FMB965 Bluetooth® 4.0 settings

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Bluetooth 4.0 settings

FMB965 offers Bluetooth 4.0 (Bluetooth Low Energy, also referred as BLE) functionality.

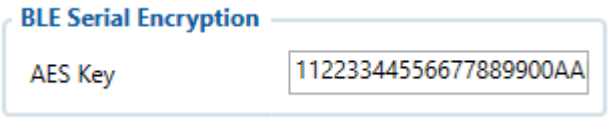
Configurable parameters:

- ***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

Parsing Advanced Beacon data from record (AVL ID 548)

Beacon data
Unparsed Beacon data
01360001b10110f34b6f6aa38255aa9ef619154e2d0055021f0201060303aafe1716aafe0002f34b6f6aa38255a a9ef619154e2d00550000360001ab0110e987706aa38255aa94321b154e2d0055021f0201060303aafe1716aafe0 002e987706aa38255aa94321b154e2d00550000360001a801101e74706aa38255faabcd0000000000000021f0201060303aafe1716 aafe00021e74706aa38255faabcd00000000000000000360001a201100c8c6f6ba38255aab7361a164e2d0055021f0201060303aafe171 6aafe00020c8c6f6ba38255aab7361a164e2d00550000

Beacon Parameters

The below table represents possible Beacon Parameters.

Parameters	
00	RSSI
01	Beacon ID
02	Additional beacon data

Parsed Beacon data

Parsed Beacon data part	HEX Code Part
(Constant)	01
1st Beacon data length	36
RSSI (Parameter 00)	00
RSSI length	01
RSSI value	B1
Beacon ID (Parameter 01)	01
Beacon ID length	10
Beacon ID	F34B6F6AA38255AA9EF619154E2D0055
Additional data (Parameter 02)	02
Additional data length	1F
Additional data	0201060303AAFE1716AAFE0002F34B6F6AA38255AA9EF619154E2D00550000
2nd Beacon data length	36
RSSI (Parameter 00)	00
RSSI length	01
RSSI value	AB
Beacon ID (Parameter 01)	01
Beacon ID length	10
Beacon ID	E987706AA38255AA94321B154E2D0055
Additional data (Parameter 02)	02
Additional data length	1F
Additional data	0201060303AAFE1716AAFE0002E987706AA38255AA94321B154E2D00550000
3rd Beacon data length	36
RSSI (Parameter 00)	00
RSSI length	01
RSSI value	A8
Beacon ID (Parameter 01)	01
Beacon ID length	10
Beacon ID	1E74706AA38255FAABCD000000000000
Additional data (Parameter 02)	02
Additional data length	1F
Additional data	0201060303AAFE1716AAFE00021E74706AA38255FAABCD0000000000000000
4th Beacon data length	36
RSSI (Parameter 00)	00
RSSI length	01
RSSI value	A2
Beacon ID (Parameter 01)	01
Beacon ID length	10
Beacon ID	0C8C6F6BA38255AAB7361A164E2D0055
Additional data (Parameter 02)	02
Additional data length	1F
Additional data	0201060303AAFE1716AAFE00020C8C6F6BA38255AAB7361A164E2D00550000

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.

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
FMB965	All versions