

Green Driving Solution

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Solution description

Growing world population and development of new technologies contribute to the growth in use of transport. Driving style is one of the factors directly influencing fuel consumption and vehicle life, e.g. aggressive acceleration, harsh braking, harsh cornering and over speeding. Inefficient driving produces more exhaust gas emissions, thus, increasing the negative environmental impact on our planet.

FYI

This solution helps to get only those parameters that are broadcast on the bus, and does not require sending a request command to get this parameter

What you need for a solution?

- All Teltonika FM devices are compatible with this use case.
- The SIM card in order to receive data to Your server.
- [Teltonika Configurator](#) to set up FM device correctly for the solution.
- [FOTA WEB](#) to remotely send the configuration to the device.
- [BTAPP](#) / Driver application to monitor and score driver behavior. Real time events notifications about harsh acceleration, braking, cornering, over speeding, idling and RPM. Solution designed to improve driver behavior and productivity.

Installation



Green driving functionality that collects data on acceleration, braking, over speeding, harsh cornering and no-load engine operation. This information is instantly analyzed. If the received values are beyond the set parameters, the device sends a command to the LED or Buzzer installed in the driver's cab and alerts that he or she is driving inefficiently. In case of the driver alert function, please note that the device must have DOUT for this feature to work.

There are two sources for Green Driving operation - GPS data and accelerometer. The desired one can be selected in Configurator. GPS data is pretty reliable and does not require any additional effort to make it work. On the other side, accelerometer data is more precise and ensures uninterrupted operation even when GPS signal is not available, for example, in tunnels or underground parking lots.

What is also very important for green driving to work properly, device connection pins socket must point towards the vehicles front side. Deviations of +/- 20 are allowed. But it should be as straight as possible. Deviations of maximum +/- 150 are allowed. Horizontal position must be as flat as possible - parallel with vehicle plain.

Configuration

1. Prerequisites:

1.1. Read through [First start guide](#)

2. Configuration of Green driving scenario:



Parameter ID - Parameter name GPRS settings:

- **2001** - APN
- **2002** - APN username (if there are no APN username, empty field should be left)
- **2003** - APN password (if there are no APN password, empty field should be left)



Server settings:

- 2004 - Domain
- 2005 - Port
- 2006 - Data sending protocol (0 - TCP, 1 - UDP)

After successful GPRS/SERVER settings configuration, FMB920 device will **synchronize time** and **update records to the configured server**. Time intervals and default I/O elements can be changed by using [Teltonika Configurator](#) or [SMS parameters](#). After familiarizing with devices first start guide and device's GPRS settings are set - configuration for Green driving can be done.



Configuration of Eco/Green driving scenario

Parameter ID - Parameter name

- 11000 - Scenario priority (0 - Disable, 1 - Low, 2 - High, 3 - Panic).
- 11004 - Maximum Acceleration (m/s²).
- 11005 - Maximum Braking (m/s²)
- 11006 - Maximum Cornering (m/s²)
- 11007 - Source (0 - GPS, 1 - Accelerometer). Green driving scenario according to selected data source.
- 11019 - Advanced Eco Driving (0 - Disable, 1 - Enable). If enabled, Eco Driving Average (ID.: 11011) and / or Eco Driving Maximum (ID.: 11015) settings can be changed.
- 11008 - Eco/Green Driving Duration (0 - Disable, 1 - Enable).
- 11003 - (None - if event happens, it will not effect DOUT state; DOUT1 - Digital output 1 will be activated; DOUT2 - Digital output 2 will be activated)
- 11001 - DOUT on duration
- 11002 - DOUT off duration
- 7034 - ID of SMS recipient.
- 8034 - SMS Text.

Note: Maximum acceleration, braking and cornering values should be set according to vehicle type, power, weight and etc. Best values can be approached by practical testing.



Configuration of Excessive Idling scenario Parameter ID - Parameter name

- 11200 - Scenario priority (0 - Disable, 1 - Low, 2 - High, 3 - Panic).

- 11203 - Eventual settings (0 - Disable, 1 - Enable), if disabled - excessive idling data will come with periodical data.
- 11205 - Time To Stopped (s). Represents how long vehicle should not move with engine ON.
- 11206 - To Moving (s). Represents how long vehicle should be moving with engine ON, to exit idle state.
- 7033 - ID of SMS recipient.
- 11204 - (None - if event happens, it will not effect DOUT state; DOUT1 - Digital output 1 will be activated; DOUT2 - Digital output 2 will be activated)
- 11201 - For how long DOUT should be active.
- 11202 - For how long DOUT should be inactive.
- 7033 - SMS Text.

Note: Maximum acceleration, braking and cornering values should be set according to vehicle type, power, weight and etc. Best values can be approached by practical testing.



Configuration of Over Speeding scenario

Parameter ID - Parameter name

- **11100** - Scenario priority (0 - Disable, 1 - Low, 2 - High, 3 - Panic).
- 11104 - Max speed (Default value - 90, Value range 0-260, Value - km/h)
- 13217 - Speed source (0 - GNSS, 1 - OBD, 2 - Pulse counter).
- 13223 - Overspeeding hysteresis (Default value - 28, Value range 0 - 100)
- 11101 - DOUT ON duration
- 11102 - DOUT OFF duration
- 7032 - ID of SMS recipient.
- 8032 - SMS Text.

Quick start: From default configuration to Green driving records in one [SMS](#):

" setparam **11800**:1;**11801**:0;**11806**:1;**11000**:2;**11007**:1;**11200**:2;**11100**:2"

This SMS will set up Your device to send Trip, Eco/Green driving and Excessive idling data to Your previously provided server.

Note: Before SMS text, two space symbols should be inserted if no SMS username or password was set in [SMS / Call settings](#).

3. BTAPP Mobile application



After making configuration for Your device, it is time to [download BTAPP](#). Keep in mind, app and device connection is established via Bluetooth®. Devices by default come with Bluetooth® enabled and visible. After pairing to device - You can change the trip type of Your trips by performing a long press on the icon and confirming the change.

Parsing information

1. Prerequisites:

1.1. Open [TCP/UDP port](#)

1.2. Go to [Java parser first start guide](#)

2. Parsing example:

Unparsed received data in hexadecimal stream

```
0000000000000005E08010000017716AE03D8010F0F22D720982E9C007E00120A002FD1609E
F01F00150011505C80045010101FD03FE230BB5000BB60006423A0018002F430F8A4400000
901301100161200EC13FBD90F038402C7000003BD1003066802000100005F75
```

AVL Data Packet Part	HEX Code Part
Zero Bytes	00 00 00 00
Data Field Length	00 00 00 5E
Codec ID	08 (Codec 8)
Number of Data 1 (Number of Total Records)	01
Timestamp	00 00 01 77 16 AE 03 D8 (Mon Jan 18 18:07:19 UTC 2021)
Priority	01
Longitude	0F 0F 22 D7
Latitude	20 98 2E 9C
Altitude	00 7E
Angle	00 12
Satellites	0A
Speed	00 2F
Event IO ID	FD (AVL ID: 253, Name: Green driving type)
N of Total ID	16
N1 of One Byte IO	09
1'st IO ID	EF (AVL ID: 239, Name: Ignition)
1'st IO Value	01
2'nd IO ID	F0 (AVL ID: 240, Name: Movement)
2'nd IO Value	01
3'rd IO ID	15 (AVL ID: 21, Name: GSM Signal)
3'rd IO Value	05
4'th IO ID	50 (AVL ID: 80, Name: Data mode)
4'th IO Value	01
5'th IO ID	C8 (AVL ID: 200, Name: Sleep Mode)
5'th IO Value	00
6'th IO ID	45 (AVL ID: 69, Name: GNSS Status)
6'th IO Value	01
7'th IO ID	01 (AVL ID: 1, Name: Digital Input 1)
7'th IO Value	01
8'th IO ID	FD (AVL ID: 253, Name: Green driving type)

8'th IO Value	03 (01 - harsh acceleration, 02 - harsh braking, 03 - harsh cornering)
9'th IO ID	FE (AVL ID: 254, Name: Green Driving Value)
9'th IO Value	23 (Depending on green driving type: if harsh acceleration or braking - g*100 (value 123 ->1,23g). If Green driving source is "GPS" - harsh cornering value is rad/s*100. If source is "Accelerometer" - g*100.
N2 of Two Byte IO	0B
1'st IO ID	B5 (AVL ID: 181, Name: GNSS PDOP)
1'st IO Value	00 0B
2'nd IO ID	B6 (AVL ID: 182, Name: GNSS HDOP)
2'nd IO Value	00 06
3'rd IO ID	42 (AVL ID: 66, Name: External Voltage)
3'rd IO Value	3A 00
4'th IO ID	18 (AVL ID: 24, Name: Speed)
4'th IO Value	00 2F
5'th IO ID	43 (AVL ID: 67,Name: Battery Voltage)
5'th IO Value	0F 8A
6'th IO ID	44 (AVL ID: 68, Name: Battery Current)
6'th IO Value	00 00
7'th IO ID	09 (AVL ID: 9, Analog input 1)
7'th IO Value	01 30
8'th IO ID	11 (AVL ID:17, Name: Axis X)
8'th IO Value	00 16
9'th IO ID	12 (AVL ID:18, Name: Axis Y)
9'th IO Value	00 EC
10'th IO ID	13 (AVL ID:19, Name: Axis Z)
10'th IO Value	FB D9
11'th IO ID	0F (AVL ID: 15, Name: Eco score)
11'th IO Value	03 84
N4 of Four Byte IO	02
1'st IO ID	02 C7(AVL ID: 199, Name: Trip Odometer)
1'st IO Value	00 00 03 BD
2'nd IO ID	10 03(AVL ID: 16, Name: Total Odometer)
2'nd IO Value	06 68 80 20
Number of Data 2 (Number of Total Records)	01
CRC-16	00 00 5F 75

Demonstration in platform

BTAPP: ECO driving:



Bluetooth® connection to monitor and score driver behavior. Real time events notifications about

harsh acceleration, braking, cornering, overspeeding, idling and RPM. Solution designed to improve driver behavior and productivity.

- You must connect to the device by clicking Bluetooth® icon, and selecting your device.
- Each event that was detected by our device will be displayed in the application as well. Users can be notified visually, event icon will turn yellow and event count will be increased accordingly, and by sound alert as well (can be optionally enabled in application settings).
- Eco score is calculated by devices depending on total event amount and trip distance.

Eco score, distance, and duration is being updated periodically automatically.

- Trip status can be Ongoing and Finished. The trip finish is decided by device configuration. If the application will be connected to device during an ongoing trip - the application will update event count, score, distance, and trip duration for an ongoing trip.

TAVL: Open TAVL application → Select Client → Select Device → Select the date interval → Select Track → Select Advanced → Chose Show button see in left down corner all the information.



WIALON: Open WIALON → Open Messages → Select your device → Select the date interval → Select Message (data messages) → Select execute and you will see all the information.

