Eco-Drive configuration

Introduction

The Eco-Drive functionality is used for monitoring the driving habits of drivers. This document describes, how to configure the Eco-Drive functionality and what options may be used. A detailed description on how the functionality works and a full list of Eco-Drive parameters can be found in the "Eco-Drive parameters description" document.

This feature is available for the following FM devices with the newest firmware version:
- FM-Tco4 HCV;
- FM-Tco4 LCV;
- FM Pro4;
- All FM-Eco4 and FM-Eco4 S devices;
- FM-Plug4.

You can get the newest firmware and configurator from our documentation website: doc.ruptela.lt

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Document change log

Date	Version	Change details
2015-10-08	1.0	Initial draft.
2015-11-06	1.1	Added schematics for Eco Panel connection.
2015-11-18	1.2	Eco Panel connection changes.
2016-01-12	1.3	"Idling speed" added.
2016-01-27	1.4	FM-Tco4 HCV label.
2016-06-22	1.5	GPS+CAN, GPS+OBD data source for cornering parameter, Alternative data source selection
2017-06-06	1.6	Described "Enable IO" function
2017-12-08	1.7	Described the new "Calculate data only when engine is ON" function in the configuration section.
2018-09-12	1.8	"Eco-Drive from accelerometer" and "Eco-Drive from GPS" manuals merged into "Eco-Drive configuration". Eco-Drive panel connection schemes removed. Added description of "Ignore CAN brake switch".
2018-10-08	1.9	Calibration process description reworked.

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Configuration

The FM device must be configured properly for the Eco-Drive functionality to work. The configuration is split into two parts. The first part is described below:

1. Open the configurator and select your device.
2. Under **Eco-Drive** section put a tick in the **Enable** checkbox.
3. Click on the **Options** button on the right.
4. In the **Eco-Drive** pop-up window select a proper **Profile** for your vehicle. Profiles help to distinguish between different vehicles and their Eco-Drive parameter values. You can choose between *Custom*, *Light vehicle* and *Truck*.
5. Each profile comes with recommended Eco-Drive parameter values. However, you can easily modify them to achieve wanted results.
6. A different number of **Data sources** are available for different devices. Some sources have fewer Eco-Drive parameters, more information can be found below in the "Eco-Drive sources" chapter.
7. If the **Ignore CAN brake switch** checkbox is ticked, the brake pedal position ("CAN brake switch" parameter) will not be used in Eco-Drive event calculations and the "CAN wheel based speed" parameter will be used instead. This functionality is disabled by default. To enable it, the data source must be set to CAN, CAN+ACC or CAN+GPS. If "CAN wheel based speed" is not available and **Alternative data source selection** is enabled, GPS speed will be used instead. **Note:** ECO braking duration and ECO braking distance will be calculated only if "CAN brake switch" is available.
8. Tick the **Calculate data only when engine is ON** checkbox, this is necessary to avoid false Eco-Drive data calculation because of various factors when the vehicle is standing with ignition off.
9. If **Custom Engine source** is ticked, you can customize how engine state will be determined for Eco-Drive data calculation. More information can be found in the "Eco-Drive parameters description" document.
10. Tick the **Eco Driving panel connected** checkbox if you have connected an Eco-Drive panel to the device. Connection schemes for different devices are provided below in the "Eco-Drive Panel Connection" document.
11. **Alternative data source selection** is enabled by default. If the data source is set to ACC or GPS, it will be disabled automatically (greyed out). When active, it functions as follows:
    a. CAN, CAN+ACC or GPS+CAN data source has to be set. If CAN speed data from CANbus line is not available, then GPS speed data will be used instead. Also, if RPM data from CANbus line is not available, then power voltage data will be used to determine engine start.
    b. OBD, OBD+ACC or GPS+OBD data source has to be set. If speed data from OBD is not available, then GPS speed data will be used instead. Also, if RPM data from OBD is not available, then power voltage data will be used to determine engine start.
12. If **Beeper Enabled** is ticked, Eco-Drive panel will beep on exceeded value (e.g. if over speeding).
13. The user can click the **Enable IO** button. This will enable seven standard Eco driving IO parameters, thus reducing the amount of IO parameters that need to be enabled in the next part of the configuration.
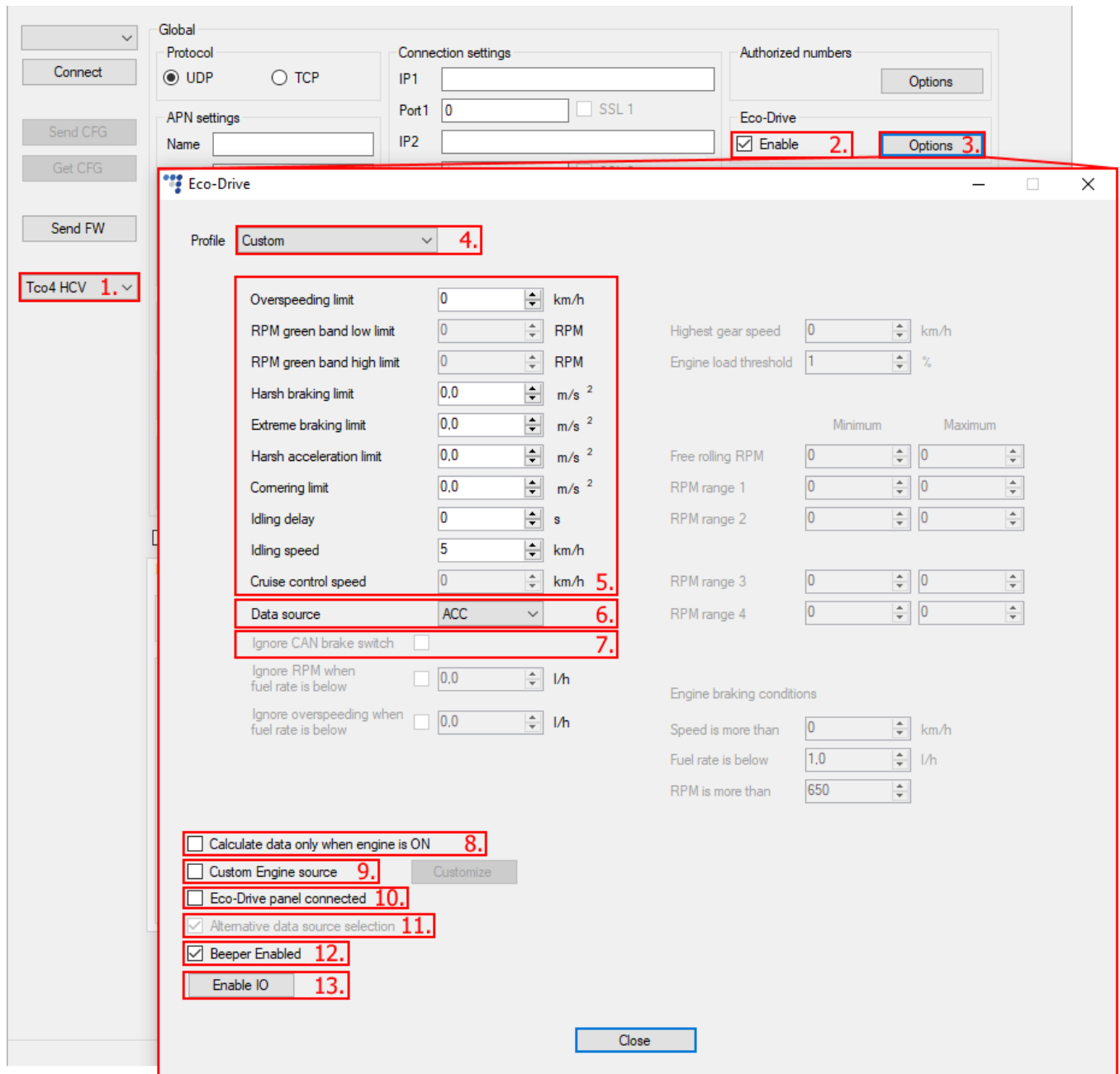
The second part of the configuration deals with IO events. In order to see the parameters in the reports, you have to select proper IO parameters in **IO settings**. Remember that Eco-Drive parameter availability depends on the selected data source. More information can be found in the "Eco-Drive sources" chapter.

1. In the **IO events** section click on the **Options** button. It opens up a new **IO settings** window.
2. Select the slot that you want to enable (If **Enable IO** was selected in the previous part of the configuration, 7 IOs will already be enabled in the list).
3. In the **IO properties** section tick the **Enable** check box, otherwise the slot will remain empty.
4. **ID** contains the parameters list. Choose an Eco-Drive parameter that you want to enable for the selected slot.

Repeat steps 1 to 4 until you enable all desired Eco-Drive parameters. The amount of total available parameters depends on the data source.

Once all parameters are enabled, close the **IO settings** window and send the configuration to the device.
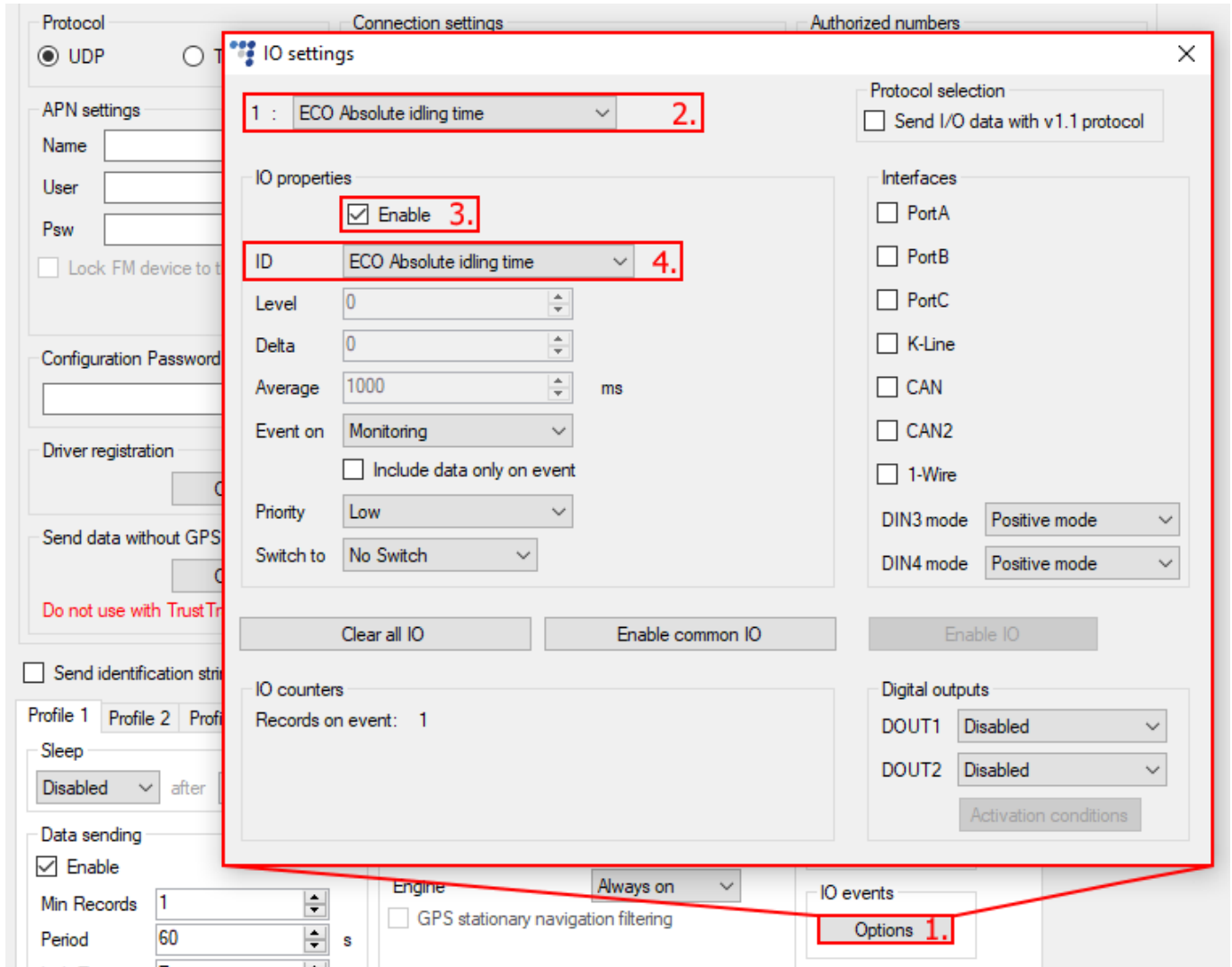
Note

It is very important to enable at least one Eco-Drive parameter in the IO list. If you fail to do so, the Eco-Drive functionality will not work.

Eco-Drive sources

You can manually select an Eco-Drive parameter source or choose to enable automatic source detection. Different devices can have different Eco-Drive sources.

FM Device side	Eco-Drive source
FM-Eco4	ACC, GPS
FM-Plug4	ACC, OBD, OBD+ACC, GPS, GPS+OBD

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FM-Pro4	ACC, CAN, CAN+ACC, GPS, GPS+CAN			
FM-Tco4 LCV	ACC, CAN[1], CAN[1]+ACC, OBD, OBD+ACC, GPS, GPS+OBD, GPS+CAN			
FM-Tco4 HCV	ACC, CAN, CAN+ACC, OBD, OBD+ACC, GPS, GPS+OBD, GPS+CAN			

[1]Only for LCV source.

Devices can measure angular momentum (harsh cornering or aggressive turning), which is detected by the accelerometer. It is not available, when CAN or OBD is used as a data source. Therefore additional data sources can be selected:
- CAN+ACC: here Eco-Drive parameters are calculated from CAN data and cornering detection is done by the accelerometer.
- OBD+ACC: here Eco-Drive parameters are calculated from OBD data and cornering detection is done by the accelerometer.

Note
Cornering events do not work in the TrustTrack system.

Some data sources have fewer Eco-Drive parameters than others. Unavailable parameters will be greyed out in the "Eco-Drive" window. For example RPM bands and Cruise control speed for the GPS source. Availability of parameters according to the Eco-Drive source is shown in table below:

IO parameter	Data source			
	CAN	Accelerometer	OBD	GPS
ECO absolute idling time	+	+	+	+
ECO brake counter	+	+	+	+
ECO cornering counter	CAN+ACC GPS+CAN	+	OBD+ACC GPS+OBD	+
ECO cruise control distance	+	Not available	Not available	Not available
ECO cruise control timer	+	Not available	Not available	Not available
ECO engine on timer	+	+	+	+
ECO extreme and harsh brake counter	+	+	+	+
ECO harsh acceleration counter	+	+	+	+
ECO idling event	+	+	+	+
ECO idling timer	+	+	+	+
ECO max RPM	+	Not available	+	Not available
ECO max speed	+	+	+	+
ECO normal speed distance	+	+	+	+
ECO overspeeding timer	+	+	+	+
ECO RPM in green band distance	+	Not available	+	Not available
ECO RPM in red band timer	+	Not available	+	Not available
ECO braking value	+	CAN+ACC	+	+
ECO acceleration value	+	CAN+ACC	+	+
ECO cornering value	CAN+ACC GPS+CAN	CAN+ACC	OBD+ACC GPS+OBD	+

Note
Extended Eco-Drive parameters can be used only with FM-Tco4 HCV / LCV and FM-Pro4 devices.

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Calibration process

If *ACC*, *CAN+ACC* or *OBD+ACC* is selected as a data source, the accelerometer will need to be calibrated. This process is done automatically.

Requirements:
- Data source: *ACC*, *CAN+ACC* or *OBD+ACC*.
- A GPS fix for acceleration/braking.
- The FM device must be installed tightly, it cannot move, shake or get loose. This is VERY important.
- No previous calibration, if the accelerometer was calibrated previously, it will not be calibrated again unless the *accreset* SMS command is sent.

Calibration sequence:
Use the *accinfo* SMS command described below to obtain calibration status.

The calibration is unlikely to be successful if the vehicle is driving in a straight line at a constant speed, for instance in a motorway. In an urban location, the calibration should finish in around an hour of driving.

Important!
If you calibrated the device and then removed it from the vehicle or reinstalled it in a different location, it must be recalibrated. The old calibration can be reset using the *accreset* SMS command.

Note
If you previously calibrated the accelerometer using an older firmware version without automatic calibration and then updated to a later version which has it, the existing calibration will not be changed.

SMS commands
SMS command to receive the status of the accelerometer:
- *accinfo*

  The device will send a response, an example is shown below:

  AXL state:11 XYZo:120 -39 -945 Xc:131 -92 -94 -7 Yc:-138 97 -96 16 Zc:953 120 -39 -945

  AXL state shows the calibration process:
  - *2* indicates that the accelerometer calibration started.
  - *3* indicates that the calibration is in progress.
  - *11* indicates that the accelerometer is calibrated.

SMS commands to reinitiate automatic calibration:

- *accreset*

  The device will send a response, an example is shown below:

  ACC reset OK

- *accreset r*

  This command will reinitiate automatic calibration just as the *accreset* command and will also send SMS responses with each calibration step. The device can send the following responses:

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- *Acc calibration initiated. Drive normally to autocalibrate* – the requirements for autocalibration are met and autocalibration will commence.
- *Up direction found. Drive normally to finish calibration* – the calibration is in progress.
- *Calibration successful* – the calibration process finished successfully.
- *Configuration error* – the requirements for autocalibration were not met.

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