The eBike Rechargeable Battery Guide

Everything you need to know about Bosch batteries
Bosch batteries
The energy carriers

Bosch rechargeable batteries are an efficient, long-life energy source, as well as being the most state-of-the-art eBike batteries available on the market. They combine impressive mileage performance, a long service life and low weight (approx. 2.5 to 2.8 kg) with an ergonomic design and simple handling. The high-quality lithium-ion batteries have a battery management system that detects significant potential sources of error and protects cells from overloading. DualBattery is the perfect solution for tour bikers, long-distance commuters and cabby bikers or eMountain bikers. The combination of two Bosch batteries delivers up to 1,000 Watt hours and can be installed in almost any battery combination* from the manufacturer. The system switches intelligently between the two batteries both during charging and discharging.

* DualBattery is not possible in combination with a PowerPack 300.

PowerTube and Power Packs are the energy sources for the Bosch Active Line, Active Line Plus, Performance Line and Performance Line CX 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.

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Bosch batteries

Product overview

* The PowerPack 300 rack battery is only available in combination with the Active Line and Active Line Plus.
* DualBattery is available in combination with PowerPack 300.

Position

The PowerTube is fully integrated into the bike frame and can be installed almost invisibly in a wide variety of bike frame types. When installed as a frame battery, the PowerPack is very close to the centre of gravity of the bicycle and thus has a positive effect on handling. As a rack variant, the PowerPack is frequently used on step-through bicycles to offer as much clearance as possible when getting on and off the bike.
What is the range of a single battery charge and what factors influence the range of the battery?

These are central questions for many eBikers that are impossible to answer precisely. The margin of variation is wide: Sometimes a single battery charge will take you less than 20 kilometres, while other times it will take you significantly more than 100 kilometres. A host of different factors influence the range: support level, riding style, air resistance, rider weight, tyre pressure and, naturally, the terrain. What is the surface quality like? Am I cycling on a paved road, field track or a woodland trail? Does my route include climbs and gradients or am I only covering level ground? These are just some of the factors that influence the battery’s range.
Range

Tips and tricks for optimal range

As an eBiker you can ride very economically and thus maximize the range of a rechargeable battery charge.

▶ Cadence – Cadences above 50 revolutions per minute optimise the efficiency of the drive unit. In contrast, very slow pedalling is very costly in terms of energy.
▶ Weight – The mass should be minimised 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.
▶ Tyre pressure – Rolling resistance can be minimised by proper tyre pressure. Tip: In order to maximise the range, inflate the tyres to the maximum permissible tyre 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.

What range can I achieve with the Bosch eBike system?

The range of Bosch rechargeable batteries depends on numerous different factors. Your range is influenced by you as a rider and, for example, your chosen support mode, as well as the drive or battery installed in your eBike. In addition, there are environmental factors such as temperature, wind conditions or background that play a key role in determining how far you will go. Our Range Assistant helps to calculate the typical range under various conditions, helping you to better understand how to determine your range.
Range
Bosch batteries

For the Bosch rechargeable batteries, the following graphics provide an overview of the range as a function of a variety of conditions:

<table>
<thead>
<tr>
<th>Difficult conditions**</th>
<th>Favourable conditions**</th>
<th>Ideal conditions**/***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadence</td>
<td></td>
<td></td>
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<tr>
<td>70-90 rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total weight</td>
<td></td>
<td></td>
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<tr>
<td>(Total weight = Rider + bike and luggage)</td>
<td>115 kg</td>
<td>105 kg</td>
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<tr>
<td>Ø-Speed ca.</td>
<td></td>
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<tr>
<td>Cruise (25 km/h)</td>
<td>18 km/h</td>
<td>21 km/h</td>
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<tr>
<td>Speed (45 km/h)</td>
<td>28 km/h</td>
<td>31 km/h</td>
</tr>
<tr>
<td>Bosch eBike system</td>
<td>Drive unit, battery and Intuvia</td>
<td>Drive unit, battery and Intuvia</td>
</tr>
<tr>
<td>Shifting system</td>
<td>Derailleur system</td>
<td>Derailleur system</td>
</tr>
<tr>
<td>Tyre Tread</td>
<td>MTB tyres</td>
<td>Trekking tyres</td>
</tr>
<tr>
<td>Type of bike and posture</td>
<td>Touring bike / MTB sporty</td>
<td>Touring bike / MTB sporty</td>
</tr>
<tr>
<td>Terrain type</td>
<td>Low mountain ranges</td>
<td>Hilly</td>
</tr>
<tr>
<td>Surface</td>
<td>Dirt tracks and off-road trails</td>
<td>Mainly gravel and paved forest paths</td>
</tr>
<tr>
<td>Starting frequency</td>
<td>Bike tour with regular starting up</td>
<td>Bike tour with frequent breaks</td>
</tr>
<tr>
<td>Wind conditions</td>
<td>Moderate wind</td>
<td>Slight wind</td>
</tr>
</tbody>
</table>

* Average of combined use of all four modes.
** The ranges are typical values of the new rechargeable batteries, which may decrease if one of the conditions listed above deteriorates.
*** No additional connected electronic components, e.g. light.
**Range**

**Active Line Plus**

*PowerPack 300*

- Turbo
- Sport
- Tour
- Eco
- Mix*

0 20 40 60 80 100 120 140 160 180 200 220 km

*PowerPack 400*

- Turbo
- Sport
- Tour
- Eco
- Mix*

0 20 40 60 80 100 120 140 160 180 200 220 km

*PowerTube 500 and PowerPack 500*

- Turbo
- Sport
- Tour
- Eco
- Mix*

0 20 40 60 80 100 120 140 160 180 200 220 km

**Performance Line Cruise**

*PowerPack 300*

- Turbo
- Sport
- Tour
- Eco
- Mix*

0 20 40 60 80 100 120 140 160 180 km

*PowerPack 400*

- Turbo
- Sport
- Tour
- Eco
- Mix*

0 20 40 60 80 100 120 140 160 180 km

*PowerTube 500 and PowerPack 500*

- Turbo
- Sport
- Tour
- Eco
- Mix*

0 20 40 60 80 100 120 140 160 180 km

* Average of combined use of all four modes.
** The ranges are typical values of the new rechargeable batteries, which may decrease if one of the conditions listed above deteriorates.
*** No additional connected electronic components, e.g. light.
Range
Performance Line Speed

**PowerPack 300**

- Turbo
- Sport
- Tour
- Eco
- Mix*

**PowerPack 400**

- Turbo
- Sport
- Tour
- Eco
- Mix*

**PowerTube 500 and PowerPack 500**

- Turbo
- Sport
- Tour
- Eco
- Mix*

**Performance Line CX**

**PowerPack 300**

- Turbo
- Sport
- Tour
- Eco
- Mix*

**PowerPack 400**

- Turbo
- Sport
- Tour
- Eco
- Mix*

**PowerTube 500 and PowerPack 500**

- Turbo
- Sport
- Tour
- Eco
- Mix*

eMTB mode was not taken into account when calculating the range.

* Average of combined use of all four modes.

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

*** No additional connected electronic components, e.g. light.
Range
DualBattery 1000

DualBattery is also available in the following combinations:
- 2x PowerPack (frame battery)
- 2x PowerPack (frame and rack battery)
- PowerTube and PowerPack (frame battery)

Active Line
- Turbo
- Sport
- Tour
- Eco
- Mix*

Active Line Plus
- Turbo
- Sport
- Tour
- Eco
- Mix*

Performance Line Cruise
- Turbo
- Sport
- Tour
- Eco
- Mix*

Performance Line Speed
- Turbo
- Sport
- Tour
- Eco
- Mix*

Performance Line CX***
- Turbo
- Sport
- Tour
- Eco
- Mix*

- Average of combined use of all four modes.
- The ranges are typical values of the new rechargeable batteries, which may decrease if one of the conditions listed above deteriorates.
- No additional connected electronic components, e.g. light.
- eMTB mode was not taken into account when calculating the range.
Benefits
The advantage of Bosch rechargeable batteries

Bosch rechargeable batteries are an efficient, long-life energy source, as well as being the most state-of-the-art eBike batteries available on the market. They are characterised by the following features:

▶ No memory effect – The Bosch rechargeable batteries with lithium-ion cells can be briefly charged at any time regardless of their charging state. Interruptions of the charging process do not harm the battery. Complete discharge is not required.

▶ Very low self-discharge rates – Even after prolonged storage, such as during the winter, it is possible to use the rechargeable battery without recharging it. For longer storage, a charge status of approx. 30 to 60% is recommended.

▶ Long service life – Bosch rechargeable batteries are designed for many tours, miles and years of service. The intelligent, electronic Bosch battery management system (BMS) protects lithium-ion batteries from excessive operating temperatures, overload and deep discharge. The BMS checks every cell, extending the life of the rechargeable battery. This makes the time from initial use to the need to replace a Bosch battery very long.
Bosch chargers are compact, lightweight and robust. And most of all, charge your battery quickly. The Bosch Standard Charger is only about the size of a drinks bottle and is also extremely lightweight at under 800 grams. The Compact Charger is 40% smaller than the Standard Charger and fits easily into any saddlebag. Bosch chargers are the smallest and lightest eBike chargers in their class.

**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 perfect charger for anyone making long journeys with their eBike. Small and compact, the 2A Compact Charger weighs less than 600 grams and is compatible with supply voltages from 110 to 230 volts. The Compact Charger can be used in Europe, the USA and Canada as well as Australia.
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 PowerTube 500 or 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, the PowerTube 500 and the PowerPack 500 4.5 hours. A charge cycle refers to full charge in a single charging session or several partial charging sessions.

Service life
Lifelines

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

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

Factors that have a positive impact on service life:
- Low load
- Storage at a temperature between 0 and 20 °C
- Storage at approx. 30 to 60% charge status
Handling
One flick of the wrist, everything under control

High-tech can be this simple. The Bosch batteries are secure in their mount, even when travelling in rough terrain. However, they are easily removed for storage or charging purposes. Simply open the lock of the Bosch rechargeable batteries, which serves as attachment and theft protection, and remove the batteries from the mount at an angle.

▶ Charging directly on the pedelec is also very easy. You just need to insert the plugs of the charger into the charging socket in the mount and into the wall outlet. Done. The Bosch batteries are 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.

▶ A convenient function means that the PowerTube pops approx. 2 cm out of the frame when unlocked, making it easier to grasp. In addition, a safety mechanism prevents the battery from falling out. The battery is also optimally protected by the frame. Recesses in the top surface are suitable for attaching bottle holders or design trims. With their low weight, handy dimensions and precise fit between battery and mount, Bosch batteries 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 in the frame or on the eBike.

▶ Bosch batteries are maintenance free. Occasional cleaning and light greasing of the plug is still recommended, however. The batteries are also splash water protected. Cleaning with a direct water jet or immersion in water, however, are impermissible.
For your safety
Conscientious use of the battery

Bosch batteries are lithium-ion cells, which are developed and manufactured to the state-of-the-art. The applicable safety standards are met or even exceeded. In their 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 familiarise yourself with the warnings contained in the owner’s manual.

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

▶ careful storage – Avoid excessive heating and do not store your Bosch battery and charger 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 your Bosch battery 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 the eBike.

▶ damaged, used and no longer needed batteries should be disposed of in the appropriate manner – You should not touch heavily damaged batteries with your bare hands, since electrolyte may leak and cause skin irritation. Store damaged batteries in a safe place outdoors. If necessary, tape over the poles and inform your dealer. He will support you in proper disposal.

▶ safe charging with Bosch chargers – The integrated battery management system in all Bosch batteries 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. Do not use your charger in the vicinity of heat sources or inflammable materials. We recommend that batteries should be charged in unoccupied rooms and that the charger should be disconnected from the power supply after charging.
Care
Proper treatment

▶ Charging – The batteries should be charged in a dry location and at room temperature.

▶ Storage during winter – Store the batteries in a dry location at temperatures between 0 and 20 °C. 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 the eBike, 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 500 costs less than 15 cents (assumption: green electricity rate of 27 cents per kWh).

Recycling
The right way to dispose of Bosch rechargeable batteries

The dealer takes care of environmentally sound and free disposal of Bosch rechargeable batteries. 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.