TELTONIKA | Telematics

# FMC150

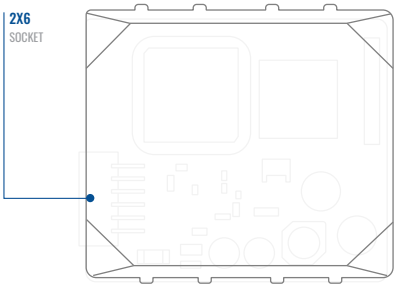
Advanced tracker with CAN data reading feature

Quick Manual v1.6

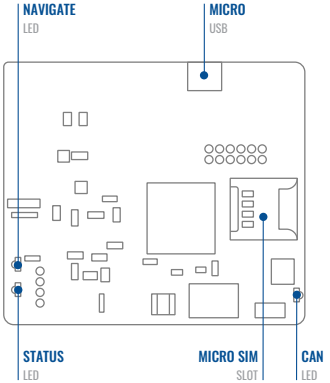
# CONTENT

# KNOW YOUR DEVICE

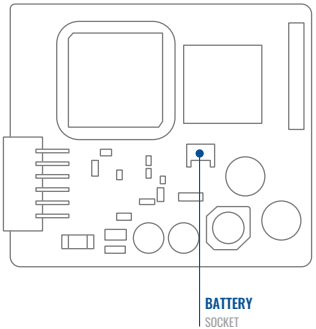
## TOP VIEW




## BOTTOM VIEW (WITHOUT COVER)




## TOP VIEW (WITHOUT COVER)

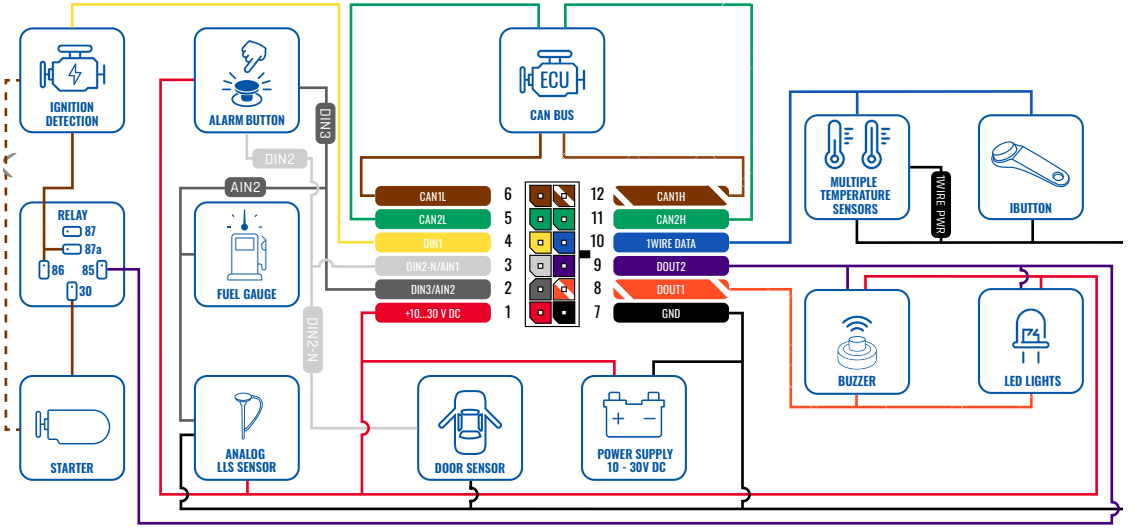


# PINOUT

| Pin number | Pin name | Description |
|---|---|---|
| 1 | VCC (10-30) V DC (+) | Power supply (+10-30 V DC). |
| 2 | DIN 3 / AIN 2 | Analog input, channel 2. Input range: 0-30 V DC / Digital input, channel 3. |
| 3 | DIN2-N / AIN1 | Digital input, channel 2 / Analog input, channel 2. Input range: 0-30 V DC /GND Sense input |
| 4 | DIN1 | Digital input, channel 1. |
| 5 | CAN2L | CAN LOW, 2nd line |
| 6 | CAN1L | CAN LOW, 1st line |
| 7 | GND (-) | Ground pin. (10-30) V DC (—) |
| 8 | DOUT 1 | Digital output, channel 1. Open collector output. Max. 0,5 A DC. |
| 9 | DOUT 2 | Digital output, channel 2. Open collector output. Max. 0,5 A DC. |
| 10 | 1WIRE DATA | Data for 1–Wire devices. |
| 11 | CAN2H | CAN HIGH, 2nd line |
| 12 | CAN1H | CAN HIGH, 1st line |

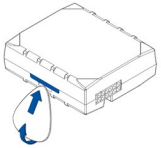

FMC150 2x6 socket pinout

# WIRING SCHEME



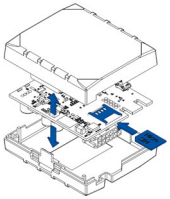
# SET UP YOUR DEVICE

## HOW TO INSERT MICRO-SIM CARD AND CONNECT THE BATTERY



### 1 COVER REMOVAL

Gently remove FMC150 cover using plastic pry tool from both sides.

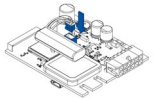


### 2 MICRO-SIM CARD INSERT

Insert Micro-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 forward to slot.

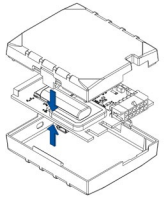
[1] wiki.teltonika-gps.com/index.php?title=FMC150_Security_info

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



### 3 BATTERY CONNECTION

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



### 4 ATTACHING COVER BACK

After configuration, see “PC Connection (Windows)”, attach device cover back.

# PC CONNECTION (WINDOWS)

1. Power-up FMC150 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**
     - FMC150 **Bluetooth** is enabled by default. Turn on Bluetooth on your PC, then select **Add Bluetooth or other device** > **Bluetooth.** Choose your device named – **"FMC150_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/FMC150_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/FMC150/TeltonikaCOMDriver.zip

# CONFIGURATION (WINDOWS)

At first FMC150 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.

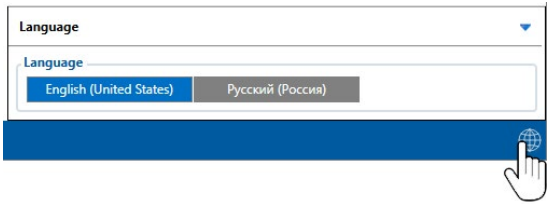
[1] wiki.teltonika-gps.com/view/Teltonika_Configurator

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

### MS .Net requirements

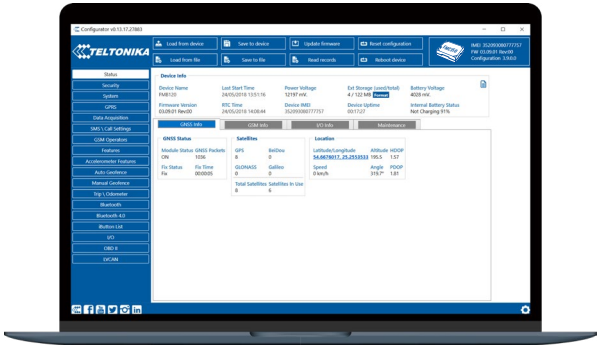
| Operating system | MS .NET Framework version | Version | Links |
|---|---|---|---|
| Windows Vista<br>Windows 7<br>Windows 8.1<br>Windows 10 | MS .NET Framework 4.6.2 | 32 and 64 bit | **www.microsoft.com**[1] |

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. FMC150 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 FMC150 configuration using Configurator can be found in our **Wiki**[8].

[1] wiki.teltonika-gps.com/view/FMC150_Status_info

[2] wiki.teltonika-gps.com/view/FMC150_Status_info#GNSS_Info

[3] wiki.teltonika-gps.com/view/FMC1501_Status_info#GSM_Info

[4] wiki.teltonika-gps.com/view/FMC150_Status_info#I.2FO_Info

[5] wiki.teltonika-gps.com/view/FMC150_Status_info#Maintenance

[6] wiki.teltonika-gps.com/index.php?title=FMC150_GPRS_settings

[7] wiki.teltonika-gps.com/index.php?title=FMC150_Data_acquisition_settings

[8] wiki.teltonika-gps.com/index.php?title=FMC150_Configuration

# QUICK SMS CONFIGURATION

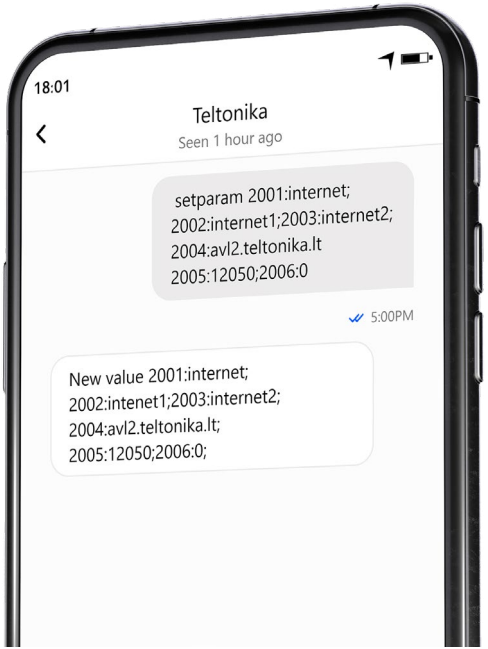
Default configuration has optimal parameters present to ensure best performance of track quality and data usage.

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, FMC150 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:<br>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 fast constantly | Reading CAN data from vehicle |
| Permanently switched on | Wrong program number or wrong wire connection |
| Off | Wrong connection or CAN processor in sleep mode |

# BASIC CHARACTERISTICS

| Module | |
|---|---|
| Name | FMC150-QJIB0: Quectel EG915U-EU with Teltonika TM2500<br>FMC150-QKIB0: Quectel EG915U-LA with Teltonika TM2500 |
| Technology | GSM, GPRS, GNSS, BLUETOOTH |
| **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 | FMC150-QJIB0: GSM: B2/B3/B5/B8<br>FMC920-QKIB0: GSM: B2/B3/B5/B8 |
| 4G bands | FMC150-QJIB0: LTE FDD: B1/B3/B7/ B8/B20/B28<br>FMC150-QKIB0: LTE FDD: B2/B3/B4/ B5/B7/B8/B28/ B66 |
| Data transfer | LTE: LTE FDD : Max 10Mbps (DL)/ Max 5Mbps (UL)<br>GSM: GPRS: Max 85.6Kbps (DL)/ Max 85.6Kbps (UL) |
| Data support | SMS (text/data) |

## 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**)<br>At 12V < 8 mA (**Deep Sleep**)<br>At 12V < 11 mA (**Online Deep Sleep**)<br>At 12V < 20 mA (**GPS Sleep**)[1]<br>At 12V < 35 mA (nominal with no load)<br>At 12V < 250 mA Max. (with full Load/ Peak) |

## Bluetooth

| | |
|---|---|
| Specification | 4.0 + LE |
| Supported peripherals | **Temperature and Humidity sensor**[2], Inateck Barcode Scanner, Universal BLE sensors support |

## Interface

[1] wiki.teltonika-gps.com/view/FMC150_Sleep_modes#GPS_Sleep_mode

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

| | |
|---|---|
| Digital Inputs | 3 |
| Negative Inputs | 1 (Digital input 2) |
| Digital Outputs | 2 |
| Analog Inputs | 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 + eSIM |
| Memory | 128MB internal flash memory |

### Physical Specification

| | |
|---|---|
| Dimensions | 65 x 56.6 x 20.6 mm (L x W x H) |
| Weight | 55 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<br>-20 °C to +35 °C for 6 months |
| Operating humidity | 5% to 95% non-condensing |
| Ingress Protection Rating | IP41 |
| Battery charge temperature | 0 °C to +45 °C |
| Battery storage temperature | -20 °C to +45 °C for 1 month<br>-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**[3] |
| Sleep modes | **GPS Sleep**, **Online Deep Sleep**, **Deep Sleep**, **Ultra Deep Sleep**[4] |
| Configuration and firmware update | **FOTA Web**[5], **FOTA**[6], **Teltonika Configurator**[7] (USB, Bluetooth), **FMBT mobile application**[8] (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 |

[3] wiki.teltonika-gps.com/view/FMC150_Accelerometer_Features_settings

[4] wiki.teltonika-gps.com/view/FMC150_Sleep_modes

[5] wiki.teltonika.lt/view/FOTA_WEB

[6] wiki.teltonika.lt/view/FOTA

[7] wiki.teltonika.lt/view/Teltonika_Configurator

[8] teltonika.lt/product/fmbt-mobile-application/

# ELECTRICAL CHARACTERISTICS

| Characteristic description | Value | | | |
|---|---|---|---|---|
| **Supply voltage** | **Min.** | **Typ.** | **Max.** | **Unit** |
| 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 |
| Input resistance (DIN3) | 150 | | | kΩ |

| Characteristic description | Value | | | |
|---|---|---|---|---|
| **Supply voltage** | **Min.** | **Typ.** | **Max.** | **Unit** |
| 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 |
| Input voltage threshold | | 0.5 | | V |

| Characteristic description | | Value | | |
|---|---|---|---|---|
| **Supply voltage** | **Min.** | **Typ.** | **Max.** | **Unit** |
| 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 FMC150 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 FMC150 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.

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=FMC150

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

## CHECK ALL CERTIFICATES

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

2 wiki.teltonika-gps.com/view/FMC150_Certification_%26_Approvals

# WARRANTY

TELTONIKA guarantees its products to be free of any manufacturing defects for a period of 24 months. With additional agreement we can agree on a different warranty period, for more detailed information please contact our sales manager.

**Contact us teltonika-gps.com/about-us/contacts**

All batteries carry a reduced 6 month warranty period.

If a product should fail 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
- TELTONIKA can also repair products that are out of warranty at an agreed cost.

# WARRANTY DISCLAIMER

TELTONIKA PRODUCTS ARE INTENDED TO BE USED BY PERSONS WITH TRAINING AND EXPERIENCE. ANY OTHER USE RENDERS THE LIMITED WARRANTIES EXPRESSED HEREIN AND ALL IMPLIED WARRANTIES NULL AND VOID AND SAME ARE HEREBY EXCLUDED. ALSO EXCLUDED FROM THIS LIMITED WARRANTY ARE ANY AND ALL INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO, LOSS OF USE OR REVENUE, LOSS OF TIME, INCONVENIENCE OR ANY OTHER ECONOMIC LOSS.

More information can be found at **teltonika-gps.com/warranty-repair**