

Rechargeable Battery Guide 2019



BOSCH

Invented for life

THE eBIKE RECHARGEABLE BATTERY GUIDE

FEEL THE FLOW

Bosch eBike Systems | EN
bosch-ebike.com/us



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, optimize their efficiency and maximize their service life are provided on the following pages.

- 03** Bosch batteries
- 06** Range and Range Assistant
- 16** Handling
- 20** Safety
- 22** Care
- 24** Bosch charger
- 26** Charging time
- 27** Service life
- 28** Benefits
- 30** Electricity costs and recycling



Bosch batteries

More energy for traveling



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. 5.5 lbs. to 6.2 lbs.) 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.

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 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 center of gravity of your eBike to ensure optimal weight distribution.



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)

Range

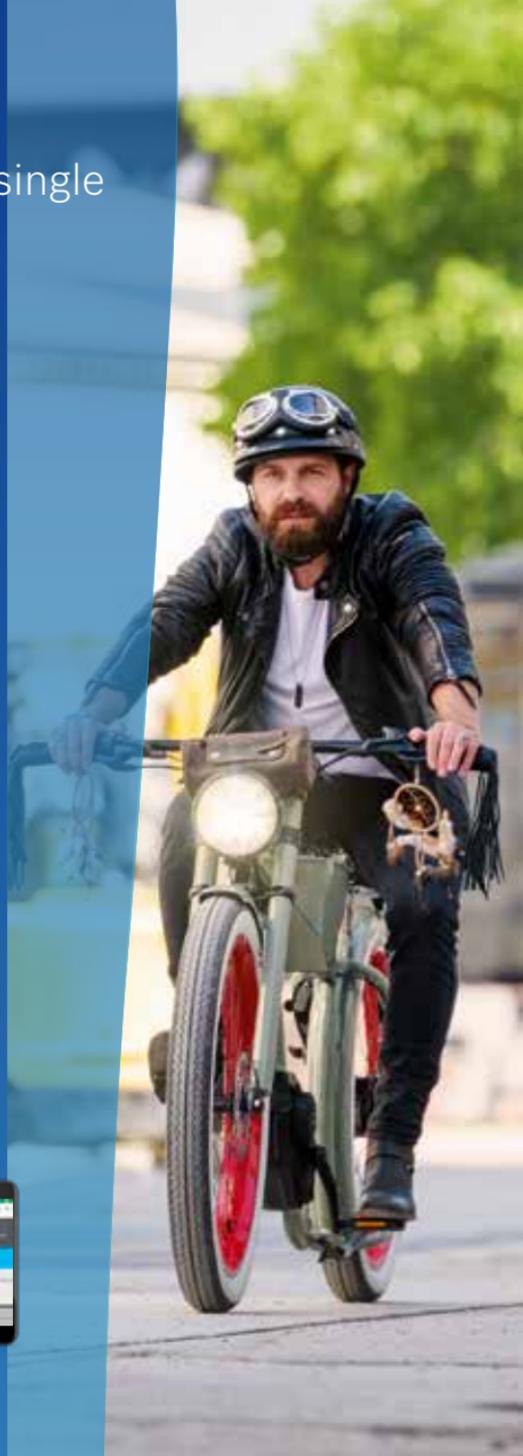
What is the range of a single battery charge?

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 12 miles, while at other times it will take you much further than 100 miles. However, following a few tips can easily help maximize 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/us/service/range-assistant



Tips and tricks for longer riding enjoyment

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 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 Intuvia on-board computer provides shift recommendations.

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

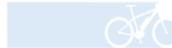
Motor performance indicator – Monitor the motor performance indicator of the Intuvia and Kiox on-board computers and adapt your riding style accordingly. A long bar means higher power consumption.

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

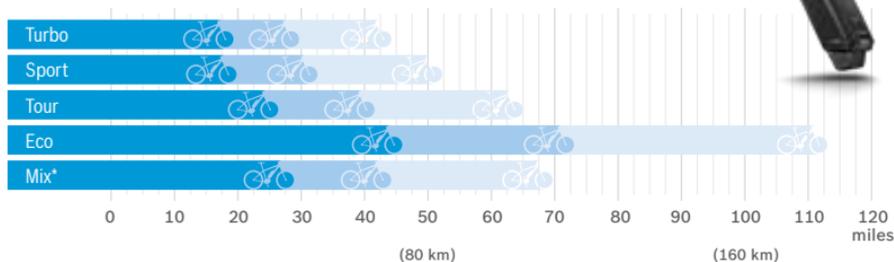
For Bosch rechargeable batteries, the following graphics provide an overview of the range as a result of varying conditions.

	 Difficult conditions**	 Favorable 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)	254 lbs	231 lbs	209 lbs
	Ø speed approx.			
	Cruise (20 mph)	11 mph (18 km/h)	13 mph (21 km/h)	15 mph (24 km/h)
	Speed (28 mph)	17 mph (28 km/h)	19 mph (31 km/h)	21 mph (34 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
	Tire tread	MTB tires	Trekking tires	Trekking tires
	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

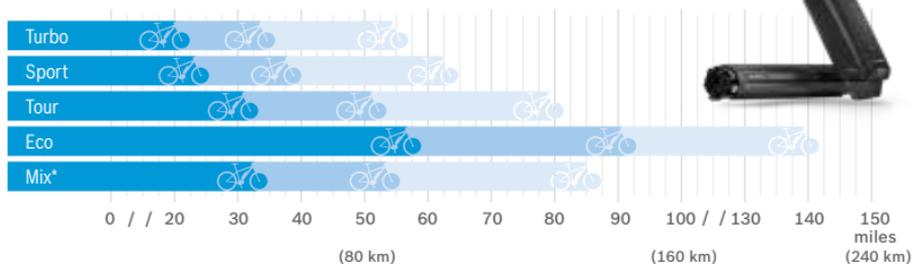
Active Line



PowerPack 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.

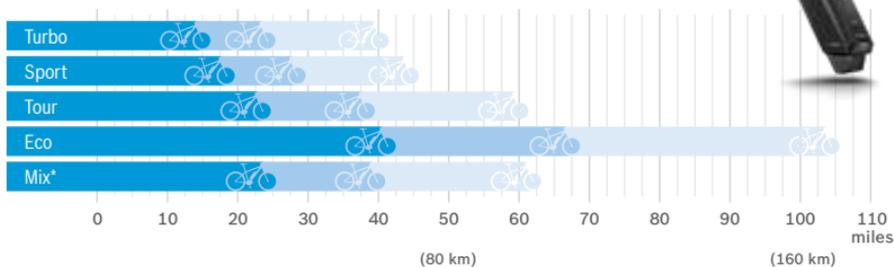
*** No additional connected electronic components, e.g. light.

Range

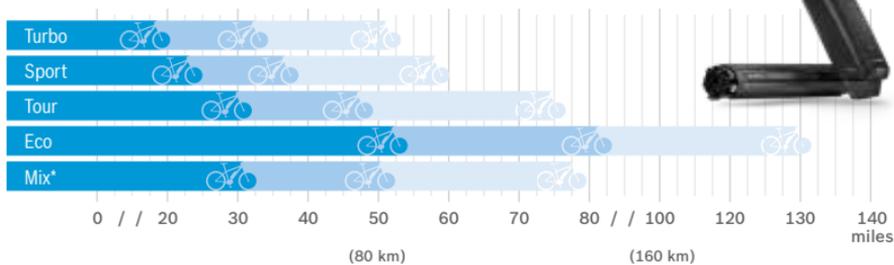
Active Line Plus



PowerPack 400



PowerTube 500 or PowerPack 500



Difficult conditions**

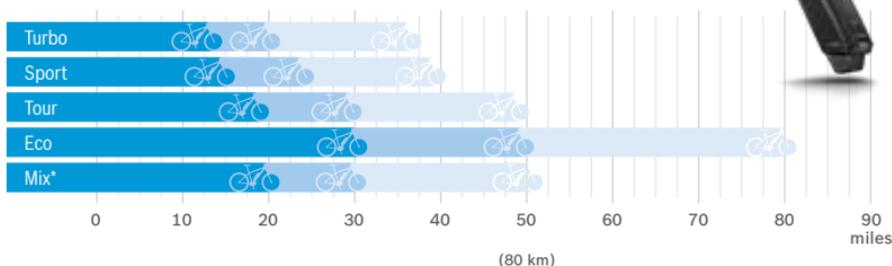
Favorable conditions**

Ideal conditions**/**

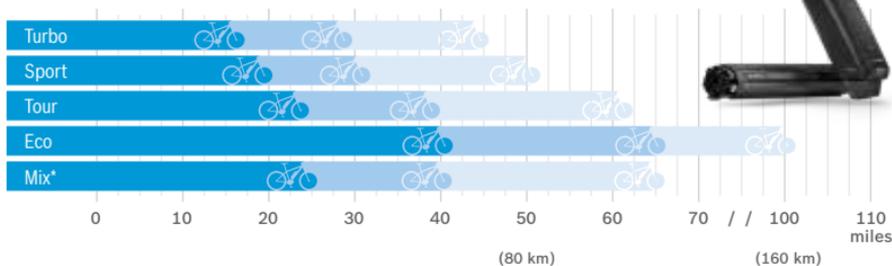
Performance Line Cruise



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.

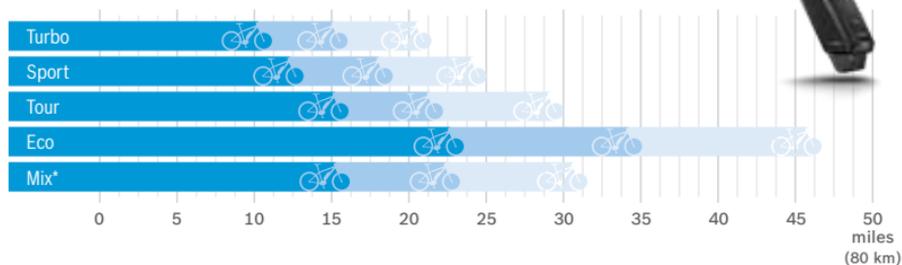
*** No additional connected electronic components, e.g. light.

Range

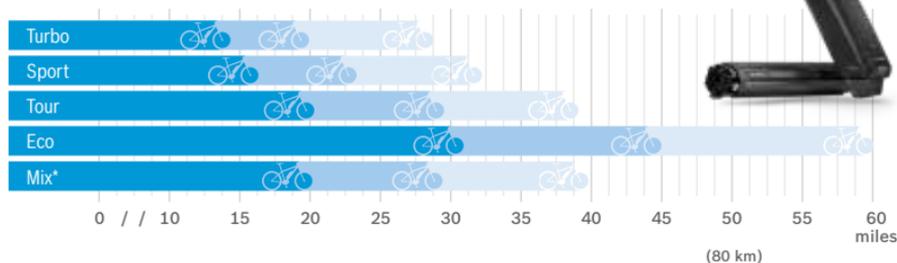
Performance Line Speed



PowerPack 400



PowerTube 500 or PowerPack 500



Difficult conditions**

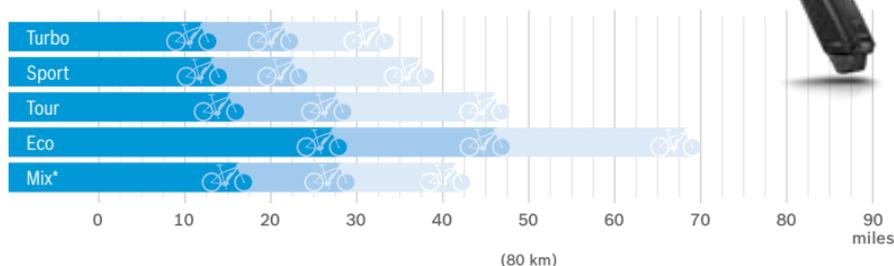
Favorable conditions**

Ideal conditions**/**

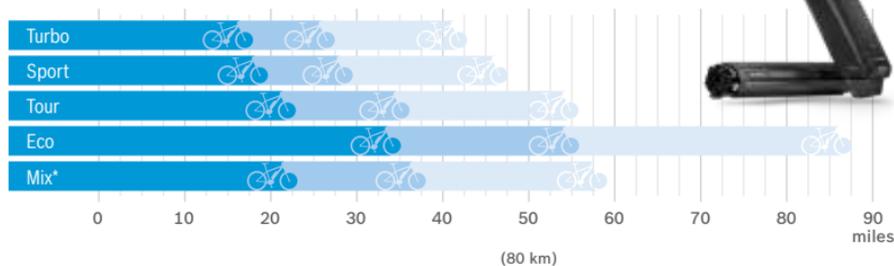
Performance Line CX



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 PowerPack 500)

DualBattery is also available in the following combinations:



2x PowerPack
(frame battery)

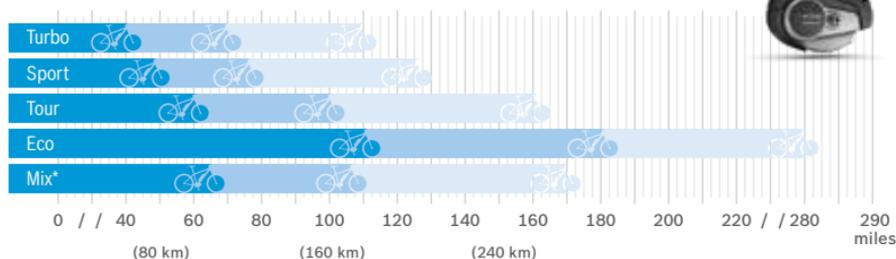


2x PowerPack
(frame and rack battery)

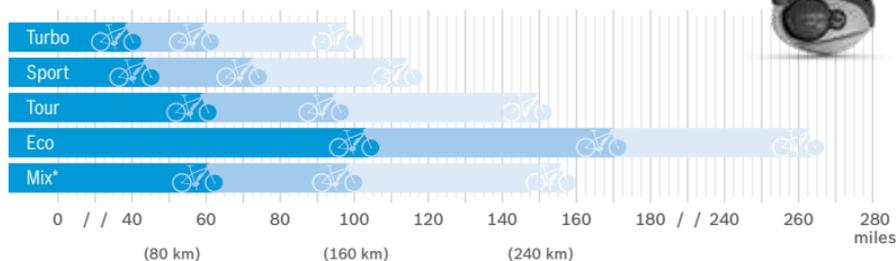


PowerTube and PowerPack
(frame battery)

Active Line



Active Line Plus

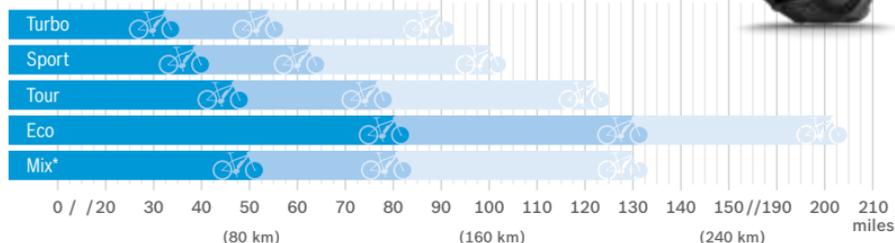


Difficult conditions**

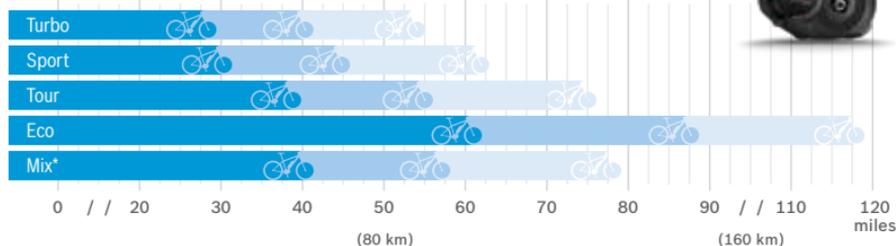
Favorable conditions**

Ideal conditions**/**

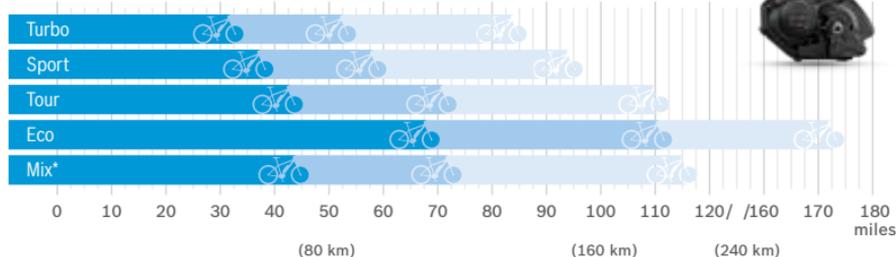
Performance Line Cruise



Performance Line Speed



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 traveling 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 eBike – Charging directly on the eBike 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 – The PowerTube conveniently 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.



Opening the frame cover.

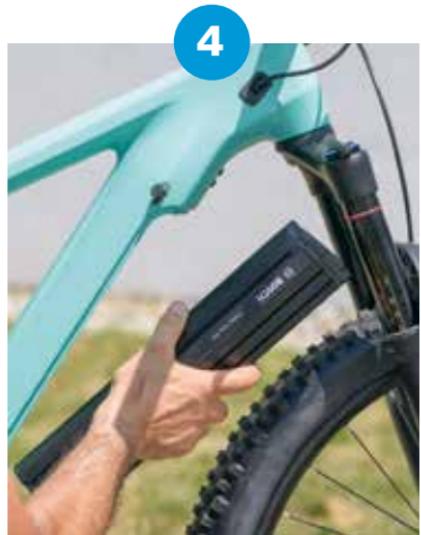


The battery is unlocked using a key and then falls into the restraint support.

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.



Push the top of the battery to detach it 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 be 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 68° F (20° C) are the most suitable.

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.



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 drive, 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 uninhabited rooms. 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 32° F (0° C) and 68° F (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.

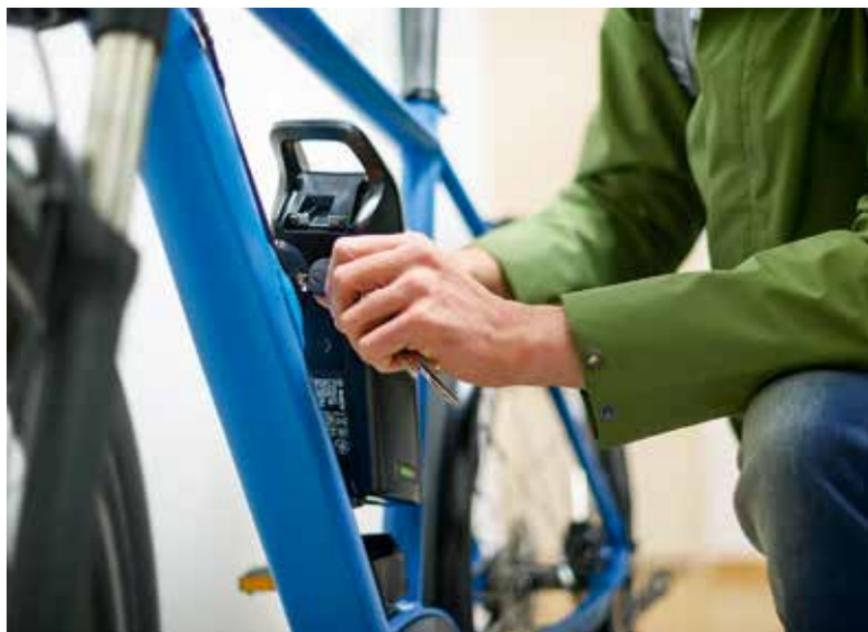
Cleaning & care – Cleaning with a direct water jet is impermissible, in particular to protect the electronic components. Before cleaning the eBike, remove the battery. Occasionally clean and lightly grease the connection port.

Winter use – During winter use (particularly below 32° F (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 14° F (-10° C) and above 140° F (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. Bosch chargers can be used in the United States and Canada as well as Europe and Australia with supply voltages of 110 to 230 volts. Bosch has developed two models that can charge Bosch eBikes quickly and reliably with the 2A Compact Charger and 4A Standard Charger. 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 Compact Charger is the ideal charger for all eBikers who travel a lot. It weighs less than 1.3 lbs (600 grams) and is 40% smaller than the Standard Charger – small enough to fit into many saddlebags.



Standard Charger

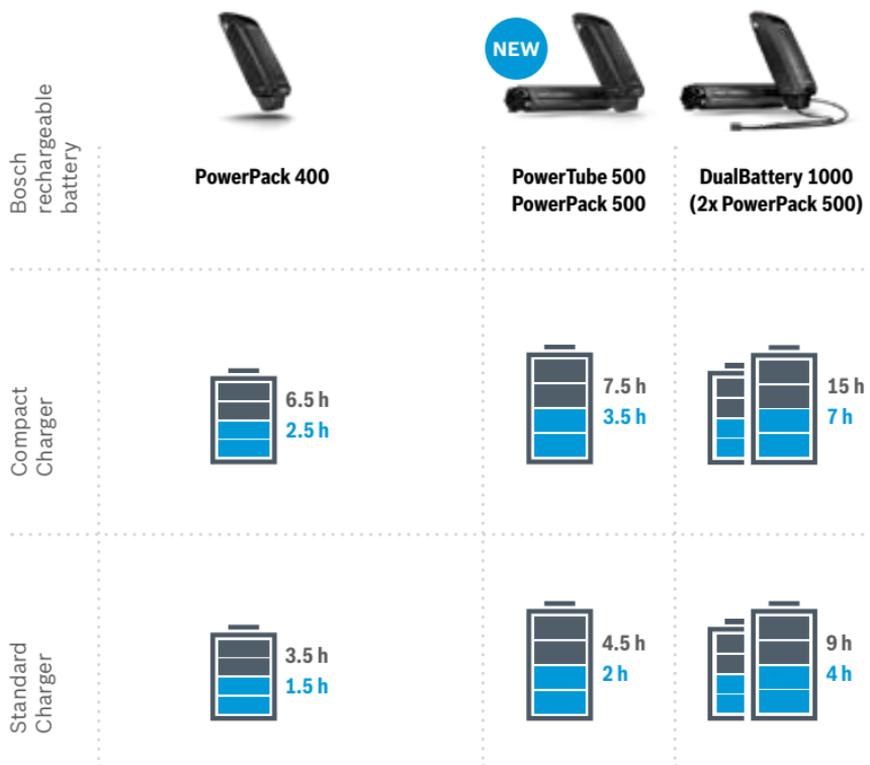
The robust and functional Standard Charger features a convincingly good balance between performance and size/weight and is suitable for every possible use.



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.



 50% charge  100% charge

Service life

Tips for maximizing 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.



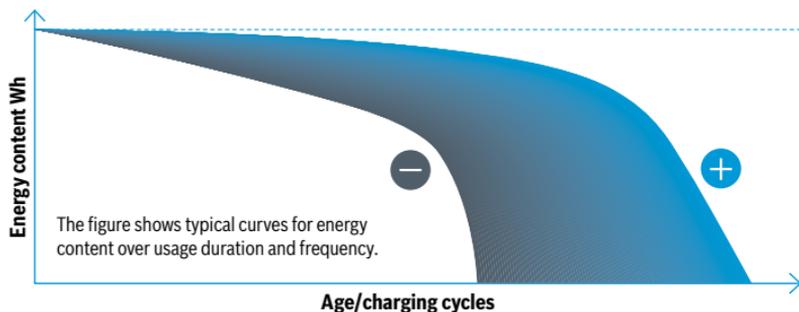
Factors that shorten the service life:

- ▶ Heavy-load use
- ▶ Storage at over 86° F (30° C) ambient temperature
- ▶ Prolonged storage in a fully charged or fully discharged state
- ▶ Parking the eBike in direct sunlight



Factors that extend the service life:

- ▶ Low-load use
- ▶ Storage at a temperature between 32° F (0° C) and 68° F (20° C)
- ▶ Storage at approx. 30–60% charge status
- ▶ Parking the eBike in the shade or a cool location



Benefits

Good reasons for choosing eBike batteries 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 30 cents per kWh).

UL Classified – Bosch rechargeable batteries feature the “UL Classified” quality mark from the prestigious Underwriters Laboratory for peace of mind.



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 30 cents per kWh).

Recycling

Correct disposal of Bosch batteries

Dealers offer a free, environmentally friendly service for disposing of your 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.



Robert Bosch LLC

Bosch eBike Systems

12 Mauchly, Unit E

Irvine, CA 92618

Website: **bosch-ebike.com/us**

facebook.com/boschebikesystems

instagram.com/boschebikeusa

twitter.com/boschebikeusa