# Picotrack SafeDrive Installation Manual

**Version 1.0**


## Picotrack SafeDrive

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# *General Terms and Conditions*

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# 1 General Information

This Installation Manual consists of the following chapters:

| Chapter | Description |
|---|---|
| 1 | *General Information* provides basic information such as the conventions for the warning levels, applicable related documentations, used abbreviations, a revision history, and contact information. |
| 2 | *Product Description* provides a brief overview about the functions and features of the device as well as the available accessories. |
| 3 | *Safety* addresses the audience for this manual, the indented use of this device and safety-related information important to read before using the device. |
| 4 | *Device Assembly and Installation* guides you with detailed step-by-step-procedures through the process of commissioning the device. |
| 5 | *Status Indicators* describes the different LED statuses. |
| 6 | *Device Installation in a vehicle* provides important instructions about how to install the device in a vehicle (for e.g. car, truck…). |
| 7 | *Using the Device* explains separate functionalities of the device |
| 8 | *Troubleshooting Hints* provides solutions to issues that may occur during operation setup and active use of the device. |
| 9 | *Technical Data* provides the technical data of the device. |

## 1.1 Contact

Please contact our Telic team in your region. You will find the contact information on our website: http://www.telic.de/en/contact-us

**Support Hotline**
If you need specific technical support, please submit a request via the Telic website (you will be requested to setup an account) by using the following link: http://www.telic.de/en/support/support-request

## 1.2 Conventions used in this Manual

The following conventions for warning levels are used in this manual:

| **Warning** |
|---|
|  Warnings against hazards that may result directly in **serious injuries or death** in case of non-observance. |

**Caution**

Warnings against hazards that may result in **injuries** in case of non-observance.

***NOTICE***

Warnings against hazards that may result in **material damage** in case of non-observance.

| | |
|---|---|
|  | Indicates that the device can be damaged by electrostatic discharge. |

| | |
|---|---|
|  | This note contains helpful suggestions or references to material not covered in the document. |

## 1.3 Abbreviations

The following abbreviations are used in this manual:

| Abbreviation | Description |
|---|---|
| DOTA | Software Download Over The Air |
| ESD | Electrostatic discharge |
| GPS | Global Positioning System |
| GPRS | General Packet Radio Service |
| GSM | Global System for Mobile Communications |
| LED | Light Emitting Diode |
| PCB | Printed Circuit Board |
| SIM | Subscriber Identity Module |

Table 1: Abbreviations

## 1.4 Revision History

| Revision | Date | Change |
|---|---|---|
| V1.0 | 16.01.2017 | First version of this document |

Table 2: Revision History

# 2 Product Description

This chapter provides a brief overview about the functions and features of the device.

## 2.1 Functional Overview

The figure below gives an overview about the main components and its functions available on the Printed Circuit Board (PCB):

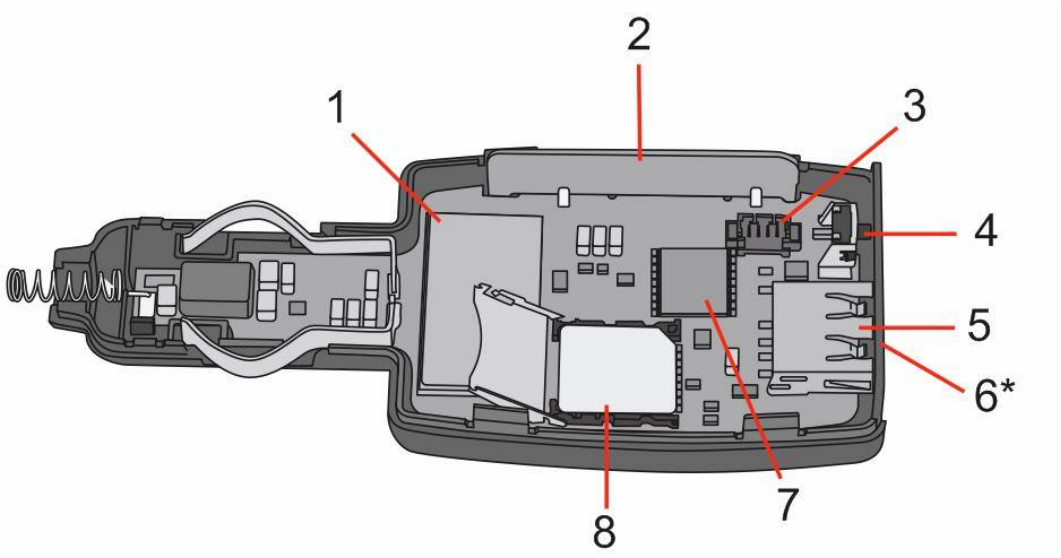



Figure 1: Opened Device with view on main PCB components

| No. | Function |
|---|---|
| 1 | GSM / GPRS module |
| 2 | GSM antenna |
| 3 | Connector for rechargeable battery |
| 4 | Push button |
| 5 | USB connector |
| 6 | LED (*) They are not visible in Figure 1 |
| 7 | GPS module |
| 8 | Micro-SIM card holder |

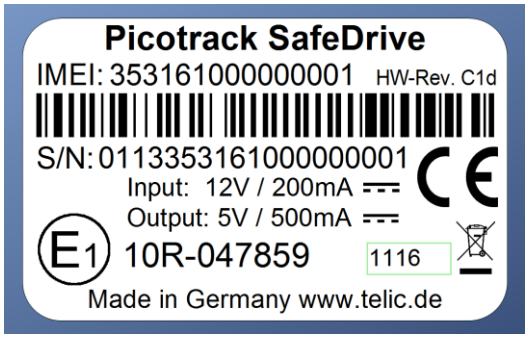
Table 3: Functions on PCB

***NOTICE***

Please notice that that GPS antenna is at the bottom of the PCB.

## 2.2 Identification

The following table explains the elements of the product type label:




| Label | Description |
|---|---|
| S/N | Serial number |
| | Serial number |
| IMEI | International Mobile Equipment Identity |
| HW-Rev. | Hardware Revision Number |
| CE | CE conformity mark |
| | Disposal in accordance with European Directive 2002/96/CE |
| Input | Maximum input voltage and current |
| Output | Max. output voltage and current at the USB-connector |
| 1116 | Manufacturing date (MMYY) |
| E1 | E1 conformity mark |

Table 4: Product label

## 2.3 Delivery Content and Accessories

The delivery could include furthermore the following accessory, depending on the details of your purchase order:

| Picture | Product | Part Number |
|---|---|---|
|  | USB-A to micro-USB cable. | 17005 |

Table 5: List of Accessories

# 3 Safety

This device has been designed in accordance with state-of-the-art standards, manufactured with utmost care using high-quality materials, and tested. Nevertheless, its use may constitute a risk to persons or cause material damage.
The following safety instructions must be followed in order to ensure the safety of users and the device.

***NOTICE***

If these instructions are ignored, Telic will not assume responsibility for any damages that are incurred.

## 3.1 Audience and Intended Use

The device enables telematics and logistic service providers to track vehicles while plugged into a 12V socket. It can also be used for tracking for a limited period of time while disconnected from the external power supply. Any other use is not indented.

## 3.2 General Safety Information

**Caution**

➔ Read all enclosed instructions and information.
➔ Observe the warnings included in the documentation.
➔ The device must only be used within the environmental specifications of the product (see 8 Technical Data, page 27).

## 3.3 Precautions

**Caution**

**Negative consequences on safety and device integrity may occur when connecting the wrong cable to the unit.**

➔ Only use cable with a micro USB-B connector (like the one specified in Section 2.3) to charge external periphery devices.

***NOTICE***

The messages of the device are transmitted via the mobile GSM network. Therefore you need a standard Micro-SIM card. Please give preference to post-paid SIM cards!

Caution: The device is designed exclusively for use with the cigarette lighter socket (12V or 24V) of vehicles.

## 3.4 ESD Protection

An electrostatic discharge (ESD) is the transfer of charge between two electrically charged objects with different electrical potentials either caused by contact or short circuit. If you are charged, for example due to walking on a carpeted room, you generate static electricity that can damage the PCB.

Therefore, take proper measure for ESD protection, e.g. electrical connection of the body to the ground, to make sure you do not destroy internal electronics.

**Electrostatic discharge (ESD)**

The internal electronics of the device can be damaged.

➔ Take proper measures for ESD protection, e.g., electrical connection of the body to ground.

**Repair of ESD damages caused by user's negligence will not be covered by Telic's warranty.**

## 3.5 General Battery Handling

The Picotrack SafeDrive uses an integrated rechargeable battery as backup battery in case the device is disconnected from the 12V socket. This battery is designed according to the highest safety standards. It may, however, present a potential hazard if it is abused electrically or mechanically. This is in most circumstances associated with the generation of excessive heat. In this case the internal pressure may cause the cell case to rupture. For this reason, the following general guidelines should be followed when handling the device's battery. **Telic will not assume any responsibility for material damage or bodily harm incurred by non-observance of these guidelines.**

**Caution**

**Material damage caused by electrical or mechanical abuse.**

➔ Do not short-circuit.
➔ Do not over discharge.
➔ Do not incinerate.
➔ Do not expose to temperatures beyond the specified temperature range.
➔ Do not crush or puncture.
➔ Do not open cells, do not disassemble battery packs.
➔ Do not expose contents to water.
➔ Do not connect with false polarity.
➔ Do not weld or solder to the battery's body.
➔ Only authorized official Telic replacement batteries must be used in the devices.
➔ The batteries included with the devices must only be used in the device.
➔ The batteries must never be used in any other devices unless specifically authorized by Telic, including but not limited to other Telic products or devices.

## 3.6 Battery and General Storage Conditions

Before storing the device for a prolonged period of time (>1 month), make sure that the device has been fully charged. After a full charge of the battery, the following environmental limits must be maintained in order to safely store the Picotrack SafeDrive and ensure that it remains functional until a maximum of 6 months:

- Storage temperature: from 0 °C to +45 °C
- Humidity: <75% relative humidity

Preferably, do not expose the device or the battery to very cold or very hot temperatures (beyond the given limits) as the useful charge may be reduced. The battery is a consumable and its useful charge will get shorter over time.

Additionally, the following guidelines should be followed when storing the batteries:

- Ensure that storage areas are well ventilated.
- Batteries should not be placed on or covered with metallic or otherwise conductive material.
- The device should be stored away from any flammable material in the storage area. Fire extinguishers for metal fire (class D) are preferred.
- Do not attempt to extinguish fires with small amounts of water.

## 3.7 Battery Disposal

The disposal or recycling of batteries is regulated by each European country. In each country, the manufacturers, importers and users are responsible for the proper disposal. The European Community (EC) has issued the EU Battery Directive (2006/66/EC). This directive is implemented by each member country of the EC independently and in a different way. In accordance with this directive, the batteries do not contain dangerous substances. The reaction products are inorganic and do not represent environmental risks once the decomposition process has terminated.

Please dispose of used batteries in accordance with your local regulations.

# 4 Device Assembly and Installation

The device is delivered with the casing opened in order to allow you to easily install the SIM card and to connect the rechargeable battery to the device's PCB.

| *NOTICE* |
| --- |
| Please be aware that, once the device is closed, it should not be opened again. Opening the device may damage the housing and will not be covered by Telic's warranty. |

The following parts are contained in the packaging:

1. Top side with attached rechargeable battery
2. Bottom side of the housing with PCB
3. Metal Pin

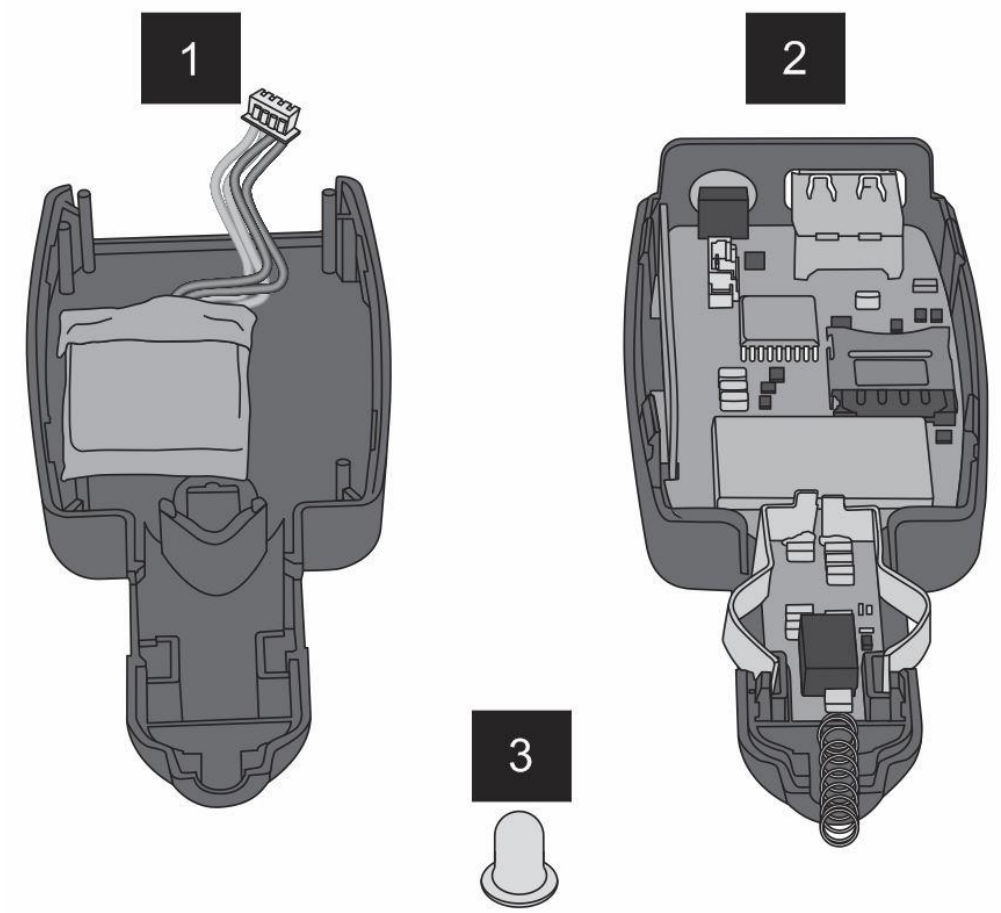



Figure 2: Main device components

| | |
| --- | --- |
|  | **Electrostatic discharge (ESD)**<br>The internal electronics of the device can be damaged.<br>➔ Take proper measures for ESD protection, e.g., electrical connection of the body to ground. |

## 4.1 Inserting the SIM Card

A working SIM card from a suitable network provider must be properly inserted in order for the device to operate correctly.

| *NOTICE* |
| --- |
| As far as possible, avoid touching with the bare skin any electronic components on the PCB, and especially the GPS antenna. We recommend using protective gloves when inserting the SIM card into the SIM card holder. Should you be forced to clean the GPS antenna sometime, please do so using pure alcohol. |

| *NOTICE* |
| --- |
| Please notice that the SIM card holder is only suitable for micro SIM cards. |

**To insert the SIM-Card:**

1. To open the SIM card holder, slide its top gently to the left (as indicated by the arrow “OPEN” on the SIM card holder) until it clicks and swing it into the upright position.
2. Place the SIM card in the bottom of the SIM card holder:

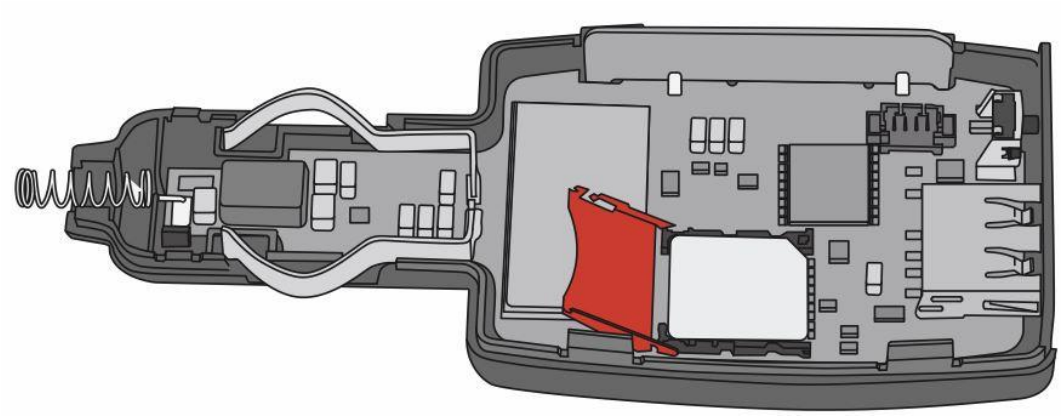


Figure 3: Inserting the SIM card

3. To close the SIM card holder, slide it gently backward (as indicated by the arrow “CLOSE” on the SIM card holder) until it snaps into place.

Before the device logs into the mobile GSM network, it checks whether the used SIM card is PIN free. If it is PIN free, it will start normal operation.
If the SIM card is not PIN free, set the PIN to “0000” before insertion. The PIN can be changed e.g. with a normal GSM mobile phone to “0000”.

| | |
| --- | --- |
|  | To speed up the log-in into the GSM network, the SIM card should not contain any phone book entries. |

## 4.2 Connecting the Battery

The device is delivered with the internal battery disconnected from the PCB.

**Caution**

**Do not connect any other rechargeable batteries to the PCB aside from those approved by Telic.** Connecting the wrong rechargeable battery may result into irreparable damage, which will not be covered by Telic's warranty terms.

**To connect the battery:**

Plug the end of the battery cable into the PCB connector, as shown in Figure 4 below. The red cables of the PCB connector point towards the button and the black cable towards the metal pin.

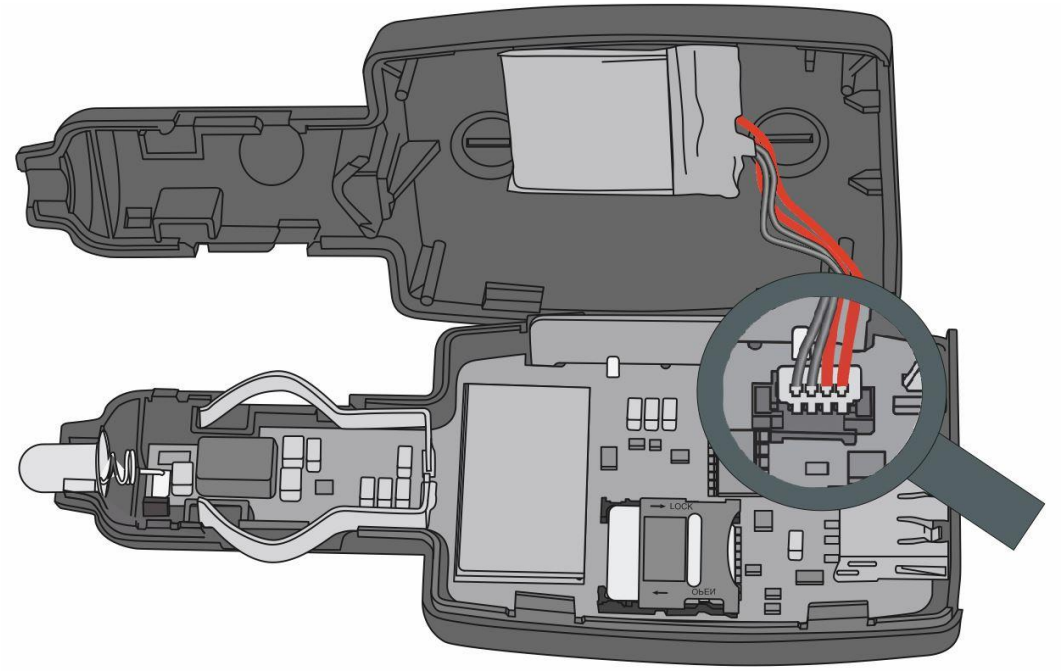


Figure 4: Connecting the battery

4. Check that the LED starts blinking.

## 4.3 Inserting the metal pin

Take the metal pin and push it over the spring. Make sure that the end of the metal pin is inserted inside the housing, as shown in Figure 5. Caution! The spring is now clamped and the metal pin can easily jump out.

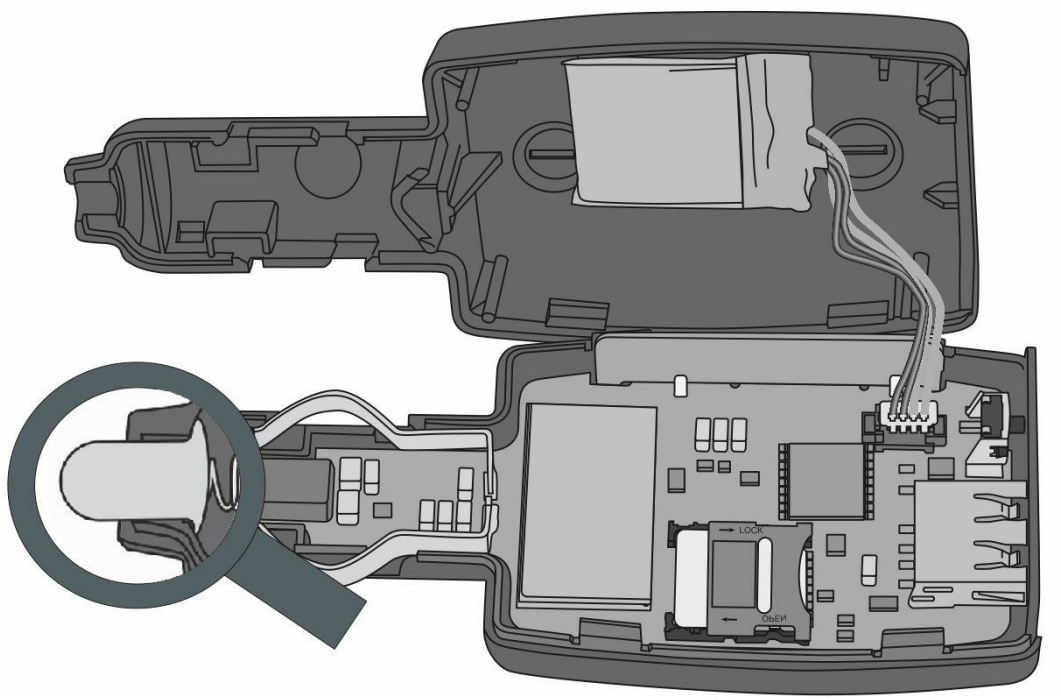


Figure 5: Inserting the metal pin

## 4.4 Closing the Device

Take the top side of the housing (#1 shown in Figure 2) and place over the bottom side of the housing (#2 in Figure 2). Be sure that the metal clips fits inside the prescribed position as shown in

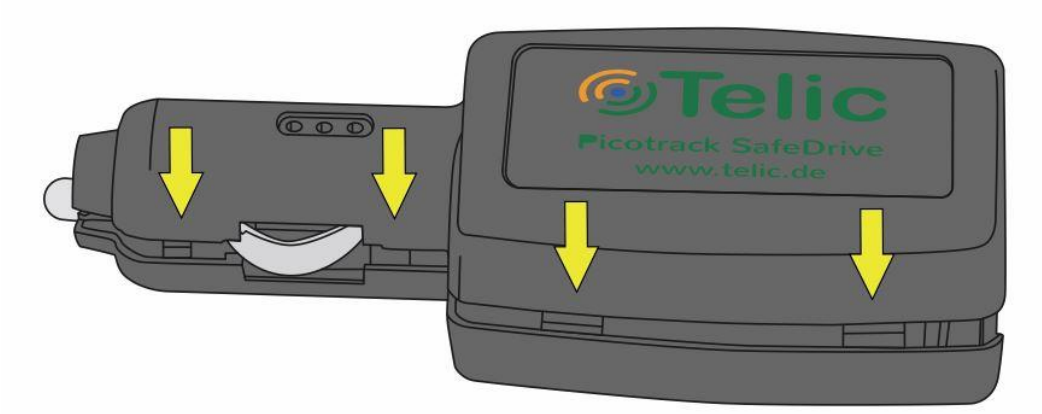



Figure 6. Now apply even pressure on the cover of the housing until it clicks.

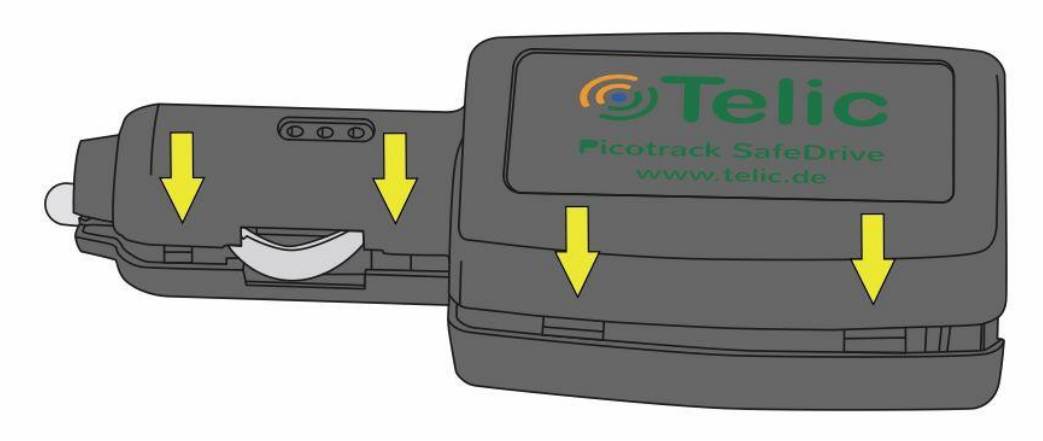



Figure 6: Closing the device

## 4.5 Opening the Device

| *NOTICE* |
| --- |
| **The device should not be opened again once it has been closed. Opening the device again may cause damage the housing and will not be covered by Telic's warranty.** |

Apply slight pressure on the side of the lower part of the housing (red arrows) and try to open the unit parallel to the upper part of the housing (preferably in the gap between the lower part and the upper part -> yellow arrows).

When removing the housing cover, make sure that the printed circuit board does not fall out.

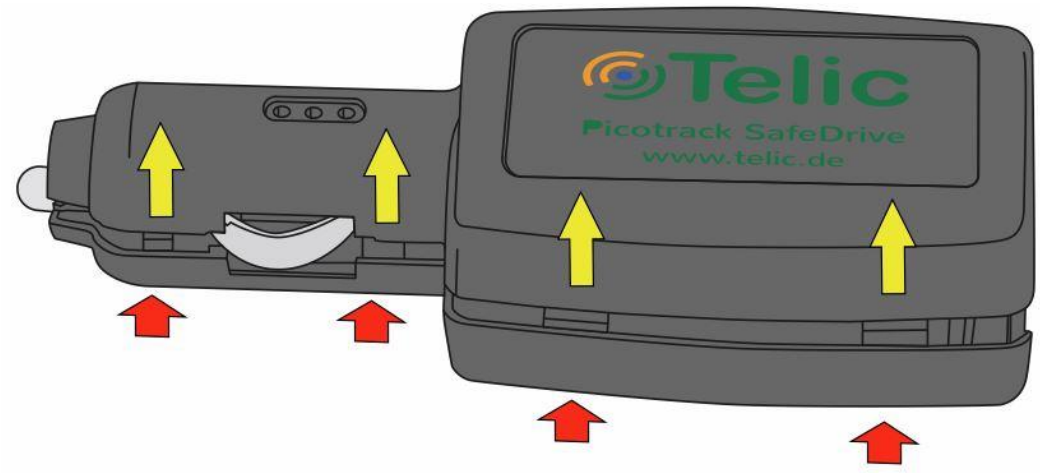



Figure 7: Opening the device

## 4.6 Switching the Device ON or OFF

**To switch on the device:**

Plug the device in the cigarette lighter as described in Section 6 and wait until the red LED lights up.

**To switch off the device**

Plug the Picotrack Safedrive out of the cigarette lighter. Depending on the configuration, the device will switch off automatically after a configurable time (by default: up to a maximum of 4 minutes).

| | |
|---|---|
|  | See Section 5 Status Indicators for a detailed description of the status indicators. |

# 5 Status Indicators

The following table gives an overview how the different device statuses are indicated by the LEDs:

| Event | Green LED | Red LED |
|---|---|---|
| Device not ready for operation (e.g. no GSM, no GPS fix) | Permanently switched off | Permanently switched on |
| Device ready for operation | Permanently switched on | Permanently switched off |
| Sleep mode | Permanently switched off | Permanently switched off |
| Software Update (DOTA) | Both LEDs start flashing alternately at 1x per second | |

# 6 Device Installation in a vehicle

## 6.1 Location / positioning of the telematics unit in the vehicle

The mounting position of the device is essential for a good GPS performance and therefore a reliable function of the device. Since the mounting location is specified by the position of the cigarette lighter socket, the following rules of thumb should be observed.

- When the 12V power socket is in a horizontal position, it is preferable to align the device with the brand label (i.e. the GPS antenna) pointing towards the sky.

- When the 12 power socket is in the vertical position, the device should be plugged-in so that the GPS antenna (i.e. the side of the housing with the brand label) points towards the interior of the vehicle.

Furthermore, avoid placing any objects such as USB charging cables directly over the brand label, i.e. over the GPS antenna.

## 6.2 Plugging / unplugging the telematics unit into the 12V power socket

Please note that a certain amount of force must be applied while plugging the Picotrack SafeDrive device into the power socket. The device has been designed to have a force-fit connection with the socket (and thus with the vehicle) to ensure a reliable detection of motion by the device's integrated accelerometer. The necessary force that must be applied can eventually be high, depending on the specific vehicle model.

Additionally, avoid inserting the device into the socket by pressing on the pushbutton or the device's USB socket.

Unplug the device with care.

# 7 Using the Device

## 7.1 Push button

The button accessible at the front is configured for the manual triggering of a message. The user must press the button for at least 3 seconds. This minimum duration has been configured to minimize the risk of false usage of the device. The push button is available in normal operation as well as in the sleep mode of the device. Other functions are not available via the push button.

## 7.2 USB connector

The USB-A connector on the front of the device can be used as a voltage output for external peripherals, e.g. to charge a mobile phone. The power supply corresponds to the USB specification with 5V DC ± 0.25V. The output current is limited at 500mA.

The USB port does not provide any data functions.

***NOTICE***

**A standard USB-cable can be used for the USB connector.**

## 7.3 Power Management

The device has an intelligent power management which changes the operational condition depending on the situation in order to ensure efficient use of the various resources. The two main operating conditions are:

- Full power: The Picotrack SafeDrive is active, all components are in operation
- Sleep: The Picotrack SafeDrive is inactive

The device becomes inactive when there is no movement (after timeout); this is independent of the availability of the 12V supply and is time-controlled; this means after a period of inactivity (= no movement) configured in the device, the sleep mode is activated.

The timeout time is configured by software, default value is 5 min.

# 8 Troubleshooting Hints

## 8.1 The Device doesn't Log into the GSM Network

| Possible cause of the issue | Troubleshooting |
|---|---|
| The device isn't in a GSM covered area | Please check whether there is GSM reception in this area (e.g. using a cell phone). |
| The SIM card in the Picotrack SafeDrive is new and has not yet been activated | Please check, whether the SIM card is already activated.<br>This can be done e.g., by putting the SIM card into your cell phone and checking, whether your cell phone is able to log into a GSM network. |
| The SIM card has been locked by the provider | Please check whether the SIM card is locked.<br>This can be done e.g. by putting the SIM card into your cell phone and checking, whether your cell phone is able to log into a GSM network.<br>If this not the case, then please try to make a phone call. If you are successful, the SIM card is definitely not locked. |
| The prepaid bonus is exhausted | Please recharge the SIM card in the device. |
| The prepaid SIM card is no longer valid | If they aren't recharged on a regular basis (often after 12 or 24 months).<br>In this case usually you have to buy a new SIM card. |
| The PIN code of the card has not been deactivated or is not set to "0000" | Please remove the SIM card from the device and check the PIN code.<br>The Pin code has to be deactivated or set to "0000"<br>After a triple wrong entry of the PIN, unblocking the SIM card requires the PUK. |
| The SIM card hasn't been inserted into the SIM card holder in the correct way | Please check the correct position of the SIM card in the card holder.<br>(Figure 3: Inserting the SIM card) |

Table 6: Troubleshooting: Device doesn't log into the GSM network

## 8.2 The Device doesn't Log into the GPRS Network

| Possible cause of the issue | Trouble shooting |
|---|---|
| The GPRS service is not yet activated | Please ask your provider whether the GPRS function is already activated for the SIM card in use. |

Table 7: Troubles hooting: Device doesn't log into the GPRS network

## 8.3 The Device doesn't Receive GPS Data

| Possible issue source | Trouble shooting |
|---|---|
| The position of the device is not favorable for the GPS reception | Please check correct positioning of the device as described in Section 6.1 ("Location / positioning of the telematics unit in the vehicle"). |

Table 8: Troubleshooting: Device doesn't receive GPS data

Further hints regarding sources of error are indicated by the LEDs which are easily visible from outside (see 5 Status Indicators).

# 9 Technical Data

| Cellular / GNSS | |
|---|---|
| GSM/GPRS | Quad Band |
| Receiver Type | 72-channel GPS engine |
| Support GNSS | GPS \| Glonass \| Galileo |
| Concurrent GNSS | For up to two GNSS |
| GPS Sensitivity (Tracking) | -167 dBm |
| Position Acquisition Time | GPS: Cold 26 sec; Reacquisition 1 sec |
| Position Accuracy | GPS: 2.0 m CEP |
| **Software[1]** | |
| Software Update | Software Download Over The Air (DOTA) only |
| Device Configuration | GPRS / SMS |
| Message Storage Capacity | ~ 2000 Messages |
| Data transmission modes | GPRS \| SMS |
| Additional features, including: | • 3-Level Watchdog System<br>• Mileage Counter |
| **Hardware Features** | |
| Cellular & GNSS Antenna | Internal |
| Integrated 3D Accelerometer | For motion detection |
| SIM Card Reader | Micro-SIM (eSIM as option) |
| Status Indicators | 1 LED (dual-color red/green; optional 2 additional LEDs available) |
| Type Approvals | CE; E1 |
| USB | External USB-A for accessories charging (5V / 500 mA max.) |
| Additional Features | Remove Detection<br>Configurable Button |
| **Hardware Characteristics** | |
| External voltage range | 7V - 30V |
| Battery Capacity | 300 mAh (LiPo) |
| Battery Safety | Compliant with IEC 62133 for the extended operating temperature range |
| Typical current consumption in sleep Mode | ▪ External power source, battery is fully charged: 1 mA @ 12V DC<br>▪ From internal battery: 135 µA |
| **Hardware Characteristics** | |
| Dimensions | 104x43x24 mm |
| Operating temperature | -30 °C to +70 °C |
| Recharging temperature | 0°C to +45°C |
| Weight | 80g |

[1] Exemplary list of software features. Please contact us to learn how we can address your use cases with our extensive set of software features as well as hardware options.