Rechargeable Battery Guide 2019

BOSCH
Invented for life

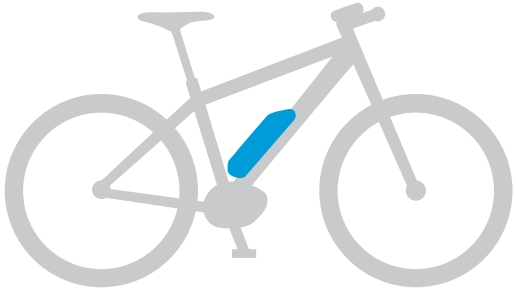
THE eBIKE RECHARGEABLE BATTERY GUIDE

FEEL THE FLOW

Bosch eBike Systems | New Zealand
bosch-ebike.nz

Contents

Succinctly stated



PowerTube and PowerPacks 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, optimise their efficiency and maximise their service life are provided on the following pages.

03 Bosch batteries
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Bosch batteries

More energy for travelling

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, a long service life and low weight (approx. 2.5 to 2.8 kg) with an ergonomic design and convenient handling. The high-quality lithium-ion batteries have a battery management system that detects significant potential sources of error and protects cells against overload. DualBattery is the perfect solution for tourers, long-distance commuters and cargo bikers. The combination of two Bosch batteries delivers up to 1,000 Wh and can be installed in almost any battery combination* from the manufacturer. The system switches intelligently between the two batteries during both charging and discharging.

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

Bosch batteries

Powerful in every design

Integrated rechargeable battery

Stylishly elegant: The PowerTube can be integrated perfectly in the frame to create new eBike designs.

PowerTube 500
(Vertical)

PowerTube 500
(Horizontal)

Rack battery

Comfortably convenient: On step-through models, the rack battery creates space and allows the rider to get on and off safely.

PowerPack 300

PowerPack 400

PowerPack 500

PowerTube 500 and PowerPacks are compatible with all product lines from model year 2014.

Frame battery

Sporty & dynamic: When used as a frame battery, the PowerPack sits close to the centre of gravity of your eBike to ensure optimal weight distribution.

PowerPack 300

PowerPack 400

PowerPack 500

DualBattery

Double the power: Combining two Bosch eBike rechargeable batteries provides an energy content of up to 1,000 Wh* and doubles the range as a result.

DualBattery
2x PowerPack
(Frame battery)

DualBattery
2x PowerPack
(Frame and rack battery)

DualBattery
PowerTube + PowerPack
(Integrated rechargeable battery and frame battery)

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

Range

What is the range of a single battery charge?

This is a common question for many eBikers. There is no definitive answer. The number and variety of influential factors is simply too great. Sometimes a single battery charge will take you less than 20 kilometres, while at other times it will take you much further than 100 kilometres. However, following a few tips can easily help maximise the range of the battery.

Calculate the range yourself:
You can use the Range Assistant to calculate typical ranges under various conditions.
bosch-ebike.com/range

Tips and tricks for longer riding enjoyment

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 almost constant speed.

Gear shifting – Correct shifting also makes eBiking more efficient: It is best to start off and take inclines in a low gear, then shift to a higher gear in accordance with the terrain and speed. The on-board computer provides shift recommendations.

Tyre pressure – Rolling resistance can be minimised by correct tyre pressures. Tip: In order to maximise the range, inflate the tyres to the maximum permissible tyre pressure.

Motor performance indicator – Monitor the motor performance indicator of Intuvia on-board computer and adapt your riding style accordingly. A long bar means higher power consumption.

Rechargeable battery & temperature – With decreasing temperature, the efficiency of a rechargeable battery is reduced, as the electrical resistance increases. In winter, you can therefore expect a reduction in the normal range.

Range

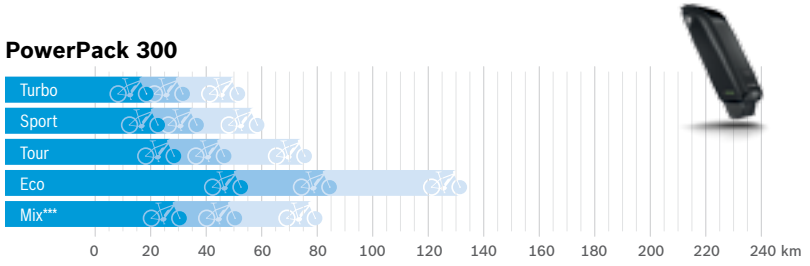
Extending your range

For Bosch rechargeable batteries, the following graphics provide an overview of the range as a result of varying conditions.

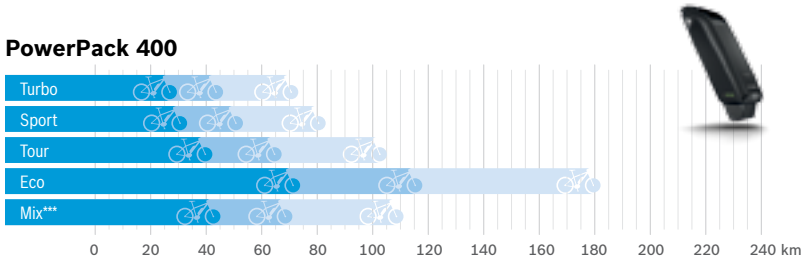
		Difficult conditions*	Favourable conditions*	Ideal conditions*/**
Rider	**Cadence**	70–90 rpm	50–70 rpm	70–90 rpm
	Total weight (Overall weight consisting of rider incl. eBike and luggage)	115 kg	105 kg	95 kg
	Ø speed approx. Cruise (25 km/h) Sport (32 km/h)	18 km/h	21 km/h	24 km/h
eBike	**Bosch eBike system**	Drive Unit, battery and Intuvia	Drive Unit, battery and Intuvia	Drive Unit, battery and Intuvia
	Gears	Derailleur system	Derailleur system	Derailleur system
	Tyre tread	MTB tyres	Trekking tyres	Trekking tyres
	Bicycle type and posture	Touring bike/sporty MTB	Touring bike/sporty MTB	Touring bike/sporty MTB
Environment	**Terrain type**	Low mountain ranges	Hilly	Some inclines
	Surface	Dirt tracks and off-road trails	Mainly gravel and paved forest paths	Predominantly smooth asphalt
	Starting frequency	Bike ride with regular standing starts	Bike ride with occasional standing starts	Bike ride with few breaks
	Wind conditions	Moderate wind	Slight wind	Calm

Active Line

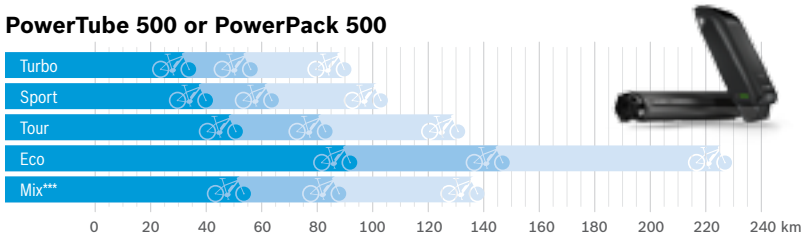
PowerPack 300



PowerPack 400



PowerTube 500 or PowerPack 500

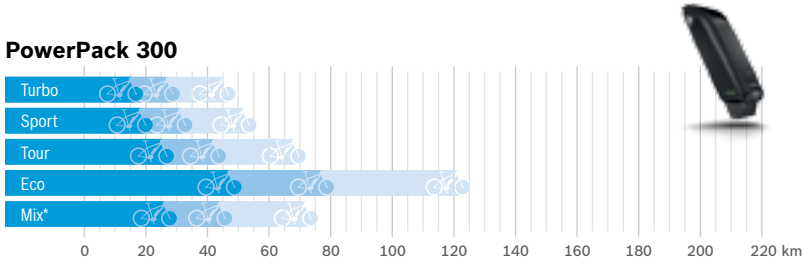


* The ranges are typical values of the new rechargeable batteries, which may decrease if one of the conditions listed above deteriorates.
** No additional connected electronic components, e.g. light.
*** Average of combined use of all four modes.

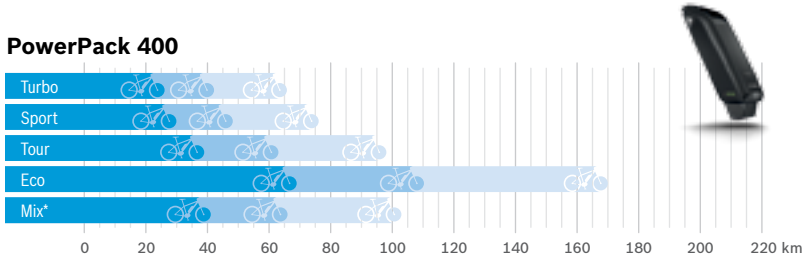
Range

Active Line Plus

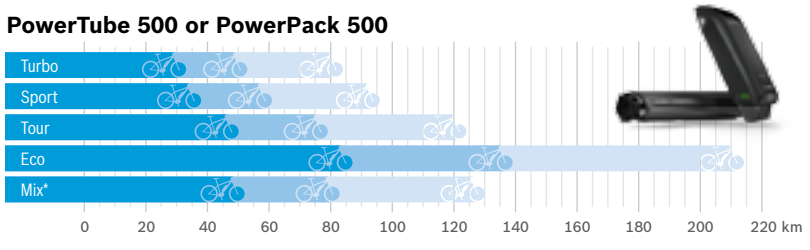
PowerPack 300



PowerPack 400



PowerTube 500 or PowerPack 500



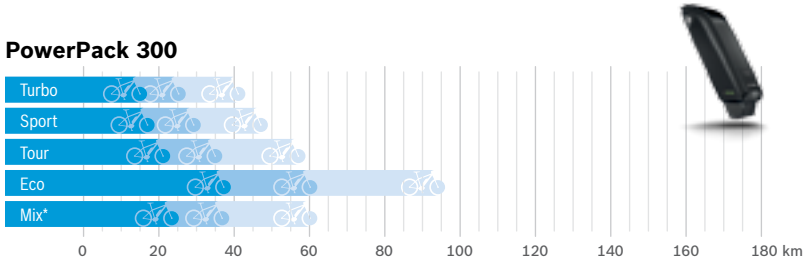
Difficult conditions**

Favourable conditions**

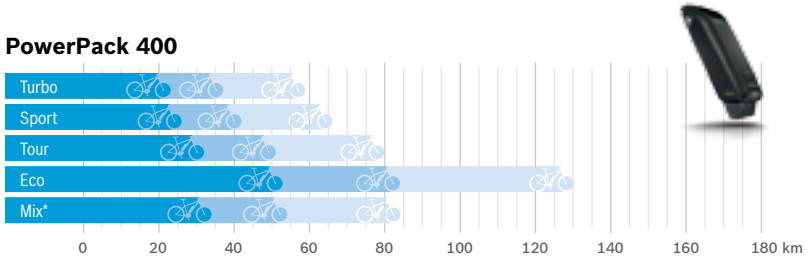
Ideal conditions**/***

Performance Line

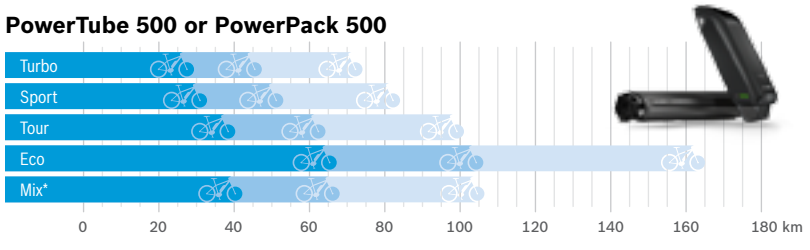
PowerPack 300



PowerPack 400



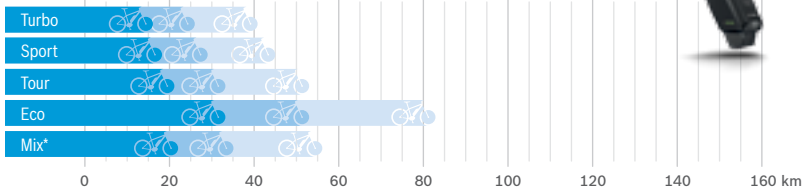
PowerTube 500 or PowerPack 500



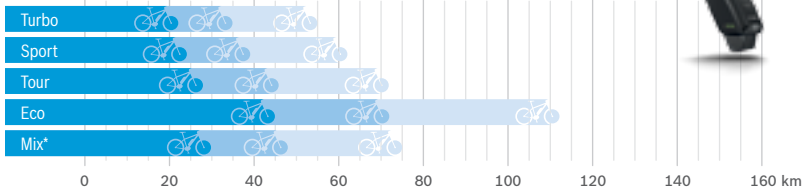
* Average of combined use of all four modes.
** The ranges are typical values of the new rechargeable batteries, which may decrease if one of the conditions listed above deteriorates.
*** No additional connected electronic components, e.g. light.

Performance Line CX

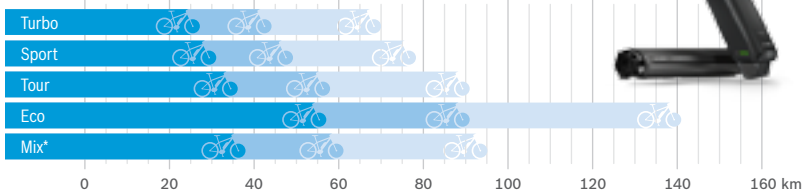
PowerPack 300



PowerPack 400



PowerTube 500 or PowerPack 500



eMTB mode was not considered when calculating these ranges.

* 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 (2x PowerPack500)

DualBattery is also available in the following combinations:

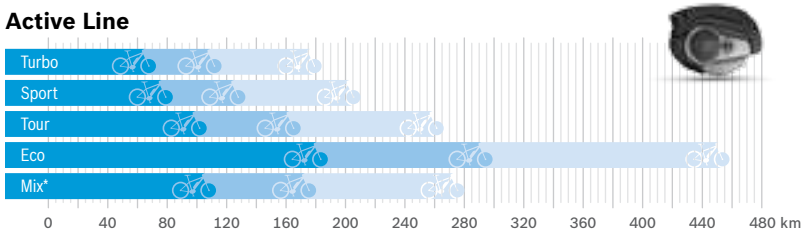
2x PowerPack
(frame battery)

2x PowerPack
(frame and rack battery)

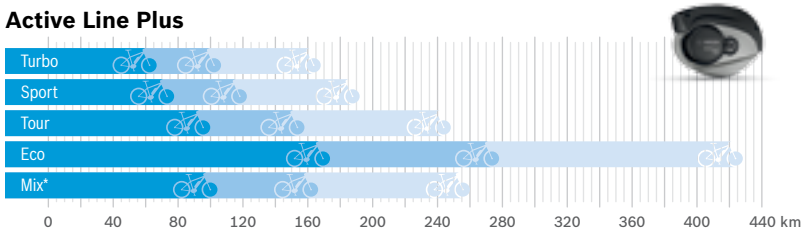
PowerTube and PowerPack
(frame battery)

DualBattery is not available in combination with a PowerPack 300.

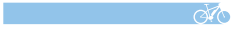
Active Line



Active Line Plus



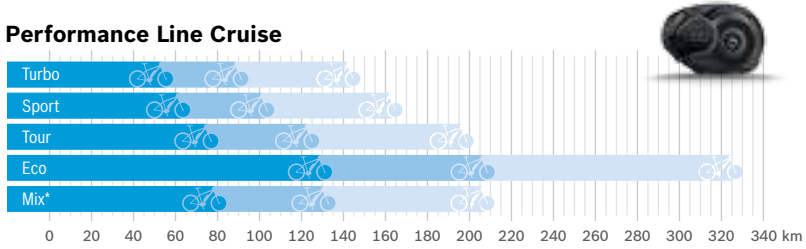
Difficult conditions**



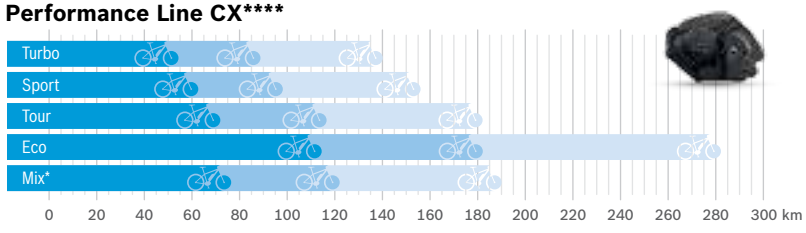
Favourable conditions**

Ideal conditions**/***

Performance Line Cruise



Performance Line CX****



* 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 considered when calculating these ranges.

Handling

High-tech can be this simple

The Bosch batteries are seated securely in their mounts, even when travelling over rough terrain. However, they are easily removed for storage or charging purposes. Simply open the lock, which serves as an attachment and remove the Bosch battery from the mount.

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 is seated securely in the frame or on the eBike.

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

Charging on the pedelec – Charging directly on the pedelec is particularly simple. You just need to insert the charging plug on the charger into the charging socket in the battery mount and insert the power plug into the wall outlet. Done. The Bosch batteries are charged directly on the eBike.

Handling

The PowerTube is easy to change

PowerTube – A convenient function means that the PowerTube moves approx. 2 cm out of the frame when unlocked, making it easier to handle. In addition, a safety mechanism prevents the battery from falling out. The battery is also protected by the frame. Recesses in the top surface are suitable for attaching design trims, for example.

Bosch batteries are maintenance free. Occasional cleaning and light greasing of the plug port is however recommended. The batteries are also splash water protected. Cleaning with a direct water jet or immersion in water, however, are impermissible. A damp cloth is more suitable for this task.

Opening the frame cover

The battery is unlocked using a key and then falls into the restraint support

Push the top of the battery to detach it the from the restraint support – the battery then falls into your hand.

Remove battery from the frame

Safety

Recommendations for handling batteries

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. The operating manual contains instructions on safe handling.

Double protection – Each individual cell in a Bosch rechargeable battery is protected by a rugged steel cup and held in a plastic housing. The housing must not be opened. Mechanical stress and excessive heat must also be avoided as they could damage the battery cells and cause flammable contents to leak out.

Storage – Excessive heating should be avoided, and Bosch batteries and chargers must not be stored in the vicinity of heat sources of flammable materials. We recommend storage in uninhabited rooms with smoke detectors. Dry locations with an ambient temperature of roughly 20°C are the most suitable.

Cleaning – Cleaning with a high pressure washer is forbidden. in particular to protect the electronic components. A damp cloth is more suitable for this task. Always remove the battery before cleaning the eBike.

Correct disposal of damaged, used and redundant batteries – Do not touch heavily damaged batteries with your bare hands, since electrolyte may leak and cause skin irritation. Damaged batteries are best stored in a safe place outdoors with the connection port taped over. The dealer will make sure the battery is disposed of correctly.

Safe charging – In conjunction with the battery management system integrated in the battery, Bosch chargers protect the battery against overload during charging, damage caused by extreme overcharging and short circuits. Bosch chargers are designed exclusively for eBikes with Bosch systems, as the components ensure a perfectly coordinated charging and discharging process. The battery storage recommendations are even more important for charging: batteries must not be charged in the vicinity of heat sources or flammable materials. We recommend charging batteries in at room temperature. Fully charged batteries should be disconnected from the power supply.

Care

How to increase the service life of the battery

Charging – Batteries should be charged in a dry location and at room temperature.

Storage during winter – Store batteries in a dry location at temperatures between 0 and 20°C. Fully charging or fully discharging results in higher loading of the battery. 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 high pressure washer is forbidden, in particular to protect the electronic components. Before cleaning the eBike, remove the battery. Occasionally clean and lightly grease the connection port.

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 longer journeys 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 removed from 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 inform you of the number of charging cycles.

Bosch charger

Reliable power source

Bosch chargers are handy, lightweight and robust. The sealed housing makes them extremely stable. Wherever your journey may take you: with the 2A Compact Charger, 4A Standard Charger and new 6A Fast Charger*, Bosch has developed three models that can charge Bosch eBikes quickly and reliably. All Bosch chargers operate silently and can also charge the Bosch PowerTube. They also feature a practical velcro fastener for stowing the cable tidily.

Compact Charger
The companion
The Compact Charger is the ideal charger for all eBikers who travel a lot. It weighs less than 600 g and is 40% smaller than the Standard Charger – small enough to fit into many pannier bags or backpacks.

Standard Charger
The all-rounder
The robust and functional Standard Charger features a good balance between performance and size/weight and is suitable for every possible use.

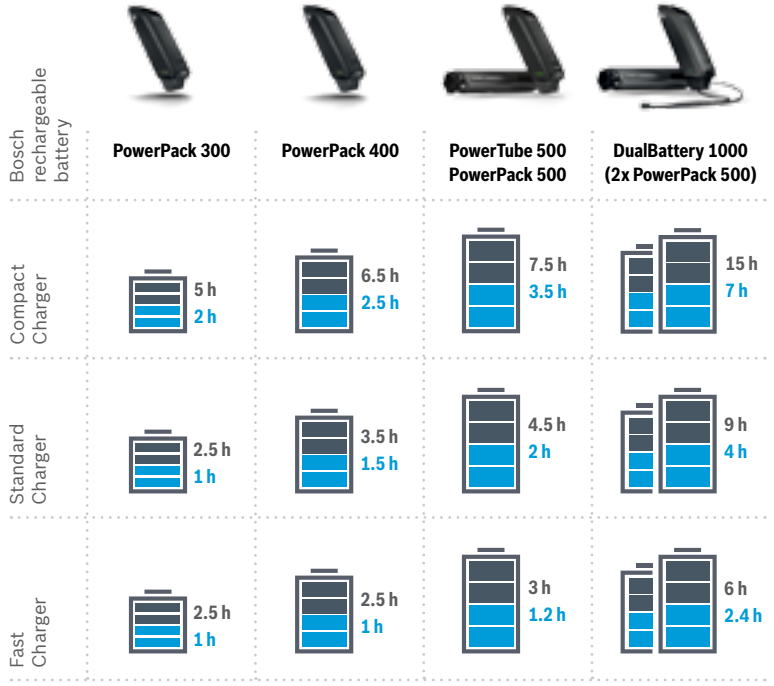
Fast Charger NEW
The fastest
The Fast Charger is currently the fastest eBike charger in its class and will recharge the eBike battery in the shortest possible time. After just three hours, the powerful PowerTube 500 and PowerPack 500 are fully recharged. The Fast Charger needs just over one hour to charge a battery to 50% capacity. This makes it the perfect charger for fast re-charging while on a trip. The Fast Charger is ideal for eBikes that are regularly in use and frequently charged, in particular for DualBattery with up to 1,000 Wh.

* Charging current is limited to 4 A for the PowerPack 300.

Charging time

As fast as you like

The charging time depends on the battery capacity and the charger type. The following diagrams show how quickly the various batteries can be recharged using each specific charger.



Service life

Tips for maximising your charge

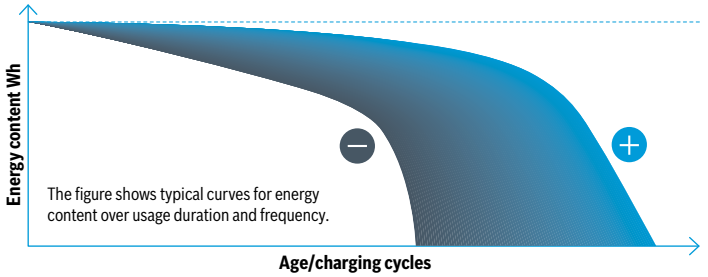
The service life of Bosch rechargeable batteries is influenced mainly by the type and duration of use. Like every lithium-ion battery, a Bosch rechargeable battery also ages over time, even if you do not use it.

Factors that shorten the service life:

- Heavy-load use
- Storage at over 30°C ambient temperature
- Prolonged storage in a fully charged or fully discharged state
- Leaving the eBike in direct sunlight

Factors that extend the service life:

- Low-load use
- Storage at a temperature between 0 and 20°C
- Storage at approx. 30 – 60% charge status
- Parking the eBike in the shade or a cool location



The figure shows typical curves for energy content over usage duration and frequency.

Benefits

Good reasons for choosing eBike systems by Bosch

Efficient, durable, state-of-the-art technology – there is a good reason why Bosch eBike batteries are some of the most popular models on the market. Here are the most important:

No memory effect – Bosch rechargeable batteries with lithium-ion cells can be briefly charged at any time regardless of their charge 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 rides, miles and years of service. The intelligent, electronic Bosch Battery Management System (BMS) protects against excessive operating temperatures, overcharging and deep discharge. The BMS checks every cell, extending the life of the rechargeable battery.

Rapid charging – Bosch chargers are available in a range of different sizes and performance levels, and enable rapid charging according to your needs.

Easy to remove – Bosch batteries can be removed in just a few hand movements. The battery can therefore be charged and stored away from the eBike, to enhance operation during winter, for example. The battery can be stored in a warm environment until just before you set off on your journey instead of discharging in a cold garage.

Extremely efficient – Bosch batteries represent an economic drive solution. It costs no more than 15 cents to fully charge a large PowerPack 500 (assumption: green electricity rate of 27 cents per kWh).

Competent service – Bosch batteries are well-protected and require hardly any maintenance. However, should you ever need help, you can contact our competent service team for assistance.

Electricity costs

An economical choice

If only everyone would use as little electrical energy as an eBiker! Even a refrigerator with 250 kWh per year consumes significantly more energy 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.

It costs less than 15 cents to fully charge a PowerPack 500 (assumption: green electricity rate of 27 cents per kWh).

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