

The eBike Rechargeable Battery Guide

Everything you need to know about Bosch PowerPacks



Bosch eBike Systems
2017

EN



BOSCH
Invented for life

Contents

Succinctly stated

PowerPacks are the energy source for the Bosch Performance Line CX, Performance Line and Active Line eBike systems. Tips and useful pointers on how to determine their range, optimize their efficiency and maximize their service life are provided on the following pages.

- 03 PowerPacks
- 06 Range
- 13 DualBattery
- 17 Benefits
- 18 Charger
- 20 Charging time
- 21 Weight
- 23 Service life
- 24 Handling
- 26 For your safety
- 28 Care
- 30 Electricity costs
- 31 Recycling



PowerPacks

The energy carriers



Product overview



PowerPack 500



PowerPack 400



PowerPack 300

NEW



DualBattery Performance Line

NEW



DualBattery Active Line

► Performance Line / Active Line:
frame and rack battery

► Performance Line / Active Line:
frame and rack battery

► Performance Line: frame
battery
Active Line: frame and rack
battery

► Performance Line / Active Line:
DualBattery combines two
PowerPacks, either two frame
batteries or a frame battery
and a rack battery

Position Balanced

When installed as a frame battery, the PowerPack is very close to the center of gravity of the bicycle and thus has a very positive effect on the handling. The rack variant is frequently used on step-through bicycles to offer as much clearance as possible when getting on and off the bike.

Rack battery



Frame battery



Range Optimized

PowerPacks are the fuel tanks of pedelecs. State-of-the-art lithium-ion technology makes them into efficient and longlasting suppliers of power. As an eBiker you can ride with them very economically and thus maximize the range of a rechargeable battery charge.

Tips and tricks for optimal range:

Cadence

Cadences above 50 revolutions per minute optimize the efficiency of the drive unit. In contrast, very slow pedaling is very costly in terms of energy.

Weight

The mass should be minimized by keeping the total weight of the bicycle and luggage from being unnecessarily high.

Starting & braking

As with a car, frequent starting and stopping is less economical than long distances at a nearly constant speed.

Gear shifting

Correct shifting also makes eBiking more efficient. It is best to start off and take inclines in a low gear. You then switch to a higher gear in accordance with the terrain and speed.

Tire pressure

Rolling resistance can be minimized by proper tire pressure. Tip: In order to maximize the range, inflate the tires to the maximum permissible tire pressure.

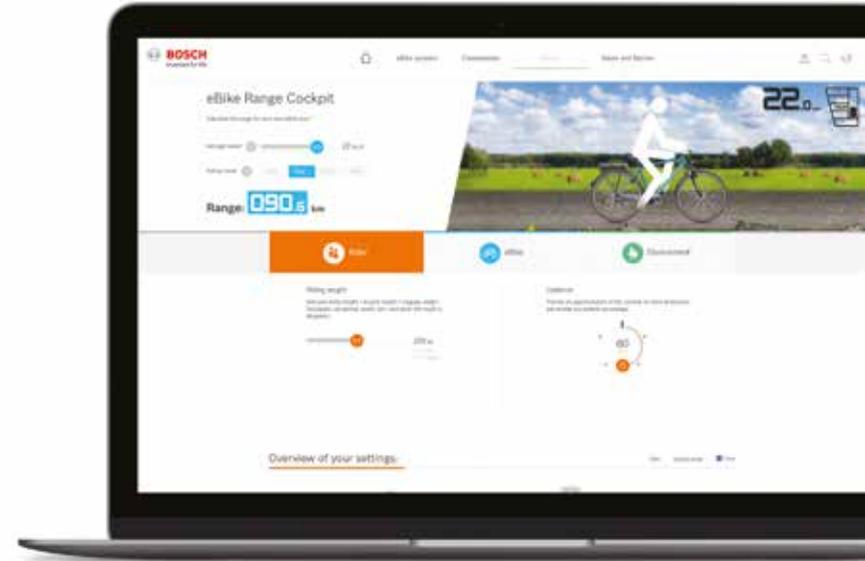
Motor performance indicator

Keep track of the motor performance indicator of the Nyon or Intuvia on-board computer and adapt your riding style accordingly. A long bar means greater power consumption.

Rechargeable battery & temperature

With decreasing temperature, the efficiency of a rechargeable battery goes down, since the electrical resistance increases. In winter you can thus expect a reduction in the normal range.

eBike Range Assistant



The range of the Bosch PowerPacks depends on numerous different factors: the Drive Unit with which your eBike is equipped, the terrain you are riding on and your average speed. You can calculate the range of your own eBike – powered by Bosch – using our Range Assistant.



Calculate your range using the Range Assistant at [bosch-ebike.com/range-assistant](https://www.bosch-ebike.com/range-assistant)

Range of PowerPacks

Support modes, riding behavior, and external factors influence the range. For the PowerPacks, the following graphics provide an overview of the range as a function of a variety of conditions:

Ideal conditions*

Flat terrain, approx. 15 km/h, no headwind, approx. 20 °C outside temperature, low rolling resistance, optimal gear shifting, weight without eBike < 70 kg, no additional connected components, e.g. lights.

Favorable conditions*

Slightly hilly terrain, approx. 20 km/h, slight headwind, approx. 10 °C to 20 °C outside temperature, medium rolling resistance, generally optimal gear shifting, weight without eBike 70 to 80 kg, additional connected components, e.g. lights.

Difficult conditions*

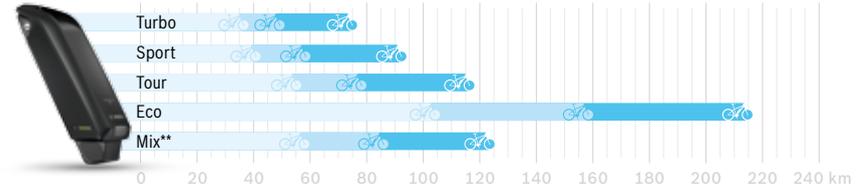
Hilly terrain, approx. 25 km/h (Speed: 30 km/h), headwind, < 10 °C outside temperature, high rolling resistance, unfavorable gear shifting, weight without eBike > 85 kg, additional connected components, e.g. lights.

* The ranges are typical values for new batteries, which may decrease if one of the conditions listed deteriorates.

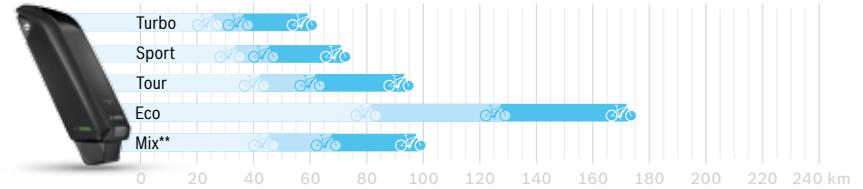
** Average of combined use of all four modes.

Performance Line CX

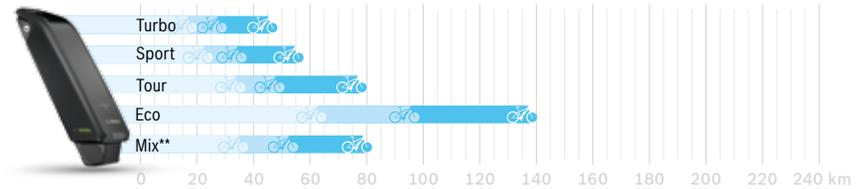
PowerPack 500



PowerPack 400



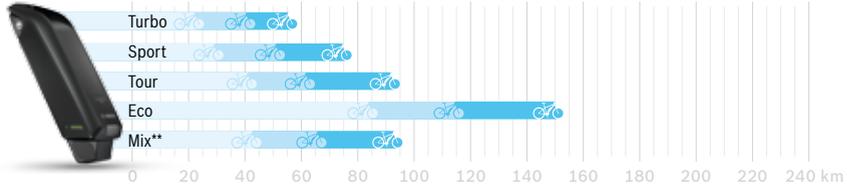
PowerPack 300



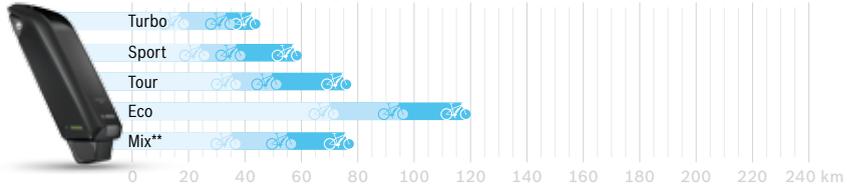
■ Difficult conditions ■ Favorable conditions ■ Ideal conditions

Performance Line Speed

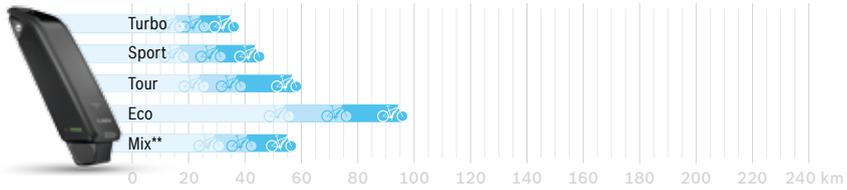
PowerPack 500



PowerPack 400

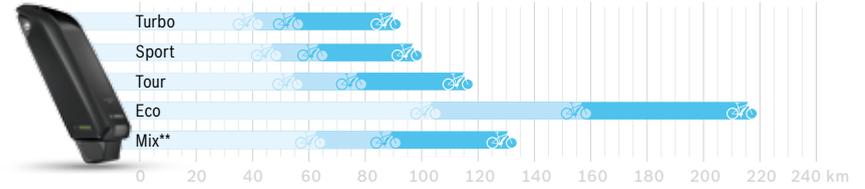


PowerPack 300

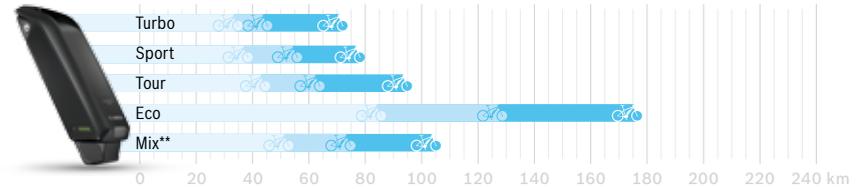


Performance Line Cruise

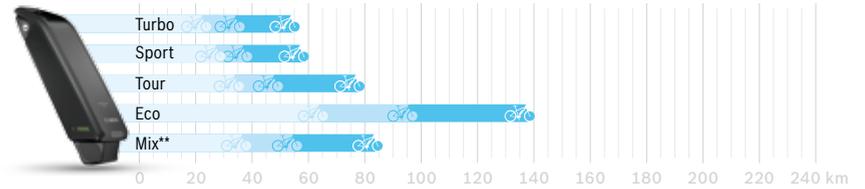
PowerPack 500



PowerPack 400



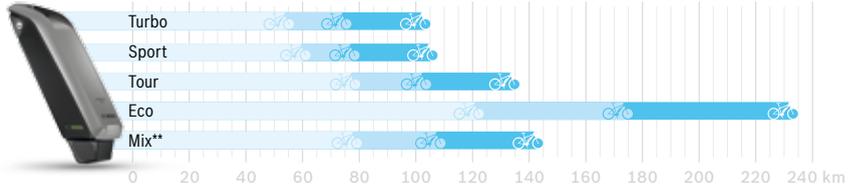
PowerPack 300



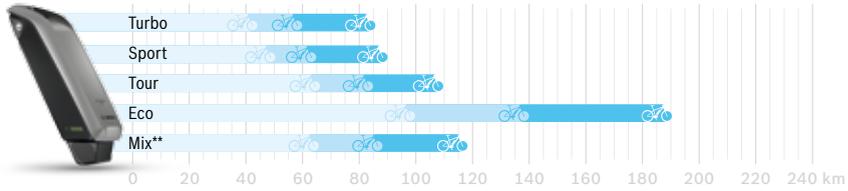
■ Difficult conditions
 ■ Favorable conditions
 ■ Ideal conditions

Active Line Cruise

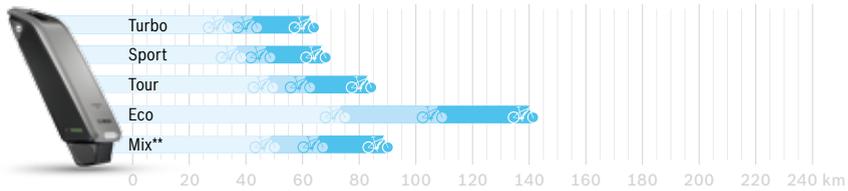
PowerPack 500



PowerPack 400



PowerPack 300



■ Difficult conditions
 ■ Favorable conditions
 ■ Ideal conditions

DualBattery

Range doubled

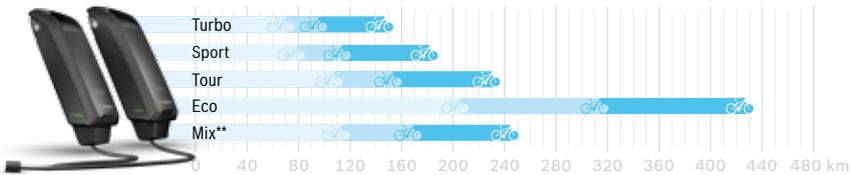


DualBattery range

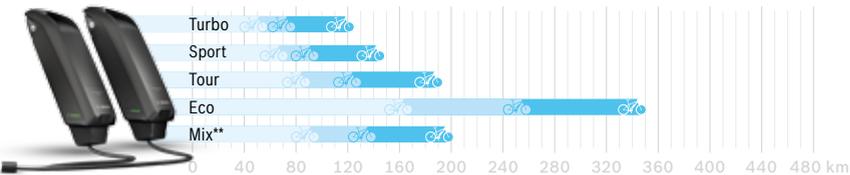
DualBattery is the ideal solution for trekking bikers and long-distance commuters: DualBattery combines two PowerPacks 500/400/300 installed on the bike. This makes capacities of up to 1,000 watt hours possibly for eBikers.

Performance Line CX

DualBattery 1000 (2 x PowerPack 500)



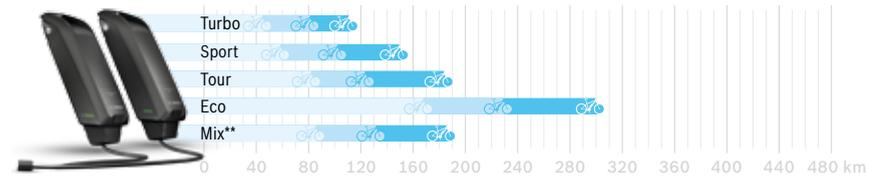
DualBattery 800 (2 x PowerPack 400)



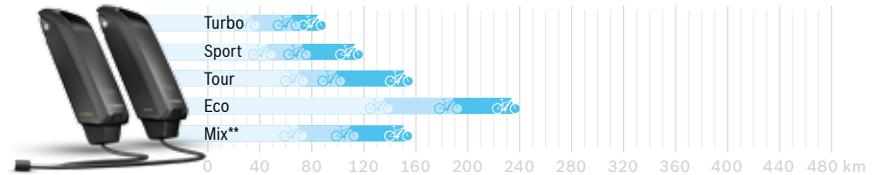
■ Difficult conditions
 ■ Favorable conditions
 ■ Ideal conditions

Performance Line Speed

DualBattery 1000 (2 x PowerPack 500)

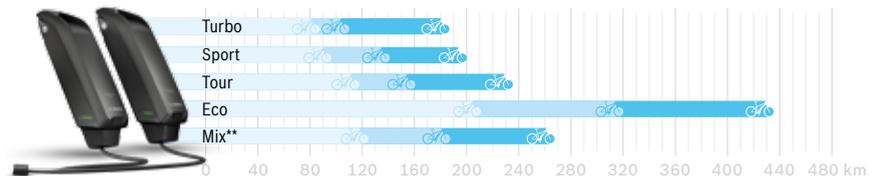


DualBattery 800 (2 x PowerPack 400)

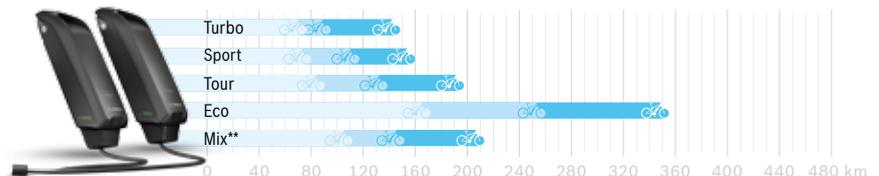


Performance Line Cruise

DualBattery 1000 (2 x PowerPack 500)

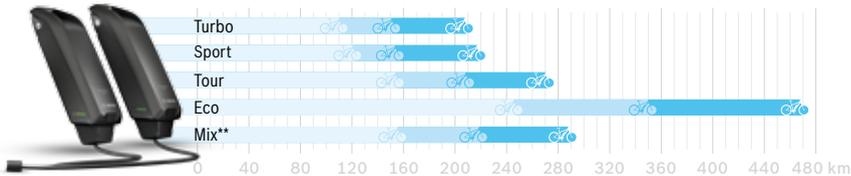


DualBattery 800 (2 x PowerPack 400)

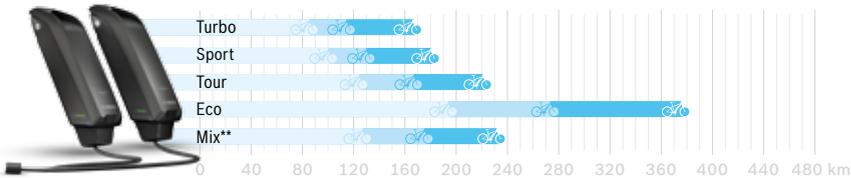


Active Line Cruise

DualBattery 1000 (2 x PowerPack 500)



DualBattery 800 (2 x PowerPack 400)



■ Difficult conditions
 ■ Favorable conditions
 ■ Ideal conditions

Benefits

The advantage of the PowerPacks

No memory effect

The PowerPack with lithium-ion cells can be briefly charged at any time regardless of its charging state. Interruptions of the charging process do not harm the battery. Complete discharge is not required.

No self-discharge

Even after prolonged storage, such as during the winter, it is possible to use the rechargeable battery without recharging it. This means PowerPacks do not need to be recharged after a long break in use. For longer storage, a charge status of approx. 30 to 60% is recommended.

Long service life

PowerPacks are designed for many tours, miles, and years of service. The intelligent, electronic Bosch battery management system (BMS) protects lithium-ion batteries from excessive temperatures, overcharging, and deep discharge. The BMS checks every cell, extending the life of the battery. This makes the time from initial use to the need to replace a PowerPack very long.



Charger

Instant energy



Faster charging made easy

Bosch Chargers are compact, lightweight, and rugged. And above all, really fast. The Bosch Standard Charger is only about the size of a drinks bottle and is extremely lightweight at under 800 grams. The Travel Charger weighs even less, at barely 500 grams. In this way you can charge your pedelec on the go without a 230-volt connection – all you need is the cigarette lighter of a car or motorhome.



Standard Charger

Thanks to the short charging times of the 4A Standard Charger, the battery can quickly be used again and your pedelec is always ready. Like all the Bosch eBike System chargers, the Standard Charger is low-noise.



Compact Charger

The Compact Charger is the ideal charger for all those who undertake long trips with their eBike. Small and compact, the 2A Charger weighs less than 600 grams. With 40% less volume than the Standard Charger, it fits into any saddlebag. The Compact Charger is compatible with supply voltages of 110 to 230 volts and can be used in Europe, the US and Canada as well as Australia.



Travel Charger

Weighing just under 500 grams, the small Travel Charger is operated via the cigarette lighter in a car or the 12V vehicle socket in a motorhome and also enables convenient recharging when on the road. An integrated discharge protection protects the car battery.

Charging time

Quickly at full charge

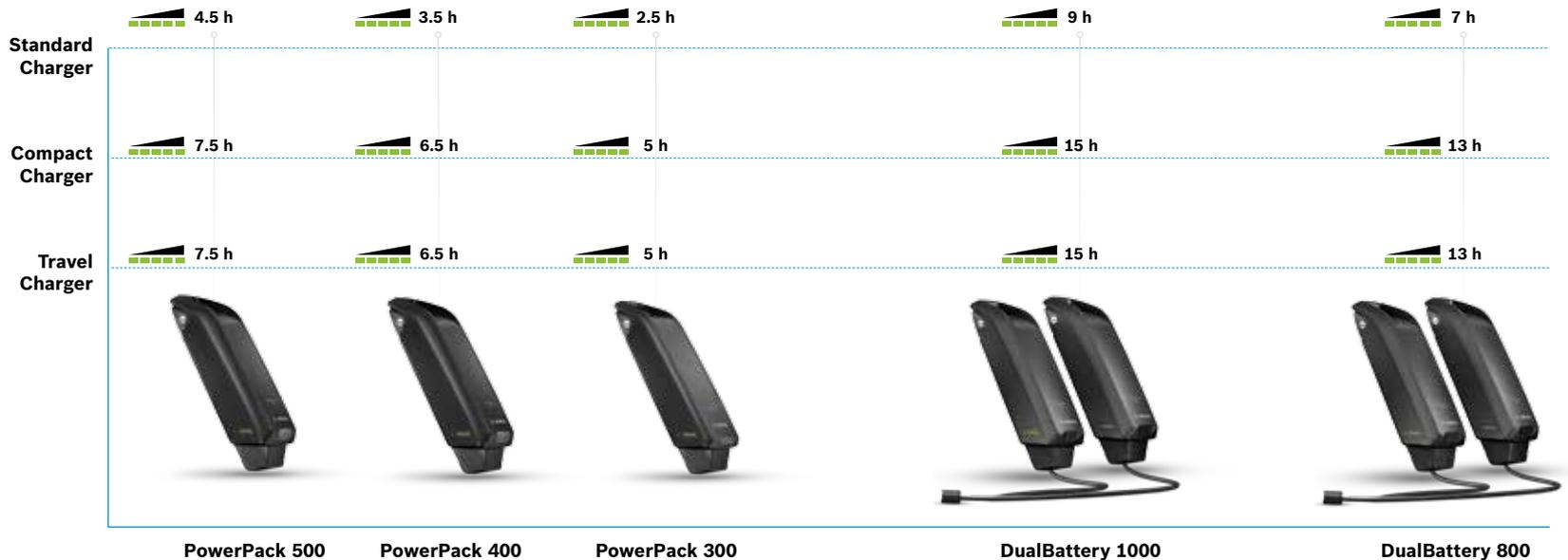
The charging time depends on the capacity of the battery and of the charger: with the Standard Charger, the PowerPack 300 requires approx. one hour for half a charge, while the PowerPack 400 requires around 1.5 hours and the PowerPack 500 about two hours. An empty PowerPack 300 is fully charged in just 2.5 hours. A PowerPack 400 needs 3.5 hours for this, and the PowerPack 500 4.5 hours.

A charge cycle refers to full charge in a single charging session or several partial charging sessions.

Weight

Saved

The PowerPacks are efficient and reliable energy suppliers for when you are on the go. At approx. 2 to 2.7 kg, they are really lightweight, with energy density (Wh/kg) that takes a leading position among eBike batteries.





Service life Lifelines

The service life of a PowerPack is influenced mainly by the type and duration of use. Like every lithium-ion battery, a PowerPack also ages over time, even if you do not use it.



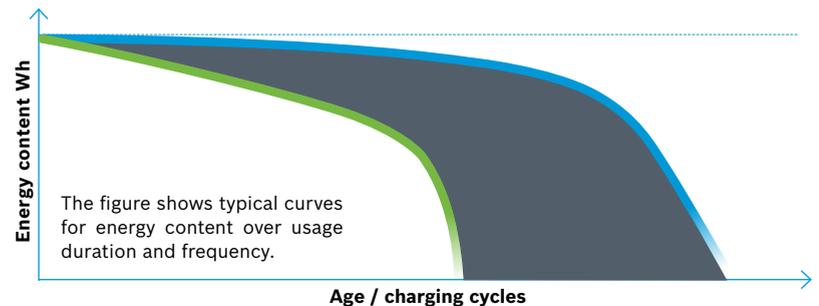
Factors that have a positive impact on the service life of the battery:

- ▶ Low load
- ▶ Storage at a temperature between 0 and 20 °C
- ▶ Storage at approx. 30 to 60% charge status



Factors that shorten the service life:

- ▶ Heavy-duty use
- ▶ Storage at over 30 °C ambient temperature
- ▶ Prolonged storage in a completely charged or completely discharged state
- ▶ Parking of the eBike in the blazing sun



Handling

One flick of the wrist, everything under control

High-tech can be this simple. The Bosch PowerPacks rest securely in their mounts even when you are riding on uneven terrain, but they are very easy to remove for storage or charging. Simply open the lock, which serves as attachment and theft protection, and remove the battery from the mount at an angle.

It can of course be inserted again just as easily. With the low weight, handy dimensions, and precise fit of the rechargeable battery, the PowerPack can be easily and intuitively inserted. The rechargeable battery locks into its mount in a manner that is noticeable and audible, so that it rests securely on the eBike.

Charging directly on the pedelec is also very easy. You just need to insert the plugs of the charger into the charge socket in the mount and into the wall outlet. Done. The PowerPack is charged directly on the eBike.

All PowerPacks are equipped with an ergonomic carrying handle, which makes them very easy to carry and manipulate. It allows the PowerPacks to be conveniently inserted, removed, carried, and charged.

PowerPack frame and rack batteries are maintenance free. Occasional cleaning and light greasing of the plug is still recommended, however. Cleaning with a direct water jet or immersion in water, however, are impermissible.



For your safety

Conscientious use of the battery

PowerPacks are lithium-ion cells, which are developed and manufactured to the highest standard. The applicable safety standards are met or even exceeded. In the charged state, these lithium-ion batteries have a high energy content. The constituents of lithium-ion cells are flammable under certain conditions. For this reason, please familiarize yourself with the warnings contained in the owner's manual.

Doubly protected

Each individual cell in the PowerPack is protected by a rugged steel cup and kept in a plastic housing. Do not open the case, and avoid mechanical stress and excessive heat. These could damage the battery cells and lead to leakage of flammable ingredients.

Careful storage

Avoid excessive heating and do not store your PowerPack in the vicinity of heat sources of inflammable materials. We recommend storage in uninhabited rooms with smoke detectors. Cool and dry locations are the most suitable. Disconnect the PowerPack and Charger from the power supply after charging.

Cleaning

Cleaning with a direct water jet is impermissible, in particular to protect the electronic components. A damp cloth is more suitable for this task. Always remove the battery before cleaning.

Properly dispose of damaged batteries

You should not touch heavily damaged batteries with your bare hands, since electrolyte may leak and cause skin irritation. Keep the battery in a safe place outdoors. If necessary, tape over the poles and inform your dealer. He will support you in proper disposal.

Safe storage with Bosch Chargers

The integrated battery management system in the PowerPack in conjunction with a Bosch Charger protects the battery against overload during charging.

Bosch Chargers protect against damage from extreme overload or short circuit. Use these exclusively for eBikes with Bosch drive, since the components ensure a perfectly coordinated charging and discharging process.



Care

Proper treatment

The more conscientiously you treat the PowerPack, the further it will take you.

We have a few tips and tricks to help:

Charging

The battery should be charged under dry conditions and at room temperature.

Storage during winter

Store the batteries in a dry location at temperatures between 0 and 20 °C. Storage at room temperature is ideal. Being completely charged or completely discharged for storage is not advised for the batteries. The ideal charge status for lengthy periods of storage is approx. 30 to 60% or two to three LEDs on the battery indicator.

Cleaning & care

Cleaning with a direct water jet is impermissible, in particular to protect the electronic components. Before cleaning, remove the battery. Occasionally clean and lightly grease the plug terminals.

Winter use

During winter use (particularly below 0 °C) we recommend charging and storing the battery at room temperature before inserting the battery in the eBike immediately before riding it. For frequent travel in the cold, it is advisable to use thermal protective covers.

Storage

Temperatures below -10 °C and above 60 °C should be avoided.

Transport

For transport, the battery should always be taken off the eBike and safely transported in your car, for example.

Inspection

Using a diagnostic unit, the dealer can check the health status of the eBike, especially the battery, and tell you the number of charging cycles.



Electricity costs

Ride & save

If only everyone would use as little electrical energy as an eBiker! Even a refrigerator with 250 kWh per year consumes significantly more than an active eBike commuter with only about 40 kWh per year. But riding an eBike is good not only for the environment but also for your wallet.

A full charge of a PowerPack 300 costs less than 10 cents (Assumption: green electricity rate of 25 cents per kWh).

Recycling

After cycling: Recycling

The dealer takes care of environmentally sound and free disposal of Bosch PowerPacks. In this way, valuable raw materials reenter the cycle and resources are conserved. Simply take the rechargeable battery to your dealer – perhaps on your eBike.



Robert Bosch GmbH
Bosch eBike Systems

Postfach 1342
72703 Reutlingen
Germany

bosch-ebike.com
facebook.com/boschebikesystems

Subject to change

August 2016 / EN

