FMB140 Bluetooth 4.0 settings

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Disclaimer

If you are not using Bluetooth®, **please consider turning it off** or **change Bluetooth® PIN** to remove potential risks.

If you are using Bluetooth® we strongly recommend **using AES encryption** for enhanced security.

Bluetooth® 4.0 settings

FMB140 offers Bluetooth® 4.0 (Bluetooth® Low Energy, also referred as BLE) functionality.

Configurable parameters:

- ***Non Stop Scan*** - Enabled Non Stop Scan feature, the device will try to scan for the sensors all the time if any of them are configured.
- ***TZ-BT04/05/05B Update frequency*** – changes sensor's temperature/humidity/battery voltage data update frequency.
  Minimum value: 30 s, maximum value: 65535 s, default value: 30.
- ***BLE Scan Duration*** - Sensors data reading time.
- ***Scan retries until error*** - Configured scan retries, to show the Error Value '3000' - sensor disconnected.
- ***Working mode*** – Bluetooth® connection mode. ***Disabled****:* Bluetooth® 4.0 connection will not be used. ***TZ-BT04/05/05B sensor****:* this Bluetooth® connection will be used to communicate with TZ-BT04/05/05B sensor. ***Advanced*** - It allows to gather data from BLE device‘s broadcast

packets regardless of what data packing protocol is used.

- ***Local Name*** – Bluetooth® local name user for pairing. If it is empty, name will be automatically generated: FMBxxx_<last 7 IMEI digits>. Maximum name length = 16 characters

BLE Serial Encryption

Since FW version **03.27.07.Rev.00** there has been an implementation of BLE transferred data encryption with **AES128 cipher**. In **Bluetooth® 4.0 tab** under **Settings** there is a field for a **AES128 key**. Which if left empty, the BLE outgoing data will not be ciphered and incoming data will not be decoded. AES128 key field settings showed below.

If a key is present the outgoing data will be ciphered by the configured key and incoming data will be deciphered. The **AES128 key** must be in **HEX format with a length of 16 bytes**. As an example 11223344556677889900AABBCCDDEEFF is used.

Configuration modes

Non Stop Scan Enabled.

In Configurator when Non Stop sensor scans is active update frequency & scan retries until error will be hidden. Although BLE scan duration will still be active because it is important for btgetlist SMS command.

Non Stop Scan Disabled, Scan period is selected manually.

From the picture above, the Scan time period will be selected from two sources, ***BLE Scan Duration -*** the time when sensors are scanned and the ***Update frequency*** - The time when the sensor information is packed as the AVL Data record.

For example:

Update frequency *- 120 seconds.*

BLE Scan Duration *- 60 Seconds*

Device will start the first scan after 120 seconds and will scan nearby BLE devices for 60 seconds to update configured sensor data. The sensor data will be updated every 120 seconds. Update Frequency is counted even while a scan is performed.

Update frequency period passes. 120 seconds -> 0 seconds, a 60 second scan is initiated. Update Frequency countdown is restarted (countdown from configured value to 0) while the scan (according to the BLE Scan duration parameter) is performed.

Advanced Mode

When Advanced mode is selected a table with configurable parameters will appear:

- The table has 9 types of parameters:
    1. Type – EIR data type. This parameter will indicate which type to look for and work with. Note: We have also added type with value 0xFE which will indicate to work with a whole data packet and not just a single data type.
    2. Data Offset – start index of data we are interested in.
    3. Data Size – size of the data we are interested in.
    4. Action – two actions are possible: Match and Save. Match means that we want to perform a validation of certain data. Save means that we want to get certain data and later save it to an AVL record.
    5. IO – tells which IO element's data will be saved to. Possible choices for IO elements will be described later in the chapter. **Used only with Save action.**
    6. Match – hex string to be matched with BLE sensor data. **Used only with Match action.**
    7. Endianness – endianness of data: little endian (ex. 0x1122) or big endian (ex. 0x2211). **Used only with Save action.**
    8. Multiplier – value to be used to multiply output data. **Used only with Save action.**
    9. Offset – value to be added to output data. **Used only with Save action.**

More information about Advanced Beacon Capturing Configuration can be found HERE

IO elements choices

Name	Connection #1 AVL ID	Connection #2 AVL ID	Connection #3 AVL ID	Connection #4 AVL ID
None	-	-	-	-
Temperature	25	26	27	28
Battery	29	20	22	23
Humidity	86	104	106	108
Custom1	331	332	333	334
Fuel	270	273	276	279
Luminosity	335	336	337	338

Fuel Frequency	306	307	308	309
Custom2	463	467	471	475
Custom3	464	468	472	476
Custom4	465	469	473	477
Custom5	466	470	474	478

Supported Sensors List

This list shows the supported BLE sensors and where their Presets can be found in the configurator to use those sensors with FMB devices. The prests and sensors have been fully tested by Teltonika and are confirmed to work properly.

While following the steps showed in the images below, you can find the supported sensors in our Configurator.

In the Configurator, find the Bluetooth® 4.0 Settings menu, select the advanced sensors mode which was mentioned before. The following window should appear.

At the top right corner, you should see the following **Buttons**, press on the first one from the left.

After the named **Button** was pressed the list with all supported sensors and the configuration presets should appear.

Select your sensor and click load. The correct configuration and recommended settings will appear in the configuration.

The supported sensors are listed below:

- EYE Sensor
- BLE TPMS -Tire Pressure Monitoring System.
- Efento Humidity BLE sensors (version 2.2 and 4 presets)
- ELA ANG (Angle)
- ELA MOV AG (Movement and Angle)
- ELA PUCK ID (ID)
- ELA RHT (Temperature and Humidity)
- ELA T (Temperature)
- ELA MOV MAG (Movement Magnetic)
- Escort Fuel BLE sensors
- Escort luminosity BLE sensors
- Escort Temperature BLE sensors
- S1 BLE Motion, Humidity and Temperature Sensors
- Technoton Wireless fuel level sensors
- TZ-BT04 Temperature and Humidity Sensors
- TZ-BT05 Temperature and Humidity Sensors

Save your own settings as a preset/delete the preset

Visual demonstration

Here is a visual demonstration of Bluetooth® 4.0 sensors in a cold storage truck.

Backup Tracker

FMB devices from **03.28.06.Rev.02** firmware version have an ability to set up TAT100 device as a backup tracker. When the feature is enabled - FMB device starts to advertise encrypted BLE packets. In this solution - FMB device is a main tracker and TAT100 is set up as a backup tracker - TAT100 periodically checks if FMB advertised packets are available. If no FMB packets are read - an alarm is sent from TAT100 side and tracker switches it's mode to become the main tracker.

To enable Backup tracker:

1) BLE Connection control must be prohibited:
2) Enable Backup Tracker:

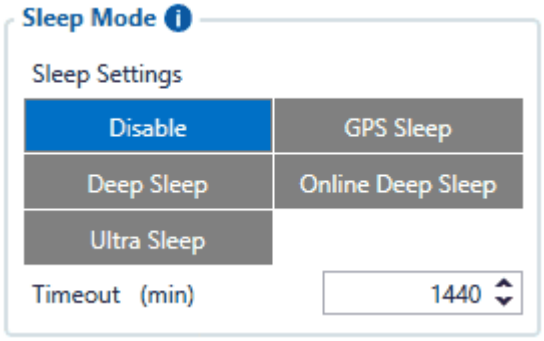
Note: when Backup Tracker is enabled - **BLE sensor and Beacon settings become disabled**. Additionally - **Ultra Deep Sleep mode is also disabled** (in this mode BLE packets would not be advertised)

TAT100 device recognizes the BLE packets by FMB devices IMEI, therefore after FMB configuration is done - additional TAT100 device configuration is required to support the full solution. You can learn more about the backup tracker and TAT100 configuration in our wiki site

FMB+FMB Backup Tracker

FMB+FMB Backup Tracking functionality lets you pair two FM devices together where primary device will report periodical and eventual data and secondary device will be responsible only for reporting once primary device is lost. With **03.27.13.Rev.452** firmware version Devices are able to set Main and Backup trackers through configurator.
To enable FMB+FMB Backup Tracking:

System tab



Backup Tracking both modes (Main and Backup) does not allow **Ultra Sleep** mode to be used so it has to be disabled in order for functionality to work effectively. Other sleep modes don't have an effect on the Bluetooth® functionality. If Ultra Sleep mode is selected - Backup Tracking options will be hidden and if Backup Tracking (Main or Backup modes) are selected then Ultra Sleep mode button will be hidden.

Bluetooth® 4.0 tab

Main Tracker - Once Main Tracker is selected device will work as usual but additionally it will start broadcasting BLE packets with encrypted manufacturer data, which contains device's IMEI number. Broadcasting range depends from set BT Power Level
Backup Tracker - When Backup Tracker is selected device will start scanning for Main tracker's broadcasted BLE packet at the configured Update frequency (s)
`IMEI` – Set IMEI that Backup device will look for while scanning.
`Update frequency` – Frequency at which FMB should scan for the main tracker.
`Delay timeout` – Delay after which alarm should be sent to the server.

Note: Once Main tracker or Backup tracker is selected Non Stop Scan and All BLE connectionless functionalities such as sensors will be **Disabled**. More information about full solution such as sent packets, received and parsed data and flowchart can be found in our **wiki site**.

FMB Family Bluetooth® 4.0 support

Devices that are listed in table below shows which device model has Bluetooth® 4.0 hardware installed. If your device is manufactured before the day shown in the list it means that this model does not have Bluetooth® functionality or it has an older version installed. The date shown in the table depends on when hardware production has started, but not when first lot was sold.

Device Model	BT 4.0 manufacture starting date
FM3001	2018.01
FMB001	2018.04
FMB010	2018.04
FMB020	All versions
FMB002	All versions
FMB003	All versions
FMB900	2018.08
FMB920	2018.07
FMB964	2019.07
FMB110	2018.01
FMB120	2018.01
FMB122	2017.11
FMB125	2017.11
FMB130	All versions
FMB140	All versions

FMU125	FW is on release, All versions
FMU126	FW is on release, All versions
FMU130	FW is on release, All versions
FMM125	FW is on release, All versions
FMM130	FW is on release, All versions
FMM0YX	FW is on release, All versions
FMC130	FW is on release, All versions
FMB202	All versions
FMB204	All versions
FMB208	All versions
FMC640	All versions
FMT100	All versions
FMP100	All versions
FMC800	All versions
FMM800	All versions
FMC880	All versions
FMM880	All versions