

## ECO Driving Functionality From Accelerometer for FM3<sup>rd</sup> gen.

ECO driving from accelerometer is available for ECO3 and PRO3 devices. It is useful when CAN information is not accessible or more precise data is needed.

- ECO Driving with accelerometer
- IO parameters

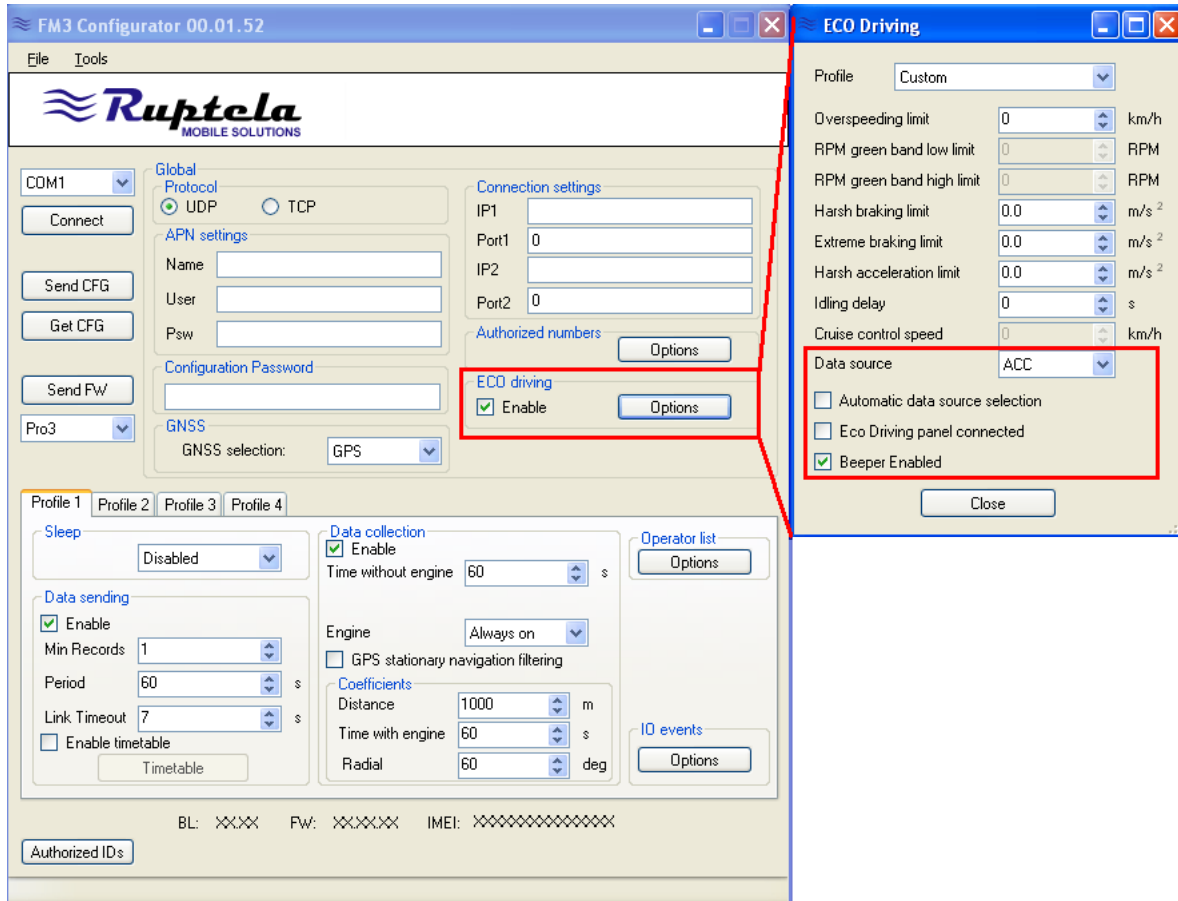
Now, you can select ECO Driving parameters source or choose automatic detection. You can have ECO Driving without having FMS connection (ECO3 device).

- Accelerometer
- CAN
- OBD<sup>a</sup>

All newest software and firmware can be obtained at <ftp://dev.ruptela.lt> (user name: ftp, password: ftp).

### Configurator update

You can see check box in **ECO Driving settings** section. This check box enables or disables whole ECO driving system. In ECO Driving settings **popup**, you can see data source control check boxes and drop boxes (circled in red).

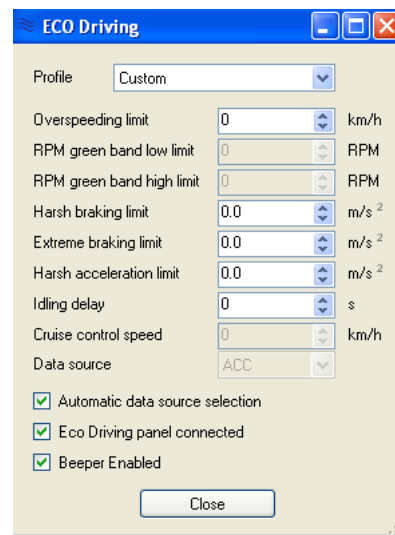
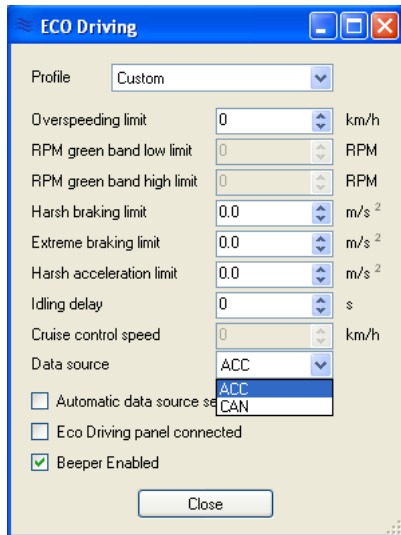


<sup>a</sup>Only for TCO3 devices with TCO OBD firmware and OBD parameters available

## Hardware identification for 3<sup>rd</sup> GEN devices

Devices have different version hardware. V3 does not have accelerometer, thus cannot use ECO Driving from accelerometer and V7 have. Please check serial number of your device. Example of serial number E1111Q7U7-555555. Character in bold indicate hardware type. If it is 3 - device does not have accelerometer, if 7 - device has accelerometer.

## CONFIGURATION

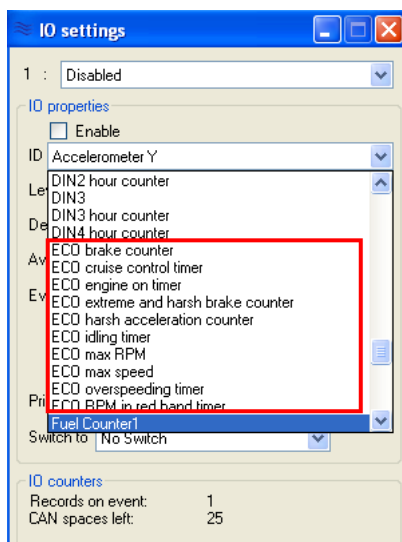


In **ECO Driving options** pop up you can select predefined **profile** for vehicle – *Truck* or *Light vehicle*. At bottom of pop up is eco driving **data source**. If you select **ACC**, unavailable parameters will grey out (e.g. RPM green band limit). Upon selection of **CAN** all parameters will be available.

- You can also check **automatic data source selection**. In this case, device will search what interfaces are connected and what data is available. Upon automatic selection accelerometer calibration is still necessary.
- Check **Eco Driving panel connected** if you have eco driving panel attached to device.
- If **Beeper Enabled** is checked, Eco Driving panel will beep on exceeded value (e.g. if over speeding).

## IO parameters

In order to see parameters in reports you have to select **IO parameter** in **IO events options**. If ECO Driving is enabled you will see ECO parameters:



Enable all ECO parameters in IO list. If ECO parameters are not enabled, ECO drive will not work and will be disabled. ECO parameter availability depend on selected data source.

TCO3 device can allow more ECO parameters but they are optional - only mandatory parameters are shown in picture and table below (according to data source). Best is to enable all available ECO parameters - in this case you will get everything that is possible.

Availability of these parameters according to Eco Driving source is shown in table below:

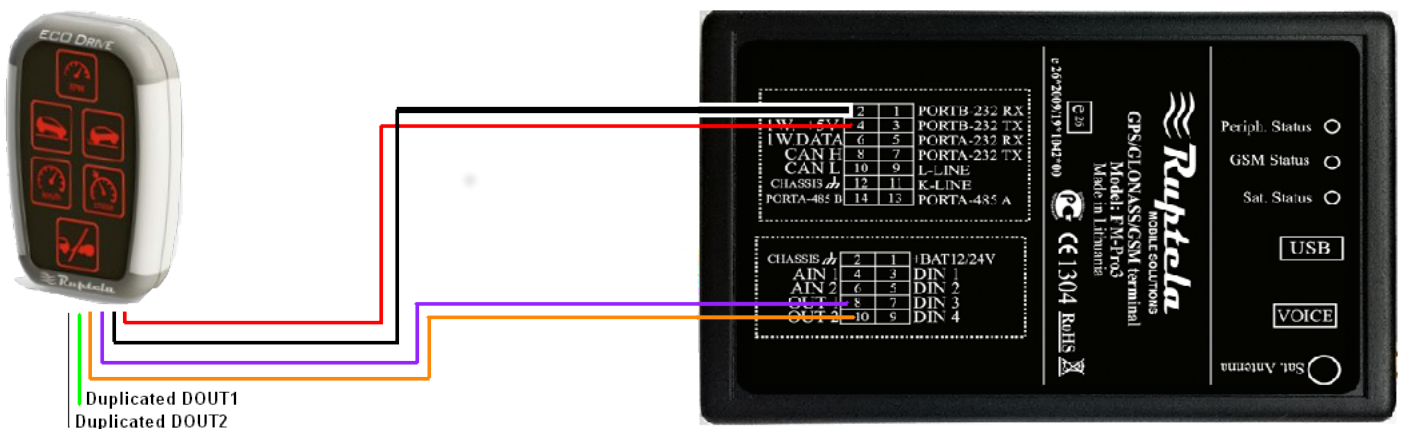
IO ID Parameter	Data Source		
	CAN	Accelerometer	OBD
ECO brake counter	+	+	+
ECO cruise control timer	+	not available	not available
ECO engine on timer	+	+	+
ECO extreme and harsh brake counter	+	+	+
ECO harsh acceleration counter	+	+	+
ECO idling timer	+	+	+
ECO max RPM	+	not available	+
ECO max speed	+	+	+
ECO overspeeding timer	+	+	+
ECO RPM in red band timer	+	not available	+

## Connection Scheme

**IMPORTANT**  
ECO Driving panel is not available for ECO3 device!

ECO Driving panel connection scheme is shown below. ECO Driving panel wire colors matches device's wire colors.

**NOTE**  
Green and white wires are Digital outputs. These wires can be used to connect another peripheral to Digital outputs simultaneously with ECO Driving panel. DOUTs will act the same as usual.



## Calibration process

If ACC or Automatic data source selection is used, accelerometer needs to be calibrated. This is one time procedure which must be done in order ECO Driving to work properly.

### Requirements:

- GPS fix for speeding/braking.
- FM device is installed tightly, cannot move to any side, shake or get loose. This is VERY important.

**Calibration Sequence:**

## 1. Steady (zero) position.

Wait, until the device detects steady position:

- (a) Device is installed according to requirements. Please do not open or shut doors or anyhow cause strong vibrations to vehicle.
- (b) Vehicle is located in plain, flat surface area (5 degrees).
- (c) Turn on engine.
- (d) Wait 1 - 5 minutes. It should be no movement for 1024 samples (in a row). Sample rate: every 10 ms. No movement Period =  $1024 * 0.01 \text{ s} = 10.24 \text{ s}$ .

Movement is caused by increased acceleration in any direction or if GPS speed is noticeable. Zero position can be calibrated in garage or some similar location because GPS is not necessary needed for this calibration step.

## 2. Acceleration (GPS needed).

Drive forward to calibrate front movement and positive acceleration.

- (a) Start driving. Speed must be rapidly increased, accelerate at full power.
- (b) Calibration starts when GPS speed is more than 15 km/h.
- (c) Speeding (positive/forward acceleration) must be continued at least for 3 seconds.
- (d) Do steps a, b, c at least **2 times**.

Calibration needs two measurements of acceleration. Device compares two values of acceleration and calibrates accelerometer. This is why two acceleration actions must be done. To check if calibration was successful please use SMS commands (*see below*).

**Please note**

Minimum speed for ECO acceleration/braking events is 10 km/h.

**IMPORTANT!**

If you calibrated device and then removed it from vehicle or reinstalled to different location recalibrate device. Old calibration can be reset using SMS command. (*see SMS commands below*)

There are some new commands regarding ECO Driving from accelerometer.

**SMS commands:**

- accinfo - SMS message to get all calibrated parameters from device. SMS format:

AXL state:11; XYZo:-0.024,-0.999,-0.215; N:0.271; ABC:0.229,0.025,-0.142.

AXL state shows calibration process:

- 0-3 indicates zero position. If you get AXL state 3, steady position is calibrated. Usually you will get some values on XYZo and "nan" on ABC.
- 3-6 indicates acceleration calibration is progress.
- Other states show internal processes (e.g. calculating acceleration data).
- State 11 means calibration is finished. If you get some values at XYZo and ABC parameters - calibration successful. If you get 'nan' - calibration failed.

- accreset - SMS message to reset calibrated accelerometer parameters → start calibration from beginning. SMS answer format is "ACC reset OK/FAILED".

**Terminal command:**

- ?reset acc calib - Terminal command to reset calibrated accelerometer parameters → start calibration from beginning.

If you get a lot false breaking/acceleration events please review configuration settings if everything is ok and recalibrate device - calibration is tricky procedure but once it is done correctly device will function as it should.