FMB125 I/O settings

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When no I/O element is enabled, AVL packet comes with GNSS information only. After enabling I/O element(s) AVL packet contains current value(s) of enabled I/O element(s) along with GNSS information.

Input Name

I/O element name.

Current Value

If device is connected to **Configurator** all current I/O values are displayed in this column. Also I/O current values can be seen in Status→I/O Info tab.

Units

Units of measurement.

Priority

This field allows to enable I/O elements and setting them a priority so they are added to the data packet, which is sent to the server. By default **12 I/O elements** with **Low priority** are enabled: `Ignition, Movement, Data Mode, GSM Signal, Sleep Mode, GNSS Status, GNSS PDOP, GNSS HDOP, External Voltage, Speed, Battery Current, Battery Voltage`. All records made by FMB125 are regular, and regular packets are sent as low priority records.

Priority level (AVL packet priority) can be:

None Priority

Module doesn't make additional record.

Low Priority

Module makes an additional record with an indication that the **event was caused by an I/O element change** (depending on Operands configuration).

High Priority

Module makes an additional record with High priority flag and **sends event packet immediately** to the server using **GPRS**.

Panic Priority

This priority triggers same actions as **High priority**, but if GPRS fails, it sends an AVL packet using **SMS data** if SMS data sending is enabled and the number is provided in SMS/Call Settings.

High and Low Level

These levels define I/O value range. If I/O value **enters or exits** this range, FMB125 **generates an event**.

Event Only

When this is selected, I/O element status value will be **appended only to eventual records**, otherwise I/O element status value will appear in each AVL record.

Operands

Defines when to generate event: On Exit, On Entrance, On Both, Monitoring, On Hysteresis, On Change or On Delta Change.

Operand On Exit

Record is generated when input value leaves a range between low and high level limits.

Operand On Entrance

Record is generated when input value enters a range between low and high level limits.

Operand On Both

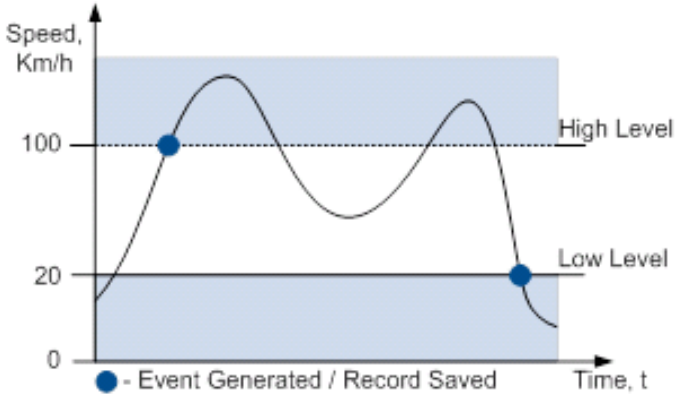
Record is generated by both *On Exit* and *On Entrance* operands' logic at same time.

Operand Monitoring

No event at all. Values are recorded only when other triggers worked.

Operand On Hysteresis

Record is generated when input value crosses the high limit value from below the low limit value or vice versa.



Operand On Change

Record is generated when input value changes.

Operand On Delta Change

Record is generated when input value changes and the absolute change becomes equal to or higher than the limit value.

Avg Const

If *Avg Const* value is 10, new value must be present for 1 second to register the change to a new value. Internal sampling is done every 40 ms, so 25 samples are taken per second. To configure 5 seconds of averaging multiply 10 by 5 yielding 50 as *Avg Const* value. The same logic works if the device is in Deep Sleep mode.
Averaging follows RC exponential curve, see image below:

For Boolean values of 5τ, values is used, that means value change is taken when new values is averaged to more than 99.3%.

NOTE: Average Constant is not used as an activation timer or delay timer. But it is used as a filter.

Event is generated at different times due to variations in voltage. Average constant is designed to filter jumps instead of event generation time.

For example: generation is set to happen at 14500mV, and actual voltage is set to 15000mV, that record will be generated earlier than 10s with avg const set to 100. This is because avg const is calculating time it takes for device to get to actual voltage (in this case 15000 mV), while device will be generating records when it hits 14500mV.

Send SMS To

Sends SMS notification about event to selected number from SMS/Call Settings **GSM Predefined Numbers** list if event priority is set to Low, High or Panic.

SMS Text

The SMS Text field can be altered and any text can be entered. Maximum message length is **160** symbols (numbers, letters and symbols in ASCII, except for comma ",").

SMS Event Text may be either in default or composed format.

Default format:

```
Date, time, longitude, latitude, 'SMS text', value
```

Example:

```
2018/11/02 12:00:00 Lon:0.000000 Lat:0.000000 Alarm 1
```

Composed format:

Composed format may consist of text and defined commands which start with **%** symbol.

Supported commands:

Command	Description
imei	IMEI
fw	Firmware version
fullfw	Full firmware version
modem	Modem firmware version
gnss	GPS firmware version
vin	OBD VIN number
lat	Latitude (non-float value)
lon	Longitude (non-float value)
sat	Satellites in use
time	Timestamp
din1	Digital Input 1
din2	Digital Input 2
din3	Digital Input 3
ain1	Analog Input 1
out1	Digital Output 1
out2	Digital Output 2
pdp	PDOP
hdp	HDOP
exv	External Voltage
gmap	Google Maps link
mov	Movement
odo	Trip Odometer
op	GSM operator
spd	Speed
ib	iButton
mod	Data Mode
sig	GSM signal
slp	Sleep Mode
cel	Cell ID
lac	Area Code
tmp	Dallas Temperature 1
mac	BT MAC address

dtc	OBD fault codes
flat	Latitude (float value)
flon	Longitude (float value)
date	Date in yyyy/mm/dd format
datetime	Time in hh:mm:ss format
val	Eventual IO value
io'par_id'	Element value by parameter ID

Composed text example:

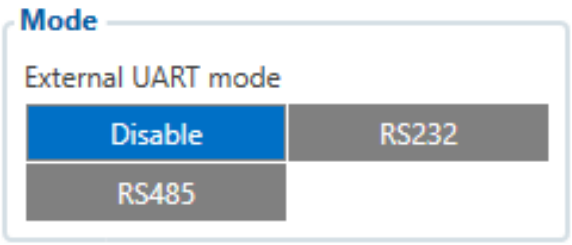
```
%imei Movement %io50010
```

Event SMS text:

```
352094082828606 Movement 1
```

If FMB125 is in Deep Sleep or Ultra Deep Sleep mode and an SMS event occurs with Low priority (which does not wake up FMB125), then the device does not send the message. It is saved to device memory until it wakes up from Deep Sleep or Ultra Deep Sleep mode and GSM modem starts working normally. After it wakes up, all the messages that are saved to memory will be sent, but keep in mind that only 10 messages can be saved to memory – all other messages will not be saved, until there is free memory space.

FMB125 RS-232/RS-485 parameter configuration



FMB-125 supports RS-232 and RS-485 serial standards and can be configured to work in different RS-232/RS-485 modes. More information about each mode is provided in RS-232 and RS-485.
Only one mode may be selected at a time:

- Disable - Disable RS-232/RS-485 functionality;
- RS232 - Select RS-232 functionality;
- RS485 - Select RS-485 functionality.

RS-232 modes

RS-232 supports following modes:

- Log Mode – suitable for debugging/logging;
- NMEA – NMEA logs are transferred;
- LLS – LLS sensor support;

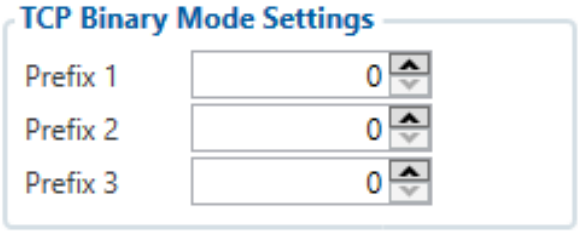
- LCD – external LCD support;
- RFID HID – RFID HID reader support;
- RFID MF7 - RFID MF7 reader support;
- Garmin FMI – Garmin support;
- TCP ASCII – for routing any input string from external device to the server;
- TCP Binary – for routing any binary input data from external device to the server.

RS-232 baudrate and parity

Every RS-232 mode supports different baudrates, but each mode has its own default baudrate value. Default baudrate and parity values for each RS-232 mode are provided in the table below.

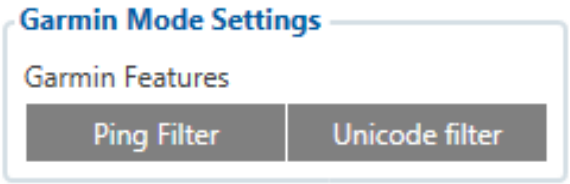
Mode	Default settings		
	RS-232		RS-485
	Baudrate	Parity	Baudrate
Log Mode	115200	None	115200
NMEA	115200		115200
LLS	19200		19200
LCD	57600		-
RFID HID	57600		-
RFID MF7	9600		-
Garmin FMI	9600		-
TCP ASCII	115200		57600
TCP Binary	115200		57600

RS-232 TCP Binary mode settings



RS-232 *TCP Binary mode* has additional configurable parameters for advanced data filtering as shown on the right hand side figure.

RS-232 Garmin mode settings



Garmin FMI mode has addditional filtering capabilities. It is possible to filter Ping and Unicode packets. If Ping Filter is enabled, then Ping packets are blocked. When Unicode Filter is enabled Unicode packets are not sent to the server. Both filters may be enabled for simultaneous effect.

RS-485 modes

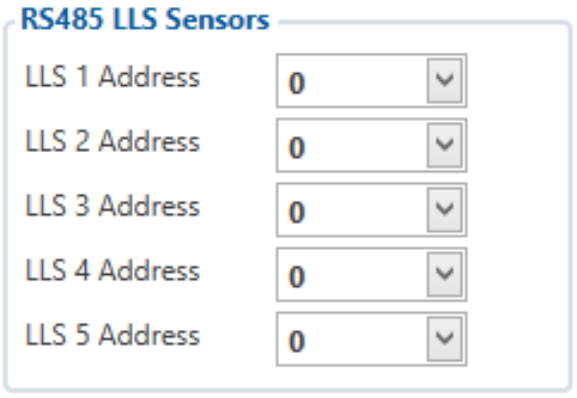
RS-485 supports several modes:

- Log Mode – suitable for debugging/logging;
- NMEA – NMEA logs are transferred;
- LLS – LLS sensors support;
- TCP ASCII – for routing any input string from external device to the server;
- TCP Binary – for routing any binary input data from external device to the server.

RS-485 baudrate

Every RS-485 mode supports different baudrates, but each mode has its own default baudrate value. Default baudrate values for each RS-485 mode are provided in the table above.

RS-485 LLS sensors



LLS addresses may be configured for 5 LLS sensors. If at least one LLS sensor is connected to FMB125 when configuring device using configurator, LLS sensor ID will be entered automatically. Up to 16 LLS sensors are supported with **03.28.XX** firmware version Up to 8 passenger counter sensors "PP-01" can be connected each requiring 2 LLS addresses. The passenger counter sensor "PP-01" provides the possibility to count passengers getting either on or off public transport (bus, trolleybus, etc.).