

Ebike Riding Range Explained



AVENTON

External Factors

Weight



The heavier an object is the more force it takes to move it. Thus, the heavier the load on the ebike the more the motor has to exert itself, the more the motor exerts itself the more power it uses. This all results in a shorter electric bike distance traveled. This isn't only down to the rider's weight but includes the cargo they may be carrying too.

Terrain



Going uphill requires using more energy as the motor is working against both friction and gravity in this situation, rather than just friction when traveling on flat ground. This is compounded by the weight factor above i.e. more weight going uphill requires even more power. Terrain doesn't just mean hills, and traveling over dirt and gravel, i.e. less grippy surfaces requires more power than traveling on smooth pavements.

Wind & Weather



A tailwind can help to buoy you along, assisting you and increasing your range, while a headwind does the opposite, forcing you and your ebike to work harder, thus reducing your range. Wet surfaces, from paved roads to dirt, are also less grippy, meaning that the ebike has to put out more power to push the rider along.

Stop - Starting



Ebikes take much larger amounts of energy to attain a top speed versus what it takes to sustain speed. Once you've stopped and lost your momentum, the motor is going to have to exert energy to accelerate off the line and get you back up to the top speed you want to travel at.

Human Input



How hard you pedal directly correlates to how much energy the ebike uses. The more energy you put into the system the less the ebike has to put in. This increases your range. Conversely, the laxer you are with your energy input the more the ebike compensates, increasing its energy input and reducing your range.

Ebike Range Calculator

Average Ebike Battery Travel:

1 mile = 20-watt hours

Range Equation

Voltage (V) x Amp Hours (Ah) = Watt Hours (Wh)

Example: Aventon Level

The first and most obvious range factor on an ebike is its battery capacity, i.e. how much power it can hold, and we can use this to calculate an ebike's range. After about 1000 charge cycles, around the 2-year mark for a daily ebike user and up to the 5-year mark for infrequent users or "weekend warriors", you'll notice that the battery won't fully charge. This is a natural part of the lifecycle of all lithium-ion batteries. The electric bike battery life's capacity won't drop by a large amount but a reduced capacity means a reduction in available power and, thus, a shorter range. When this happens it's about time to consider purchasing a replacement battery.

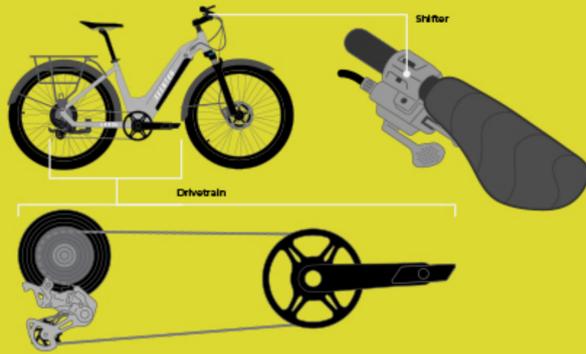


- (1) $48V \times 14 Ah = 672 Wh$
- (2) $672 Wh / 20 = 336 miles$

Mechanical Factors

Gearing

One of our recent articles covered ebike gears, and how to use them to your advantage. In that piece, we talked about balancing the human and electrical inputs of an ebike with the gearing and the terrain. If you're in too high a gear for your situation you and/or your motor are going to have to put in extra effort, burning more watt-hours and more calories. Getting the gearing balanced with your pedal assist level helps you, your motor, and your range!



Tire Choice & Pressure

Slimmer, smoother tires, like commuter tires, are much better at transferring energy into movement than their off-road cousins; especially if those tires are fat tires. Tire pressure also plays an important role and under-pumped tires can harm your ebike range score too.



Tips to Increase Your Ebike Range

Lose the Extra Weight

If it doesn't need to come it'll just slow you down.



Fully Pumped Up Tires

Fully pressurized tires provide the best transfer of power from the wheels to the ground.



Correct Tires

Get tires that suit your purpose i.e. if you ride exclusively on pavements consider purchasing commuter tires instead of the mountain bike style tires you might have.



Correct Pedal Assist Level

Match your desired top speed with a pedal assist level that suits it. Doing so will reduce the burden on the motor because it won't be trying to push you harder and faster.



Ride Slower

Through our own "Real World Range Testing" we've proven that the tortoise always wins the race, that is: the slower your ride the further you'll go.



A Clean & Oiled Drivetrain

The drivetrain runs an ebike. Keeping in good working order is key to operating at the greatest efficiency.

