



PEPPINO

Datasheet &
Instruction Manual



v 3.6



Index

1.0

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Integration overview

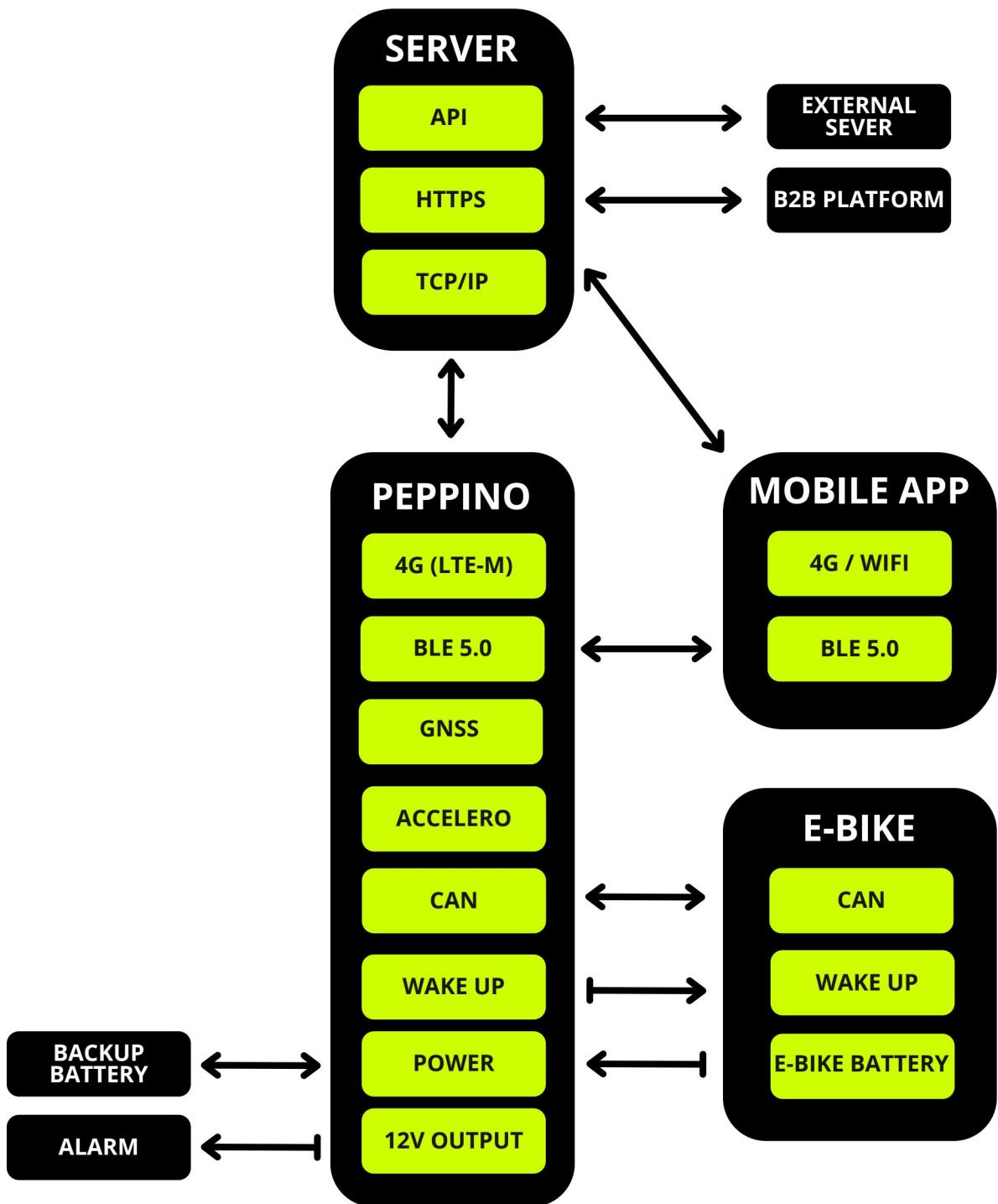
2.0

- Trackap's Peppino is an IoT, embedding GPS, 4G, BLE and CAN technologies, designed to fit most e-bikes by separating the Peppino main module from its backup battery and external buzzer.
- The Peppino is meant to be hidden between the motor and its motor cover, allowing its antennas to have an unobstructed view to the environment to allow reliable GNSS, cellular and Bluetooth connectivity.
- The backup battery can be placed inside the e-bike frame, for example in the downtube, seat tube or any other large enough space.



Architecture

3.0





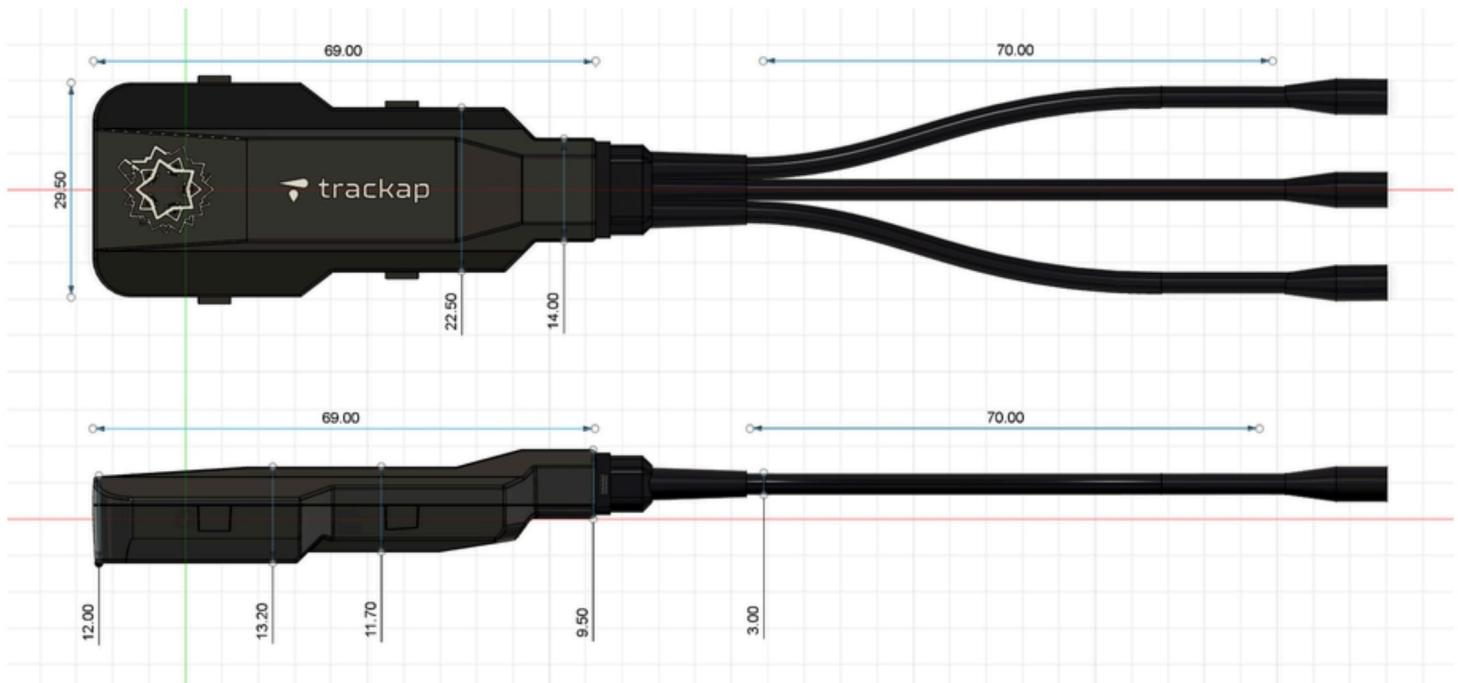
Mechanical specifications

4.0

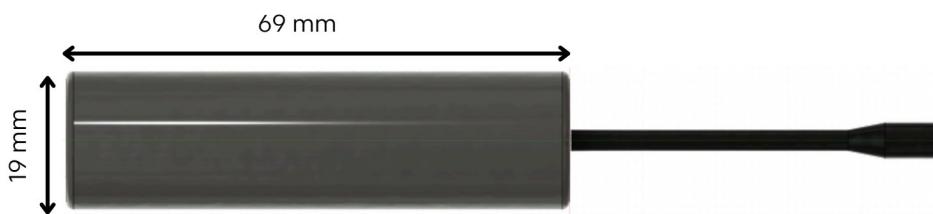
Dimensions

4.1

PEPPINO



BACKUP BATTERY



ALARM



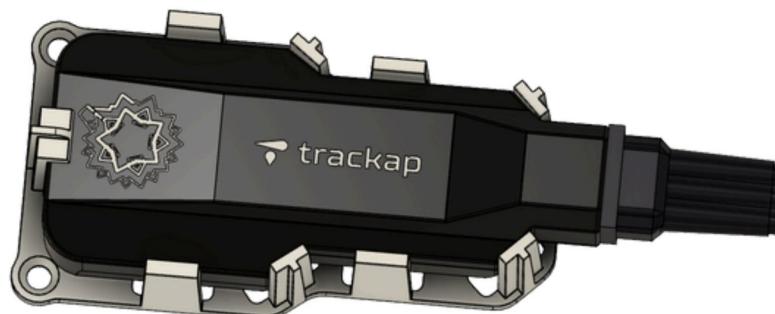
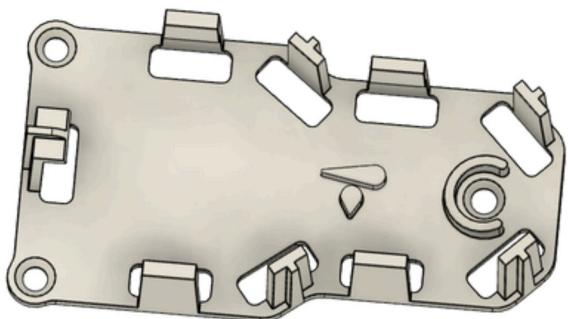
Clip fasteners

4.2

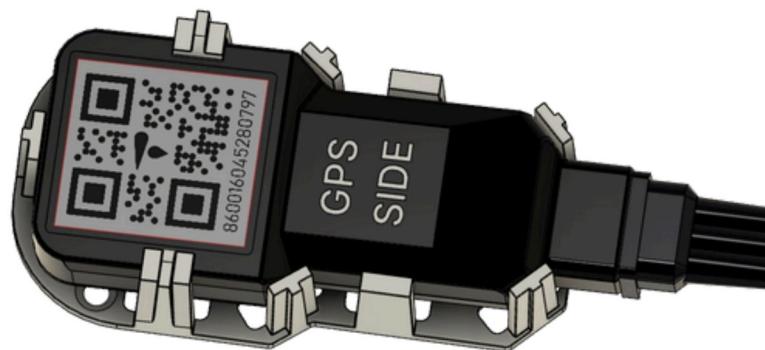
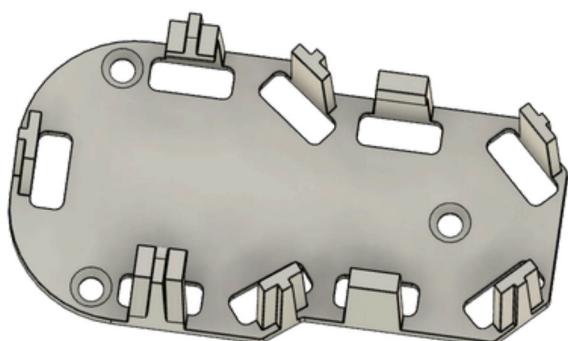
Here are some **3D reference designs** (included in the PEPPINO.step file) for integrating these fastening systems into your vehicle. These designs may be subject to modification to meet customer-specific strength requirements. The mechanical validation of these clip systems is therefore the responsibility of the customer.

However, if you would like Trackap to take care of the mechanical validation and manufacture of the clips, we can provide you with a quotation.

Visible 4G antenna clip



Visible GPS antenna clip



Antenna layout

4.3



Module placement is primarily determined by the radio constraints of the antennas. Caution must be taken when positioning the module within the vehicle frame to avoid interference with the RF (Radio Frequency) signals of the module.

Here is some information on installing our module, which is necessary for it to work properly and comply with regulations.

- The module's GPS antenna should face the outside of the vehicle frame.
- The GPS antenna should face upwards if possible.
- The GPS antenna must be placed behind a non-metallic wall, without glass or carbon fibres.
- LTE and BLE antennas radiate almost omnidirectionally, so if they are placed against metal walls, their performance will remain acceptable.
- LTE and BLE antennas must not be placed closer than 20 cm to the end user.





Electrical specifications

5.0

4G connectivity	<ul style="list-style-type: none">• LTE-M communication : CAT-M1 and NB-IOT• A secure and robust communication through TCP.• FOTA (Firmware Over The Air) update• CAT-M1 frequency bands : B1/B2/B3/B4/B5/B8/B12/B14/B18/B19/B20/B25/B26/B27/B28/B66/B85• NB-IOT frequency bands : B1/B2/B3/B4/B5/B8/B12/B18/B19/B20/B25/B26/B28/B66/B85
Global Navigation Satellite System	<ul style="list-style-type: none">• Concurrent reception of GPS and GALILEO• Powerful antenna for difficult use cases reception• GPS frequency bands : <u>L1 C/A</u>, <u>L2C</u>, <u>L5</u> and <u>L1C</u>• GALILEO frequency bands : E5a, E5b, E6 and E1
Accelerometer	<ul style="list-style-type: none">• 3 axis accelerometer and gyroscope• Shake to wake up bike• Free-fall detection
Bluetooth	<ul style="list-style-type: none">• Bluetooth Low Energy (BLE) 5.0• Phone as a Display• Phone as a Key• Bluetooth tag as a key



Electrical spec

Power consumption	<p>Peppino's battery fully charged:</p> <ul style="list-style-type: none">• Current draw at 36V while emitting: 37 mA• Current draw at 36V while sleeping: 2 mA <p>Peppino's battery charging:</p> <ul style="list-style-type: none">• Current draw at 36V while emitting: 91 mA• Current draw at 36V while sleeping: 60 mA
Onboard flash memory	<ul style="list-style-type: none">• 1.5 MB available for customer applications.
RF Power Class	<ul style="list-style-type: none">• CAT-M1/NB-IOT : class 5 (Typ. 21 dbm)• Bluetooth : class 1, class 2 and class 3



Electrical spec

Trackap side connectors

5.1

<p><i>HIGO MINI F male 5 pins</i> E-bike connector</p>	<ul style="list-style-type: none"> Power input : 60V - 6V DC, 2A max. CAN 2.0 & CAN Frame Extended, ISO 11898-1 compliant. Wake up : connects the line to GND or let it floating
<p><i>HIGO MINI F 3 pins</i> Backup battery connector</p> <p><i>HIGO MINI F 2 pins</i></p>	<ul style="list-style-type: none"> Backup battery capacity : 2600 mAh <p><i>When e-bike battery is not plugged:</i></p> <ul style="list-style-type: none"> Deep sleep autonomy : 40 days Operating 1h/day : 14 days Operating non stop: 24 h Charge temperature: 0°C ~ 45 °C Discharge temperature: -20°C ~ 60°C
<p>Alarm connector</p>	<ul style="list-style-type: none"> Alarm output for 12V piezo buzzer: >85db for 35 mA draw Alarm + : 12V, 0.7A power supply Alarm - : open collector output



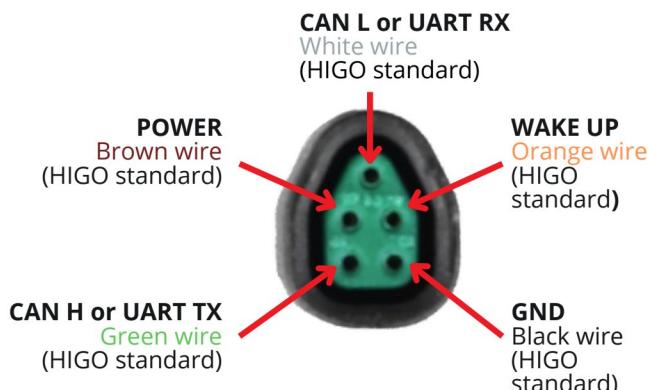
Electrical spec

E-bike side connectors

5.2

HIGO MINI F female 5 pins

(ref : Z509FM P 00 A3 1000)

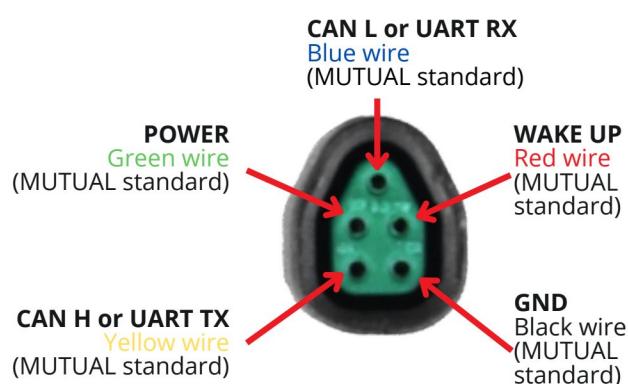


Contact : info@ac-solutions.be

Website : <https://www.ac-solutions.be>

MUTUAL MINI J female 5 pins

(ref : 13914928689)



Contact : chenayu@mutual-connector.com

Website : mutual-connector.com.cn/





Disclaimer & Recommendations

6.0



Power & Battery

- We recommend that the tracker is permanently powered to ensure normal operation.
- If the power supplied to the tracker depends on the e-bike being switched on, we strongly recommend that you give the tracker the opportunity to switch on the bike's battery itself via its "Wake up" interface or a CAN message.
- Disposing of a battery in a fire or hot oven, or mechanically crushing or cutting a battery, is likely to cause an explosion;
- Keeping a battery in a high-temperature environment can cause an explosion , or leakage of flammable liquid or gas;
- A battery subjected to extremely low air pressure may cause an explosion or leakage of flammable liquid or gas.

Radio Frequencies

- LTE and BLE antennas must not be placed closer than 20 cm to the end user.
- The PEPPINO does not support the 4G bands 13 and 71. This limitation is guaranteed by specific software restrictions implemented within the device.



Disclaimer & Recommendations

Security

- The Peppino's BLE 5.0 integration is secured by an authentication system including a rolling code algorithm using SHA-256 encryption.
- Only the BLE tag and the user application can be the cause of a complete wake-up of the bike, thanks to a secure authentication system that prevents any untimely start-up. When it comes to the "Wake Up" function used to recharge the Peppino's battery via the bike's battery, this only activates the components needed for recharging, without switching on the bike's functional elements such as the bike's display or motor. As a result, this function does not allow the bike to be fully switched on. This ensures that only legitimate authentication sources (BLE tag and the mobile app) can enable full start-up.



Declarations

7.0

The PEPPINO complies with the following standards and certifications.



CE : Main indicator of a product's compliance with EU legislation and allowing its free circulation on the European market.



RED: European Directive 2014/53/EU1, which concerns the placing on the market of radioelectric equipment.



RoHS : Restriction of Hazardous Substances, is a directive in the European Union that regulates the use of certain hazardous substances in electrical and electronic equipment (EEE).



FCC: This device complies with part 15 of the FCC Rules.

- Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- The distance between user and products should be no less than 20cm.

