TELTONIKA | Telematics

FMC250

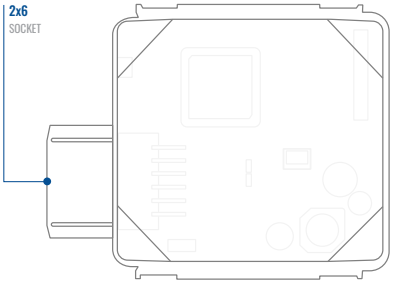
Advanced watter resistant tracker with CAN data reading feature

Quick Manual v1.0

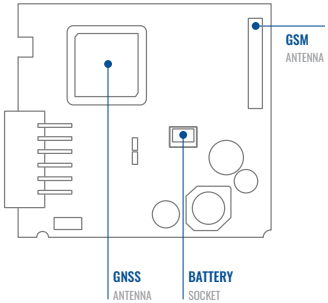
CONTENT

KNOW YOUR DEVICE

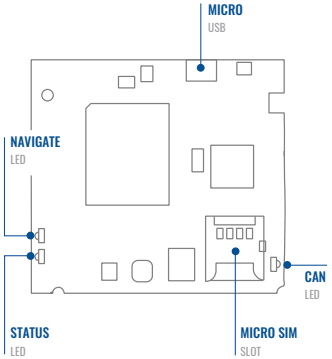
TOP VIEW



BOTTOM VIEW (WITHOUT COVER)



TOP VIEW (WITHOUT COVER)

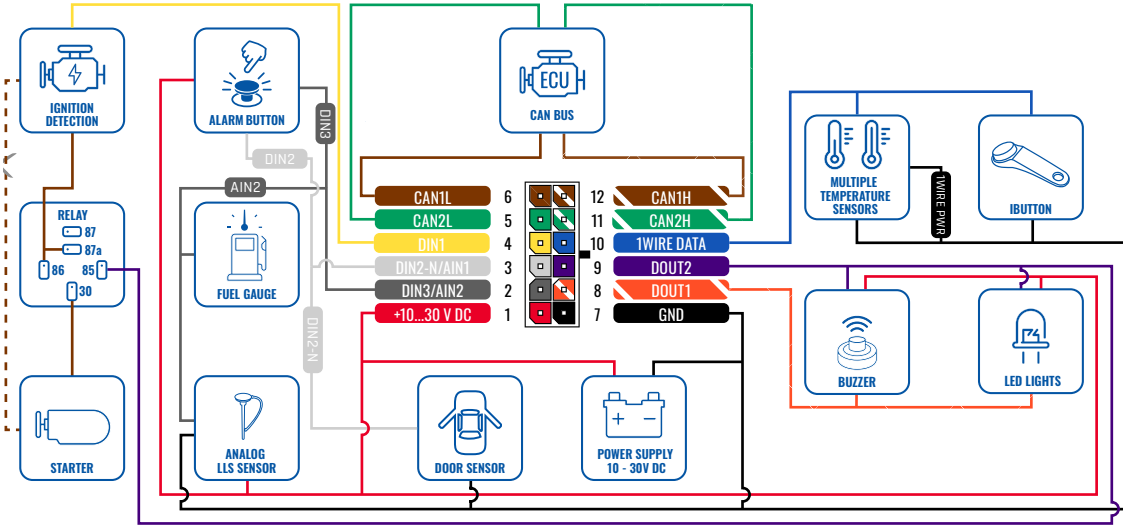


PINOUT

PIN NUMBER	PIN NAME	DESCRIPTION
1	VCC (10-30) V DC (+)	Power supply (+10-30 V DC)
2	DIN 3 / AIN 2	Digital input, channel 3 / Analog input, channel 2, Input range: 0-30 V DC
3	DIN2-N / AIN1	Digital output, channel 3 with ground sense / Analog input, chanel 1. Input range: 0-30 V DC
4	DIN1	Digital input, channel 1
5	CAN2L	CAN2 Low
6	CAN1L	CAN1 Low
7	GND (-)	Ground
8	DOUT 1	Digital output, channel 1. Open collector output. Max. 3,3 A DC.
9	DOUT 2	Digital output, channel 2. Open collector output. Max. 3,3 A DC.
10	1WIRE DATA	Data for 1–Wire devices.
11	CAN2H	CAN2 High
12	CAN1H	CAN1 High

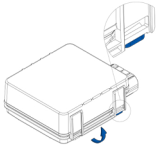
FMC250 QJIBO pinout

FMC250-QJIBO WIRING SCHEME



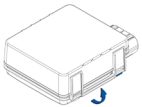
SET UP YOUR DEVICE

HOW TO INSERT MICRO-SIM CARD AND CONNECT THE BATTERY



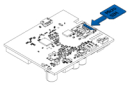
1 PARTLY CLOSED DEVICE

You will receive your device partly closed.



2 COVER REMOVAL

Gently remove **top and bottom covers.**

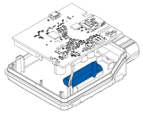


3 SIM CARD INSERT

Insert SIM card as shown with **PIN request disabled** or read our **Wiki**[1] how to enter it later in **Teltonika Configurator**[2]. Make sure that Micro-SIM card **cut-off corner** is pointing outward from slot. **SIM slot 1** is closer to PCB, **SIM slot 2** is the top one.

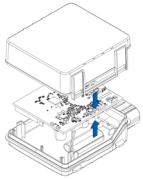
[1] wiki.teltonika-gps.com/view/FMC230_Security_info

[2] wiki.teltonika-gps.com/view/Teltonika_Configurator



4 BATTERY CONNECTION

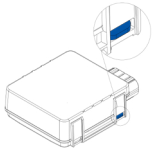
Connect **battery** as shown to device. Position the battery in place where it does not obstruct other components.



5 ATTACHING COVER BACK

After **configuration**, see "**PC Connection (Windows)**[1]", attach device **top** and **bottom cover** back and press them twice to the full closure.

1 Page 7, "PC Connection (Windows)



6 COMPLETELY CLOSED DEVICE

Make sure that product casing is closed correctly.

IMPORTANT!

This device has an IP67 casing with a two-phase closing, that ensures reliable protection and ease of use. Please make sure that product casing corner clips are fixed tightly and cable is connected to the device in order to maintain the degree of IP67 protection.

PC CONNECTION (WINDOWS)

1. Power-up FMC250 with **DC voltage (10 – 30 V)** power supply using **supplied power cable**. LED's should start blinking, see **"LED indications[1]"**.
2. Connect device to computer using **Micro-USB cable** or Bluetooth® connection:
   - Using Micro-USB cable
     - You will need to install USB drivers, see **"How to install USB drivers (Windows)[2]"**
   - Using Bluetooth®
     - FMC250 Bluetooth® is enabled by default. Turn on Bluetooth® connection on your PC, then select **Add** Bluetooth® **or other device** > Bluetooth®**.** Choose your device named – **"FMC250_last_7_imei_digits"**, without **LE** in the end. Enter default password **5555**, press **Connect** and then select **Done**.
3. You are now ready to use the device on your computer.

[1] wiki.teltonika-gps.com/view/FMC250_LED_status

[2] Page 7, "How to install USB drivers"

HOW TO INSTALL USB DRIVERS (WINDOWS)

1. Please download COM port drivers from **here**[1].
2. Extract and run **TeltonikaCOMDriver.exe**.
3. Click **Next** in driver installation window.
4. In the following window click **Install** button.
5. Setup will continue installing the driver and eventually the confirmation window will appear. Click **Finish** to complete the setup.

[1] teltonika-gps.com/downloads/en/FMC250/TeltonikaCOMDriver.zip

CONFIGURATION (WINDOWS)

At first FMC250 device will have default factory settings set. These settings should be changed according to the users needs. Main configuration can be performed via **Teltonika Configurator**[1] software. Get the latest **Configurator** version from **here**[2]. Configurator operates on **Microsoft Windows OS** and uses prerequisite **MS .NET Framework.** Make sure you have the correct version installed.

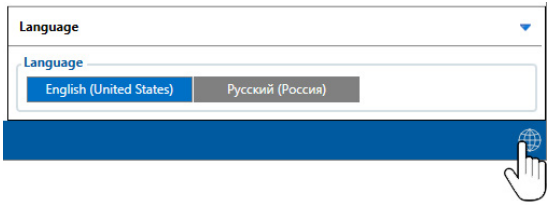
[1] wiki.teltonika-gps.com/view/Teltonika_Configurator

[2] wiki.teltonika-gps.com/view/Teltonika_Configurator_versions

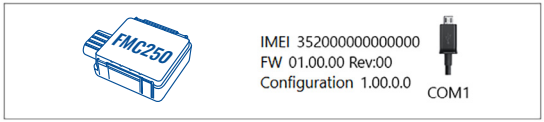
MS .NET REQUIREMENTS

Operating system	MS .NET Framework version	Version	Links
Windows Vista Windows 7 Windows 8.1 Windows 10	MS .NET Framework 4.6.2	32 and 64 bit	**www.microsoft.com**[1]

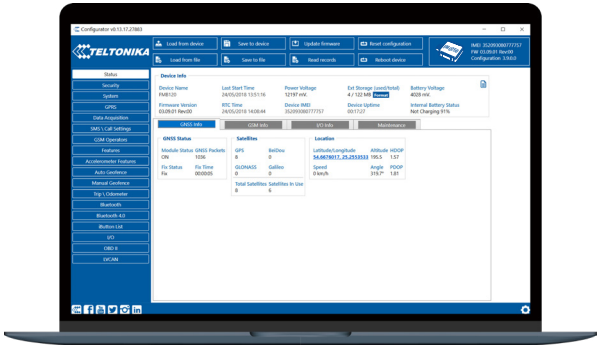
1 dotnet.microsoft.com/en-us/download/dotnet-framework/net462



Downloaded Configurator will be in compressed archive. Extract it and launch Configurator.exe. After launch software language can be changed by clicking in the right bottom corner.



Configuration process begins by pressing on connected device.



After connection to Configurator **Status window** will be displayed.

Various **Status window**[1] tabs display information about **GNSS**[2], **GSM**[3], **I/O**[4], **Maintenance**[5] and etc. FMC250 has one user editable profile, which can be loaded and saved to the device. After any modification of configuration the changes need to be saved to device using **Save to device** button. Main buttons offer following functionality:

Load from device – loads configuration from device.

Save to device – saves configuration to device.

Load from file – loads configuration from file.

Save to file – saves configuration to file.

Update firmware – updates firmware on device.

Read records – reads records from the device.

Reboot device – restarts device.

Reset configuration – sets device configuration to default.

Most important configurator section is **GPRS** – where all your server and **GPRS settings**[6] can be configured and **Data Acquisition**[7] – where data acquiring parameters can be configured. More details about FMC250 configuration using Configurator can be found in our **Wiki**[8].

[1] wiki.teltonika-gps.com/view/FMC250_Status_info

[2] wiki.teltonika-gps.com/view/FMC250_Status_info#GNSS_Info

[3] wiki.teltonika-gps.com/view/FMC2501_Status_info#GSM_Info

[4] wiki.teltonika-gps.com/view/FMC250_Status_info#I.2FO_Info

[5] wiki.teltonika-gps.com/view/FMC250_Status_info#Maintenance

[6] wiki.teltonika-gps.com/index.php?title=FMC250_GPRS_settings

[7] wiki.teltonika-gps.com/index.php?title=FMC250_Data_acquisition_settings

[8] wiki.teltonika-gps.com/index.php?title=FMC250_Configuration

QUICK SMS CONFIGURATION

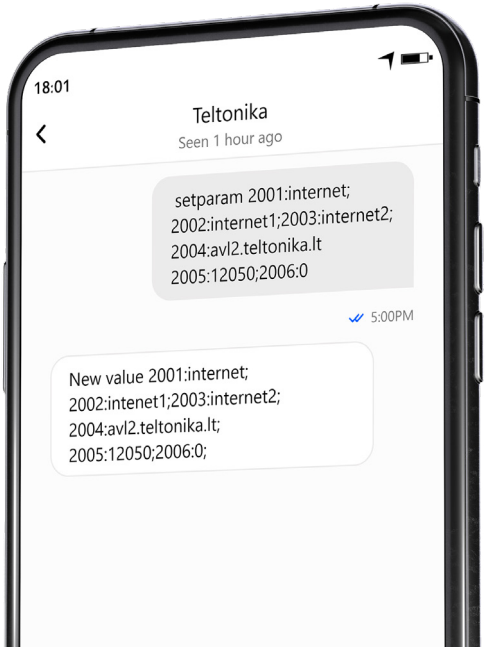
Default configuration has optimal parameters present to ensure best performance of track quality and data usage.

Quickly set up your device by sending this SMS command to it:

```
«  setparam 2001:APN;2002:APN_username;2003:APN_password;2004:Domain;2005:Port;2006:0»
```

1 2 3 4 5 6

Note: Before SMS text, two space symbols should be inserted.



GPRS SETTINGS:

1. **2001** – APN
2. **2002** – APN username (if there are no APN username, empty field should be left)
3. **2003** – APN password (if there are no APN password, empty field should be left)

SERVER SETTINGS:

4. **2004** – Domain
5. **2005** – Port
6. **2006** – Data sending protocol (0 – TCP, 1 – UDP)

DEFAULT CONFIGURATION SETTINGS

MOVEMENT AND IGNITION DETECTION:

VEHICLE MOVEMENT
will be detected by accelerometer

IGNITION
will be detected by vehicle power voltage between 13,2 – 30 V

DEVICE MAKES A RECORD ON STOP IF:

1 HOUR PASSES
while vehicle is stationary and ignition is off

RECORDS SENDING TO SERVER:

EVERY 120 SECOND
it is sent to the server If device has made a record

DEVICE MAKES A RECORD ON MOVING IF ONE OF THESE EVENTS HAPPEN:

PASSES
300 seconds

VEHICLE DRIVES
100 meters

VEHICLE TURNS
10 degrees

SPEED DIFFERENCE
between last coordinate and current position is greater than 10 km/h

After successful SMS configuration, FMC250 device will synchronize time and update records to configured server. Time intervals and default I/O elements can be changed by using **Teltonika Configurator**[1] or **SMS parameters**[2].

[1] wiki.teltonika-gps.com/view/Teltonika_Configurator

[2] wiki.teltonika-gps.com/view/Template:FMC_Device_Family_Parameter_list

MOUNTING RECOMMENDATIONS

CONNECTING WIRES

- Wires should be fastened to the other wires or non-moving parts. Try to avoid heat emitting and moving objects near the wires.
- The connections should not be seen very clearly. If factory isolation was removed while connecting wires, it should be applied again.
- If the wires are placed in the exterior or in places where they can be damaged or exposed to heat, humidity, dirt, etc., additional isolation should be applied.
- Wires cannot be connected to the board computers or control units.

CONNECTING POWER SOURCE

- Be sure that after the car computer falls asleep, power is still available on chosen wire. Depending on car, this may happen in 5 to 30 minutes period.
- When module is connected, measure voltage again to make sure it did not decrease.
- It is recommended to connect to the main power cable in the fuse box.
- Use 3A, 125V external fuse.

CONNECTING IGNITION WIRE

- Be sure to check if it is a real ignition wire i. e. power does not disappear after starting the engine.
- Check if this is not an ACC wire (when key is in the first position, most of the vehicle electronics are available).
- Check if power is still available when you turn off any of vehicles devices.
- Ignition is connected to the ignition relay output. As alternative, any other relay, which has power output when ignition is on, may be chosen.

CONNECTING GROUND WIRE

- Ground wire is connected to the vehicle frame or metal parts that are fixed to the frame.
- If the wire is fixed with the bolt, the loop must be connected to the end of the wire.
- For better contact scrub paint from the spot where loop is going to be connected.

LED INDICATIONS

NAVIGATION LED INDICATIONS

BEHAVIOUR	MEANING
Permanently switched on	GNSS signal is not received
Blinking every second	Normal mode, GNSS is working
Off	GNSS is turned off because: Device is not working or Device is in sleep mode
Blinking fast constantly	Device firmware is being flashed

STATUS LED INDICATIONS

BEHAVIOUR	MEANING
Blinking every second	Normal mode
Blinking every two seconds	Sleep mode
Blinking fast for a short time	Modem activity
Off	Device is not working or Device is in boot mode

CAN STATUS LED INDICATIONS

BEHAVIOUR	MEANING
Blinking very fast	FW is being flashed for CAN IC
Fast blinking	The flashed FW image is corrupted or not found
Short blink and long wait	No CAN configuration uploaded in device
2 short blinks and long wait	CAN configuration is loaded for parsing CAN data
3 short blinks and long wait	Data is being read from CAN bus

BASIC CHARACTERISTICS

MODULE	
Name	FMC250-QJIB0: Quectel EG915U-EU
Technology	GSM, GPRS, GNSS, BLUETOOTH LE, LTE

GNSS	
GNSS	GPS, GLONASS, GALILEO, BEIDOU, QZSS, AGPS
Receiver	Tracking: 33
Tracking sensitivity	-165 dBM

Accuracy	< 3 m
Hot start	< 1 s
Warm start	< 25 s
Cold start	< 35 s

CELLULAR

Technology	LTE Cat 1, GSM
2G bands	FMC250-QJIB0: GSM: B2/B3/B5/B8
4G bands	FMC250-QJIB0: LTE FDD: B1/B3/B5/ B7/B8/B20/B28
Data transfer	LTE: LTE FDD : Max 10Mbps (DL)/ Max 5Mbps (UL) GSM: GPRS: Max 85.6Kbps (DL)/ Max 85.6Kbps (UL)
Data support	SMS (text/data)
Transmit power	Class 5 for GSM900: 36dBm Class 3 for DCS1800: 33dBm Class 3 for LTE-FDD: 25.7dBm Bluetooth®: 5.56dBm Bluetooth® LE: -3.17dBm

POWER

Input voltage range	10-30 V DC with overvoltage protection
Back-up battery	170 mAh Li-Ion battery 3.7 V (0.63 Wh)
Internal fuse	3 A, 125 V
Power Consumption	At 12V < 6 mA (**Ultra Deep Sleep**[1]) At 12V < 8 mA (**Deep Sleep**[2]) At 12V < 11 mA (**Online Deep Sleep**[3]) At 12V < 20 mA (**GPS Sleep**[4]) At 12V < 35 mA (nominal with no load) At 12V < 250 mA Max. (with full Load/ Peak)

BLUETOOTH® TECHNOLOGY

Specification	4.0 + LE
Supported peripherals	**Temperature and Humidity sensor**[5], Inateck Barcode Scanner, Universal Bluetooth® LE sensors support

INTERFACE

Digital Inputs	FMC250-QJIB0: 3
Negative Inputs	FMC250-QJIB0: 1 (Digital Input 2)
Impuls Inputs	FMC250-QJIB0: 2 (Digital Input 1, Digital Input 2)
Analog Inputs	FMC250-QJIB0: 2

[1] wiki.teltonika-gps.com/view/FMC250_Sleep_modes#Ultra_Deep_Sleep_mode

[2] wiki.teltonika-gps.com/view/FMC250_Sleep_modes#Deep_Sleep_mode

[3] teltonika-gps.com/view/FMC250_Sleep_modes#Online_Deep_Sleep_mode

[4] wiki.teltonika-gps.com/view/FMC250_Sleep_modes#GPS_Sleep_mode

[5] teltonika.lt/product/bluetooth-sensor/

Digital outputs	FMC250-QJIB0: 2
CAN interfaces	2
1-Wire	1 (1-Wire data)
GNSS antenna	Internal High Gain
GSM antenna	Internal High Gain
USB	2.0 Micro-USB
LED indication	3 status LED lights
SIM	Micro-SIM or eSIM
Memory	128MB internal flash memory

PHYSICAL SPECIFICATION

Dimensions	70,5 x 67,0 x 25,6 mm (L x W x H) 85,0 x 67,0 x 25,6 mm (L x W x H) (length with connector socket)
Weight	73.5 g

OPERATING ENVIRONMENT

Operating temperature (without battery)	-40 °C to +85 °C
Storage temperature (without battery)	-40 °C to +85 °C
Operating temperature (with battery)	-20 °C to +40 °C
Storage temperature (with battery)	-20 °C to +45 °C for 1 month -20 °C to +35 °C for 6 months
Operating humidity	5% to 95% non-condensing
Ingress Protection Rating	IP67
Battery charge temperature	0 °C to +45 °C
Battery storage temperature	-20 °C to +45 °C for 1 month -20 °C to +35 °C for 6 months

FEATURES

CAN Data	Fuel Level (Dashboard), Total fuel consumption, Vehicle speed (wheel), Vehicle driven distance, Engine speed (RPM), Accelerator pedal position
Sensors	Accelerometer
Scenarios	**Green Driving**, **Over Speeding detection**, **Jamming detection**, **GNSS Fuel Counter**, **DOUT Control Via Call**, **Excessive Idling detection**, **Immobilizer**, **iButton Read Notification**, **Unplug detection**, **Towing detection**, **Crash detection**, **Auto Geofence**, **Manual Geofence**, **Trip**[6]

[6] wiki.teltonika-gps.com/view/FMC250_Accelerometer_Features_settings

Sleep modes	**GPS Sleep**, **Online Deep Sleep**, **Deep Sleep**, **Ultra Deep Sleep**[7]
Configuration and firmware update	**FOTA Web**[8], **FOTA**[9], **Teltonika Configurator**[10] (USB, Bluetooth® wireless technology), **FMBT mobile application**[11] (Configuration)
SMS	Configuration, Events, DOUT control, Debug
GPRS commands	Configuration, DOUT control, Debug
Time Synchronization	GPS, NITZ, NTP
Ignition detection	Digital Input 1, Accelerometer, External Power Voltage, Engine

[7] wiki.teltonika-gps.com/view/FMC250_Sleep_modes
[8] wiki.teltonika.lt/view/FOTA_WEB
[9] wiki.teltonika.lt/view/FOTA
[10] wiki.teltonika.lt/view/Teltonika_Configurator
[11] teltonika.lt/product/fmbt-mobile-application/

ELECTRICAL CHARACTERISTICS

CHARACTERISTIC DESCRIPTION	VALUE			
	MIN.	TYP.	MAX.	UNIT
SUPPLY VOLTAGE				
Supply Voltage (Recommended Operating Conditions)	+10		+30	V
DIGITAL OUTPUT (OPEN DRAIN GRADE)				
Drain current (Digital Output OFF)			120	µA
Drain current (Digital Output ON, Recommended Operating Conditions)		0.1	0.5	A
Static Drain-Source resistance (Digital Output ON)		400	600	mΩ
DIGITAL INPUT				
Input resistance (DIN1)	47			kΩ
Input resistance (DIN2)	38.45			kΩ

CHARACTERISTIC DESCRIPTION	VALUE			
	MIN.	TYP.	MAX.	UNIT
Input resistance (DIN3)	150			kΩ
Input voltage (Recommended Operating Conditions)	0		Supply voltage	V
Input Voltage threshold (DIN1)		7.5		V
Input Voltage threshold (DIN2)		2.5		V
Input Voltage threshold (DIN3)		2.5		V

OUTPUT SUPPLY VOLTAGE 1-WIRE

Supply voltage	+4.5		+4.7	V
Output inner resistance		7		Ω
Output current (Uout > 3.0 V)		30		mA
Short circuit current (Uout = 0)		75		mA

NEGATIVE INPUT

Input resistance	38.45			kΩ
Input voltage (Recommended Operating Conditions)	0		Supply voltage	V

CHARACTERISTIC DESCRIPTION	VALUE			
	MIN.	TYP.	MAX.	UNIT
Input voltage threshold		0.5		V
Sink current			180	nA

CAN INTERFACE

Internal terminal resistors CAN bus (no internal termination resistors)				Ω
Differential input resistance	19	30	52	kΩ
Recessive output voltage	2	2.5	3	V
Differential receiver threshold voltage	0.5	0.7	0.9	V
Common mode input voltage	-30		30	V

SAFETY INFORMATION

This message contains information on how to operate FMC250 safely. By following these requirements and recommendations, you will avoid dangerous situations. You must read these instructions carefully and follow them strictly before operating the device!

- The device uses SELV limited power source. The nominal voltage is +12 V DC. The allowed voltage range is +10...+30 V DC.
- To avoid mechanical damage, it is advised to transport the device in an impact-proof package. Before usage, the device should be placed so that its LED indicators are visible. They show the status of device operation.
- When connecting the 2x6 connector wires to the vehicle, the appropriate jumpers of the vehicle power supply should be disconnected.
- Before unmounting the device from the vehicle, the 2x6 connector must be disconnected. The device is designed to be mounted in a zone of limited access, which is inaccessible to the operator. All related devices must meet the requirements of EN 62368-1 standard. The device FMC250 is not designed as a navigational device for boats.

Do not disassemble the device. If the device is damaged, the power supply cables are not isolated or the isolation is damaged, DO NOT touch the device before unplugging the power supply.

All wireless data transferring devices produce interference that may affect other devices which are placed nearby.

The device must be connected only by qualified personnel.

The device must be firmly fastened in a predefined location.

The programming must be performed using a PC with autonomic power supply.

Installation and/or handling during a lightning storm is prohibited.

The device is susceptible to water and humidity if the device housing is not properly closed

CAUTION: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Battery should not be disposed of with general household waste. Bring damaged or worn-out batteries to your local recycling center or dispose them to battery recycle bin found in stores.

CERTIFICATION AND APPROVALS

This sign on the package means that it is necessary to read the User's Manual before your start using the device. Full User's Manual version can be found in our **Wiki**[1].

1 wiki.teltonika-gps.com/index.php?title=FMC250

Hereby, Teltonika declare under our sole responsibility that the above described product is in conformity with the relevant Community harmonization: European Directive 2014/53/EU (RED).

UK Conformity Assessed (UKCA) marking is a conformity mark that indicates conformity with the applicable requirements for above described products sold within Great Britain.

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by UAB Teltonika Telematics is under license. Other trademarks and trade names are those of their respective owners.

This sign on the package means that all used electronic and electric equipment should not be mixed with general household waste.

The RoHS1 is a directive regulating the manufacture, import and distribution of Electronics and Electrical Equipment (EEE) within the EU, which bans from use 10 different hazardous materials (to date).

E-Mark and e-Mark are the European conformity marks issued by the transport sector, indicating that the products comply with relevant laws and regulations or directives. Vehicles and related products need to go through the E-Mark certification process to be legally sold in Europe.

CHECK ALL CERTIFICATES

All newest certificates may be found in our **Wiki**[2].

2 wiki.teltonika-gps.com/view/FMC250_Certification_%26_Approvals

WARRANTY

We guarantee our products 24-month warranty[1] period.

All batteries carry a 6-month warranty period.

Post-warranty repair service for products is not provided.

If a product stops operating within this specific warranty time, the product can be:

- Repaired
- Replaced with a new product
- Replaced with an equivalent repaired product fulfilling the same functionality
- Replaced with a different product fulfilling the same functionality in case of EOL for the original product

[1] Additional agreement for an extended warranty period can be agreed upon separately.

WARRANTY DISCLAIMER

- Customers are only allowed to return products as a result of the product being defective, due to order assembly or manufacturing fault.
- Products are intended to be used by personnel with training and experience.
- Warranty does not cover defects or malfunctions caused by accidents, misuse, abuse, catastrophes, improper maintenance or inadequate installation – not following operating instructions (including failure to heed warnings) or use with equipment with which it is not intended to be used.
- Warranty does not apply to any consequential damages.
- Warranty is not applicable for supplementary product equipment (i. e. PSU, power cables, antennas) unless the accessory is defective on arrival.
- **More information on what is RMA**[1]

[1] wiki.teltonika-gps.com/view/RMA_guidelines