

# Extended Eco-Drive parameters

## Introduction

Eco-Drive solution aims to teach drivers efficient driving style and to cut transport operation costs. Real time monitoring allows to analyze driver performance and suggest improvements if needed. Data enabling Eco-Drive is gathered from vehicle's on-board computer, accelerometer and GPS. Collected information is processed in real time transport monitoring and control system TrustTrack, which allows you to make the insights on how to reduce and optimize fuel consumption. Extended Eco-Drive parameters offer even greater control over your vehicles and help to push driver's eco-friendly performance even further.

Feature for different FM devices is available starting with these firmware versions:

- FM-Pro3 - 00.02.53
- FM-Tco3 - 00.04.31
- FM-Pro4 - 00.02.04.10
- FM-Tco4 HCV - 00.02.04.10
- FM-Tco4 LCV - 00.02.04.10

You can get the newest firmware and configurator from our FTP server: [doc.ruptela.it](http://doc.ruptela.it)

## Legal information

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## Document change log

Date	Version	Change details
2016-03-01	1.0	Initial draft

## Standard Eco-Drive parameters with different FM devices

Parameter	FM-Tco3, FM-Tco4 HCV/LCV	FM-	FM-Eco3/4	FM-Eco4+/ light/light+	FM-Plug4/4+
ECO max speed	●	●	●	●	●
ECO overspeeding timer	●	●	●	●	●
ECO RPM in red band timer	●	●			●
ECO max RPM	●	●			●
ECO brake counter	●	●	●	●	●
ECO extreme and harsh brake counter	●	●	●	●	●
ECO harsh acceleration counter	●	●	●	●	●
ECO idling timer	●	●	●	●	●
ECO cruise control timer	●	●			
ECO engine on timer	●	●	●	●	●
ECO RPM in green band distance	●	●			●
ECO normal speed distance	●	●	●	●	●
ECO cruise control distance	●	●			
ECO cornering counter	●	●	●	●	●
ECO idling event	●	●	●	●	●
ECO Absolute idling time	●	●	●	●	●
ECO braking value*	●	●	●	●	●
ECO acceleration value*	●	●	●	●	●
ECO cornering value*	●	●	●	●	●

\*Parameters available only with 4<sup>th</sup> generation devices (FM4). Also protocol v1.1 has to be used.

## Extended Eco-Drive parameters with FM3 devices

In 3<sup>rd</sup> generation devices, when “extended ECO-drive parameters” option is used all the parameters are reorganized. Usual Eco-Drive parameters layout is no longer available. This is done in order to prevent confusion in configuration and parameter duplication. Standard Eco-Drive parameters and extended Eco-Drive parameters are arranged into 9 separate groups (see table below). These groups are only available with FM-Tco3 and FM-Pro3 devices. All these parameters are derived from vehicle CANbus data (FMS parameters).

If „extended ECO-drive parameters” is unchecked, only usual layout without extended parameters is available.

ID	Name	Size, B	Structure	IO Factor
220	ECO drive group1	8	ECO max speed (1B), MSB	1 kmh/bit
			ECO overspeeding timer (2B)	1 s/ bit
			ECO RPM in red band timer (2B)	1 s/ bit
			ECO max RPM (2B)	1 RPM/ bit
			ECO brake counter (1B), LSB	1 event / bit
221	ECO drive group2	8	ECO extreme and harsh brake counter (1B), MSB	1 event / bit
			ECO harsh acceleration counter (1B)	1 event / bit
			ECO idling timer (2B)	1 s/bit
			ECO cruise control timer (2B)	1 s/bit
			ECO cruise control timer (2B) - LSB	1 s/bit
222	ECO drive group3	8	ECO RPM in green band distance (4B), MSB	1 m/bit
			ECO normal speed distance (4B), LSB	1 m/bit
223	ECO drive group4	8	ECO stops counter (1B), MSB	1 event / bit
			ECO fuel used while idling (2B)	0,001 l/bit
			ECO free rolling distance (2B)	5 m/bit
			ECO engine on timer (2B)	1 s/bit
			LSB is reserved	
224	ECO drive group5	8	ECO engine overloaded distance (2B) - MSB,	5 m/bit
			ECO engine overloaded fuel used (2B),	0,001 l/bit
			ECO overspeeding distance (2B),	5 m/bit
			ECO overspeeding fuel used (2B) - LSB.	0,001 l/bit
225	ECO drive group6	8	ECO cruise control on distance (2B) - MSB,	5 m/bit
			ECO cruise control on fuel used (2B),	0,001 l/bit
			ECO highest gear distance (2B),	5 m/bit
			ECO highest gear fuel used (2B) - LSB.	0,001 l/bit
226	ECO drive group7	8	ECO RPM range1 distance (2B) - MSB,	5 m/bit
			ECO RPM range1 fuel used (2B),	0,001 l/bit
			ECO RPM range2 distance (2B),	5 m/bit
			ECO RPM range2 fuel used (2B) - LSB	0,001 l/bit
227	ECO drive group8	8	ECO RPM range3 distance (2B) - MSB,	5 m/bit
			ECO RPM range3 fuel used (2B),	0,001 l/bit
			ECO RPM range4 distance (2B),	5 m/bit
			ECO RPM range4 fuel used (2B) - LSB	0,001 l/bit
228	ECO drive group9	8	ECO cruise control distance (4B),	1 m/bit
			ECO cruise control distance (4B).	1 m/bit

## Configuration

In the first part of configuration it is shown how to enable extended parameters. Follow these steps to configure your FM Device:

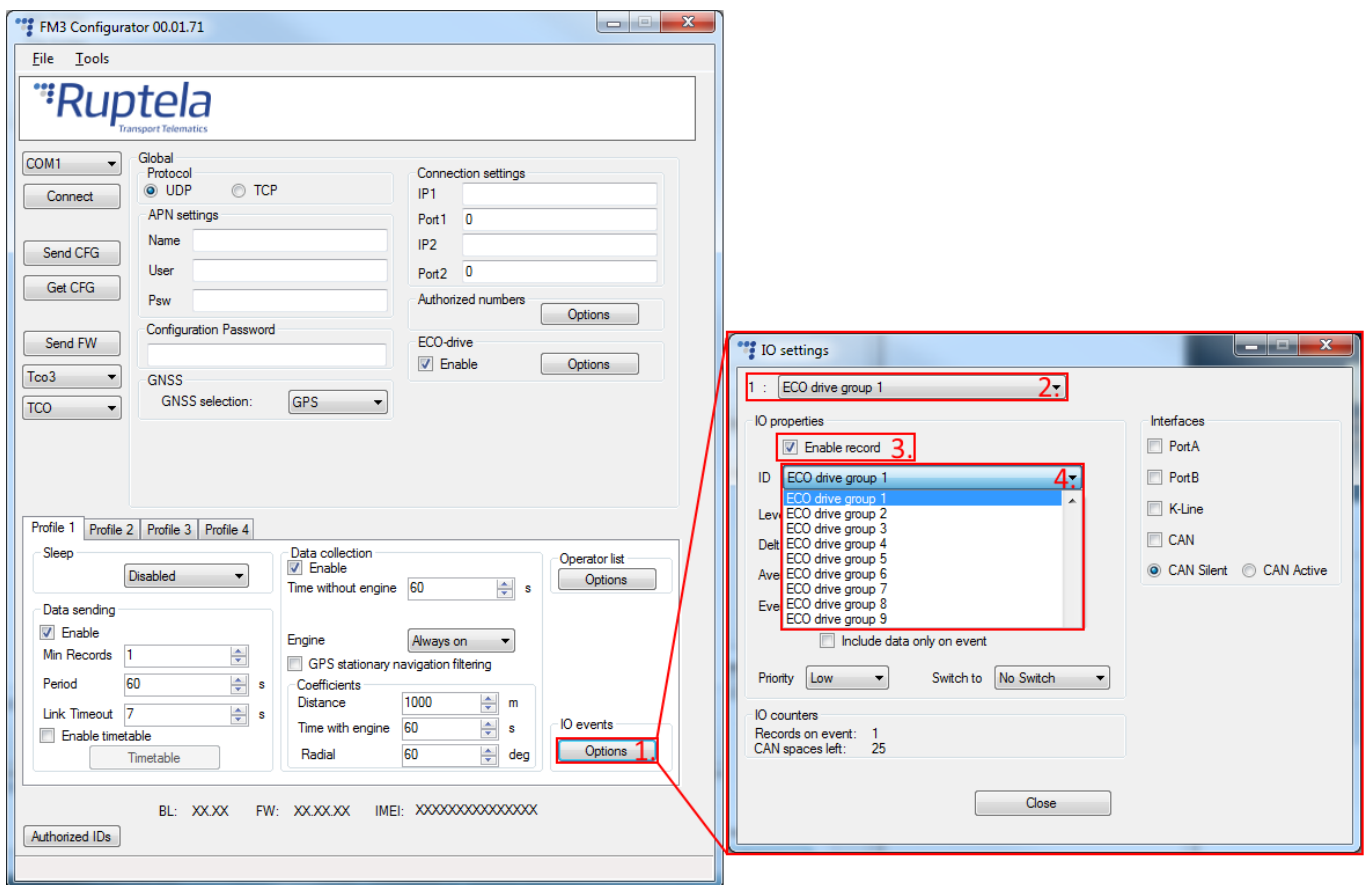
1. In the main configurator window choose your device (*FM-Tco3* or *FM-Pro3*).
2. Under **ECO-drive** section put a tick on **Enable** checkbox.
3. Click "Options" button.
4. Put a tick on **Expanded protocol for eco-drive** checkbox. This checkbox enables fields on the right that were previously greyed out. Also, standard Eco-Drive parameters and extended Eco-Drive parameters are grouped.
5. **Highest gear speed** - not every vehicle provides gear parameters in FMS data. It is considered that vehicle is driven in the highest gear, when its speed is above a set limit. "ECO highest gear distance" and "ECO highest gear fuel used" parameters are calculated, when vehicle exceeds this limit. Value range is from 0 to 255 km/h.
6. **Engine load threshold** - "ECO engine overloaded distance" and "ECO engine overloaded fuel used" parameters are calculated, when Engine Percent Load At Current Speed is above set limit. Value range is from 0 to 125 %.
7. **Free - rolling RPM range** - sets RPM range, which is used for "ECO free rolling distance" parameter calculation. Value range is from 0 to 10000 rpm's. Value in the Min column cannot be higher, than in the Max column.
8. **RPM range 1, 2, 3 and 4** - sets RPM ranges for 4 "ECO RPM range distance" and 4 "ECO RPM range fuel used" parameters. Value range in each field is from 0 to 10000 rpm's. Value in the Min column cannot be higher, than in the Max column.

The image displays two screenshots from the Ruptela FM3 Configurator software. The left screenshot shows the main configuration window with 'Tco3' selected in the device dropdown and the 'Enable' checkbox checked under the 'ECO-drive' section. The 'Options' button is also highlighted. The right screenshot shows the 'ECO-Drive' configuration window with the 'Expanded protocol for eco-drive' checkbox checked. Several parameters are highlighted with red boxes and numbered 5 through 8: 'Highest gear speed' (75 km/h), 'Engine load threshold' (90 %), 'Free-rolling RPM range' (450-650), and 'RPM range 1' (1-900), 'RPM range 2' (900-1300), 'RPM range 3' (1300-1500), and 'RPM range 4' (1500-2300).

## Enable Extended Eco-Drive parameters in IO settings

Second part of configuration deals with IO events. In order to see Extended Eco-Drive parameters in reports you have to enable them in the **IO settings** window.

1. In the **IO events** section click on "Options" button. It opens up a new "IO settings" window.
2. Select a free slot for a new parameter that you want to enable.
3. In the **IO properties** section tick the **Enable** check box, otherwise the slot will remain empty.
4. **ID** contains the parameters list. Choose and enable all the parameters starting with *ECO drive group 1* up to *ECO drive group 9*.



## Note

- When extended Eco-Drive parameters are used, fuel consumption parameters are calculated from FMS "HRLFC" – high resolution liquid fuel consumption data. If "HRLFC" is not available, then fuel consumption is calculated from "Fuel Rate" data.
- "Averaging" is not applied for extended parameters. "Event on" can be set only to *Monitoring*.

## Extended Eco-Drive parameters with FM4 devices

In 4<sup>th</sup> generation devices extended Eco-Drive parameters are enabled, when correct data source is chosen in Eco-Drive options. This can either be CAN or CAN+ACC data source. Also v1.1 protocol has to be used.

When these conditions are met, standard and extended Eco-Drive parameters will be displayed in the IO list. If not, only standard parameters are visible.

Table with extended parameters is displayed below. They are only available with FM-Tco4 HCV, FM-Tco4 LCV and FM-Pro4 devices. All these parameters are derived from vehicle CANbus data (FMS parameters).

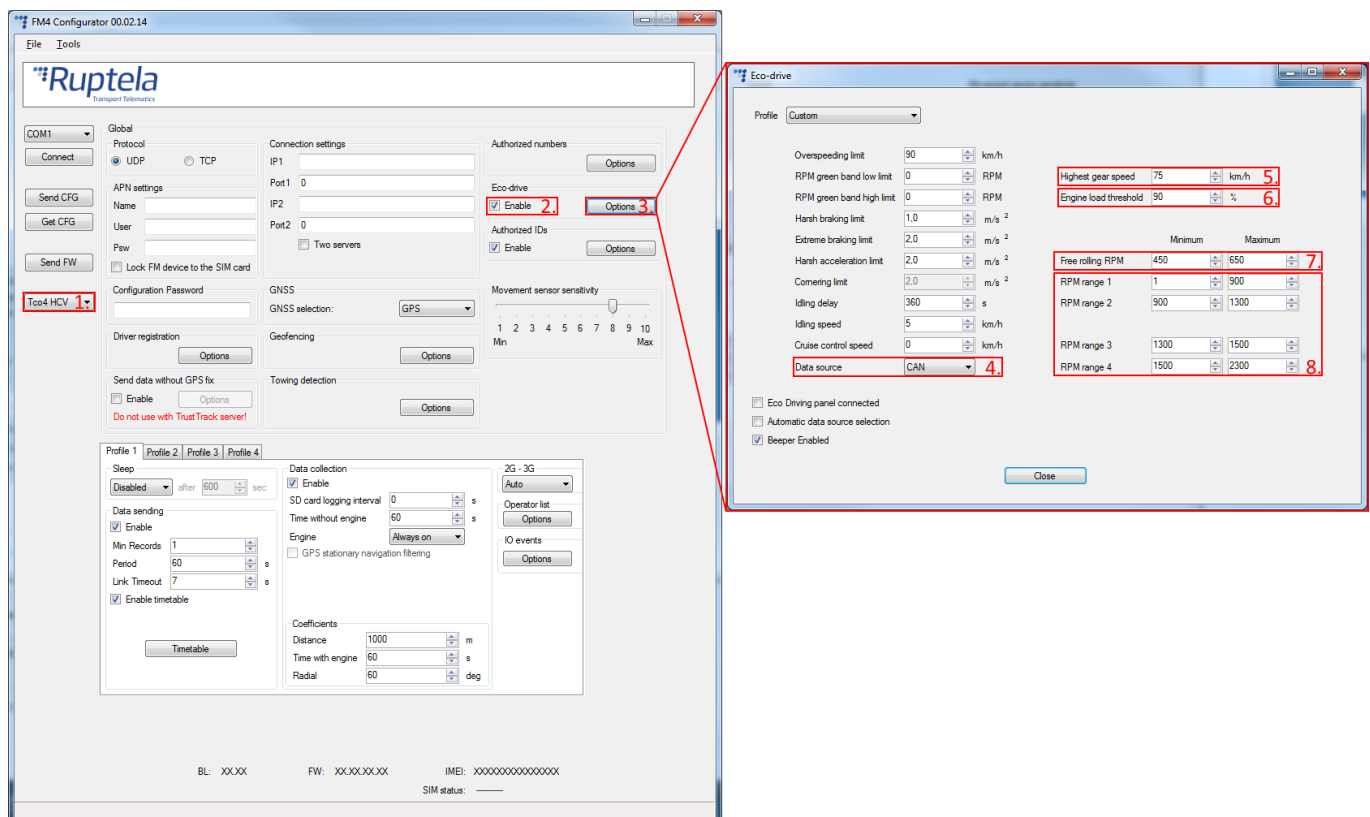
ID	Name	Size, B	Value range	IO Factor
540	ECO fuel used while idling	2	1-65535	1 ml/bit
541	ECO free rolling distance	2	1-65535	5 m/bit
542	ECO engine overloaded distance	2	1-65535	5 m/bit
543	ECO engine overloaded fuel used	2	1-65535	1 ml/bit
544	ECO overspeeding distance	2	1-65535	5 m/bit
545	ECO overspeeding fuel used	2	1-65535	1 ml/bit
546	ECO cruise control on distance	2	1-65535	5 m/bit
547	ECO cruise control on fuel used	2	1-65535	1 ml/bit
548	ECO highest gear distance	2	1-65535	5 m/bit
549	ECO highest gear fuel used	2	1-65535	1 ml/bit
550	ECO rpm range1 distance	2	1-65535	5 m/bit
551	ECO rpm range1 fuel used	2	1-65535	1 ml/bit
552	ECO rpm range2 distance	2	1-65535	5 m/bit
553	ECO rpm range2 fuel used	2	1-65535	1 ml/bit
554	ECO rpm range3 distance	2	1-65535	5 m/bit
555	ECO rpm range3 fuel used	2	1-65535	1 ml/bit
556	ECO rpm range4 distance	2	1-65535	5 m/bit
557	ECO rpm range4 fuel used	2	1-65535	1 ml/bit

### Configuration

In the first part of configuration it is shown how to enable extended parameters. Follow these steps to configure your FM Device:

1. In the main configurator window choose your device (*FM-Tco4 HCV, FM-Tco4 LCV or FM-Pro4*).
2. Under **ECO-drive** section put a tick on **Enable** checkbox.
3. Click "Options" button.

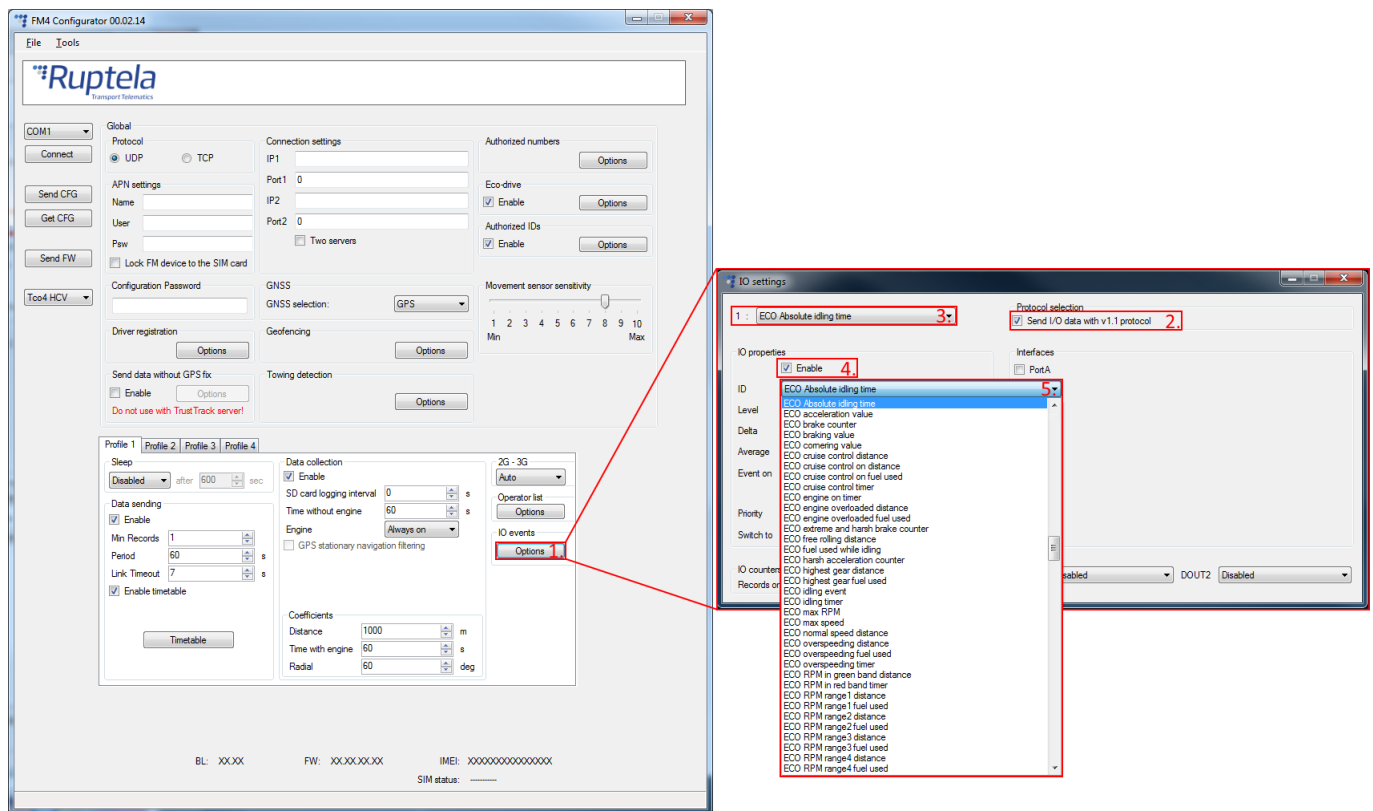
4. In **Data source** section choose **CAN** or **CAN+ACC**. This action enables fields on the right that were previously greyed out.
5. **Highest gear speed** - not every vehicle provides gear parameters in FMS data. It is considered that vehicle is driven in the highest gear, when its speed is above a set limit. "ECO highest gear distance" and "ECO highest gear fuel used" parameters are calculated, when vehicle exceeds this limit. Value range is from 0 to 255 km/h. Default is 75 km/h.
6. **Engine load threshold** - "ECO engine overloaded distance" and "ECO engine overloaded fuel used" parameters are calculated, when Engine Percent Load At Current Speed is above set limit. Value range is from 0 to 125 %. Default is 90 %.
7. **Free - rolling RPM range** - sets RPM range, which is used for "ECO free rolling distance" parameter calculation. Value range is from 0 to 10000 rpm's. Value in the Minimum column cannot be higher, than in the Maximum column. Default range is 450 - 650 rpm's.
8. **RPM range 1, 2, 3 and 4** - sets RPM ranges for 4 "ECO RPM range distance" and 4 "ECO RPM range fuel used" parameters. Value range in each field is from 0 to 10000 rpm's. Value in the Minimum column cannot be higher, than in the Maximum column.
  - a. Default value for range 1 is 1 - 900 rpm's.
  - b. Default value for range 2 is 900 - 1300 rpm's.
  - c. Default value for range 3 is 1300 - 1500 rpm's.
  - d. Default value for range 4 is 1500 - 2300 rpm's.



## Enable Extended Eco-Drive parameters in IO settings

Second part of configuration deals with IO events. In order to see Extended Eco-Drive parameters in reports you have to enable them in the **IO settings** window.

1. In the **IO events** section click on "Options" button. It opens up a new "IO settings" window.
2. In **Protocol selection** section add a tick in **Send I/O data with v1.1 protocol** checkbox. Now you will be able to see extended Eco-Drive parameters in the IO list.
3. Select a free slot for a new parameter that you want to enable.
4. In the **IO properties** section tick the **Enable** check box, otherwise the slot will remain empty.
5. **ID** contains the parameters list. Choose ID and enable all the ECO drive parameters.



## Note

- When extended Eco-Drive parameters are used, fuel consumption parameters are calculated from FMS "HRLFC" – high resolution liquid fuel consumption data. If "HRLFC" is not available, then fuel consumption is calculated from "Fuel Rate" data.
- "Averaging" is not applied for extended parameters. "Event on" can be set only to *Monitoring*.