FMU126 Features settings

Contents

Magnetic card functionality

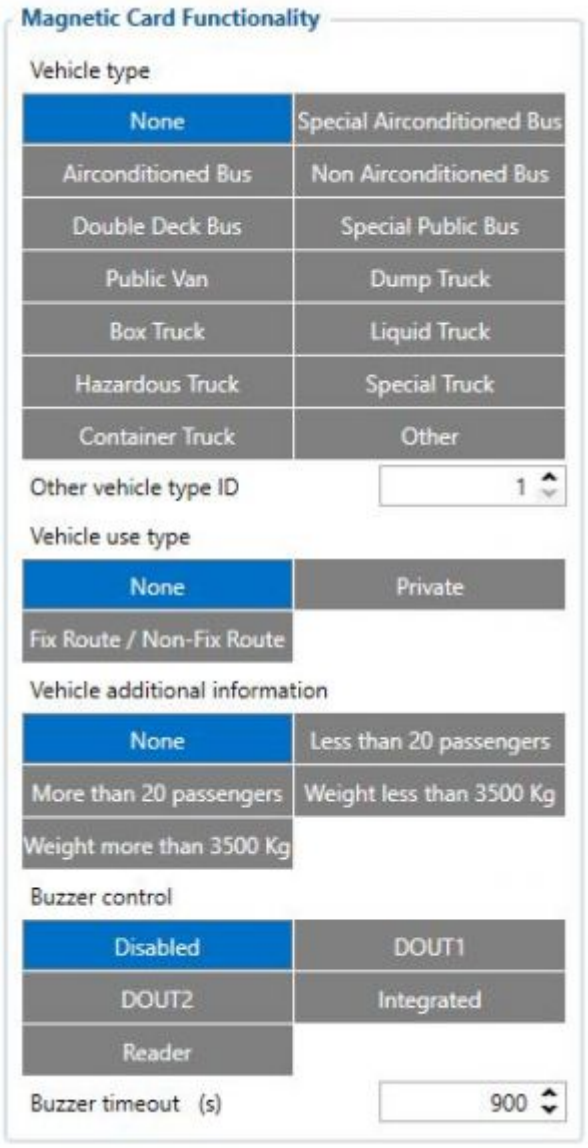


Figure 1 Magnetic card functionality parameters in configurator

Vehicle type

Magnetic card functionality parameter appearance is shown in *Figure 1.* The Other vehicle type ID is displayed only if **Vehicle type** is selected as **Other** This field allows configuring custom vehicle types see chapter Custom Vehicle Types.

Vehicle use type

On initial configuration, the parameters **Vehicle type** and **Vehicle use type** are set to **None**. This allows the vehicle to be started via immobilizer scenario with any license type (if the immobilizer is enabled) enabled). If any other options are used for **Vehicle type** and **Vehicle use type**, *Table 1* is used to lookup authorization with regards to driver's license type.

Buzzer Control

Different buzzers can be controlled when unauthorized cards are swiped see chapter Driver state the logic for a specific or infinite amount of time:
• DOUT1 or DOUT2 are simply turned on for the amount of time configured
• Integrated uses built-in buzzer in tracking device

• Reader uses built-in buzzer in the magnetic card reader (if supports buzzer control command)

Authorization for immobilizer scenario

Type of card parameter

Introduced from firmware version **FMB.Ver.03.27.01.Rev.163+**.

This parameter determines if the vehicle can be started based on card type. If the card type matches the configured parameter and the vehicle can be started based on user configuration, then the scenario allows entering the registered state. Also, if the vehicle is authorized to start (the device is in a registered state), then the card which is not allowed will cause deregistration if swiped.

Based on parameters **Vehicle type**, **Vehicle use type**,**Vehicle additional information**, *Table 1* data that is shown below and the license type obtained from the magnetic card via reader , the functionality decides whether or not the vehicle can be started (immobilizer scenario) The immobilizer must have priority to be set and output control configured in order for it to function.

Table 1 Authorization to start vehicle depending on license and vehicle type

Vehicle type		B.1	B.2	B.3	B.4	T.1	T.2	T.3	T.4
Special Airconditioned Bus	Private								
	Fix Route/Non-Fix Route								
Airconditioned Bus	Private								
	Fix Route/Non-Fix Route								
Non Airconditioned Bus	Private								
	Fix Route/Non-Fix Route								
Double Deck Bus	Private								
	Fix Route/Non-Fix Route								
Special Public Bus	Private								
	Fix Route/Non-Fix Route								
Public Van	Private								
	Fix Route/Non-Fix Route								
Dump Truck	Private								
	Fix Route/Non-Fix Route								
Box Truck	Private								
	Fix Route/Non-Fix Route								
Liquid Truck	Private								
	Fix Route/Non-Fix Route								
Hazardous Truck	Private								
	Fix Route/Non-Fix Route								
Special Truck	Private								
	Fix Route/Non-Fix Route								
Container Truck	Private								
	Fix Route/Non-Fix Route								

Less than 20 passenger vehicle can be started

Vehicle weighing less than 3500 kg can be started

Vehicle can be started

Vehicle can‘t be started

If the **Vehicle type** is configured as **Other**, then the decision of whether the vehicle can be started or not is made by using the table located in Custom Vehicle Types tab.

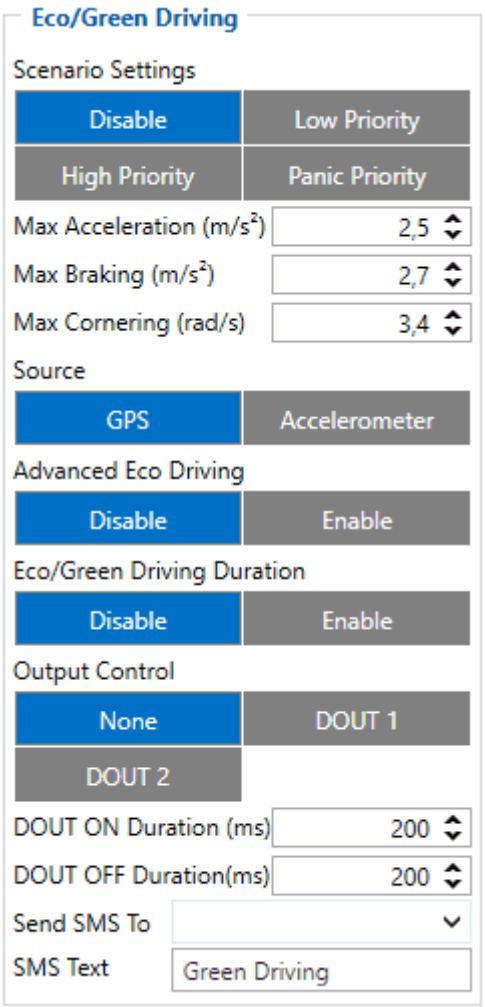
Driver State Logic

Figure 2 Driver State Logic

The main driver registration, deregistration and swapping logic is shown in **Figure 2**.

Once deregistration event is generated, the start of the car is disallowed immediatelly (ignition off timer is not taken into consideration).

Eco/Green Driving



When vehicle parameters exceed the values of *Max Acceleration*, *Max Braking* or *Max Cornering* parameters, the scenario is activated: a record is generated, and the digital output status is changed to 1 when configured. You can configure all three parameters in m/s^2 units. The scenario is activated until the current Acceleration, Braking, or Cornering value decreases below the set parameter value. Parameters used with *Eco/Green Driving* functionality are given in a table below.

Parameter name	Description
Scenario Settings	Enable/Disable Green driving functionality
Max Acceleration	Value which can be reached while accelerating without triggering harsh acceleration event.
Max Braking Acceleration	Value which can be reached while braking without triggering harsh braking event.
Max Cornering Acceleration	Value which can be reached while cornering without triggering harsh cornering event.
Source	Which source (GPS or accelerometer) data will be collected from.
Eco/Green Driving Duration	If enabled, additional record with Eco/Green Driving event duration (ms) will be saved and send to server. When GPS is selected as the data source duration accuracy will be in seconds.
Output Control	Which FMU126 Digital Output will be used for accesory (buzzer, LED and etc.) activation/deactivation.
DOUT ON Duration	A value in miliseconds (ms), for how long DOUT should be active.
DOUT OFF Duration	A value in miliseconds (ms), for how long DOUT should be inactive.

Advanced Eco Driving

From 03.25.14.Rev.03 base firmware version new **parameter** has been added (Eco Driving Maximum and Eco Driving Average) to **FMT100** device. This parameter is **enabled** by default.

When this parameter is enabled device uses an advanced Eco Driving algorithm and sends different IO (maximum, average) elements instead of IO to server. When enabled, device does not send Green Driving value IO element **254**.

Parameter name	Description
Eco Driving Average	If Eco/Green driving is enabled and accelerometer is selected as the data source, enabling Eco Driving Average will cause records with Eco Driving event Average value to be saved and send to the server.
Eco Driving Maximum	If Eco/Green driving is enabled and accelerometer is selected as the data source, enabling Eco Driving Maximum will cause records with Eco Driving event Maximum value to be saved and send to the server.

Data output

Data from accelerometer/GPS are continuously monitored and processed and are used to decide whether a harsh event has occurred. If either of three cases is satisfied, an event is generated and a record is saved and sent to the server (FMU126 must be properly configured in order to send the record). Event value is multiplied by 100 before sending/saving records to get more precision when displaying data.

Auto calibration

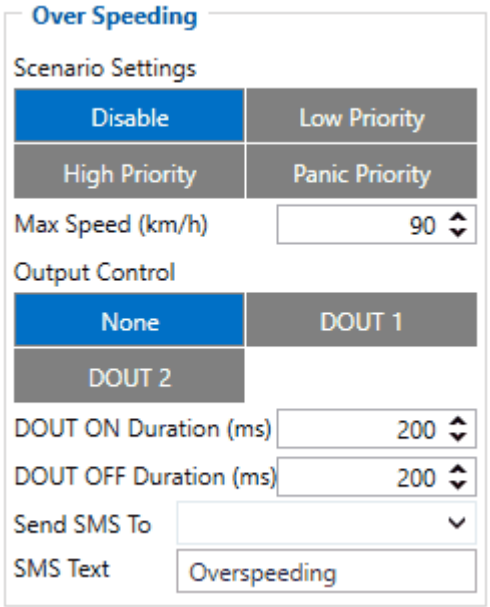
The auto-calibration process is following:

1. The vehicle is stopped.
2. There is a straight road ahead.
3. Send SMS "*auto_calibrate:set*" to the FMB device.
4. Accelerate to >30 km/h for 5 sec.
5. FMB will send a response when calibration is completed successfully.

Calibration is saved to internal flash memory, which means it will stay after a reset. To check auto-calibration status send a following short text message to the FMB device: "*auto_calibrate:get*".

Over Speeding

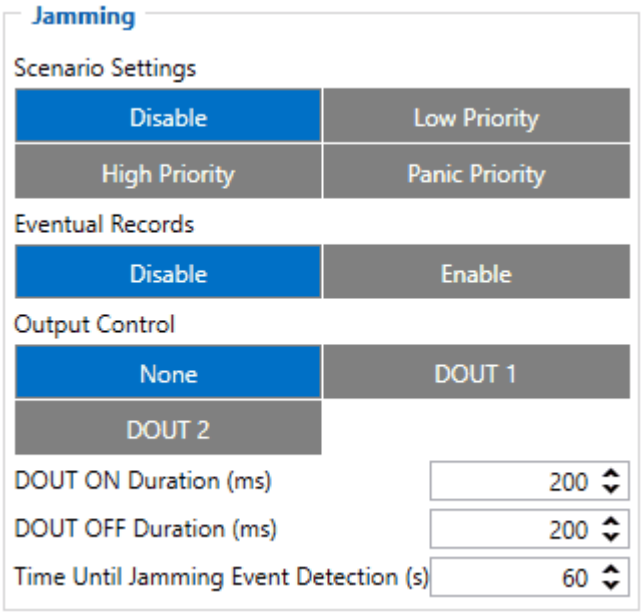
When vehicle speed exceeds configured maximum speed value the scenario is activated, an event record is generated and digital output status is changed to 1 when configured.
Scenario is active until detected speed decreases below the set parameter value. Configurable parameters:



- Scenario settings – defines priority of over speeding scenario: 0 – disabled, 1 – low, 2 – high, 3

– panic.
- Max speed – it is max allowed speed which can be reached. If speed exceeded configured value, then event will occur.
- Output control – available scenario settings for module Digital output activation/deactivation
- DOUT ON/OFF duration – a value in seconds, for how long DOUT1/DOUT2 should be active or inactive.
- Send SMS to – GSM number to which SMS event will be sent.
- SMS text – SMS text.

Jamming



When a device detects GSM signal jamming, it activates the Jamming scenario. The device then starts a configurable timeout before responding that is intended to reduce false positives. After the timeout ends, the device generates an event record and digital output status is changed to 1 when configured If the device regains a GSM signal before the countdown ends, no event will be generated and output will not be controlled. This Digital Output activation can be used to trigger measures to disrupt potential thieves using GSM signal jamming to steal your vehicle.

Connecting a Buzzer to the Digital Output to emit sounds as soon as jamming is detected is the most straightforward use of this scenario.

The Digital Output can be directly connected to the vehicle's alarm system to ensure the thief can not avoid triggering it.

It can also be connected to the central lock system to ensure that all the doors are locked.

A relay can be used to disable the starter motor. Usually used with the Immobilizer scenario.

Alternatively, the Digital output can also be connected to an LED visible to the driver to inform the

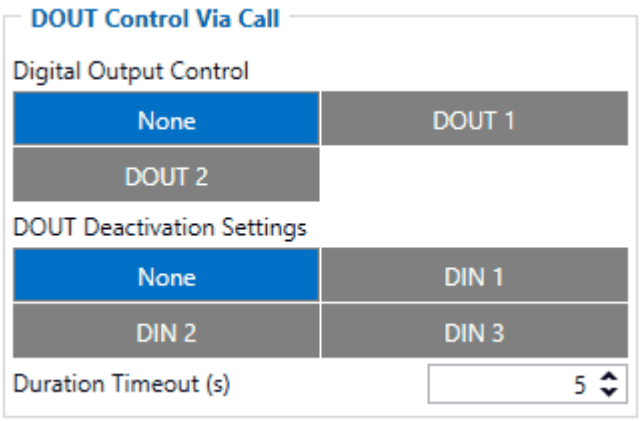
driver when Jamming occurs.

Note that this scenario will not work with Deep Sleep, Ultra Deep Sleep and Online Deep Sleep modes, since they disable the device's GSM module to save power.

Eventual Records parameter can be configured: when it is disabled scenario status value will appear in each AVL record, otherwise, it will be appended only to eventual records.

For a more visual explanation, take a look at the video made by Teltonika explaining the use-case of Jamming Detection: **Teltonika Jamming Detection scenario**

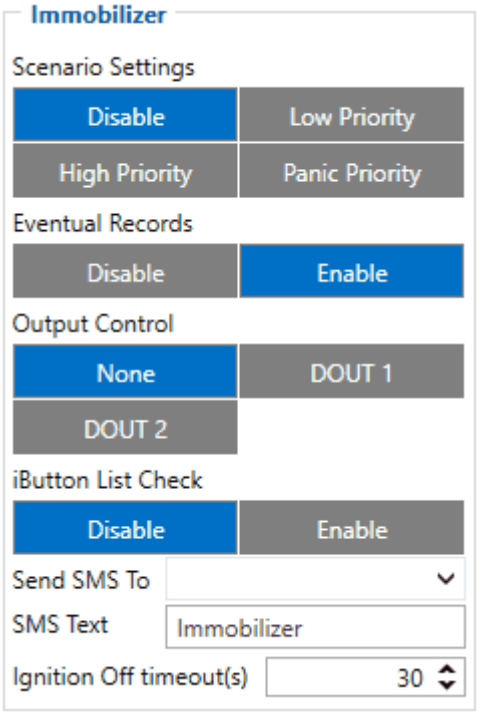
DOUT Control Via Call



The scenario is activated and digital output is ON when a call is received from a number that is on the authorized numbers list.
Call control functionality is the following:

- When FMU126 is configured to control DOUT1/DOUT2 the device waits for an incoming call from a configured secure number. If a call is received FMU126 turns on DOUT1/DOUT2 for a user defined *Duration Timeout*. If duration timeout set to "0" DOUT1/DOUT2 will be OFF.
- DOUT1/DOUT2 can be turned off by *Duration Timeout* or by digital input 1, digital input 2 or digital input 3.
- DOUT1/DOUT2 will always be ON if, for example, DOUT deactivation is set to DIN1, but DIN1 will be never turned ON, or when duration timeout is set to the maximum value (2147483647) which is about 68 years.

Immobilizer



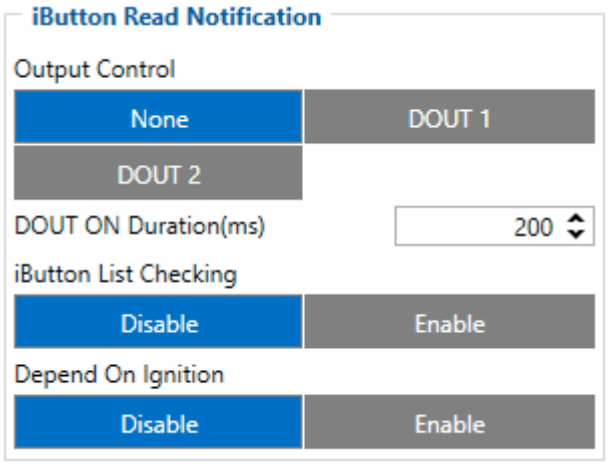
If *DOUT Control* is disabled, the scenario will only generate events without digital output activation. If *DOUT Control* is enabled DOUT1/DOUT2 turns ON if ignition turns ON (*Ignition Source* is configured to 1). After any iButton ID (or RFID card) is attached, DOUT1/DOUT2 turns OFF. After iButton identification configured *Ignition Source* can be turned OFF (*Ignition Source* is configured to 0) for no longer than 30 seconds, otherwise, the immobilizer must be repeated. If the *iButton List Check* parameter is enabled, the authorization will be successful only if the attached iButton is specified in the iButton list.

The ignition off timeout parameter is used to set the duration after which authorization is activated when the ignition is turned off. For example, if the Ignition off timeout is set to 30 seconds when the driver turns the ignition off, he has 30 seconds until the immobilizer security check turns on again. In other words, if the driver turns off the ignition and turns it back on in less than 30 seconds, then he will not have to attach the iButton to the reader again.

From the firmware version **03.25.14** iBeacon authentication was introduced. iBeacon authentication works in the same way as iButton authentication. To use authorized iBeacons, the iBeacon list should be filled in the device configurator. Instructions how to list iBeacons in FMB devices can be found **here**.

By using iBeacon authorization, the immobilizer feature can be used with devices that don't have a 1-wire data connection available.

iButton Read Notification



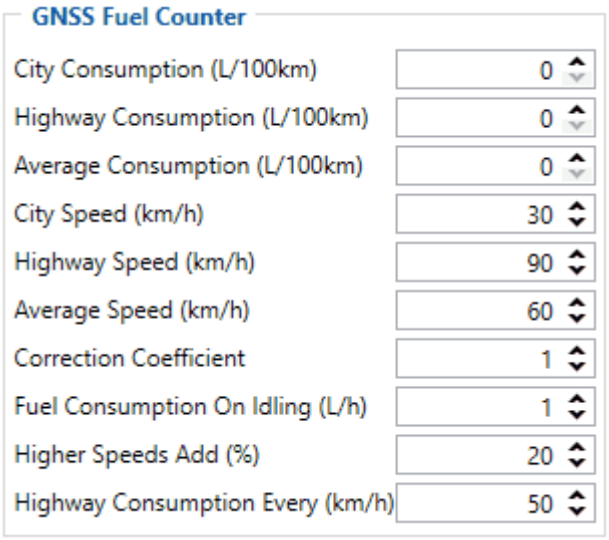
Output control parameter let user chose which DOUT will iButton blink. After connecting of iButton DOUT will blink for period of time, which configured in DOUT ON Duration parameter. The iButton List checking parameter configures that device reads the iButton ID from list or not. For example if configured as Enabled, device will not blink DOUT unless the iButton is in iButton list. If Depend on Ignition parameter is enabled then Output will be triggered only if ignition is off (in addition to being in a list if iButton List Checking is also enabled). Output control examples when iButton is detected (if None is selected in Output Control – all of the following steps will be skipped):

- If both iButton List Checking and Depend on Ignition are disabled – Output is triggered.
- If iButton List Checking is enabled and Depend on Ignition is disabled – Output is triggered only if iButton is in the list.
- If iButton List Checking is disabled but Depend on Ignition is enabled – Output is triggered only if ignition is off.
- If both iButton List Checking and Depend on Ignition are enabled – Output will trigger if iButton is in the list and ignition is off.

iButton Read Notification parameters:

- Output control – available scenario settings for module Digital output activation/deactivation
- DOUT ON/OFF duration – a value in seconds, for how long DOUT1/DOUT2 should be active or inactive.
- iButton List checking - parameter configures that device reads the iButton ID from list or not.
- Depend on Ignition - Output will be triggered only if ignition is off

GNSS Fuel Counter



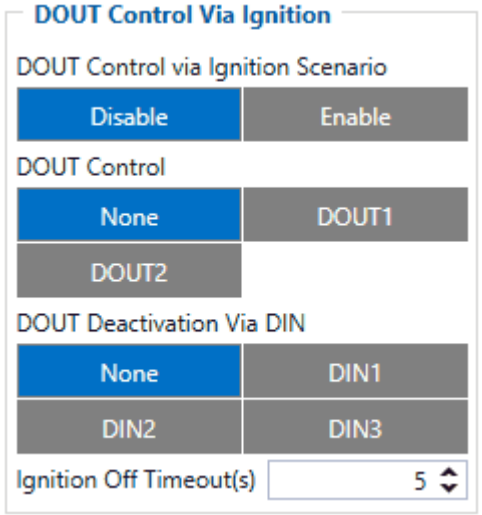
To configure *Fuel Counter* parameters use fuel consumption norms which are presented in the technical documentation of the vehicle. By default speeds for these fuel consumption norms are: City – 30 km/h, Average - 60 km/h, Highway - 90 km/h. These values can be changed.

When speed is higher than the highway fuel consumption speed, x% of highway fuel consumption is added every extra y km/h, by default FMU126 adds 20% every 50 km/h of extra speed. For example, the fuel consumption is (1.2 * (Highway Fuel Consumption)) at 140 km/h and (1.4 * (Highway Fuel Consumption)) at 190 km/h.

Correction coefficient is used to correct every value of fuel consumption which is sent to the server through an expression of ((Used Fuel) * *Correction coefficient*). By default, it is 1, with minimum and maximum values of accordingly 0.01 and 2. For example, when the correction coefficient is 1 and FMU126 calculates that the amount of used fuel over 35 m distance is 20 ml, the value of 20 ml will be sent to the server, and if correction coefficient is 1.2, the value of 20 * 1.2 = 24 ml will be sent to the server.

Fuel Consumption on Idling is used to calculate fuel consumption when the ignition is on, but the vehicle is stationary. The consumption value is 1 l/h by default, with a minimum and maximum of accordingly 0 and 5 l/h. This parameter is less than 1.0 l/h for almost all diesel cars and is equal to about 1.5 – 2.0 l/h for gasoline cars.

DOUT Control Via Ignition

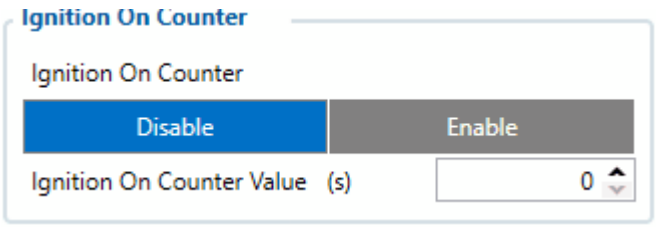


This feature allows direct control of DOUT by configured ignition source status. When enabled, the function will start to monitor ignition status, and once the ignition changes state from On to Off after configured Ignition Off a timeout, selected DOUT (Digital Output) will be turned On.

Turning DOUT Off is possible with enough voltage applied to the configured DIN (Digital Input). Voltage requirements: DIN1 – 7.5V, DIN2-4 – 2.5V.

Parameter name	Description
DOUT Control via Ignition Scenario	Enable/Disable DOUT Control Via Ignition scenario
DOUT Control	Scenario controls configured DOUT if ignition timeout exceeds its limit
DOUT Deactivation Via DIN	DOUT is turned off if configured DIN is in on (voltage applied) state
Ignition Off timeout	Duration (in seconds) after which DOUT is turned on, when ignition is turned off

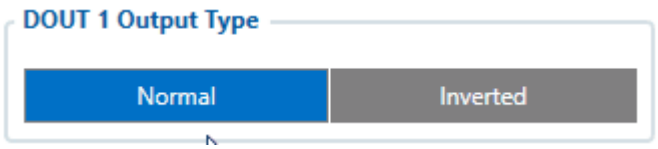
Ignition ON Counter



Ignition ON Counter scenario counts the time spent with the ignition in the resolution of seconds. It is possible to configure a starting value of the counter. Maximum value: **2147483647** seconds or 596523.235 hours **NOTE THAT**, when entering a starting value, the value must be in seconds!

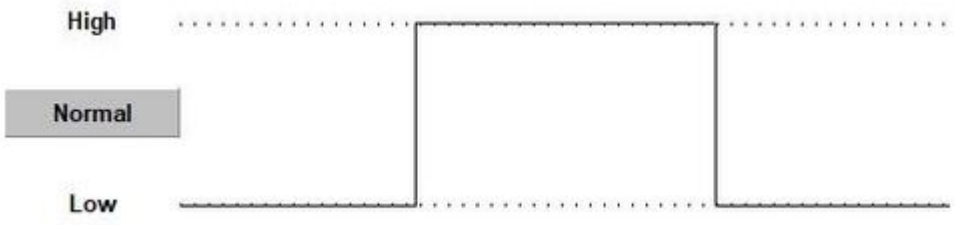
Example of Ignition On Counter **I/O** element:

DOUT 1 Output Type



DOUT 1 Output Type functionality sets the initial *DOUT1* state. If functionality is configured in *Normal* mode digital output inactive state is low and when it is controlled by any scenario digital output is set to high state. Whenever functionality is configured in *Inverted* mode digital output inactive state is high and when it is controlled by any scenario digital output is set to low state.

DOUT1 in **Normal** state:



DOUT1 in **Inverted** state:

- **Notice!** Digital output type control functionality will not affect SMS/GPRS command **setdigout** execution.

Available from Firmware version: 3.27.07.Rev.00

Buzzer Scenario

Buzzer Scenario is introduced since Firmware version **03.27.01.Rev.160.**

Buzzer Scenario extends buzzer functionality and adds additional features. A new “Buzzer Scenario” UI block in the configurator was added as well as new “Buzzer Scenario Control”, “Buzzer ON Duration”, and “Buzzer OFF Duration” parameters (full list of buzzer parameters shown in the table below).

“Buzzer control”, “Buzzer timeout”, and “Buzzer volume control” (Integrated buzzer only) parameters were carried over from previous versions without changes. In addition, they were moved

from “Magnetic Card Functionality” to the new “Buzzer Scenario” block.

When “Buzzer Scenario Control” is set to:

- “Enable” – buzzer works as described at Driver state logic and is triggered in additional conditions:
  - Buzzer is activated for the configured “Buzzer timeout” whenever the ignition is turned on. If an unauthorized card is swiped, the buzzer will remain on and will be restarted for the configured “Buzzer timeout”. Buzzer disables if the ignition is turned off or an authorized card is swiped.
  - When a driver is registered and the same card was swiped again or another unauthorized card is swiped, a deregistration event occurs and the buzzer will be enabled for the configured “Buzzer timeout”, if the ignition is on at this point.
  - If the ignition would be disengaged at any point while the buzzer is on, the buzzer will be disabled.
- “Disable” – buzzer works as before and as described at Driver state logic.

“Buzzer ON Duration”, and “Buzzer OFF Duration” parameters let users choose the control of the buzzer. “Buzzer ON Duration” specifies the time the buzzer will be enabled and “Buzzer OFF Duration” the time it will be disabled.

The turn on and turn off sequence will be repeated for the time configured at “Buzzer timeout”. However, if the buzzer on and off control is not desired, it can be turned off by setting “Buzzer OFF Duration” or “Buzzer ON Duration” to zero.

In that case, both “Buzzer ON Duration”, and “Buzzer OFF Duration” parameters would be ignored and only “Buzzer timeout” will be used for the buzzer.

Table 2 Buzzer scenario parameters

Parameter name	Min value	Max value	Default value	Parameter ID	Description, possible values	
Buzzer Scenario Control	0	1	0	65800	Disable	0
					Enable	1
Buzzer ON Duration	0	65535	200	65608	Disables buzzer duration control	0
					Time that buzzer will be on	1-65535
Buzzer OFF Duration	0	65535	200	65609	Disables buzzer duration control	0
					Time that buzzer will be off	1-65535
Buzzer control	0	4	0	65603	Disabled	0
					DOUT 1	1
					DOUT 2	2
					Integrated	3
					Reader	4
Buzzer control timeout	0	3600	0	65604	Indefinite timeout	0
					Seconds	1-3600

Buzzer volume control	0	100	100	65607	Only visible when „Buzzer control“ is set to „Integrated“	0-100