Manual

badassBox 5

Bosch CX
MY 22-24 (BDU 37)
MY25 < (BDU 38)

Introduction

Thank you for choosing a quality product from badass eBikes.
The new badassBox 5 is the result of more than 10 years of experience in ebike tuning.

Product description

In original state, a magnetic block attached to the valve of the rear wheel sends pulses to the sensor integrated in the motor, thereby transmitting the vehicle speed to the system.
This, or rather, on the transmission path, is where the badassBox comes in.
The original magnet is removed from the rear wheel.
Instead, a spoke magnet is installed on a spoke. This no longer sends its pulses to the sensor in the motor, but to the badassBox, which is attached to the chainstay.
The badassBox is connected to a pulser coil via a plug, which in turn sends signals to the original sensor in the motor.
These signals are identical in form and duration to the original signals, but depending on the type of badassBox, their number is reduced or the signal is frozen at a certain speed.
As a result, in one case the drive system is constantly fooled into believing it is travelling at a lower speed than it actually is, in the other only from just under 25 km/h, so that the motor delivers its assistance beyond the actual 25 km/h.
As with all previous models, the badassBox 5 does not interfere directly with the drive system's electronic system.

Installation has also been kept as simple as possible again.
The magnet is attached to the spokes with a screw cap, the badassBox is attached anywhere on the chainstay with cable ties, and the pulser coil finds its way to the motor almost automatically to be mounted in the correct position.

Compatibility

The badassBox 5 is currently available in specific variants for the Bosch drive systems listed below:
• Performance Line CX BDU374Y
• Performance Line CX BDU384Y
Coverage of other motor manufacturers and drive variants is currently being planned.

Function description

Very simply put, the badassBox captures the rear wheel signal, reduces the signal volume, and forwards it to the original sensor, or freezes it above a certain speed.
In this way, it tricks the drive into thinking it's traveling at a lower speed than it actually is.

Due to the badassBox's lack of a direct (cable) connection to the drive system, this operating principle falsifies all speed-relevant values on the vehicle display.

This affects not only the displayed speed itself, but also the average speed, the top speed, and, of course, the distance traveled.

The latter is especially important to consider when selling the vehicle.

In the badass Boost-Buddy app, however, you can display this data correctly.

Physical and personal requirements

The badassBox must not be used by persons with physical, sensory or mental disabilities.
Children, adolescents and persons with impaired reactions and behaviour may not use our products.
Children must be supervised to ensure that they do not play with the badassBox.
The use of accessories and add-on parts that are not explicitly authorised and recommended by the bike and drive system manufacturer can lead to injuries and damage and may invalidate the warranty/guarantee.

Legal matters

Tuning measures on ebikes limited to 25 km/h mean that they may no longer be operated within the scope of the Road Traffic Licensing Regulations.
Legally permissible use is therefore only possible on private property or, if authorised, in competitions.
Riding a tuned ebike on public roads can lead to criminal liability for riding without a driving licence or riding without insurance cover.
Tuning measures on the ebike can lead to a loss of warranty and manufacturer's guarantees.
This also applies similarly to purchase models such as job bikes, company leasing, etc.
Please refer to your respective contract documents for the exact conditions regarding subsequent modifications to the bike.
In addition, tuning measures can lead to a loss of insurance cover in the event of accidents. An ebike modified by tuning measures is exposed to additional stress due to the higher speed, which can lead to component failure on essential components of the ebike.

Safety informations

- Please read these operating instructions carefully before using the appliance for the first time. It contains important information for your safety as well as for the use and care of the appliance.
- Only use the device for its intended purpose. Improper use could lead to hazards.
- The badassBox 5 is only suitable for private use.
- This badassBox is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and/or knowledge, unless they have been given supervision or instruction concerning use of the device by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the badassBox.
- The use of accessories and components not explicitly recommended by the (bike and motor) manufacturer may cause injury or damage and will invalidate the warranty.
- Never immerse electrical parts of the badassBox in water or other liquids during cleaning or operation. Never hold it under running water.
- Never attempt to repair the badassBox yourself. Only return it to our customer service for maintenance and repair.
- To reduce the risk of fire and electric shock, do not expose the badassBox to fire (fireplace, barbecue, candles, cigarettes, etc.) or water (vases, tubs, ponds, etc.).
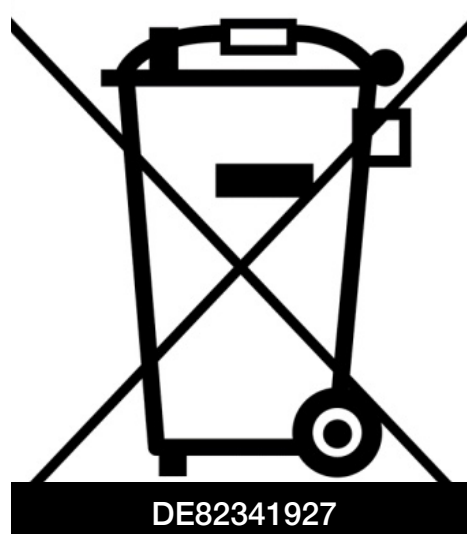

Notes on batteries and packaging

- The badassBox may only be operated with alkaline AAA batteries. Do not use lithium or rechargeable batteries.
- Caution! There is a risk of explosion if the battery is replaced incorrectly. Only replace batteries with the same or an equivalent battery type!
- Ensure that the battery is inserted correctly. Observe the polarity (+ and -) on the battery and on the rubber seal insert of the badassBox. Improperly inserted batteries can lead to leakage or, in extreme cases, cause a fire or explosion.

- Never expose batteries to excessive heat (e.g. blazing sun, fire) and never throw them into a fire. The batteries could explode.
- Battery contacts must not be short-circuited.
- Remove used batteries and dispose of them properly.
- Choking hazard! Keep all packaging material away from infants and children.
- Ensure that packaging materials are disposed of properly. Find out about local collection centres and waste separation.

Removal of old electrical equipment

The European Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) states that used household appliances must not be disposed of together with unsorted municipal waste. These used appliances must be collected separately from regular household waste in order to increase the proportion of recovered appliances and recycle their materials with the aim of minimising the impact on human health and the environment.

The crossed-out wheeled bin symbol is affixed to all appliances to remind consumers of the obligation to separate collection. Consumers must contact their local authority or seller to find out how to dispose of their appliance.
Before disposing of the device, remove the battery.
Ensure proper disposal of packaging materials.
Find out about local collection points and waste separation.
For the sake of the environment.

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Firmware upgrades

Despite all claims made by manufacturers and workshops, ebike firmware updates and upgrades are also gateways to features that could take away or restrict your choice of tuning.

We therefore recommend that you do not carry out any updates or upgrades to the motor firmware or have them carried out, for example by a bike service centre, in order to retain the option of tuning.

An ebike that works probably does not need an update and even if it is a matter of deleting an error in the memory, it is not absolutely necessary to install newer firmware.

In connection with their almost infinite number of firmware upgrades, some motor manufacturers refer to safety-relevant features in the same way as for smartphones or computer operating systems.

We do not share this opinion, as an ebike is not used to manage sensitive data like a mobile phone, carry out banking transactions or store private photos or telephone numbers and addresses on the bike.

This view is also shared by motor manufacturers, whose drives work for years with the firmware that was installed when the new bike was purchased.

Please note that a badassBox that has become unusable due to a firmware upgrade does not constitute a warranty claim. The function of a badassBox can only be guaranteed with the firmware that was current at the time of its purchase.
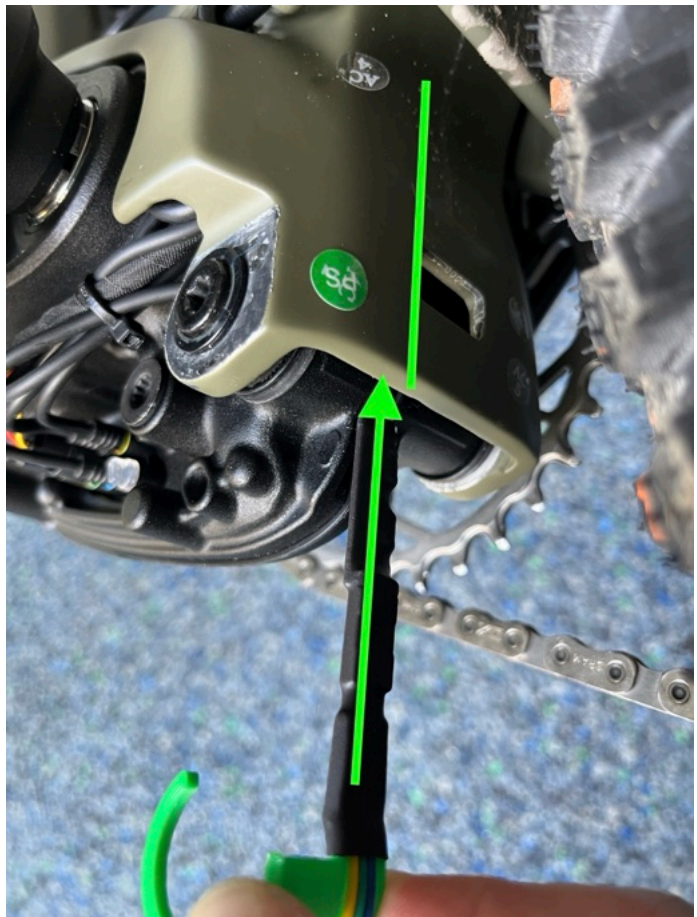
Installation

1) Ideally, you should first lay the bike on its (right) side (after shifting to the largest sprocket so that the load is not on the rear derailleur).

   Then remove the motor protection cover, in this example fastened with one single screw and hooked into a frame opening at the rear.

2) The excitation coil is installed at the rear end of the motor. To do this, it is inserted on the left (in direction of travel) along the seal running through the centre of the motor housing.
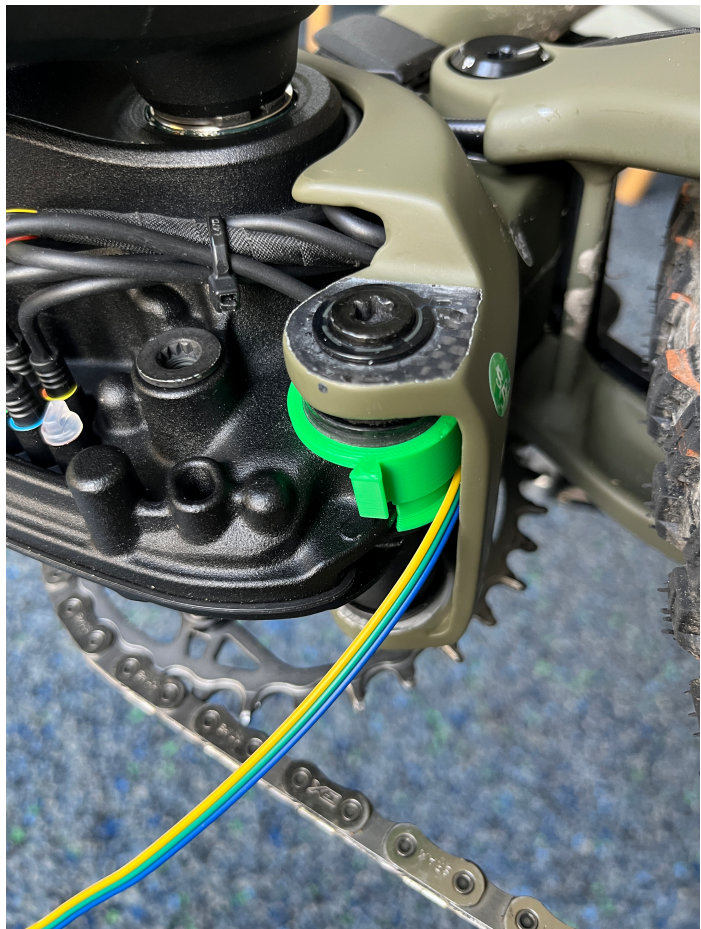
As soon as the semicircular surround is in contact with the bulge in the motor housing, push the complete pulse generator unit fully on by pressing lightly on the small handle bar (only Rim 38 type, on Rim 37 just push on the same point).

Without having to remove anything other than the motor protection cover, the pulser coil can be neatly installed in just a few steps and aligns itself.

Thanks to the independent design of the badassBox 5, there's no need to disassemble cranks, chainring or the original wiring of the drive system.

3) The motor cover can now be reinstalled in the reverse order of removal.

The cable to the pulse generator is routed out of the rear left corner and along the inside or bottom of the chainstay to the rear.

On bikes with rear suspension, ensure that the cable is not under tension, even during compression!

The cable must be routed in such a way that contact with the tire is excluded!

4) The badassBox can now be attached to the chainstay using the enclosed zip ties.

The eyelets should face towards the chainstay, as shown in the image, with the side with the plug connection facing forward.
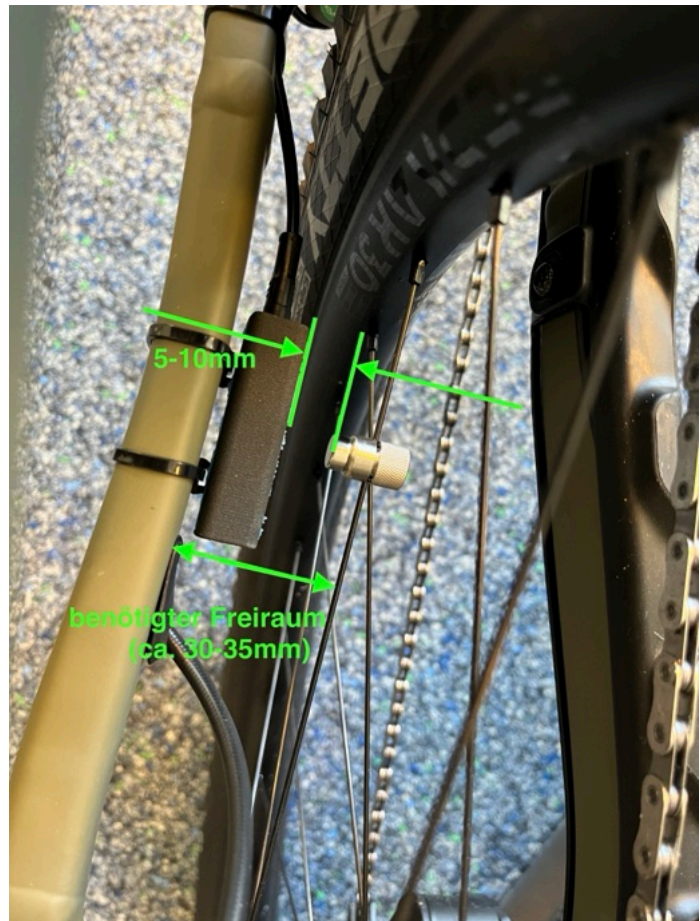
A spacer is included with the badassBox for particularly large lateral distances. It can be attached to the cable tie mounts.

The exact position is largely irrelevant, the only important thing is that there is sufficient clearance (approx. 30-35 mm as shown in the picture) between chainstay and the spokes.
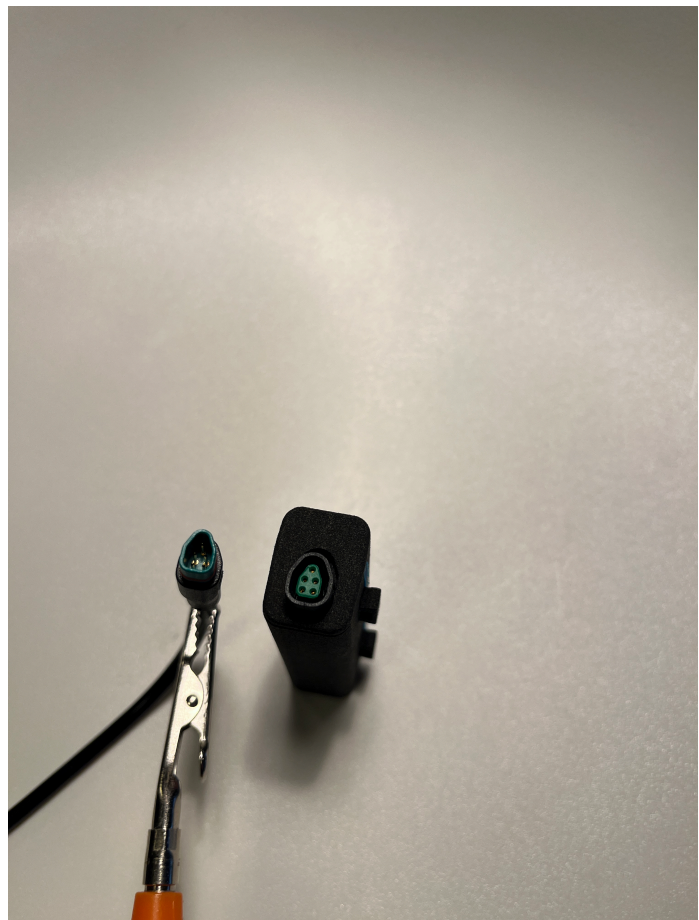
Install the magnet on a spoke. A distance of approx. 5-10mm between the badass box and the magnet is ideal.

The original magnet on the valve of the rear wheel must be removed.

5) Now all that remains is to plug the pulse coil into the badassBox, then the badassBox can be coupled.
(Turn over to the Boost Buddy-App)

Thanks to the form-fit plug, it cannot be incorrectly connected to the badassBox.
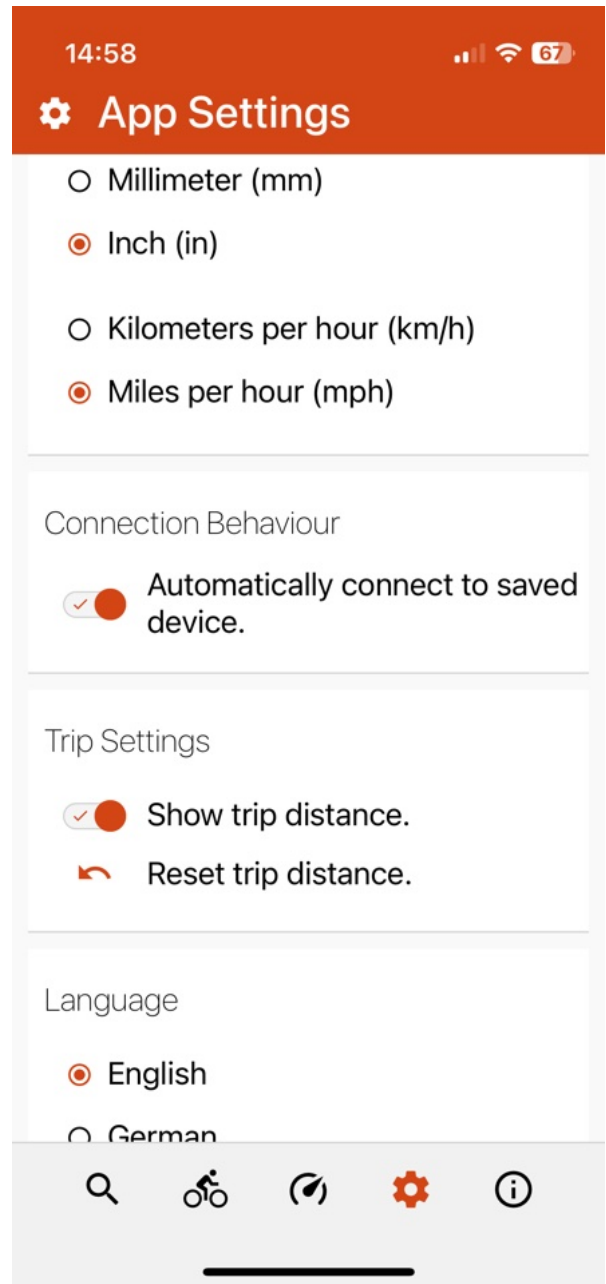
The App

The 'Boost-Buddy' app is available for Android as well as for iOS in the according app stores for free.
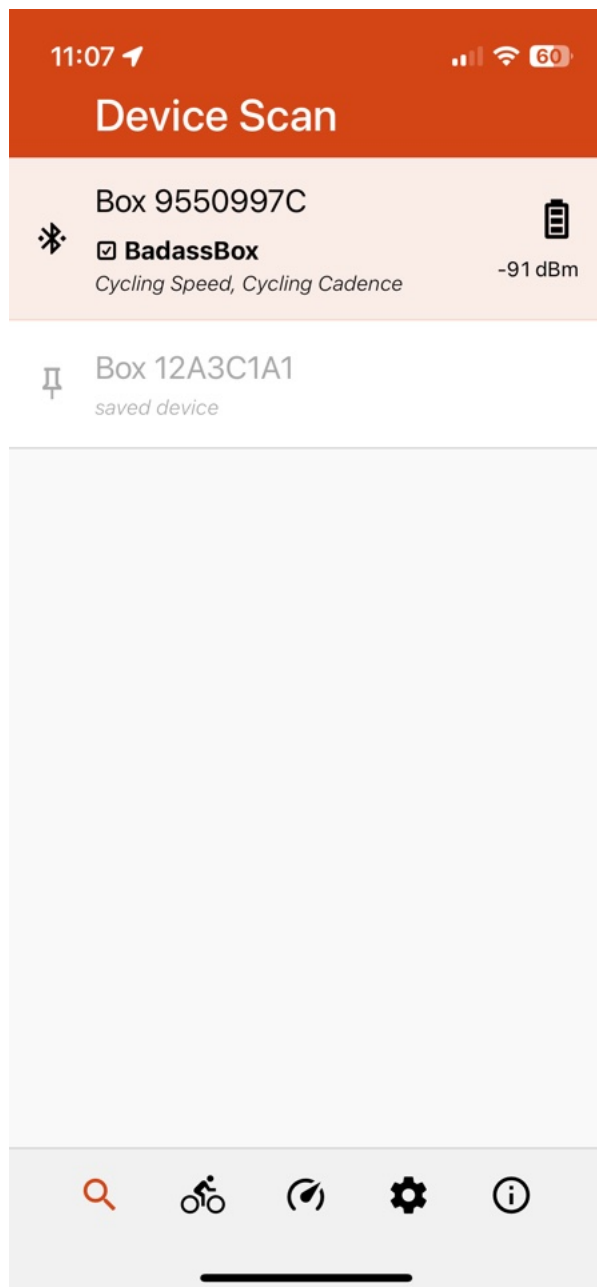
As soon as you downloaded and installed it, you best make the app settings.

When activated, the smartphone automatically connects to badassBoxes 5 that have already been paired and saved once.

In addition to actual real speed you can also display the distance travelled or reset this distance to 0.

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⚙ App Settings

○ Millimeter (mm)

◉ Inch (in)

○ Kilometers per hour (km/h)

◉ Miles per hour (mph)

Connection Behaviour

☑ Automatically connect to saved device.

Trip Settings

☑ Show trip distance.

↰ Reset trip distance.

Language

◉ English

○ German

Now, the badassBox 5 can be paired.
To do this, the badassBox must be woken up.
This is already the case with the first magnetic pulse when you turn the rear wheel.

Each badassBox has an arbitrary and unique designation.
It can be changed in the device settings section (next step).

If the app has already been connected to another badassBox, this will appear greyed out and only the currently available one will be active and can be selected by tapping on it.
As soon as a badassBox is paired with the app, the Bluetooth symbol appears in front of the name and the battery level of the badassBox is displayed behind it.

The badassBox cannot be paired with several smartphones at the same time!
If it is paired with a smartphone, it can be displayed on another smartphone, but cannot be paired with it.

To remove a saved and previously paired badassBox, tap and hold on the display of the relevant device until a ticked box appears on the right. Then tap the 'delete selected' button at the bottom.
The 'cancel' button, on the other hand, ends the deletion process.
The relevant badassBox selected by a long tap then remains saved and continues to be displayed.

In the device settings, you can

- change the name of the badassBox,
- select whether and when tuning is active,
- set the (real) speed at which the badassBox will freeze it
- enter and change the wheel circumference
- display the device version and firmware of the badassBox

Please note to finally safe changes/entries!

To change the name, tap on it and enter the new name. The change is only active when you scroll all the way down and tap the 'Save' button.

Selection of the tuning mode
- Always on, even if the smartphone is not paired. This mode is active on delivery.
- Only on when the smartphone is paired. If the bike/badassBox is or moves away from the smartphone, the rear wheel signal is passed on 1:1 and the tuning function is not active.
- Always off, even if the smartphone is paired.
- The test mode delivers a constant speed of approx. 17 km/h.

The value entered under 'Freeze Speed' specifies the (real) speed at which the badassBox freezes it. Should be as close as possible below 25km/h (exactly: the speed, the bike is limited to).

The wheel circumference is important in order to display a correct, actual speed in the app.
Tap to change, enter the value and save.

Version of badassBox and Firmware

This page displays the actual (real) speed while riding and, if selected in the app settings, the distance travelled (top right).
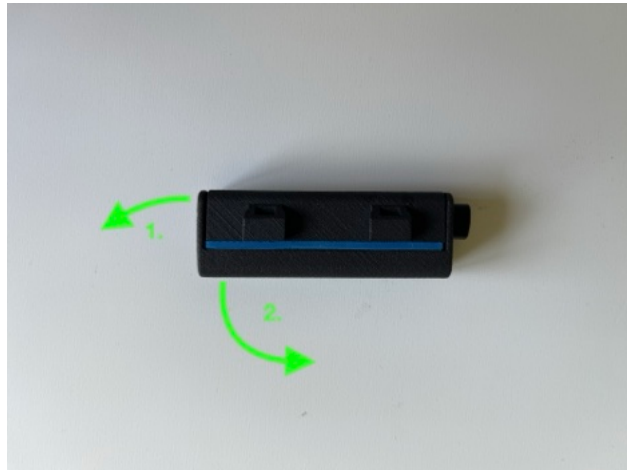
Batterietausch - *Battery Replacement*

Hierzu als erstes badassBox 5 vom Bike entfernen und den Verbindungsstecker zur Magnetspuleabziehen.
First remove badassBox 5 from the bike and unplug the connection to the magnet coil.

Batteriedeckel entfernen. Hierzu auf der Seite gegen-über dem Stecker das Ohr abhebeln und den Deckel über den Steckeranschluss abnehmen.

Remove battery cover. To do this, pry off the latch on the side opposite the plug and remove the cover over the plug connection.

Alte Batterie entnehmen, neue Batterie einsetzen. Polung beachten. Sie ist auf dem blauen Dichteinsatz eingeprägt.

Remove the old battery and insert a fresh one. Observe polarity.
It's imprinted on the blue sealing insert.

Zum Anbringen des Deckels beachten: die Laschen haben unterschiedlich grosse Öffnungen. Die grössere gehört auf die Seite des Steckanschlusses.

When attaching the cover, please note: the tabs have openings of different sizes. The larger one goes on the side of the plug connector.

Fehlersuche - Troubleshooting

Wenn die Funktion nicht gegeben ist oder eine Fehlermeldung angezeigt wird:

1. Montage der badassBox 5 sowie Magnetposition (in der vorderen Hälfte der badassBox 5, seitlicher Abstand idealerweise 5-10mm, ggf. Magnet 90° auf der Speiche drehen) prüfen.
2. App öffnen: wird die badassBox zum Koppeln angezeigt? Wenn **nein**, sicherstellen, dass volle Batterie eingebaut ist und Magnetposition optimieren. Wenn **ja**, wird auch eine Geschwindigkeit in der App angezeigt, wenn man das Hinterrad dreht?
3. Wenn **nein**, Magnetposition erneut prüfen und verbessern. Wenn **ja**, bleibt nur die Magnetspule als Ursache. Ziehen Sie diese heraus und prüfen Sie das Kabel. Wenn **nicht in Ordnung** (Kabelbruch, Quetschung mit sichtbaren Litzen, Korrossion im Stecker...), ersetzen. Wenn **in Ordnung**, Sitz am Motor prüfen. Vergewissern Sie sich, dass keine anderen Kabel über dem Motorgehäuse verlaufen, die die Magnetspule von ihrer vorgegebenen Position wegdrücken. Stellen Sie sicher, dass der Klipp der Magnetspule sicher an der vorgesehenen Position am Motor eingerastet ist.
4. Kalibrieren: der Antrieb kalibriert nach jedem Einschalten den Sensor bei den ersten Kurbelumdrehungen auf das Hinterrad- bzw. das Signal der badassBox 5. Legen Sie einen mittleren Gang ein, schalten Sie den Antrieb ein und heben Sie das Bike so an, dass Sie die Kurbeln drehen können, um den Vorgang im Stand vorzunehmen.

If the function isn't given or an error code is displayed:

1. *Check the installation of the badassBox 5 and the magnet position (in the front half of the badassBox 5, ideally 5-10mm lateral clearance, if necessary, rotate the magnet 90° on the spoke).*
2. *Open the app: Is the badassBox displayed for pairing? **If not,** make sure the battery is full and optimize the magnet position. **If yes,** does the app also display a speed when you turn the rearwheel?*
3. ***If no,** check the magnet position again and improve it. **If yes,** the solenoid coil is the only possible cause left. Pull it out and check the cable. If it's **not OK** (cable break, crimped wires with visible strands, corrosion in the plug, etc.), replace it. If it's **OK**, check the fit on the motor. Make sure there are no other cables running over the motor housing that could push the solenoid coil away from its specified position. Make sure the solenoid coil clip is securely engaged in the designated position on the motor.*
4. *Calibration: the drive system calibrates the sensor to the rearwheel or badassBox 5 signal during the first few crank revolutions each time it is switched on. Select a middle gear, switch on the drive, and lift the bike so that you can turn the cranks to perform the process while stationary.*

CE Declaration of Conformity

Manufacturer:
Badass eBikes GmbH
Mühlstraße 88
D-63768 Hösbach

We hereby declare that the product 'badassBox 5' fulfils the essential requirements and regulations of the following directives
        - Directive 2014/30/EU on electromagnetic compatibility (EMC)
        - Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

Conformity has been assessed according to the following harmonised standards
        - EN 55032: Electromagnetic compatibility of multimedia equipment
        - EN 301 489-1/-17: Requirements for radio equipment and services
        - EN 62479: Assessment of human exposure to electromagnetic fields

Date: 14.01.2025, Hösbach

Signature:

Dipl. Ing. (FH) Peter Elsesser