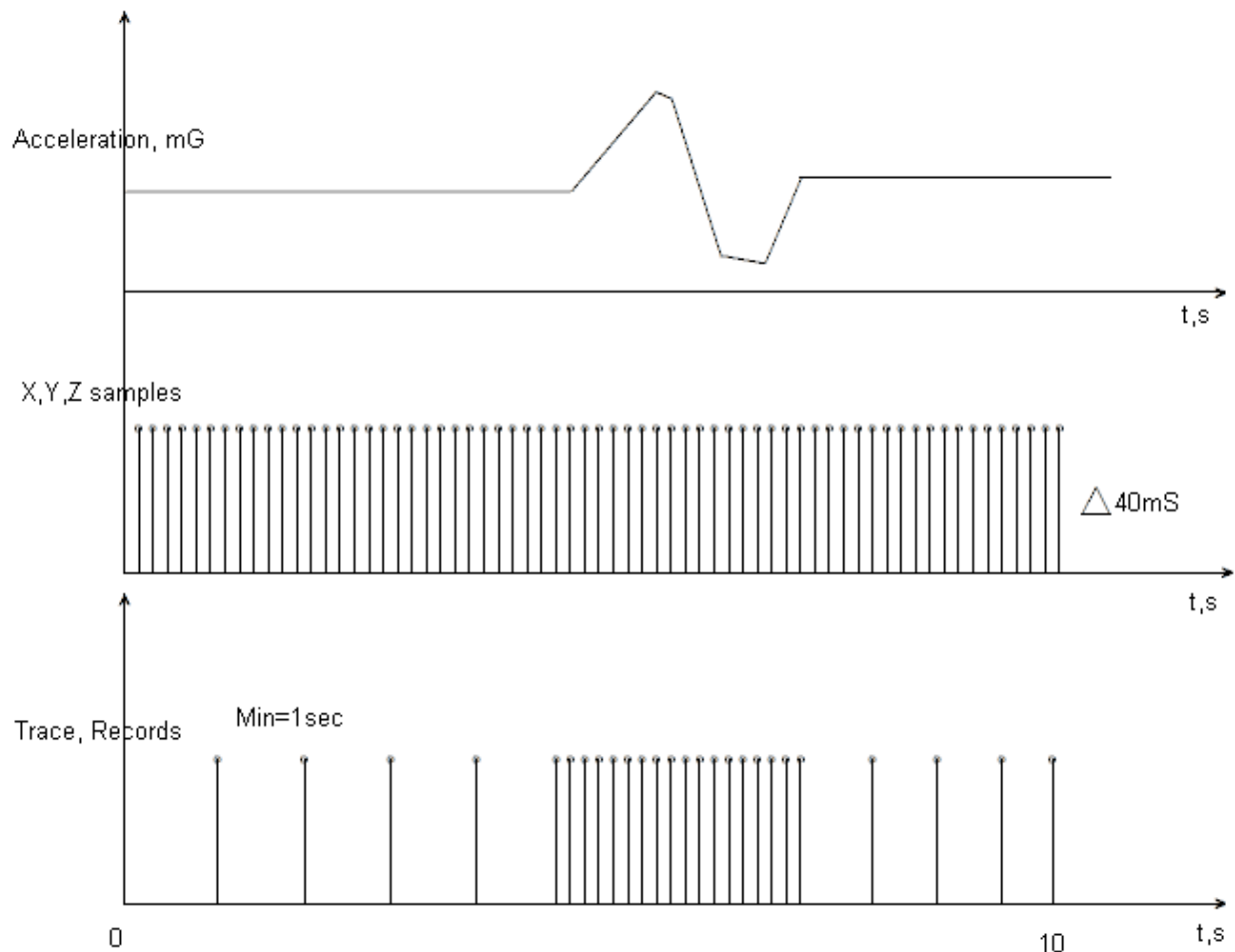


Figure 12 Example of Crash Trace logic

5.10 AutoGeofencing settings

AutoGeofence – the last known position after movement = off. If your car's being taken away – you can be notified. The shape and size of the geofence zones are parameters. It is possibility to state whether entering in or out of the geofence triggers an asynchronous message.

AutoGeofencing option can be configured by following parameters visible in figure 19 below.

Activation TMO – Time period before Geofence is activated after vehicle stops.

Deactivate By:

Ignition – If ignition becomes high it will disable AutoGeofence Zone;

Power Voltage – if power voltage enters entered value it will disable AutoGeofence Zone.

Digital input 1 – if digital input is triggered it will disable AutoGeofence Zone.

Feature – Priority of generated event, which will be applied to saved record.

Enter Event – Event generation on Geofence entrance.

Exit Event – Event generation on Geofence exit.

On Both - Event generation on Geofence entrance Or exit

Eventual Records – Enable or Disable Eventual Records functionality.

Note that AutoGeofencing does not require entering coordinates, instead it requires GPS visibility. If vehicle stopped and activation timeout has passed, an AutoGeofence will be created around vehicle's last position with set Radius value.

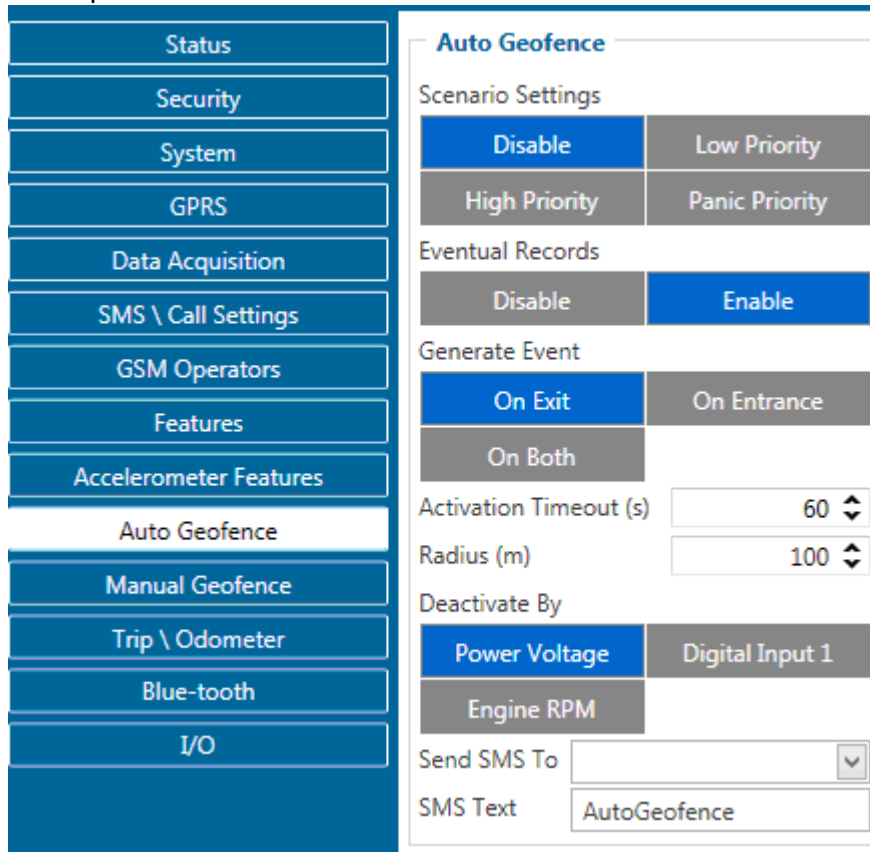


Figure 19 Geofence configuration

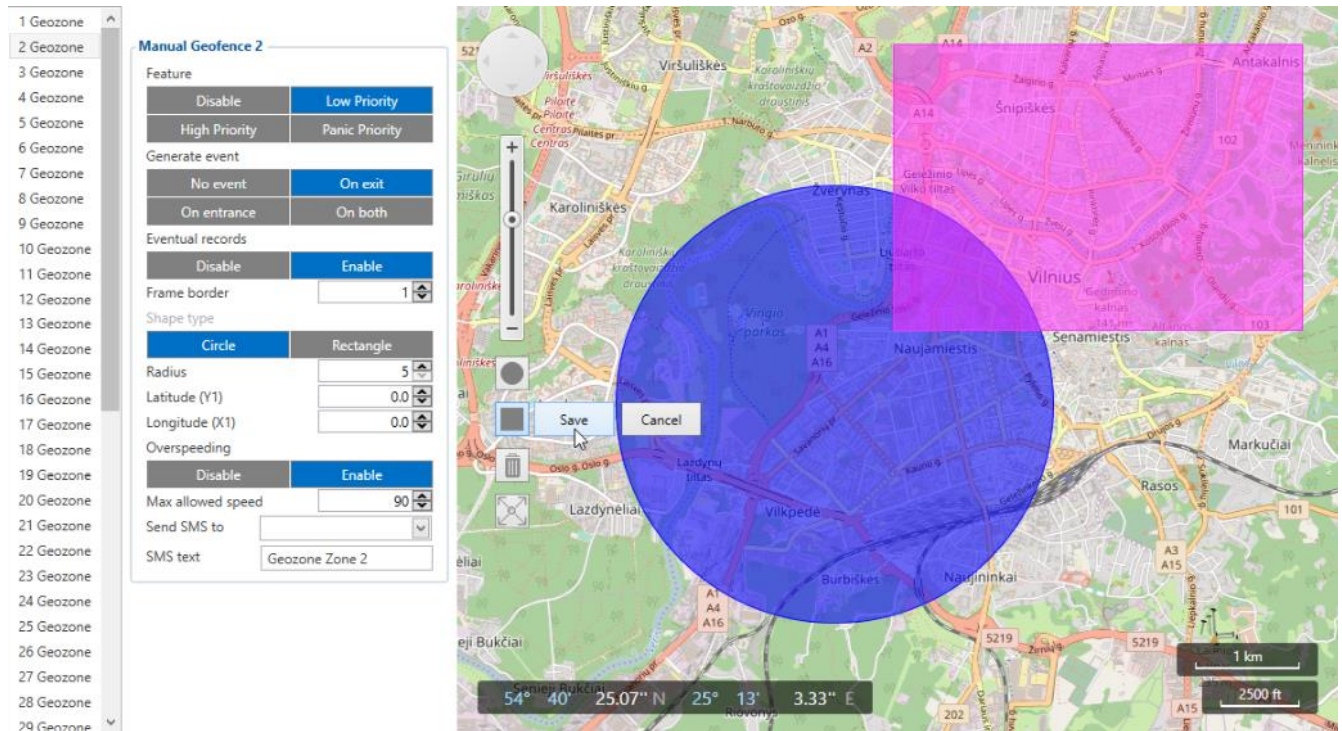


Figure 27 Geofence configuration

5.12 Trip settings

Trip scenario offers user to configure Trip feature.

Start Speed – GPS speed has to be greater than the specified Start Speed in order to detect Trip Start.

Ignition Off Timeout – timeout to wait if ignition was off, to detect Trip stop.

Continuous distance counting – Not or Continuous can be chosen. For this feature I/O Odometer must be enabled.

Odometer calculation source – parameter by which distance will be calculated.

Odometer value – calculation start point can be set here, so that vehicle and device odometer would match

If I/O Odometer is enabled and Continuous distance counting variable (Mode) is set to Continuous, **Trip distance** is going to be counted continuously (**from Trip start to Trip stop**). This value is written to I/O Odometer value field. When Trip is over and next Trip begins, Odometer value is reset to zero. When the next trip starts counting continuously starts from the beginning again.

If I/O Odometer is enabled and Continuous Distance Counting variable (Mode) is set "Between Records", then the distance is going to be counted only between every record made. This value is written to I/O Odometer value field and reset to zero every new record until Trip stops. If later all Odometer values are summed up manually, the user gets the distance driven during the whole period of the Trip.

Trip Settings

Scenario Settings

| | |
|---------------|----------------|
| Disable | Low Priority |
| High Priority | Panic Priority |

Eventual Records

| | |
|---------|--------|
| Disable | Enable |
|---------|--------|

Mode

| | |
|------------|-----------------|
| Continuous | Between Records |
|------------|-----------------|

Start Speed (km/h)

Ignition OFF Timeout (s)

Send SMS To

SMS Text

Advanced Trip Settings

Eco Score Allowed Events

Odometer

Odometer Value (km)

Figure 17 Trip configuration

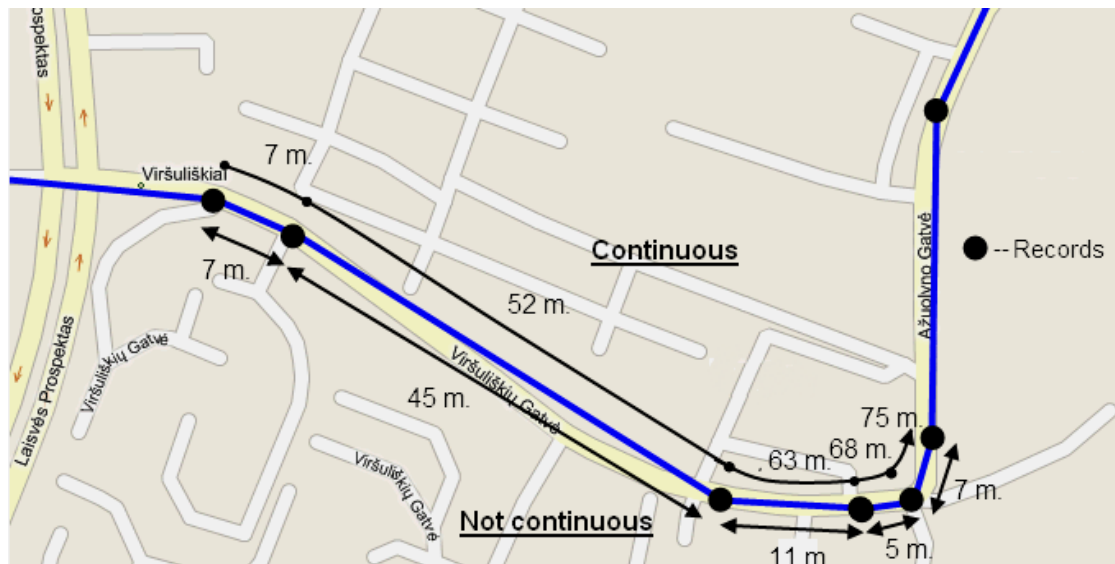


Figure 18 Trip continuous distance counting parameter example

Advanced Trip Settings

Advanced trip settings allow configure number of Eco Score allowed events in 100 km and enable or disable iButton remember functionality.

Eco Score allowed events – how much ECO events is allowed in 100 km. I/O Eco score must

be enabled to get value into server. ECO scoring is differentiated by separate Trips.
There are six ECO evaluation events:

- Harsh acceleration
- Harsh braking
- Harsh cornering
- Over-speeding (count only events with value 1 (start) and ignore value 0(end))
- Excessive Idling (count only events with value 1 (start) and ignore value 0(end))
- High RPM

Eco score value can be from 10 (excellent) to 0.00 (very bad):

- Excellent 8.00 – 10
- Good 6.00 – 7.99
- Not Good 4.00 – 5.99
- Bad 2.00 – 3.99
- Very Bad 0.00 – 1.99

Score evaluation is calculated like this:

Eco score = $10 / ((\text{Total events}) / (\text{Trip distance in km} * \text{Allowed events per km}))$

Allowed events per km = $(\text{Eco Score allowed events} / 100)$



Note: when Total events < 1, we ignore formula and then Eco score is equal to 10.

If Eco Score allowed events is configured to 0, then Eco score value can have only two values: 0 (when total events > 0) or 10 (when total events = 0).



Note: Score is updated every 1km driven or 5 minutes of trip duration.

Odometer

Odometer Value –sets starting total odometer value.

5.13 Blue-tooth

General

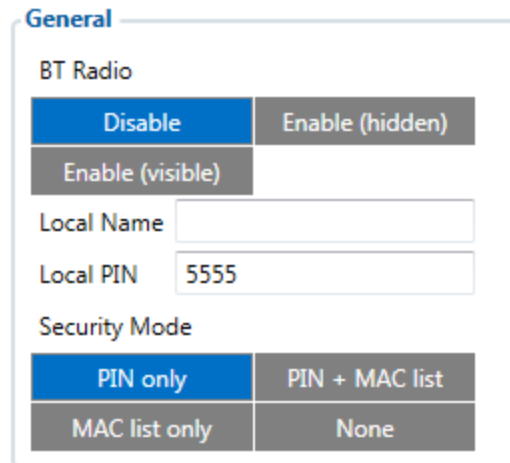


Figure 13 General Blue-tooth settings

BT Radio determines state determines Blue-tooth status, possible values:

- a) Disable – Blue-tooth is off;
- b) Enable (hidden) – Blue-tooth is on, device automatically connects to defined MAC, but is invisible for external devices which want to pair with it.
- c) Enable (visible) – Blue-tooth is on and visible for external devices.

Local name can be set according to your needs. If this field is empty, name will be automatically generated:

FMBxx_<imei last chars>

Local PIN - PIN code which will be used when external device will try to pair with FMB010.

NOTE: FMBXX supports ONE connection at a time.

NOTE: FMB010 can see up to 10 available devices. If there are more than 10, with each scanning the list may change.

Security mode possible options:

- a) PIN only – only pin is used when external device tries to connect to FMB010.
- b) PIN+MAC list – PIN is used, also external device's MAC address needs to be in Authorized MAC list
- c) MAC list only – connection to FMB010 is possible only if external device MAC is in Authorized MAC list.
- d) None – no security enabled.

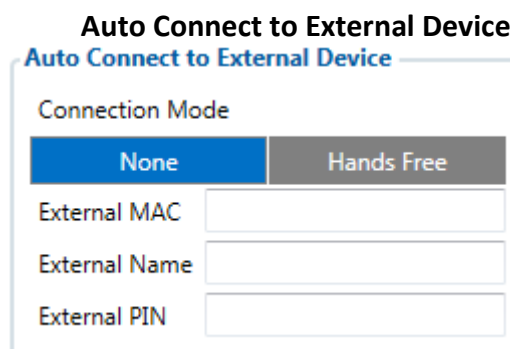


Figure 14 Auto connection to external devices

Here you can enter details of external Blue-tooth headset for hands free communication.

External MAC – MAC of your Blue-tooth headset.

External Name – Blue-tooth name of you

NOTE: FMBXX supports ONE connection at a time.

NOTE: FMB010 can see up to 10 available devices. If there are more than 10, with each scanning the list may change.

The image shows a window titled "Authorized Devices MAC List". Inside the window, there is a vertical list of five empty rectangular input boxes. To the left of each box is a number from 1 to 5, indicating the order of the list.

Figure 15 MAC list

Figure 15 shows list of Authorized MAC addresses which are allowed to connect to FMB010. If list is empty, any external device can connect to FMB010.

5.13.1 Connecting to device via Blue-tooth

When FMB device starts, automatically Blue-tooth is ON too. Take your mobile phone, go to settings>Blue-tooth and turn it on. Scan for near by devices, find you device in list, distinguish device by last IMEI numbers on device module. Press pair, wait until device will ask to enter pairing password, type: 5555. Paired device will show up in paired device list. Now download from play store/app store terminal for Blue-tooth. E.g. BlueTerm. Run app, click find>connect to your paired device. Now we need to send command to FMB010 through Blue-tooth terminal, type: .log:1

Device will respond Debug enabled and FMB010 log will show up. Do not forget to start save log file to mobile phone.

5.13.2 How to connect Blue-tooth Hands Free adapter to FMB device

Blue-tooth settings configuration

These are instructions how to easily prepare Blue-tooth Hands Free device connection to FMB device. First we need to configure FMB device Blue-tooth settings for proper connection to this hands-free unit. These are required steps:

1. Connect FMB device to PC using USB cable.
2. Launch **FMB Configurator** and connect to device as shown in **Figure 1** below.



Figure 1. FMB configurator connected devices window

3. After successful connection to device press **“Load from device”** button to load device current configuration visible at **Figure 2.1**

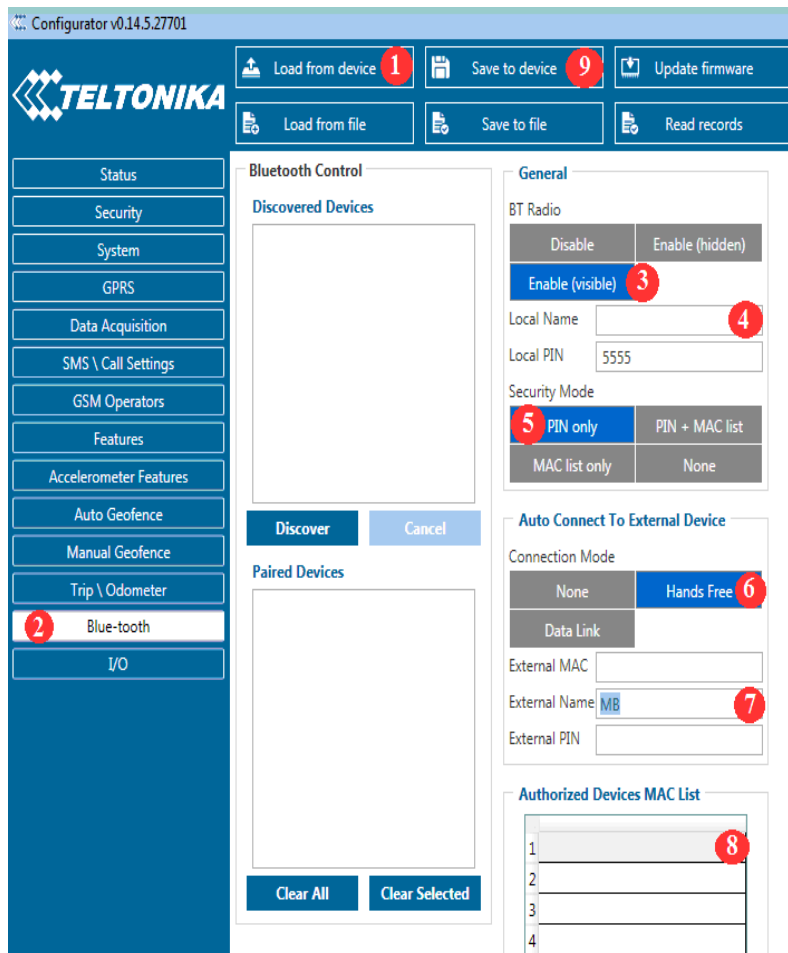


Figure 2.1 Load configuration from device; 2.2 Blue-tooth settings; 2.3 Enable Blue-tooth; 2.4 Blue-tooth local name; 2.5 Blue-tooth security mode

2.6 Hands Free connection mode; 2.7 External Blue-tooth device name; 2.8 Authorized Devices MAC List; 2.9 Save device configuration

4. When device configuration is loaded press **„Blue-tooth“** settings (**Figure 2.2**).
5. Turn on BT Radio by pressing **„Enable (visible)“** (**Figure 2.3**). You could leave **“Local name”** (**Figure 2.4**) box empty (then device name will automatically be “FMBxx_last 7 imei digits”) or type your own name.

6. Set Security Mode (**Figure 2.5**) to **“PIN only”** or **“None”** (you could select **“PIN + MAC list”** or **“MAC list only”** security mode but in this case you need to type external device MAC address in **“Authorized Devices MAC List”** (**Figure 2.8**).
7. Set connection mode to **“Hands Free”** (**Figure 2.6**).
8. Set **„External Name“** as your Hands Free device name for proper device identification and connection to it. In this example Hands Free headset name is „MBH10“ but at least 2 characters are needed to recognize it and connect to it. For better and faster adapter identification in network you could enter a full device name. You could check your Hands Free adapter Blue-tooth name by scanning nearby Blue-tooth devices using mobile phone or computer with Blue-tooth adapter.
9. Go to **“SMS \ Call Settings”** in left menu and set **“Incomming Call Action”** to **“Do Nothing”** visible at **Figure 3**.

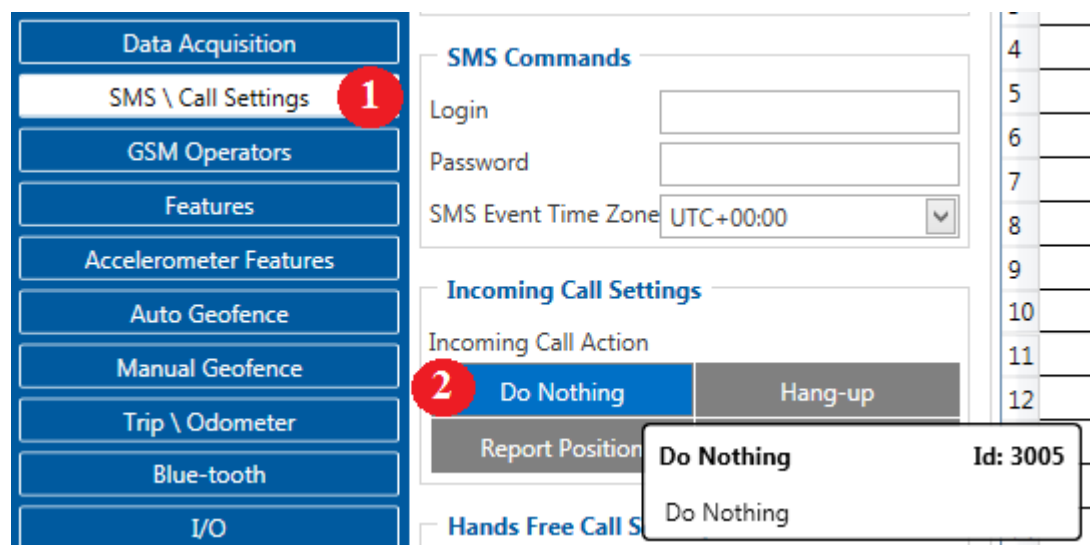


Figure 3. Incomming Call Action settings.

10. After all these steps press **„Save to device“** to save configuration (**Figure 2.9**).
11. Now you can disconnect FMB device from a PC or stay connected if you want to make further changes to configuration.

Connecting Blue-tooth Hands Free adapter

After this configuration you could connect your Hands Free device to FMB device. Turn on Hands Free device then turn on its Blue-tooth connection for pairing following your model instructions⁴. Hands Free adapter should make a special sound in ear from speaker or its led identification should change to inform about successful connection⁵. To check if adapter is successfully connected, call to FMB device, Hands Free device should start ringing. If you later restart FMB device it will automatically connect to this adapter.

⁴ Hands Free device Blue-tooth connection pairing instructions depends on specific model.

⁵ Hands Free device notification about paired Blue-tooth connection depends on specific model.

5.13.3 Device's log using your mobile phone.

When FMB device starts, automatically Blue-tooth is ON too. Take your mobile phone, go to settings>Blue-tooth and turn it on. Scan for near a by devices, find you device in list, distinguish device by last IMEI numbers on device module. Press pair, wait until device will ask to enter pairing password, type: 5555. Paired device will show up in paired device list. Now download from play store/app store terminal for Blue-tooth. E.g BlueTerm. Run app, click find>connect to your paired device. Now we need to send command to FMB0XX through Blue-tooth terminal, type: .log:1

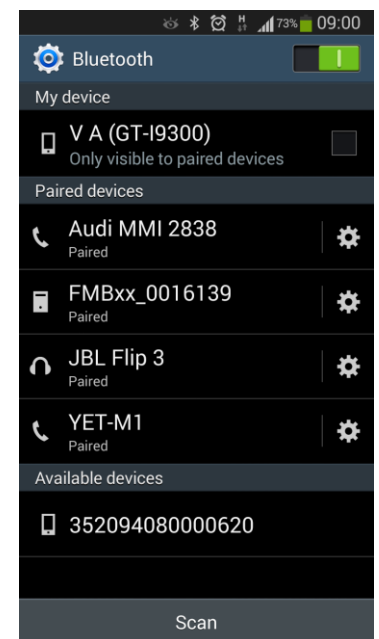
Device will respond Debug enabled and FMB0XX log will show up. Do not forget to start save log file to mobile phone.

Device debug over Android smartphone

1. Scan for visible BT devices using your Android smartphone and connect to your FMB device.

Default FMB BT name: ***FMBxx_last_7_imei_digits***

Default PIN code: **5555**

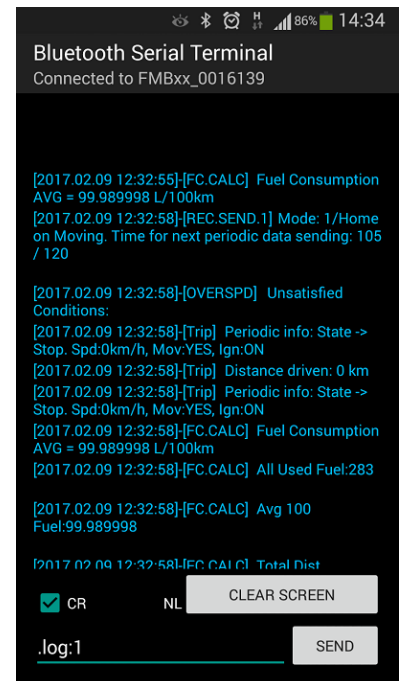


2. Download “Blue-tooth Terminal” application. You can use link or QR code shown here:

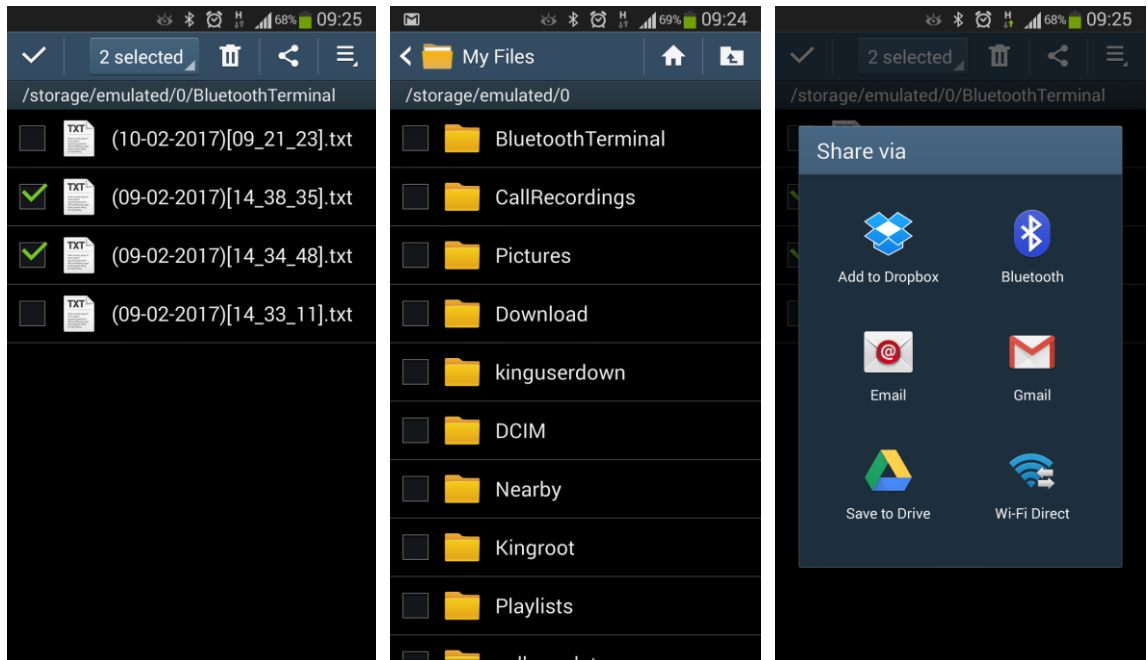
<https://play.google.com/store/apps/details?id=com.hatflabs.btt>



3. Run Blue-tooth Terminal. In menu press “Connect” button and select paired FMB device. To start log check CR and enter the command in terminal: **.log:1**



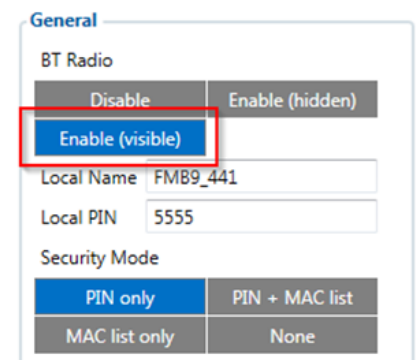
4. Wait ~10 minutes and press “Save” button in menu. You will find saved log file in device folder (My Files/Blue-toothTerminal), select log files and press button Share via Email and send them to the Teltonika support.



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 and visible".



Note: Unfortunately it is not possible to do the same on iPhone, because there is no native SPP Blue-tooth profile support in iPhone.

5.14 Blue-tooth 4.0

Here the BLE TZ-BT04/05 temperature and humidity sensors can be configured.

Status

Security

System

GPRS

Data Acquisition

SMS \ Call Settings

GSM Operators

Features

Accelerometer Features

Auto Geofence

Manual Geofence

Trip \ Odometer

Bluetooth

Bluetooth 4.0

I/O

Bluetooth BLE Control

Discover BLE

Discover services

Common settings

TZ-BT04/05/05B Update frequency 120

BT Power Level

| | |
|---|---|
| 1 | 2 |
| 3 | 4 |
| 5 | 6 |
| 7 | |

BLE connectionless functionalities

Connection #1

Mode

Working mode

Disabled

TZ-BT04/05/05B sensor

Connection #2

Mode

Working mode

Disabled

TZ-BT04/05/05B sensor

Connection #3

Mode

Working mode

Disabled

TZ-BT04/05/05B sensor

Connection #4

Mode

Working mode

Disabled

TZ-BT04/05/05B sensor

Figure 16 Blue-tooth 4.0 settings

FMB010 supports up to 4 sensors at the same time.

TZ-BT04/05 Update frequency – determines how often data will be read from sensor. Minimum – 120 seconds, maximum – 65535 [sec.]

BT Power level determines the aproximate range in meters of the Blue-tooth receiving power. Aproximate ranges:

- 1 – < 0.5
- 2 – 0.5
- 3 – 11
- 4 – 13
- 5 - 15
- 6 - 27
- 7 - 50

Discover BLE – discovers up to 20 surrounding BLE devices and shows their MAC, signal strength and name.

For BLE to work, “BT Radio” must be enabled in the “Bluetooth” configuration.

5.15

5.16 Data Acquisition Mode settings

Data Acquisition Modes are an essential part of FMB010 device, it is also highly configurable.

By 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 send frequencies depend on current GSM Operator defined in Operator list (see section 0) and are switched when GSM operator changes (e.g. vehicle passes through country boarder).

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 Operator list (but there is at least one operator code in the operator list), device will work in Unknown Acquisition mode.

This functionality allows having different AVL records acquire and send parameters values when object is moving or stands still. Vehicle moving or stop state is defined by Stop Detection Source parameter. There are 3 ways for FMB010 to switch between Vehicle on Stop and Vehicle Moving modes see section 5.7.

FMB010 has 6 different modes. Operational logic is shown in Figure 14.



If there are no operator codes entered into operator list, FMB010 will work in Unknown network mode ONLY.

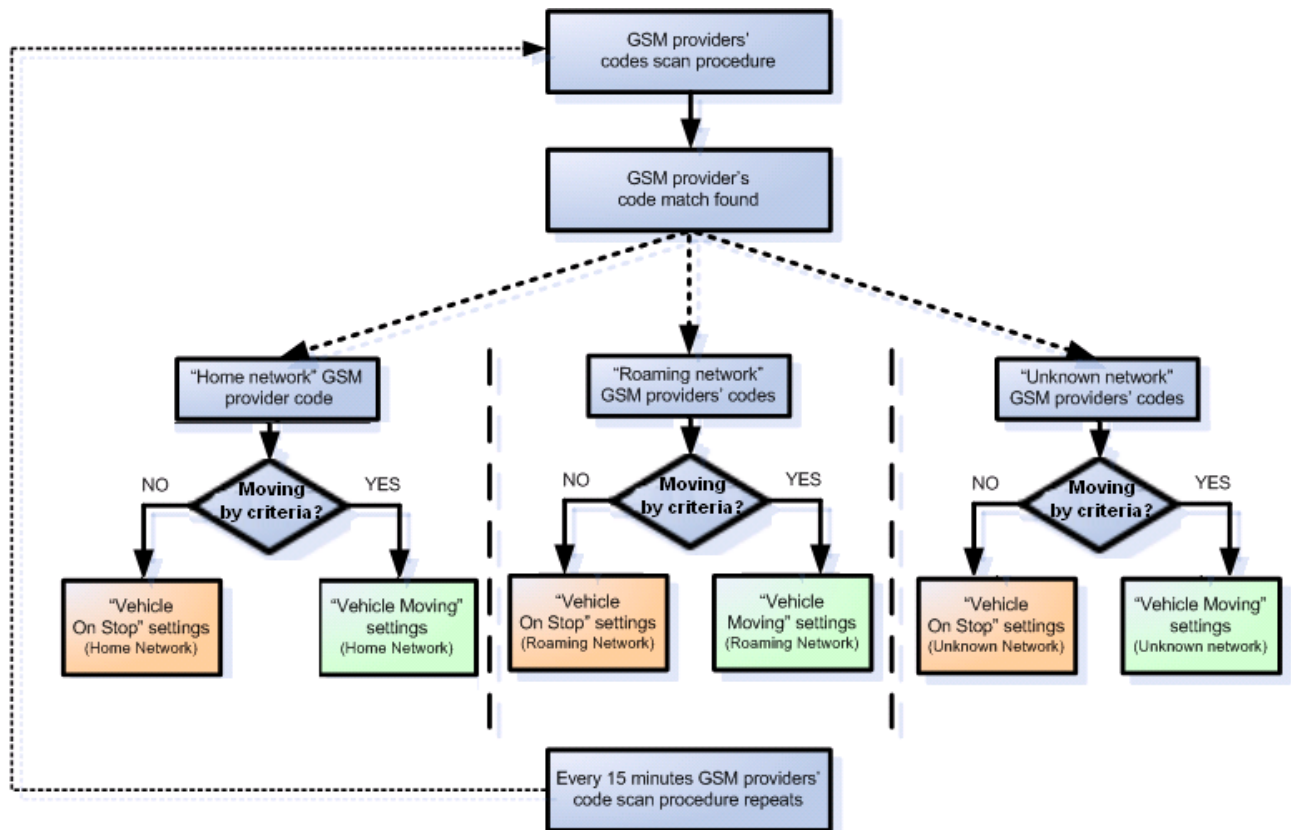


Figure 14 Data Acquisition Mode configuration

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.

| | | | |
|-------------------------|--|--|--|
| Status | | | |
| Security | | | |
| System | | | |
| GPRS | | | |
| Data Acquisition | | | |
| SMS \ Call Settings | | | |
| GSM Operators | | | |
| Features | | | |
| Accelerometer Features | | | |
| Auto Geofence | | | |
| Manual Geofence | | | |
| Trip \ Odometer | | | |
| Blue-tooth | | | |
| I/O | | | |

| | Home | Roaming | Unknown |
|-------------------|------|---------|---------|
| On stop | | | |
| Min Period | 3600 | 3600 | 3600 |
| Min Saved Records | 1 | 1 | 1 |
| Send Period | 120 | 120 | 120 |

| | Home | Roaming | Unknown |
|-------------------|------|---------|---------|
| Moving | | | |
| Min Period | 300 | 300 | 300 |
| Min Distance | 100 | 100 | 100 |
| Min Angle | 10 | 10 | 10 |
| Min Speed Delta | 10 | 10 | 10 |
| Min Saved Records | 1 | 1 | 1 |
| Send Period | 120 | 120 | 120 |

Figure 15 Data Acquisition Mode configuration

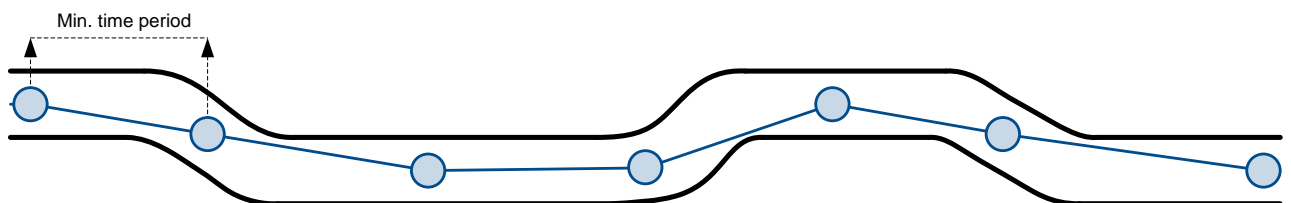
'Min Saved Records' defines minimum number of coordinates and I/O data that should be transferred with one connection to server. If FMB010 does not have enough coordinates to send to server, it will check again after time interval defined in 'Sending Period'.

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

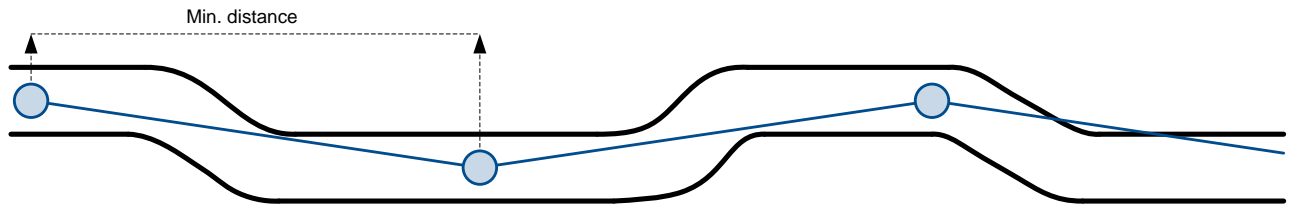


Note: Keep in mind that FMB010 operates in **GMT: 0** time zone, without daylight saving.

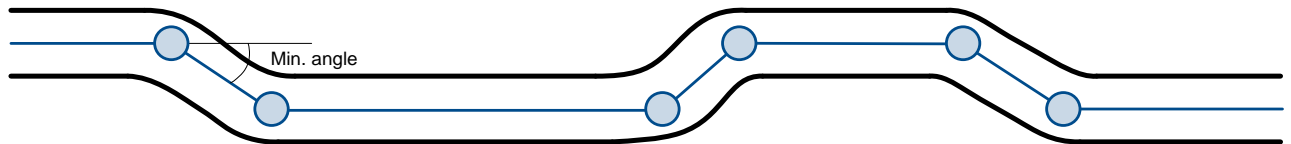
FMB010 is able to collect records using four methods at the same time: time, distance, angle and speed based data acquisition:



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



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



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



5.17 I/O settings

When none of I/O elements are enabled, AVL packet comes with GNSS information only. After enabling I/O element(s) AVL packet along with GNSS information contains current value(s) of enabled I/O element.

Enabled or disabled field – allows enabling I/O element so it is added to the data packet and is sent to the server. By default all I/O element are disabled and FMB010 records only GNSS coordinates.

Priority (AVL packet priority) all records made by FMB010 are regular. Regular packets are sent as Low priority records. When low priority event is triggered, FMB010 makes additional record with indication that the reason for that was I/O element change.

Table 6 Permanent I/O elements

| Permanent I/O elements (are always sent to server if enabled) | | |
|--|---------------------|--|
| Nr. | Property Name | Description |
| 1 | Ignition | Logic: 0 / 1 |
| 2 | Movement | Logic: 0 / 1 |
| 3 | Data mode | 0 – home on stop, 1 – home on move, 2 – roaming on stop, 3 – roaming on move, 4 – unknown on stop, 5 – unknown on move |
| 4 | GSM signal | GSM signal level value in scale 1 – 5 |
| 5 | Sleep mode | Logic: 0 / 1 |
| 6 | GNSS Status | States: 0 – short circ., 1 – connected. Parameter defines if GPS antenna is short circuit. All the time value will be sent 1. The only condition to get value 0, then antenna is damaged and short circuit. |
| 7 | GNSS PDOP | Probability * 10; 0-500 |
| 8 | GNSS HDOP | Probability * 10; 0-500 |
| 9 | External Voltage | Voltage: mV, 0 – 30 V |
| 10 | Speed | Value in km/h, 0 – xxx km/h |
| 11 | GSM Cell ID | GSM base station ID |
| 12 | GSM Area Code | Location Area code (LAC), it depends on GSM operator. It provides unique number which assigned to a set of base GSM stations. Max value: 65536 |
| 13 | Battery Voltage | Shows battery Voltage in mV |
| 14 | Battery Current | Shows battery Current in mA |
| 15 | Active GSM operator | Currently used GSM Operator code |
| 16 | Trip odometer | Distance between two records: m |
| 17 | Total odometer | Total odometer count: m |
| 18 | Digital Input 1 | Logic: 0 / 1 |
| 19 | Fuel Used GPS | Fuel used (ml) by GPS |

| | | |
|----|-----------------|---|
| 20 | Fuel Rate GPS | Fuel Consumption by average speed (l/100km) |
| 21 | Axis X | Accelerometer axis x value |
| 22 | Axis Y | Accelerometer axis y value |
| 23 | Axis Z | Accelerometer axis z value |
| 24 | ICCID | Sim Card's ICCID |
| 25 | SD status | Logic: 0 – not present, 1 – present |
| 26 | Eco Score | Average amount of events on some distance |
| 27 | User ID | MAC address of NMEA receiver device connected via Blue-tooth |
| 28 | BLE Temp #1 | Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing Sent value is multiplied by 10. |
| 29 | BLE Temp #2 | Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing Sent value is multiplied by 10. |
| 30 | BLE Temp #3 | Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing Sent value is multiplied by 10. |
| 31 | BLE Temp #4 | Degrees (°C), -40 - +125; Error codes: 4000 - abnormal sensor state 3000 - sensor not found 2000 - failed sensor data parsing Sent value is multiplied by 10. |
| 32 | BLE Battery #1 | Battery voltage of sensor #1 |
| 33 | BLE Battery #2 | Battery voltage of sensor #2 |
| 34 | BLE Battery #3 | Battery voltage of sensor #3 |
| 35 | BLE Battery #4 | Battery voltage of sensor #4 |
| 36 | BLE Humidity #1 | In %RH. Sent value is multiplied by 10. |
| 37 | BLE Humidity #2 | In %RH. Sent value is multiplied by 10. |
| 38 | BLE Humidity #3 | In %RH. Sent value is multiplied by 10. |
| 39 | BLE Humidity #4 | In %RH. Sent value is multiplied by 10. |



There are two types of operations with Permanent I/O elements: simple monitoring and event generating. Monitoring method is used when current I/O information needed with regular GNSS coordinates. Event generating method is used when additional AVL packet is needed when current value of I/O exceeds predefined High and Low levels. I/O settings allow defining I/O event criteria.

6 SMS COMMAND LIST

All commands are case sensitive. While FMB010 operates in Sleep mode and user tries to send SMS message it will arrive to FMB010 device, because GSM module is enabled. Only GNSS module is disabled in sleep mode.

6.1 SMS command list

Table 4 SMS commands

| Command | Description | Response |
|--------------|--|----------|
| getinfo | Returns RTC time, GPS status, SAT | Yes |
| getver | Returns code version, device IMEI, modem app version, RTC time | Yes |
| getstatus | Returns Data Link:0 GPRS:0 Phone:0 SIM:0 OP:24602 Signal:5 NewSMS:0 Roaming:0 SMSFull:0 LAC:0 Cell ID:0 | Yes |
| getgps | Returns GPS status, Satellite number, Latitude, Longitude, Altitude, Speed, Date, Time | Yes |
| ggps | Returns location information with Google maps link | Yes |
| readio | Returns IO status | Yes |
| cpureset | Resets device | No |
| getparam | Returns selected parameter value | Yes |
| setparam | Sets selected parameter value | Yes |
| flush | Redirects device to other server | Yes |
| countrecs | Returns record number | Yes |
| fc_reset | Resets fuel consumption parameters | Yes |
| towingreact | Towing reactivation | Yes |
| btgetlist | Returns requested Blue-tooth list(values:0, 1, 2) | Yes |
| btgscan | Starts Blue-tooth scan(values: none, 1) | Yes |
| btvisible | Sets Blue-tooth to visible with TMO | Yes |
| btrelease | Disconnects from current device and pauses auto connect functionality for TMO | Yes |
| btunpair | Unpair Blue-tooth device | Yes |
| gettimeiccid | Returns imei of device and ICCID of sim card. Response is sent to SMS/GPRS sender and to number which is provided in SMS. If no number is provided -> response is sent only to sender) | Yes |
| getrecord | SMS command initiates saving and sending of high priority record | No |

Setparam and getparam SMS is used to configure device.

Parameter ID consists of 3 or 5 digits. Detailed list of parameters and IDs can be found in chapter number 5.2 "System parameters"

Example: 'username password setparam 102:0' will disable sleep mode.

Multiple value setting in one sms:

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

6.1.1 getinfo

| Response details | Description |
|------------------|---|
| RTC | RTC Time |
| GPS | GPS receiver state. 0 – OFF, 1 – restarting, 2 – ON but no fix, 3 –ON and operational, 4 – sleep mode |
| SAT | Average satellites |

Example: RTC:2017/1/9 14:13 GPS:1 SAT:0

6.1.2 getver

| Response details | Description |
|------------------|------------------------------|
| App Ver | Firmware version |
| Modem Ver | Version of modem application |
| GPS Ver | Version of GPS module |
| Hw Ver | Version of hardware |
| Device IMEI | IMEI |

Example: App Ver:01.00.17 Rev:01 Modem Ver:TM25Q_D_01.00.00.00_010 GPS Ver:AXN_3.82_3333_1Hw Ver:FMB0_MOD2_A0:B0:C1:D0 Device IMEI:352094080000950

6.1.3 getstatus

| Response details | Description |
|------------------|--|
| Data Link | Indicate module connection to server at the moment: 0 – Not connected, 1 – connected |
| GPRS | Indicate 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 | Connected to GSM Operator: numerical id of operator |
| Signal | GSM Signal Quality [0-5] |
| NewSMS | Indicate if new message received |
| Roaming | 0 – Home Network, 1 – roaming |
| SMSFull | SMS storage is full? 0 – ok, 1 – SMS storage 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 | Count of currently available satellites |
| 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: 17/1/9 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: 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 readio

| Response details | Description |
|------------------|-------------------|
| ID | I/O element ID |
| Value | I/O Element value |

Example: Param ID:3 Value:0

6.1.7 getparam

Read parameter value. ID consists of 3 or 4 digits. Detailed list of parameters and IDs can be found in chapter number 8 "Parameter List"

Example: ,getparam 2001' command will request APN name

Answer: Param ID:2001 Value:wap

6.1.8 setparam

Sets new value for parameter. ID consists of 3 or 4 digits. Detailed list of parameters and IDs can be found in chapter number 8 "Parameter List"

Example: ,setparam 2001:wap2' will change configured APN name

Answer: Param ID:2001 Value:wap2

6.1.9 flush #,#,#,#,#,#

Initiates all data sending by GPRS to specified target server. Comma separated parameters go as numbered:

- 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 don't need to enter parameter (Login/Pass) – do not put space, simply put 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.

6.1.10 countrecs

Returns the number of records save in the Micro SD card.

6.1.11 towingreact

Reactivates Towing Detection to initial state (does not wait for ignition to be OFF). Useful when generated false Towing event and needs reactivation.

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 bluetooth 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 gettimeiccid

| Response details | Description |
|------------------|-----------------------|
| IMEI | Device's imei |
| ICCID | ICCID of the sim card |

Example: IMEI: 352094082828606, CCID: 8937002130700316555

6.1.14 getrecord

Creates a High priority record and sends it to the server.

6.2 System parameters

6.2.1 Sleep Mode (ID=102)

Device has three sleep modes: sleep, deep sleep and online sleep mode. While 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 FMB010 do not receive SMS while in deep sleep). In online sleep(value 3), device behavior is the same as in deep sleep, but GSM module stays on.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 3 | - | | U8 |

6.2.2 Sleep timeout (ID=103)

Sleep timeout is time after which FMB010 goes to sleep or deep sleep if other requirements are met. It is measured in minutes.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 3000 | - | | U8 |

6.2.3 Movement Source (ID=100)

Device can operate and change its working mode according to motion detection source: ignition (value 0), movement sensor (value 1), GPS (value 2)

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2 | - | | U8 |

6.2.4 Static Navigation (ID=106)

When static navigation is enabled, FMB010 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| | | | | |

| | | | | |
|---|---|---|--|----|
| 0 | 1 | 1 | | U8 |
|---|---|---|--|----|

6.2.5 Static Navigation Settings (ID=112)

Defines static navigation deactivation source. Available values: 1 – Movement, 2 – Ignition, 3 – Movement and Ignition

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 3 | 1 | | U8 |

6.2.6 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | 1 | | U8 |

6.2.7 GNSS Source (ID=109)

This parameter sets Satellite System, available values:

| | |
|----------------------|----------|
| Beidou only | value:1 |
| Glionass only | value:2 |
| Galileo only | value:4 |
| Galileo+Beidou | value:5 |
| Galileo+Glionass | value:6 |
| Gps only | value:8 |
| Gps+Beidou | value:9 |
| Gos+Glionass | value:10 |
| Gps+Galileo | value:12 |
| Gps+Galileo+Beidou | value:13 |
| Gps+Galileo+Glionass | value:14 |

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 14 | - | | U8 |

6.2.8 Ignition settings (ID=101)

This parameter sets ignition source available values : 1 – Digital Input, 2– Accelerometer, 3 - DIN1 or Accelerometer, 4 – Power voltage, 5 – DIN1 or Power voltage, 6 – Accelerometer or Power Voltage, 7 – DIN1, Accelerometer or Power Voltage, 8 – Engine RPM, 9 – DIN1 or Engine RPM, 10 – Accelerometer or Engine RPM, 11 – DIN1, Accelerometer or Engine RPM, 12 – Power Voltage or Engine RPM, 13 –DIN1, Power Voltage or Engine RPM, 14 – Accelerometer, Power Voltage or Engine RPM, 15 - DIN1, Accelerometer, Power Voltage or Engine RPM.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 15 | 4 | | U8 |

6.2.9 High voltage level (ID=104)

Sets high level of voltage if ignition settings is set to power voltage.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 30000 | 30000 | | U8 |

6.2.10 Low voltage level (ID=105)

Sets low level of voltage if ignition settings is set to power voltage.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 29999 | 13000 | | U8 |

6.2.11 Led indication (ID=108)

Sets led indication: 0 – disabled, 1 – enabled

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | 1 | | U8 |

6.2.12 Battery charge mode (ID=110)

Sets battery charge mode: 0 – on need, 1 – After ignition ON.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U8 |

6.3 Records parameters

6.3.1 Sorting (ID=1002)

Record sorting parameter is responsible for record sorting order. Value of 0 arranging data starting from newest, while value of 1 arranging data starting from oldest.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | - | | U8 |

6.3.2 Open Link Timeout (ID=1000)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 259200 | - | | U32 |

6.3.3 Server Response Timeout (ID=1001)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 5 | 300 | - | | U8 |



ATTENTION! Some GSM operators may disconnect the device from an active data link if the device doesn't send any data for a very long time, even if 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, 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 anew. This may cost extra, depending on the operator GPRS data charge. It is strongly recommended, when using active data link timeout, that data sending to the server should not be very rare (24 hours or more). If data sending is more frequent, then the operator will not disconnect the device from the server.

6.4 GSM parameters

6.4.1 GPRS content activation (ID=2000)

Parameter allows or does not allow GPRS usage. If GPRS is not allowed value is 0, if GPRS is allowed value is 1.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 1 | - | APN Name (ID=2001) APN username (ID=2002) APN Password (ID=2003) | S8 |

6.4.2 APN Name (ID=2001)

Parameter defines GPRS Access Point Name.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|----------------|-------------------|---|------------|
| Empty | 32 char string | - | GPRS content activation (ID=2000) APN username (ID=2002) APN Password (ID=2003) | S8[32] |

6.4.3 APN username (ID=2002)

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

| Minimum | Maximum | Recommended | Goes with (depends on) | Value |
|---------|---------|-------------|------------------------|-------|
|---------|---------|-------------|------------------------|-------|

| value | value | value | parameters | type |
|-------|----------------|-------|---|--------|
| Empty | 30 char string | - | GPRS content activation (ID=2000) APN Name (ID=2001) APN Password (ID=2003) | S8[30] |

6.4.4 APN Password (ID=2003)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|----------------|-------------------|---|------------|
| Empty | 30 char string | - | GPRS content activation (ID=2000) APN Name (ID=2001) APN username (ID=2002) | S8[30] |

6.4.5 Domain (ID=2004)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|----------------|-------------------|-----------------------------------|------------|
| 0 | 54 char string | - | GPRS content activation (ID=2000) | S8[16] |

6.4.6 Target Server Port (ID=2005)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| Empty | 65535 | - | GPRS content activation (ID=2000) | U16 |

6.4.7 Protocol (ID=2006)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | - | GPRS content activation (ID=2000) | U8 |

6.5 SMS/Call settings

6.5.1 SMS data sending settings (ID=3000)

Parameter allows or does not allow sending AVL data using binary SMS. If SMS use is not allowed value is 0 and 1 if SMS use is allowed.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | - | | |

6.5.2 Data send number (ID=3001)

In this field are written GSM numbers, to which will be sent Data SMS.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 digit | 16 digits | - | | S8 |

6.5.3 Authorized phone numbers (ID=4000-4009)

If at least one number is entered then only those number can send messages to device. Number must be entered without "+" or "00".

Example: 37060012346

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 digit | 16 digits | - | | String |

6.5.4 SMS Event Predefined Numbers (ID=6000-6009)

In this field GSM numbers are written, to which will be sent "Event SMS" text message. Number must be entered without "+" or "00".

Example: 37060012346

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 digit | 16 digits | - | | String |

6.5.5 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| Empty | 5 char | - | SMS Password (ID=3004) | S8[5] |

6.5.6 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| Empty | 5 char | - | | S8[5] |

6.5.7 SMS Event Time Zone

Time zone which will be used in eventual SMS messages.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| -720 | 840 | 0 | | Unit16 |

6.5.8 Incoming call action (ID=3005)

Parameter defines action during call: 0 – do nothing, 1 – hang up, 2 – report position

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2 | 0 | | S8[17] |

6.5.9 Outgoing Call Trigger (ID=3007)

Parameter defines hands free call trigger: 0 – Disable, 2 – Crash event.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2 | - | | UInt8 |

6.5.10 GSM number index (ID=3008)

Parameter defines gsm number's, in predefined number list, index.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 9 | - | | UInt8 |

6.5.11 Operator List (ID=5000-5049)

Parameter defines operator list. According to this list module selects operating profile. First in a list is *Home Operator Code*, then Preferred Roaming Operator Codes are written.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| Empty | 7 digits | - | | U32 |

6.6 Data Acquisition Modes parameters

6.6.1 Home Network GSM operator code “Vehicle on STOP” parameters

6.6.1.1 Min Period (ID=10000)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | | U32 |

6.6.1.2 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 255 | 1 | | U8 |

6.6.1.3 Send Period (ID=10005)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | Min Saved Records (ID=10004) | U32 |

6.6.2 Home Network GSM operator code “Vehicle MOVING” parameters

6.6.2.1 Min Period (ID=10050)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|---|------------|
| 0 | 2592000 | - | Min Distance (ID=10051) Min Angle (ID=10052) | U32 |

6.6.2.2 Min Distance (ID=10051)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|---|------------|
| 0 | 65535 | - | Min Period (ID=10050) Min Angle (ID=10052) | U32 |

6.6.2.3 Min Angle (ID=10052)

This parameter indicates angle in degrees in order to acquire 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 180 | - | Min Period (ID=10050) Min Distance (ID=10051) | U16 |

6.6.2.4 Min Speed delta (ID=10053)

This parameter indicates speed difference in order to acquire 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 distance will be saved.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 255 | 10 | Min Period (ID=10050) Min Distance (ID=10051) Min Angle (ID=10052) | U16 |

6.6.2.5 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 1 | 255 | 1 | Min Period (ID=10050) Min Distance (ID=10051) Min Angle (ID=10052) | U8 |

6.6.2.6 Send Period (ID=10055)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | | U32 |

6.6.3 Roaming Network GSM operator code “Vehicle on STOP” parameters

6.6.3.1 Min Period (ID=10100)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | | U32 |

6.6.3.2 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 255 | 1 | | U8 |

6.6.3.3 Send Period (ID=10105)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | Min Saved Records (ID=10104) | U32 |

6.6.4 Roaming Network GSM operator code “Vehicle MOVING” parameters

6.6.4.1 Min Period (ID=10150)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|---|------------|
| 0 | 2592000 | - | Min Distance (ID=10151) Min Angle (ID=10152) | U32 |

6.6.4.2 Min Distance (ID=10151)

This parameter indicates distance in meters in order to acquire 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|---|------------|
| 0 | 65535 | - | Min Period (ID=10150) Min Angle (ID=10152) | U32 |

6.6.4.3 Min Angle (ID=10152)

This parameter indicates angle in degrees in order to acquire 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 180 | - | Min Period (ID=10150) | U16 |

6.6.4.4 Min Speed (ID=10153)

This parameter indicates speed difference in order to acquire 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 distance will be saved.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 255 | 10 | Min Period (ID=10150) Min Distance (ID=10151) Min Angle (ID=10152) | U16 |

6.6.4.5 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=10155).

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 255 | 1 | | U8 |

6.6.4.6 Send Period (ID=10155)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | Min Saved Records (ID=10154) | U32 |

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

6.6.5.1 Min Period (ID=10200)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | | U32 |

6.6.5.2 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 255 | 1 | | U8 |

6.6.5.3 Send Period (ID=10205)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| | | | | |

| | | | | |
|---|---------|---|---------------------------------|-----|
| 0 | 2592000 | - | Min Saved Records (ID=10204) | U32 |
|---|---------|---|---------------------------------|-----|

6.6.6 Unknown Network GSM operator code “Vehicle MOVING” parameters

6.6.6.1 Min Period (ID=10250)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|---|------------|
| 0 | 2592000 | - | Min Distance (ID=10151) Min Angle (ID=10152) | U32 |

6.6.6.2 Min Distance (ID=10251)

This parameter indicates distance in meters in order to acquire 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|---|------------|
| 0 | 65535 | - | Min Angle (ID=10152) Min Period (ID=10150) | U32 |

6.6.6.3 Min Angle (ID=10252)

This parameter indicates angle in degrees in order to acquire 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 180 | - | Min Period (ID=10150) | U16 |

6.6.6.4 Min Speed (ID=10253)

This parameter indicates speed difference in order to acquire 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 distance will be saved.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 255 | 10 | Min Period (ID=10150) Min Distance (ID=10151) Min Angle (ID=10152) | U16 |

6.6.6.5 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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 1 | 255 | 1 | | U8 |

6.6.6.6 Send Period (ID=10255)

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

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 2592000 | - | Min Saved Records (ID=10254) | U32 |

6.7 Features Parameters

6.7.1 Green driving priority (ID=11000)

Defines priority of green driving scenario:

0 – disabled, 1 – low, 2 – high, 3 – panic

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 3 | - | | U8 |

6.7.2 Max Acceleration Force (ID=11004)

It is max allowed acceleration force which can be reached while accelerating without triggering harsh acceleration event.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0.5 | 10 | 2.2 | | Float |

6.7.3 Max Braking Force (ID=11005)

It is max allowed braking force which can be reached while braking without triggering harsh braking event.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0.5 | 10 | 2.5 | | Float |

6.7.4 Max Cornering (ID=11006)

It is max allowed cornering angle which can be reached while cornering without triggering harsh cornering event.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0.5 | 10 | 2.1 | | Float |

6.7.5 Green/Eco driving (ID=11007)

Choose between Eco driving(accelerometer) and Green driving(gps). 0 – GPS, 1 – Accelerometer

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U16 |

6.7.6 Green driving Send SMS to (ID=7034)

Enable/disable sms event sending. 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 | | Unit8 |

6.7.7 Green driving SMS text (ID=8034)

Configure green driving sms event text here.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 160 char | Green Driving | | S8[160] |

6.7.8 Overspeeding priority (ID=11100)

Defines priority of overspeeding scenario:

0 – disabled, 1 – low, 2 – high, 3 – panic

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 3 | - | | U8 |

6.7.9 Max allowed Speed (ID=11104)

It is max allowed speed which can be reached. If this value exceeded Over speeding event will occur.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| | | | | |

| | | | | |
|---|-----|---|--|-----|
| 0 | 260 | - | | U16 |
|---|-----|---|--|-----|

6.7.10 Overspeeding Send SMS To (ID=7032)

Enable/disable sms event sending. 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 | | UInt8 |

6.7.11 Overspeeding SMS Text (ID=8032)

Configure over speeding sms event text here.

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

6.7.12 Excessive idling priority (ID=11200)

Defines priority of Excessive idling scenario:

0 – disabled, 1 – low, 2 – high, 3 – panic

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 3 | - | | U8 |

6.7.13 Eventual records (ID=11203)

Disables (0) or enables (1) eventual records with idling value

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | - | | U16 |

6.7.14 Excessive idling minimum stop duration (ID=11205)

Defines minimum time in seconds of vehicle idling before scenario enables.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 255 | 5 | | Float |

6.7.15 Excessive idling minimum move duration (ID=11206)

Defines minimum time in seconds of vehicle idling before scenario disables.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 255 | 2 | | Float |

6.7.16 Jamming (ID=11300)

Scenario settings: 0 – Disable, 1 – Low, 2 – High, 3 – Panic

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 3 | 0 | | U8 |

6.7.17 Jamming Eventual records (ID=11303)

Disables or enables eventual records. 0 – Disable, 1 – Enable

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 1 | | U8 |

6.7.18 Trip priority priority (ID=11800)

Defines priority of trip 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 | | U8 |

6.7.19 Start Speed (ID=11803)

This parameter represents speed, which is detected as minimum speed to indicate TRIP START and generate event.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 255 | - | Trip priority priority (ID=11800) | U8 |

6.7.20 Ignition Off Timeout (ID=11804)

This parameter represents timeout to wait if ignition is off in order to detect TRIP STOP and generate event.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 65535 | - | Trip priority priority (ID=11800) | U16 |

6.7.21 Trip mode (ID=11802)

For this feature I/O ODOMETER must be enabled. If I/O ODOMETER is enabled, and mode is set to Continuous (value 0), TRIP distance is going to be counted till the end of trip, if between records mode is set, ODOMETER will count distance only between two records.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 1 | - | Trip priority priority (ID=11800) | U8 |

6.8 AutoGeofencing

6.8.1 AutoGeofencing priority (ID=20000)

Defines priority of trip scenario:

0 – disabled, 1 – low, 2 – high, 3 – panic

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|-----------------------------------|------------|
| 0 | 3 | 0 | | U8 |

6.8.2 Eventual Records (ID=20002)

0 – disable, include parameter to all records, 1 – enable, 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 | | Uint8 |

6.8.3 Activation Timeout (ID=20003)

Parameter represents AutoGeofencing activation timeout in seconds.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|------------------------------------|------------|
| 0 | 65535 | 60 | AutoGeofencing priority (ID=20000) | U16 |

6.8.4 Deactivate by (ID=20005)

Parameter defines Autogeofence deactivation source. Value 0 – for Ignition, - Power Voltage, Digital Input 1

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|------------------------------------|------------|
| 0 | 2 | - | AutoGeofencing priority (ID=20000) | U8 |

6.8.5 AutoGeofence event generating (ID=20001)

Generate event: 0 – on exiting zone , 1 – on entering zone; 2 – on both;

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|------------------------------------|------------|
| 0 | 2 | 0 | AutoGeofencing priority (ID=20000) | U8 |

6.8.6 Radius (ID=20004)

Parameter represents radius of circle with center device coordinates after activating AutoGeofence feature.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 1000000 | 100 | AutoGeofencing priority (ID=20000) Deactivate by (ID=20005) | U32 |

6.8.7 AutoGeofence Send SMS to (ID=7030)

Enable/disable sms event sending. 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 | | U64 |

6.8.8 SMS Text (ID=8030)

Configure AutoGeofence sms event text here.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 160 | AutoGeofence | | S8[180] |

6.9 Manual Geofence

6.9.1 First Geozone parameters

First Geozone parameters configuration. All 50 geozones are configured with the same logic.

6.9.1.1 #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 | | UInt8 |

6.9.1.1 #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 | | UInt8 |

6.9.1.1 #1 Geozone Eventual Records (ID=20102)

0 – disable, include parameter to all records, 1 – enable, 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 | | Uint8 |

6.9.1.1 #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 | | Uint32 |

6.9.1.1 #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 | | Uint8 |

6.9.1.1 #1 Geozone Radius (ID=20105)

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

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 5 | 1000000 | 5 | | Uint32 |

6.9.1.1 #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 | | Double |

6.9.1.1 #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 | | Double |

6.9.1.1 #1 Geozone X2 (ID=20108)

Geofence zone upper right corner X coordinate (longitude).

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| -180 | 180 | 0 | | Double |

6.9.1.1 #1 Geozone X1 (ID=20109)

Geofence zone upper right corner Y coordinate (latitude).

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| -90 | 90 | 0 | | Double |

6.9.1.1 #1 Geozone OverSpeeding (ID=20110)

Enable/disable overspeeding event in geozone.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | UInt8 |

6.9.1.1 #1 Geozone Max allowed speed (ID=20111)

It is max allowed speed which can be reached in geozone (km/h).

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1000 | 90 | | UInt16 |

6.9.2 Other Geozones

Other Geozone's parameters have the same logic as shown in Geozone #1.

| GeoFence Zone Number | Geofence Zone's parameters |
|----------------------|----------------------------|
| 1 | 20100-20111 |
| 2 | 20120-20131 |
| 3 | 20140-20151 |
| ... | ... |
| 49 | 21060-21071 |
| 50 | 21080-21091 |

6.9.2.1

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

Enable/disable sms event sending. 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 | | UInt8 |

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

Configure geozone # sms event text here.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|----------------|-----------------------------------|------------|
| 0 | 160 | Geozone Zone # | | S8[160] |

6.10 GPS Fuel counter

6.10.1.1 City Consumption L/100km (ID=11900)

Consumption in the city

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 50 | 0 | | Double |

6.10.1.2 Highway Consumption L/100km (ID=11901)

Consumption on highway

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 50 | 0 | | Double |

6.10.1.3 Average Consumption L/100km (ID=11902)

Average fuel consumption of the vehicle

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 50 | 0 | | Double |

6.10.1.4 City Speed [km/h] (ID=11903)

Speed in the city

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 250 | 30 | | Unit64 |

6.10.1.5 Highway Speed [km/h] (ID=11904)

Speed on highway

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 250 | 90 | | Unit64 |

6.10.1.6 Average Speed [km/h] (ID=11905)

Average speed of the vehicle

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 250 | 60 | | Unit64 |

6.10.1.7 Correction coefficient (ID=11906)

Sets the correction coefficient

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0.01 | 2 | 1 | | Double |

6.10.1.8 Fuel Consumption on Idling [L/h] (ID=11907)

Sets fuel consumption while vehicle is idling

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 5 | 1 | | Double |

6.10.1.9 Higher Speeds Add [%] (ID=11908)

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 250 | 20 | | Unit64 |

6.10.1.10 Highway Consumption every km/h (ID=11909)

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 100 | 50 | | Unit64 |

6.11 Scenarios Accelerometer

6.11.1 Unplug Detection

6.11.1.1 Scenario settings (ID=11500)

Sets priority of the scenario: 0 – Disable, 1 – Low Priority, 2 – High Priority, 3 – Panic Priority

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 3 | 0 | | U64 |

6.11.1.2 Eventual records (ID=11501)

If enabled, only eventual records of unplug detection will be sent. 0 – Disable, 1 - Enable

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 1 | | U64 |

6.11.1.3 Unplug detection mode (ID=11502)

Sets Unplug detection mode. 0 – simple, 1 – advanced.

Simple – unplug detection according to external voltage only

Advanced – unplug detection according to: external voltage OR accelerometer

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U64 |

6.11.1.4 Send sms to (ID=7067)

Enable/disable sms event sending. 0 – Disable, 1-10 – sms will be sent to configured GSM number. (SMS \ Call Settings -> GSM Predefined Numbers list.)

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| | | | | |

| | | | | |
|---|----|---|--|-----|
| 0 | 10 | 0 | | U64 |
|---|----|---|--|-----|

6.11.1.5 SMS Text (ID=8067)

Configure uplug sms event text here.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 160 | 0 | | U64 |

Note: „Unplug Detection“ work just in device with battery. FMB010 doesn't have this.

6.11.2 Crash Detection

6.11.2.1 Scenario settings (ID=11400)

Sets priority of the scenario: 0 – Disable, 1 – Low Priority, 2 – High Priority, 3 – Panic Priority

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 3 | 0 | | U64 |

6.11.2.2 Duration [ms] (ID=11401)

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 2000 | 5 | | U64 |

6.11.2.3 Treshold [mG] (ID=11402)

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 7900 | 1500 | | U64 |

6.11.2.4 Crash trace (ID=11406)

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U64 |

6.11.2.1 Crash sms send to (ID= 7037)

Enable/disable sms event sending. 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 | | Uint8 |

6.11.2.2 SMS Text (ID=8037)

Configure Crash sms event text here.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 160 | Crash | | S8[160] |

6.11.3 Excessive idling

6.11.3.1 Excessive idling priority (ID=11200)

Defines priority of Excessive idling 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 | | UInt8 |

6.11.3.2 Eventual records (ID=11203)

Disables (0) or enables (1) eventual records with idling value

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 1 | | UInt8 |

6.11.3.3 Excessive idling minimum stop duration (ID=11205)

Defines minimum time in seconds of vehicle idling before scenario enables.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 255 | 5 | | UInt8 |

6.11.3.4 Excessive idling minimum move duration (ID=11206)

Defines minimum time in seconds of vehicle idling before scenario disables.

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

6.11.3.5 Excessive idling Send SMS To (ID=7033)

Enable/disable sms event sending. 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 | | UInt8 |

6.11.3.6 Excessive idling SMS Text (ID=8033)

Configure excessive idling sms event text here.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 160 | Idling Event | | S8[160] |

6.12 Blue-tooth

6.12.1.1 BT Radio (ID=800)

Enables or disable Blue-tooth feature. 0 – Disabled, 1 – Enable hidden, 2 – Enable visible

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 2 | 0 | | U64 |

6.12.1.2 Local name (ID 801)

Parameter defines a visible name of FMBX device.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 Symbols | 30 Symbols | - | | String |

6.12.1.3 Local PIN (ID=802)

Parameter Lets to configure Blue-tooth PIN.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 Symbols | 4 Symbols | 5555 | | String |

6.12.1.4 Security mode (ID=803)

Parameter defines a security mode of FMBX 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 | | U64 |

6.12.1.5 External MAC (ID=804)

Defines external device's MAC, for FMB010 to auto connect to.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 symbols | 12 symbols | 0 | | string |

6.12.1.6 External name (ID=805)

Defines external device's name, for FMB010 to auto connect to.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 symbols | 30 symbols | 0 | | string |

6.12.1.7 External PIN (ID=806)

Defines external device's PIN, for FMB010 to auto connect to.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 symbols | 8 symbols | 0 | | string |

6.12.1.8 Connection mode (ID=807)

Defines a mode in which FMB010 will connect to external devices. 0 – None,
1 – FMB010 will connect to Hands Free Headset

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 2 | 0 | | U64 |

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

Parameter allows to add an authorized devices MAC for connection to FMB010

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 symbols | 12 symbols | - | | String |

6.13 Bluetooth 4.0

6.13.1 Common settings

6.13.1.1 Update frequency (ID 1100)

Defines BLE scanning interval of FMB0XY device.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 120 | 65535 | 120 | | U16 |

6.13.1.2 BT Power Level

Parameter defines the Bluetooth power level from 1 to 7.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 1 | 7 | 5 | | U8 |

6.13.2 BLE connectionless functionalities

6.13.2.1 Connection#1

Working mode (ID 1200)

Turns ON or OFF working mode with BLE sensors.

0 – turns OFF, 1 – turns ON.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 99999999 | 0 | | U32 |

Sensor's ID (1201)

Defines the ID of the sensor, which data will be received.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U8 |

6.13.2.2 Connection#2

Working mode (ID 1250)

Turns ON or OFF working mode with BLE sensors.

0 – turns OFF, 1 – turns ON.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 99999999 | 0 | | U32 |

Sensor's ID (1251)

Defines the ID of the sensor, which data will be received.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U8 |

6.13.2.3 Connection#3

Working mode (ID 1300)

Turns ON or OFF working mode with BLE sensors.

0 – turns OFF, 1 – turns ON.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 99999999 | 0 | | U32 |

Sensor's ID (1301)

Defines the ID of the sensor, which data will be received.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U8 |

6.13.2.4 Connection#4

Working mode (ID 1350)

Turns ON or OFF working mode with BLE sensors.

0 – turns OFF, 1 – turns ON.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 99999999 | 0 | | U32 |

Sensor's ID (1351)

Defines the ID of the sensor, which data will be received.

| Minimum value | Maximum value | default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 1 | 0 | | U8 |

6.14 I/O parameters

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

6.14.1 I/O#1 property parameter Ignition (ID=50000)

Parameter defines I/O property value. Possible values: 0-Disabled; 1-Low; 2-High; 3-Panic.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 3 | - | I/O#1 priority (ID=50000) I/O#1 logic operand (ID=50001) I/O#1 High level (ID=50002) I/O#1 Low level (ID=50003) I/O#1 Event only (ID=50004) I/O#1 averaging length (ID=50005) | S8 |

6.14.2 I/O#1 Logic operand (ID=50001)

Parameter defines eventual record is saved. Possible values: 0 – On Exit; 1-On Entrance; 2-Both; 3-Monitoring; 4-Hysterisis; 5-On Change; 6-On Delta Change

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 6 | 0 | I/O#1 priority (ID=50000) I/O#1 logic operand (ID=50001) I/O#1 High level (ID=50002) I/O#1 Low level (ID=50003) I/O#1 Event only (ID=50004) I/O#1 averaging length (ID=50005) | S8 |

6.14.3 I/O#1 High level (ID=50002)

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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| -2147483647 | 2147483647 | 1 | I/O#1 priority (ID=50000) I/O#1 logic operand (ID=50001) I/O#1 High level (ID=50002) I/O#1 Low level (ID=50003) I/O#1 Event only (ID=50004) I/O#1 averaging length (ID=50005) | S32 |

6.14.4 I/O#1 Low level (ID=50003)

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 | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| -2147483647 | 2147483647 | 0 | I/O#1 priority (ID=50000) I/O#1 logic operand (ID=50001) I/O#1 High level (ID=50002) I/O#1 Low level (ID=50003) I/O#1 Event only (ID=50004) I/O#1 averaging length (ID=50005) | S32 |

6.14.5 I/O#1 Event only (ID=50004)

Parameter defines whether element should be sent only when event is generated. Possible values:

- 1 – Yes (parameter ID and value is sent when event is generated);
- 0 – No (parameter ID and value is sent in every record).

| Minimal value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 1 | 0 | I/O#1 priority (ID=50000) I/O#1 logic operand (ID=50001) I/O#1 High level (ID=50002) I/O#1 Low level (ID=50003) I/O#1 Event only (ID=50004) I/O#1 averaging length (ID=50005) | S8 |

6.14.6 I/O#1 averaging length (ID=50005)

Parameter defines I/O property sample length to average. If no averaging needed default value is 1.

| Minimum value | Maximum value | Recommended value | Goes with (depends on) parameters | Value type |
|---------------|---------------|-------------------|--|------------|
| 0 | 2147483647 | 1 | I/O#1 priority (ID=50000) I/O#1 logic operand (ID=50001) I/O#1 High level (ID=50002) I/O#1 Low level (ID=50003) I/O#1 Event only (ID=50004) I/O#1 averaging length (ID=50005) | S32 |

6.14.1 I/O#1 send SMS (ID=7000)

Enable/disable sms event sending. 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 | | Uint8 |

6.14.2 I/O#1 SMS text (ID=8000)

Configure I/O#1 sms event text here.

| Minimum value | Maximum value | Default value | Goes with (depends on) parameters | Value type |
|---------------|---------------|---------------|-----------------------------------|------------|
| 0 | 160 | Ignition | | S8[160] |

Other I/O property elements can be configured in same logic. All I/O element parameters are listed in the next table.

6.15 I/O elements parameters and types.

| Parameter ID | Parameter Type | Default value | Value range | | Parameter name |
|--------------|----------------|---------------|-------------|-------|-----------------------|
| | | | Min | Max | |
| 50000 | UInt8 | 1 | 0 | 3 | Ignition Priority |
| 50001 | UInt8 | 5 | 0 | 6 | Ignition Operand |
| 50002 | UInt8 | 0 | 0 | 1 | Ignition High level |
| 50003 | UInt8 | 0 | 0 | 1 | Ignition Low level |
| 50004 | UInt8 | 0 | 0 | 1 | Ignition Event only |
| 50005 | UInt16 | 10 | 0 | 65535 | Ignition Average |
| 7000 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8000 | String | 0 | 0 | 160 | SMS Text |
| 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 | 5 | 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 | 5 | 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 | Deep Sleep Priority |
| 50041 | Uint8 | 3 | 0 | 6 | Deep Sleep Operand |
| 50042 | Uint8 | 0 | 0 | 2 | Deep Sleep Hight level |
| 50043 | Uint8 | 0 | 0 | 2 | Deep Sleep Low level |
| 50044 | Uint8 | 0 | 0 | 1 | Deep 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 | 5 | 0 | 6 | GNSS Status Operand |
| 50052 | Uint8 | 0 | 0 | 5 | GNSS Status Hight 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 |
| 5006 | Uint8 | 3 | 0 | 6 | GNSS PDOP Operand |
| 5006 | Uint16 | 0 | 0 | 1000 | GNSS PDOP Hight level |
| 5006 | Uint16 | 0 | 0 | 1000 | GNSS PDOP Low level |
| 5006 | Uint8 | 0 | 0 | 1 | GNSS PDOP Event only |
| 5006 | 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 Hight 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 |
| 50080 | Uint8 | 1 | 0 | 3 | External Voltage Priority |
| 50081 | Uint8 | 6 | 0 | 6 | External Voltage |
| 50082 | Uint16 | 1000 | 0 | 60000 | External Voltage Hight |
| 50083 | Uint16 | 0 | 0 | 60000 | External Voltage Low |
| 50084 | Uint8 | 0 | 0 | 1 | External Voltage Event |
| 50085 | Uint16 | 10 | 0 | 65535 | External Voltage Average |
| 7008 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8008 | String | 0 | 0 | 160 | SMS Text |
| 50090 | Uint8 | 1 | 0 | 3 | Speed Priority |
| 50091 | Uint8 | 3 | 0 | 6 | Speed Operand |
| 50092 | Uint16 | 0 | 0 | 300 | Speed Hight level |
| 50093 | Uint16 | 0 | 0 | 300 | Speed Low level |
| 50094 | Uint8 | 0 | 0 | 1 | Speed Event only |
| 50095 | Uint16 | 1 | 0 | 65535 | Speed Average |
| 7009 | Uint8 | 0 | 0 | 10 | Send SMS |

| | | | | | |
|-------|--------|---|---|---------|------------------------------|
| 8009 | 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 |
| 50113 | Uint32 | 0 | 0 | 999999 | GSM Area Code Low |
| 50114 | Uint8 | 0 | 0 | 1 | GSM Area Code Event |
| 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 |
| 50123 | Uint16 | 0 | 0 | 5000 | Battery Voltage Low |
| 50124 | Uint8 | 0 | 0 | 1 | Battery Voltage Event |
| 50125 | Uint8 | 0 | 0 | 10 | Battery Voltage Average |
| 7012 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8012 | String | 0 | 0 | 160 | SMS Text |
| 50130 | Uint8 | 1 | 0 | 3 | Battery Current Priority |
| 50131 | Uint8 | 3 | 0 | 6 | Battery Current Operand |
| 50132 | Uint16 | 0 | 0 | 5000 | Battery Current High |
| 50133 | Uint16 | 0 | 0 | 5000 | Battery Current Low |
| 50134 | Uint8 | 0 | 0 | 1 | Battery Current Event |
| 50135 | Uint8 | 0 | 0 | 10 | Battery Current Average |
| 7013 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8013 | String | 0 | 0 | 160 | SMS Text |
| 50140 | Uint8 | 0 | 0 | 3 | Active GSM Operator Priority |
| 50141 | Uint8 | 5 | 0 | 6 | Active GSM Operator |
| 50142 | Uint32 | 0 | 0 | 999999 | Active GSM Operator |
| 50143 | Uint32 | 0 | 0 | 999999 | Active GSM Operator |
| 50144 | Uint8 | 0 | 0 | 1 | Active GSM Operator |
| 7014 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8014 | String | 0 | 0 | 160 | SMS Text |
| 50150 | Uint8 | 0 | 0 | 3 | Trip Odometer Priority |
| 50151 | Uint8 | 3 | 0 | 6 | Trip Odometer Operand |
| 50152 | Uint32 | 0 | 0 | 1000000 | Trip Odometer High |
| 50153 | Uint32 | 0 | 0 | 1000000 | Trip Odometer Low level |
| 50154 | Uint8 | 0 | 0 | 1 | Trip Odometer Event |
| 7015 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8015 | String | 0 | 0 | 160 | SMS Text |
| 50160 | Uint8 | 0 | 0 | 3 | Total Odometer Priority |
| 50161 | Uint8 | 3 | 0 | 6 | Total Odometer |

| | | | | | |
|-------|--------|---|-------|----------|----------------------------|
| 50162 | Uint32 | 0 | 0 | 10000000 | Total Odometer Hight |
| 50163 | Uint32 | 0 | 0 | 10000000 | Total Odometer Low |
| 50164 | Uint8 | 0 | 0 | 1 | Total Odometer Event |
| 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 | 0 | 0 | 6 | Digital Input 1 Operand |
| 50172 | Uint8 | 0 | 0 | 1 | Digital Input 1 Hight |
| 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 |
| 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 Hight |
| 50203 | Uint32 | 0 | 0 | 1000000 | Fuel Used GPS Low level |
| 50204 | Uint8 | 0 | 0 | 1 | Fuel Used GPS Event |
| 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 Hight 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 Hight 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 Hight 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 Hight level |

| | | | | | |
|-------|--------|---|-------|-------|------------------------|
| 50243 | Uint16 | 0 | -8000 | 8000 | Axis Z Low level |
| 50244 | Uint8 | 0 | 0 | 1 | Axis Z Event only |
| 50245 | Uint16 | 1 | 0 | 65535 | Axis Z Average |
| 7024 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8024 | String | 0 | 0 | 160 | SMS Text |
| 50510 | Uint8 | 0 | 0 | 3 | Eco Score Priority |
| 50511 | Uint8 | 3 | 0 | 6 | Eco Score Operand |
| 50512 | Uint8 | 0 | 0 | 1 | Eco Score High level |
| 50513 | Uint8 | 0 | 0 | 1 | Eco Score Low level |
| 50514 | Uint8 | 0 | 0 | 1 | Eco Score Event only |
| 7220 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8220 | 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 |
| 50260 | Uint8 | 0 | 0 | 3 | SD Status Priority |
| 50261 | Uint8 | 3 | 0 | 6 | SD Status Operand |
| 50262 | Uint8 | 0 | 0 | 1 | SD Status High level |
| 50263 | Uint8 | 0 | 0 | 1 | SD Status Low level |
| 50264 | Uint8 | 0 | 0 | 1 | SD Status Event only |
| 7070 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8070 | String | 0 | 0 | 160 | SMS Text |
| 50530 | Uint8 | 0 | 0 | 3 | BLE Temp #1 Priority |
| 50531 | Uint8 | 3 | 0 | 6 | BLE Temp #1 Operand |
| 50532 | Int16 | 0 | -400 | 1250 | BLE Temp #1 High level |
| 50533 | Int16 | 0 | -400 | 1250 | BLE Temp #1 Low level |
| 50534 | Uint8 | 0 | 0 | 1 | BLE Temp #1 Event only |
| 7223 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8223 | String | 0 | 0 | 160 | SMS Text |
| 50540 | Uint8 | 0 | 0 | 3 | BLE Temp #2 Priority |
| 50541 | Uint8 | 3 | 0 | 6 | BLE Temp #2 Operand |
| 50542 | Int16 | 0 | -400 | 1250 | BLE Temp #2 High level |
| 50543 | Int16 | 0 | -400 | 1250 | BLE Temp #2 Low level |
| 50544 | Uint8 | 0 | 0 | 1 | BLE Temp #2 Event only |
| 7224 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8224 | String | 0 | 0 | 160 | SMS Text |
| 50550 | Uint8 | 0 | 0 | 3 | BLE Temp #3 Priority |
| 50551 | Uint8 | 3 | 0 | 6 | BLE Temp #3 Operand |
| 50552 | Int16 | 0 | -400 | 1250 | BLE Temp #3 High level |
| 50553 | Int16 | 0 | -400 | 1250 | BLE Temp #3 Low level |
| 50554 | Uint8 | 0 | 0 | 1 | BLE Temp #3 Event only |
| 7225 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8225 | String | 0 | 0 | 160 | SMS Text |
| 50560 | Uint8 | 0 | 0 | 3 | BLE Temp #4 Priority |
| 50561 | Uint8 | 3 | 0 | 6 | BLE Temp #4 Operand |

| | | | | | |
|-------|--------|---|------|------|---------------------------|
| 50562 | Int16 | 0 | -400 | 1250 | BLE Temp #4 High level |
| 50563 | Int16 | 0 | -400 | 1250 | BLE Temp #4 Low level |
| 50564 | UInt8 | 0 | 0 | 1 | BLE Temp #4 Event only |
| 7226 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8226 | String | 0 | 0 | 160 | SMS Text |
| 50570 | UInt8 | 0 | 0 | 3 | BLE Battery #1 Priority |
| 50571 | UInt8 | 3 | 0 | 6 | BLE Battery #1 Operand |
| 50572 | Int16 | 0 | 0 | 100 | BLE Battery #1 High level |
| 50573 | Int16 | 0 | 0 | 100 | BLE Battery #1 Low level |
| 50574 | UInt8 | 0 | 0 | 1 | BLE Battery #1 Event |
| 7227 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8227 | String | 0 | 0 | 160 | SMS Text |
| 50580 | UInt8 | 0 | 0 | 3 | BLE Battery #2 Priority |
| 50581 | UInt8 | 3 | 0 | 6 | BLE Battery #2 Operand |
| 50582 | Int16 | 0 | 0 | 100 | BLE Battery #2 High level |
| 50583 | Int16 | 0 | 0 | 100 | BLE Battery #2 Low level |
| 50584 | UInt8 | 0 | 0 | 1 | BLE Battery #2 Event |
| 7228 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8228 | String | 0 | 0 | 160 | SMS Text |
| 50590 | UInt8 | 0 | 0 | 3 | BLE Battery #3 Priority |
| 50591 | UInt8 | 3 | 0 | 6 | BLE Battery #3 Operand |
| 50592 | Int16 | 0 | 0 | 100 | BLE Battery #3 High level |
| 50593 | Int16 | 0 | 0 | 100 | BLE Battery #3 Low level |
| 50594 | UInt8 | 0 | 0 | 1 | BLE Battery #3 Event |
| 7229 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8229 | String | 0 | 0 | 160 | SMS Text |
| 50600 | UInt8 | 0 | 0 | 3 | BLE Battery #4 Priority |
| 50601 | UInt8 | 3 | 0 | 6 | BLE Battery #4 Operand |
| 50602 | Int16 | 0 | 0 | 100 | BLE Battery #4 High level |
| 50603 | Int16 | 0 | 0 | 100 | BLE Battery #4 Low level |
| 50604 | UInt8 | 0 | 0 | 1 | BLE Battery #4 Event |
| 7230 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8230 | String | 0 | 0 | 160 | SMS Text |
| 50610 | UInt8 | 0 | 0 | 3 | BLE Humidity #1 Priority |
| 50611 | UInt8 | 3 | 0 | 6 | BLE Humidity #1 |
| 50612 | Int16 | 0 | 0 | 1000 | BLE Humidity #1 High |
| 50613 | Int16 | 0 | 0 | 1000 | BLE Humidity #1 Low |
| 50614 | UInt8 | 0 | 0 | 1 | BLE Humidity #1 Event |
| 7231 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8231 | String | 0 | 0 | 160 | SMS Text |
| 50620 | UInt8 | 0 | 0 | 3 | BLE Humidity #2 Priority |
| 50621 | UInt8 | 3 | 0 | 6 | BLE Humidity #2 |
| 50622 | Int16 | 0 | 0 | 1000 | BLE Humidity #2 High |
| 50623 | Int16 | 0 | 0 | 1000 | BLE Humidity #2 Low |
| 50624 | UInt8 | 0 | 0 | 1 | BLE Humidity #2 Event |
| 7232 | UInt8 | 0 | 0 | 10 | Send SMS |
| 8232 | String | 0 | 0 | 160 | SMS Text |
| 50630 | UInt8 | 0 | 0 | 3 | BLE Humidity #3 Priority |

| | | | | | |
|-------|--------|---|---|------|---------------------------|
| 50631 | Uint8 | 3 | 0 | 6 | BLE Humidity #3 |
| 50632 | Int16 | 0 | 0 | 1000 | BLE Humidity #3 High |
| 50633 | Int16 | 0 | 0 | 1000 | BLE Humidity #3 Low |
| 50634 | Uint8 | 0 | 0 | 1 | BLE Humidity #3 Event |
| 7233 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8233 | String | 0 | 0 | 160 | SMS Text |
| 50640 | Uint8 | 0 | 0 | 3 | BLE Humidity #4 Priority |
| 50641 | Uint8 | 3 | 0 | 6 | BLE Humidity #4 |
| 50642 | Int16 | 0 | 0 | 1000 | BLE Humidity #4 High |
| 50643 | Int16 | 0 | 0 | 1000 | BLE Humidity #4 Low |
| 50644 | Uint8 | 0 | 0 | 1 | BLE Humidity #4 Event |
| 7234 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8234 | String | 0 | 0 | 160 | SMS Text |
| 50720 | Uint8 | 0 | 0 | 3 | BT Status Priority |
| 50721 | Uint8 | 5 | 0 | 6 | BT Status Operand |
| 50722 | Int16 | 0 | 0 | 4 | BT Status High level |
| 50723 | Int16 | 0 | 0 | 3 | BT Status Low level |
| 50724 | Uint8 | 1 | 0 | 1 | BT Status Event only |
| 7250 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8250 | String | 0 | 0 | 160 | SMS Text |
| 50690 | Uint8 | 0 | 0 | 3 | Battery level % Priority |
| 50691 | Uint8 | 4 | 0 | 6 | Battery level % Operand |
| 50692 | Int16 | 0 | 0 | 100 | Battery level % High |
| 50693 | Int16 | 0 | 0 | 100 | Battery level % Low level |
| 50694 | Uint8 | 1 | 0 | 1 | Battery level % Event |
| 7243 | Uint8 | 0 | 0 | 10 | Send SMS |
| 8243 | String | 0 | 0 | 160 | SMS Text |

7 EC Declaration of Conformity



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EC Declaration of Conformity

Declaring Organization: UAB TELTONIKA

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Product Name: Fleet Management System
Product Model Name: FMB010, FMB001
Product Description: GNSS/GSM OBD tracker

Technical description of built in RF module:

| Frequency range: | Tx: | Rx: |
|------------------|---------------------|-------------------------|
| GSM900: | 880MHz - 915MHz | 925MHz - 960MHz |
| GSM1800: | 1710MHz - 1785MHz | 1805MHz - 1880MHz |
| Bluetooth | 2400MHz - 2483,5MHz | 2400MHz - 2483,5MHz |
| GPS | / | 1575,42 MHz |
| GLONASS | / | 1602,56MHz - 1615,50MHz |

Transmitted Power: Max. 32,84 dBm (GSM900)

Hardware Version: TM2500_01

Software Version: TM25_D_00.00.01.00

JSC TELTONIKA
Saltoniskiu st. 10C, LT-08105 Vilnius

Company code 124429895
VAT identification number LT244298917

JSC Swedbank, Vilnius
LT51 7300 0100 8737 2567




We, UAB TELTONIKA, declare under our sole responsibility that the above described product is in conformity with the relevant Community harmonisation: European Directive 2014/53/EU (RED).

The conformity with the essential requirements has been demonstrated against the following harmonized standards:

| Harmonized Standard reference | Article of Directive 2014/53/EU | Test report No. |
|---|--|--|
| EN 60950-1:2006 + A1:2010 + A2:2013 + A11:2009 + A12:2011 | Health and safety - Article 3.1(a) | T223-0020/17 |
| EN 62311:2008 | | RXA1706-0196EMF |
| Draft EN 301 489-1 V2.2.0 Draft EN 301 489-17 V3.2.0 Draft EN 301 489-19 V2.1.0 Draft EN 301 489-52 V1.1.0 | Electromagnetic compatibility - Article 3.1(b) | T251-0278/17 A1 |
| EN 301 511 V9.0.2 EN 300 328 V2.1.1 Draft EN 303 413 V1.1.0 | Efficient use of radio spectrum - Article 3.2 | RXA1706-0196RF03 RXA1706-0196RF01 RXA1706-0196RF02 |

The conformity assessment procedure referred to in Article 17 and detailed in Annex III of Directive 2014/53/EU has been followed with the involvement of the following Notified Body: SIQ Ljubljana, Mašera-Spasičeva ulica 10, SI-1000 Ljubljana, Slovenia. Notified Body No: 1304.

Thus,  is placed on the product.

Vilnius, 2017-09-14


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EU-Type Examination Certificate No. 1304-RED-0016

Technical Documentation: FMB0XX User Manual v1.12

CHANGE LOG

| Nr. | Date | Version | Comments |
|-----|------------|---------|---|
| 1 | 2017-01-11 | 0.01 | Preliminary draft release. |
| 2 | 2017-01-24 | 0.02 | Blue-tooth radio, accelerometer scenarios, time synchronization explanation added, parameter IDs for remote configuration added. |
| 3 | 2017-02-07 | 0.03 | I/O element parameter IDs updated. |
| 4 | 2017-02-21 | 0.04 | Updated IO element "Event only" parameter values |
| 5 | 2017-04-05 | 0.05 | Updated I\O elements, sms ID parameter description. |
| 6 | 2017-05-08 | 0.06 | Sim insert edited. Added sms commands. Blue-tooth: debug over android, OBD dongle connection, hands free connection. Crash Trace. |
| 7 | 2017-05-16 | 0.07 | Deep Sleep Current edited |
| 8 | 2017-05-29 | 0.08 | Eco Driving auto calibration added. |
| 9 | 2017-06-02 | 0.09 | Micro Sim image edited |
| 10 | 2017-06-07 | 0.10 | Updated devices image |
| 11 | 2017-07-04 | 0.11 | Updated pinout, setparam corrected |
| 12 | 2017-07-21 | 0.12 | Updated SMS ID, SMS command, setparam description |
| 13 | 2017-09-13 | 0.13 | Minor changes, removed Spy Call, removed OBD sms. |
| 14 | 2017-09-26 | 0.14 | Added declaration of conformity and device's weight |
| 15 | 2018-06-15 | 0.15 | Edited BT description(...up to 10 devices...), removed Chap or Pap for APN. Setdigout sms removed, Ignition sms configuration, technical details updated, SMS event time zone updated, FOTA web description added, manual geofence added. |
| 16 | 2018-08-22 | 0.16 | Changed Bluetooth to Blue-tooth Updated configuration images. |
| 17 | 2018-12-07 | 0.17 | Added BLE description, Missing I\O sms description, Maintenance tab description, Predefined number without "+" note, pinout updated, driver download link updated, getimeiccid, getrecord sms commands, no crash buffer in Ultra DS. |