FTC921

Basic tracker

Quick Manual v1.7 | 2024-08-20

CONTENTS

GLOSSARY

CEP – Circular Error Probable: a statistical statistical measure used to describe the accuracy of a positioning system, commonly used in the context of GNSS. CEP represents the radius of a circle, centered on the true position, within which a given percentage (usually 50%) of the measured positions are expected to fall.

COM port – Serial communication interface that is used to transfer information to/from devices such as modems, terminals and various peripherals.

COLD start – A COLD start occurs when the GNSS receiver lacks all the necessary information for a position fix, requiring it to start from scratch. This means it needs to acquire and decode the almanac and ephemeris data from the satellites, determine the satellite positions, and calculate its position.

FOTA – Firmware-Over-The-Air.

HOT start – A HOT start occurs when the GNSS receiver has all the necessary information to calculate a position fix readily available. This includes the almanac and ephemeris data, the approximate time, and its last known position.

IMEI – International Mobile Equipment Identity: a unique numeric identifier used by networks to identify devices.

NITZ – Network Identity and Time Zone: a mechanism in GSM, used to provision time, date and other parameters to mobile devices in a network.

NTP – Network Time Protocol: a networking protocol for clock synchronization between computer systems.

SELV – Safety Extra Low Voltage: an electrical system in which the voltage cannot exceed 50 VAC or 120 VDC under normal conditions, and under single-fault conditions, including earth faults in other circuits.

Record – AVL data stored in device memory. AVL data contains GNSS and I/O information.

WARM start – A WARM start occurs when the GNSS receiver has some, but not all, of the necessary information for a position fix. It might have valid almanac data but needs to download new ephemeris data or doesn't have an accurate estimate of its current time or position.

ℹ SIM card should be inserted in the module while the connector is plugged off (while module has no power).

SAFETY INFORMATION

This section contains information on how to operate FTC921 safely. By following these requirements and recommendations, you will avoid dangerous situations. You must read these instructions carefully before operating the device and follow them strictly!

SIGNALS AND SYMBOLS

Warnings and cautions which are general to the use of the device under all circumstances are included in this section. Some warnings and cautions are also inserted within the manual where they are most meaningful.

CAUTION! Cautions alert users to exercise appropriate care for safe and effective use of the product.

WARNING! This classifies a hazard of medium risk level. Failure to comply with the warning may result in serious injury.

Please note: Notes provide additional guidelines or information.

— The device uses a 10 V...90 V DC power supply. The nominal voltage is 12 V DC. The allowed range of voltage is 10 V...90 V DC.

CAUTION: Using a power supply outside this range may result in damage to the device or minor injuries. Always verify the power source before connection.

— 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.

— Before unmounting the device from vehicle, ignition MUST be OFF.

WARNING: 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.

WARNING: 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.

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

DATA SAFETY AND PRIVACY

In accordance with the General Data Protection Regulation (GDPR), this Data Processing Agreement (DPA) establishes obligations between Teltonika, the data processor, and its customers, acting as data controllers. The DPA outlines how Teltonika will handle customer data while adhering to GDPR regulations. This includes details on the data Teltonika can process, security measures in place, and customer rights concerning their data.

For a comprehensive understanding of the agreement, including permitted sub-processors, data breach procedures, and dispute resolution, please refer to the full Data Processing Agreement:

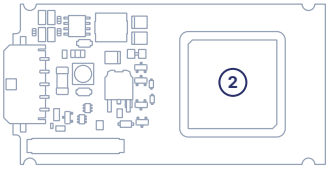
teltonika-gps.com/about-us/policies-certificates/data-processing-agreement

KNOW YOUR DEVICE

Top view

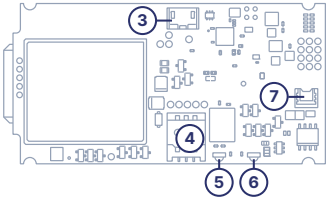
1. 1×5 socket

Top view (without cover)



2. GNSS antena

Bottom view (without cover)



3. USB Type-C connector
4. SIM slot
5. Status LED
6. Navigate LED
7. Battery socket

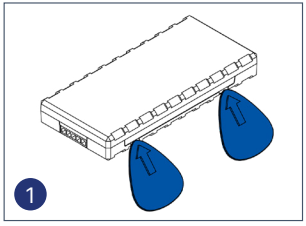
STANDARD PACKAGE CONTAINS

— 10 pcs. of FTC921 trackers

— 10 pcs. of Input/Output power supply cables (0.7 m)

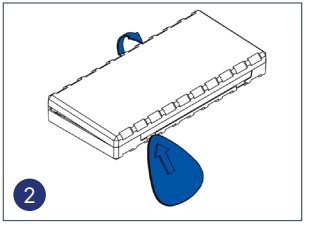
— Packaging box with Teltonika branding

SET UP YOUR DEVICE



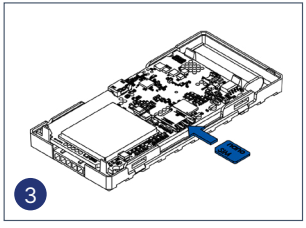
1. Remove top cover (1)

You will receive your device with covers closed. Use a pry tool and open one side of the top cover.



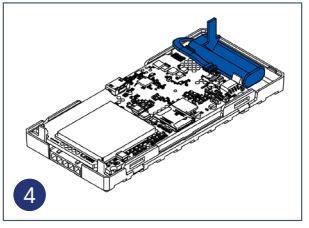
2. Remove top cover (2)

Turn the device. Use a pry tool and open the other side of top cover. Gently remove top cover.



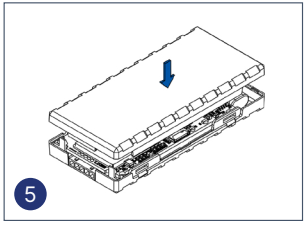
3. Insert SIM card

Insert SIM card as shown. Make sure Nano-SIM card cut-off corner is pointing towards SIM slot.



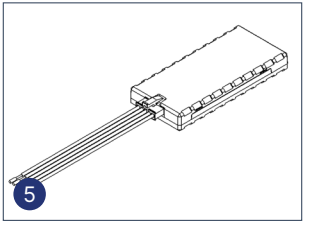
4. Connect the battery

Connect battery by pressing connector firmly to socket, ensure that both sides of connector lock properly.



5. Re-attach top cover

Please note: Before attaching the back cover, ensure the device is configured via USB. The USB port on the PCB will be inaccessible once the cover is fully attached. More details can be found in the configuration chapter [1].



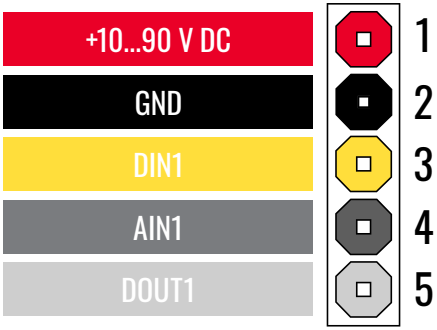
6. Device is ready

Device is ready to be mounted.

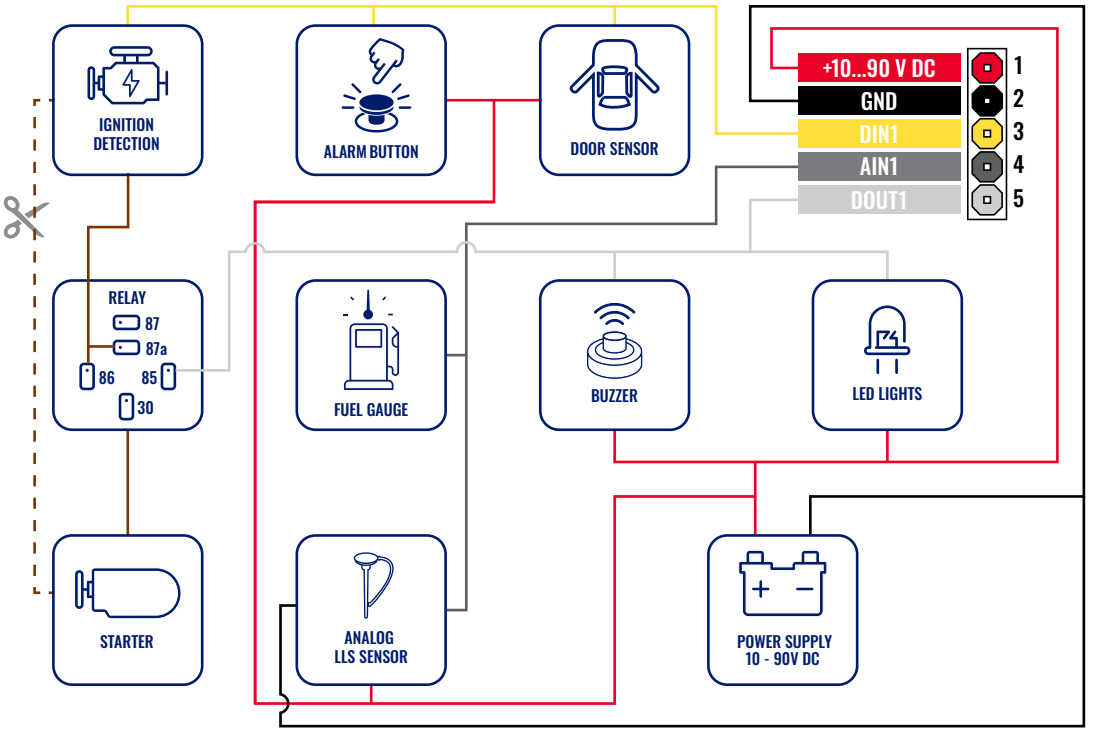
[1] Page 11 "Configuration (Windows)"

PINOUT

Pin number	Pin name	Description
1	VCC (10-90) VDC (+)	(Red) Power supply (+10-90 V DC)
2	GND (-)	(Black) Ground
3	DIN1	(Yellow) Digital input, channel 1. DEDICATED FOR IGNITION INPUT
4	AIN1	(Grey) Analog input, channel 1. Input range: 0-90 V DC
5	DOUT1	(White) Digital output. Open collector output. Max. 0.5 A DC



WIRING SCHEME



PC CONNECTION (WINDOWS)

1. Power-up FTC921 with **DC voltage (10-90V)** power supply using **power wires**. LEDs should start blinking.
2. Connect device to computer using Micro-USB cable
3. Install USB driver, see "How to install USB drivers (Windows)[1]"

HOW TO INSTALL USB DRIVERS (WINDOWS)

1. Download COM port drivers from here[2].
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] Page 10, "How to install USB drivers"

[2] wiki.teltonika-gps.com/images/d/d0/TeltonikaCOMDriver.zip

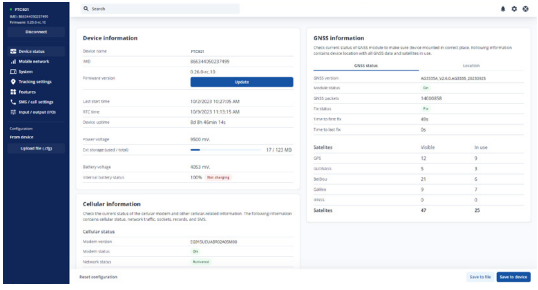
CONFIGURATION (WINDOWS)

Most Teltonika devices are shipped with default factory settings. Use Telematics Configuration Tool (TCT)[1] to change these settings according to your needs.

	Configurator	TCT
Operating system	Windows 7 Windows 8.1 Windows 10 Windows 11	Windows 10 Windows 11
MS .NET Framework version	MS .NET framework 5.0	MS .NET framework 6.0
Version	64 bit	64 bit
Disk Storage		1 GB of free disk space
Internet		Ethernet port or Wi-Fi w/ network access for auto-update

TCT

1. Download the TCT (compressed archive).
2. Extract the archive and launch the executable. The TCT will be installed.
3. Launch the TCT.
4. In the Discovered devices list, select your device and press **Configure**.
5. The Device status window opens. It contains device, GNSS and Cellular information.



Save to device – Save to device – saves configuration to device.

Upload file (.cfg) – Upload file – loads configuration from file.

Save to file – Save to file – saves configuration to file.

Update – Update – update device firmware.

Reset configuration – Reset configuration – sets device configuration to default.

Most important configurator sections are Mobile network (server, Mobile network settings) and Tracking settings (data collection parameters). More details about FTC921 configuration using TCT can be find on our Wiki[1].

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

[1] wiki.teltonika-gps.com/view/FTC921_Configuration

QUICK SMS CONFIGURATION

The default configuration ensures best track quality and optimal 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. Before SMS text, two space symbols should be inserted. These spaces are dedicated for device SMS login and password.

GPRS SETTINGS:

2. **2001** – APN
3. **2002** – APN username (leave field empty if there is no APN username)
4. **2003** – APN password (if there are no APN password, empty field should be left)

SERVER SETTINGS:

5. **2004** – Domain
6. **2005** – Port
7. **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 seconds, records are sent to the server (if device has made a record)

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

Every 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, FTC921 device will synchronize time and update records to configured server. Time intervals and default I/O elements can be changed by using TCT[1] or SMS parameters[2].

[1] wiki.teltonika-gps.com/view/FTC921_Configuration

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

MOUNTING RECOMMENDATIONS

CONNECTING WIRES

— Wires should be fastened to the other wires or non-moving parts. Do not place the wires near moving or heat-emitting objects.

— All electrical connections must be properly isolated. No bare wires should be visible. Re-apply isolation to wires if you removed factory isolation during installation.

— 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.

— Do not connect any wires to the vehicle's board computer or control unit.

CONNECTING POWER SOURCE

— Ensure 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

— Make sure that you have selected the correct wire for ignition signal - the electrical signal from the wire should be present 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 ON).

— 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 must be connected to the vehicle frame or metal parts that are fixed to the frame.

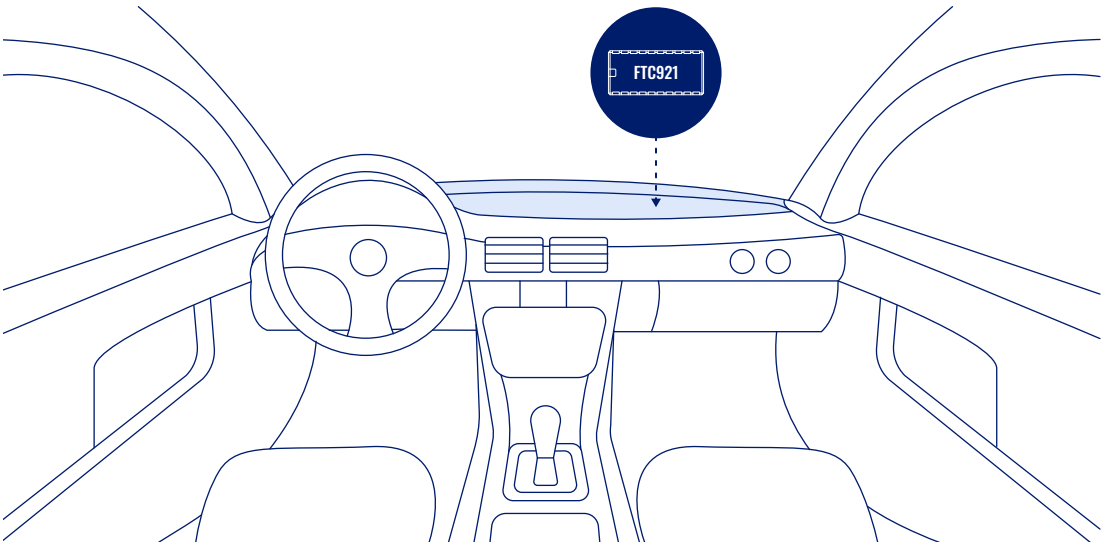
— If the wire is fixed with the bolt, the loop must be connected to the end of the wire.

— For better contact scrub paint from the spot where loop is going to be connected.

OPTIMAL MOUNTING LOCATION

— Mount the FTC921 under the plastic panel behind the front window, with the sticker/engraving facing towards the window (sky).

— It is recommended to place FTC921 behind dashboard as close to the window as possible. A good example of FTC921 placement is displayed in a picture below (area colored blue).



TROUBLESHOOTING

Troubleshooting section provides guidance to resolve frequently encountered issues during the setup and operational phases of the FTC921 device.

COMMON ISSUES AND SOLUTIONS (FAQ)

Problem	Solution
The device does not turn on when connected to power.	1. Ensure the input voltage range is within 10 - 90 V DC. 2. Avoid overvoltage and ensure that the device is mounted and connected according to mounting recommendations.
Inability to receive GPS signals.	1. Ensure that the device is mounted correct side up according to mounting recommendations 2. Check if device is not obstructed by metallic surfaces or other thick materials

DEVICE SPECIFC ISSUES AND SOLUTIONS

Problem	Solution
Data sending (modem status – deactivated) is not working, while device is connected and powered to PC with USB.	Make sure that, before connecting the USB cable, you first power the device using an external power source and voltage within 10-90 VDC.

FREQUENTLY USED SMS/GPRS COMMANDS

Command	Description	Response sent on success?	Response sent on failure?
cpureset	Restarts the device	No	Yes
getstatus	Returns status of the device	Yes	Yes
allver	Returns information about device firmware and hardware	Yes	No
web_connect	Triggers FOTA service / connection	Yes	Yes

LED INDICATIONS

NAVIGATION LED

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

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

BASIC CHARACTERISTICS

Module	
Name	FTC921-QJAB0: Quectel EG915U-EU with AG3335
Technology	LTE CAT 1/GSM/GPRS/GNSS
GNSS	
GNSS	GPS, GLONASS, GALILEO, BEIDOU
Receiver	L1: 75 channel
Tracking sensitivity	-165 dBM
Position Accuracy	< 1.8 m CEP
Velocity Accuracy	< 0.1 m/s (within +/- 15% error)
Hot start	< 1 s
Warm start	< 25 s
Celluar	
2G bands	GSM: B2/B3/B5/B8
4G bands	LTE FDD (CAT 1): B1/B3/B5/ B7/B8/B20/ B28

Data transfer	LTE FDD (CAT 1): Max. 10 Mbps (DL) / Max. 5 Mbps (UL) GSM (GPRS): Max. 85.6 Kbps (DL) / Max. 85.6 Kbps (UL)
Transmit power	Class 5 for GSM850/900: 30±5dBM Class 3 for GSM1800/1900: 29±5dBM Class 3 for LTE-FDD: 26±5dBM
Data support	SMS (TEXT, PDU), Network protocols (TCP, UDP)

Power

Input voltage range	10 - 90 V DC
Back-up battery	170 mAh Li-Ion battery 3.7 V
Internal fuse	3A
Power Consumption	At 12V < 25 mA (Nominal with no load) At 12V < 0.25A Max (with full Load/Peak)

Interface

Digital Inputs	1
Digital Outputs	1
Analog Inputs	1
GNSS antenna	Internal High Gain
GSM antenna	Internal High Gain
USB	2.0 USB Type-C
LED indication	2 status LED lights
SIM	Nano-SIM
Memory	128MB internal flash memory

Physical Specification

Dimensions	93×43×12.5 mm (L x W x H)
Weight	62 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)	0°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	IP41
Battery charge temperature	-20 °C to +45 °C for 1 month
Battery storage temperature	-20 °C to +35 °C for 6 months

Data sending protocols	Codec 8 extended[1]

Features

Sensors	Accelerometer
Scenarios	Green Driving, Over Speeding detection, Jamming detection, Excessive idling detection, Unplug detection, Crash Detection, Auto Geofence, Trip2
Sleep modes	Deep Sleep, Online Sleep, Power Off Sleep[3]
Configuration and firmware update	FOTA Web[4], Teltonika Configurator[5] (TCT)
Time Synchronization	GPS, NTP
Ignition detection	Digital Input 1, Accelerometer, External Power Voltage

[1] wiki.teltonika-gps.com/view/Codec#Codec_8_Extended

[2] wiki.teltonika-gps.com/view/FTC921_Features_settings

[3] wiki.teltonika-gps.com/view/FTC921_Sleep_modes#Deep_Sleep_mode

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

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

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]

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).

The Declaration EAC and the Certificate EAC in conformity with the technical regulation TR CU of the EurAsEC Customs Union are EAC certification documents issued by independent organizations. Such organizations perform their function through laboratories accredited to the public agencies in charge of the supervision of metrology and standardization in the three countries of the EAC Custom Union, joining at the moment the certification system : Russia, Belarus, Kazakhstan, Armenia and Kyrgyzstan.

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 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.

REACH addresses the production and use of chemical substances, and their potential impacts on both human health and the environment. Its 849 pages took seven years to pass, and it has been described as the most complex legislation in the Union's history and the most important in 20 years. It is the strictest law to date regulating chemical substances and will affect industries throughout the world.

The standard aims to provide users more detailed information than vague marketing terms such as waterproof.

ISO 16750-2:2012 applies to electric and electronic systems/components for road vehicles. It describes the potential environmental stresses and specifies tests and requirements recommended for the specific mounting location on/in the road vehicle.

The Australian Standard AS/NZS 4417.1 and AS/NZS 4417.2 Marking of electrical products to indicate compliance with regulations – General rules for use of the mark provides general requirements for the use of the RCM including location of the marking on the equipment and its dimensional requirements.

[1] wiki.teltonika-gps.com/view/FTC921

DECLARATION OF DEVICE OPERATION TEMPERATURE

An operating temperature is the temperature at which an electrical or mechanical device operates. The device will operate effectively within a specified temperature range which varies based on the device function and application context, and ranges from the minimum operating temperature to the maximum operating temperature (or peak operating temperature). Outside this range of safe operating temperatures the device may fail.

DECLARATION OF IMEI ASSIGNMENT

The IMEI number is used by a GSM network to identify valid devices and therefore can be used for stopping a stolen phone from accessing that network. For example, if a mobile phone is stolen, the owner can call their network provider and instruct them to blacklist the phone using its IMEI number. This renders the phone useless on that network and sometimes other networks too, whether or not the phone's subscriber identity module (SIM) is changed.

CHECK ALL CERTIFICATES

All newest certificates may be found in our Wiki[1].

[1] wiki.teltonika-gps.com/view/FTC921_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

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[2]

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

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

COMPANY DETAILS

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TELEMATICS WEBSITE

teltonika-gps.com

For more information about our products and services, please visit our website: teltonika-gps.com.

WIKI KNOWLEDGE BASE

wiki.teltonika-gps.com

For technical assistance, troubleshooting, and further inquiries, refer to our comprehensive support resources at our technical assistance portal: Teltonika Wiki.

FOTA WEB

fota.teltonika.lt