

CYCLING MADE EASY

WITH ELECTRIC MOTOR ASSISTANCE



- ◆ What to look for & How to choose
- ◆ Commonly Asked Questions
- ◆ Pedal Assist Explained, Battery types,
- ◆ Throttles & Twist Grips,
- ◆ Advantages & Disadvantages
- ◆ Safety and The Law

BATRIBIKE®

Electric Bicycle
Buyers Guide

Electric Bicycles A Buyers Guide



What is an electric bike?

a.k.a Battery bike, E bike, Pedelec

- ◆ In it's most basic form it is a bike with a motor, a battery and a controller to regulate speed and power.

If you are new to Electric Cycling then it can seem that there is a bewildering amount of choices available to you.

This guide will help you understand the terminology and allow you to make an informed choice about what is right for you.

At Batribike we believe that Quality and Service is important and we want you to enjoy your bike for many years to come.

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Commonly asked questions

How fast will it go?

- ◆ The law says that an electric bicycle should not be capable of more than 15 mph (25kph) under power.
- ◆ The bike will go faster than that (going downhill or if you pedal really hard!) but not under power.
- ◆ The average leisure cyclist rides at 8 to 12 mph – so 15 mph is actually quite quick!

Do I have to wear a helmet?

- ◆ Not if you don't want to.

Do I need Tax or Insurance?

- ◆ No, as long as the bike conforms to the regulations for electric bikes it is classed as a bicycle and can be used on cycle paths etc.

Will it go up hill without me pedalling?

- ◆ Electric bikes are designed to assist the rider and by their very nature will not climb the steepest hills with no assistance from the rider.

Do I have to pedal?

- ◆ Yes and No, electric bikes are designed primarily as pedal assist, but they can make it a lot easier. They take the strain out of joints allowing the rider to exercise without over exerting or arriving hot and sweaty. Some bikes have a Twist & Go system that will work without pedalling, but this will reduce the battery range considerably and may not be legal in some countries.

How do I choose the right one for me?

- *Frame first – does it need to fold? Do you need a Trike for stability? What size wheels do you prefer?*
- *Distance – will you be using it for lots of short journeys or are you regularly riding for longer distances?*
- *Level of assistance – How much help do you want the bike to give you? Do you want maximum assistance with minimum effort? Do you want to do most of the work but with assistance on hills? Do you want variable assistance so you can select the level of help for each journey?*



When you know how you are going to use your electric bike it is much easier to choose the right one for you.

Pedal Assist – What does it mean?

Exactly what it sounds like, as you turn the pedals, the controller senses the movement and turns on the motor to help. When you stop pedalling the motor stops.

Types of Pedal Assist

- **Rotation Sensor** – *this senses the pedals are turning and switches the motor on at a pre-set speed. This type of system can be available with a single speed or selectable levels.*

Advantages – You don't have to push hard on the pedals to get maximum assistance.

Selectable level versions are very versatile.

A six level system offers similar advantages to a torque sensor equipped bike.

Disadvantages – Single level version goes at maximum speed all the time.

- **Torque Sensor** – *this additionally senses how hard you are pressing the pedals and varies the assistance level accordingly.*

i.e. If you press gently it just gives a little help (slow), press harder and it helps more (faster).

This system may also have selectable power levels.

Advantages – Slows down and speeds up intuitively. Uses battery economically for greater distance per charge.

Disadvantages – To get maximum assistance full pressure must be put on the pedals.

- **Twist Grip Throttle** - *Some motors are not actuated by the pedals but by a twist grip throttle that must be turned whilst you are pedalling and held in position.*

Advantages – Power assistance variable

Disadvantages – Holding the throttle twisted all the time, including while signalling.

Combination, Pedal Assist and Throttle

Some bikes with pedal assist have a twist grip too. This can allow the rider to take ‘a breather’ without having to stop. On a torque sensor bike this allows the rider to select ‘extra’ power, which can be useful when going up hill.

Easy Start and Launch Assist

These are both terms for a device used to help you get started. Often the hardest part of cycling is the initial push to get going especially if you have stopped on an incline, or in traffic when you want to get up to speed quite quickly.

- **Twist grip** – *variable power, twist more for extra assistance.*

Advantages – instant assist

Disadvantages – twisting too quickly could make bike

unsteady (particularly front hub motors)

- **Button** – up to 4 mph (6 kph)

Advantages – nice steady start, no ‘drama’.

Disadvantages – one speed only.

Battery Types

- ◆ **Sealed Lead Acid (SLA)** – when electric bikes were first becoming popular they were hampered by battery technology and were equipped with SLA batteries.

Advantages – Low cost

Disadvantages – heavy (typically 15kg), limited range (typically 10 – 15 miles), short life (300 cycles)

- ◆ **Nickel-Metal Hydride (NiMh) & Nickel Cadmium (NiCd)** – lighter weight than SLA and greater distance (typically 15 – 20 miles).

Advantages – Cost (mid price)

Disadvantages – memory effect (must be fully discharged regularly) performance reduced in cold weather.

◆ **Lithium Ion** (Li-ion) – even lighter (36v 3.5 kg) with high energy density and no memory effect. There are several types of Li-ion batteries the principals being

- **Lithium Polymer (Li-Po)**
- **Lithium Manganese (Li-Mn)**

Both these types of battery offer good power to weight characteristics.

Advantages – lightweight, good distance (can be as much as 60 miles), good life (1000 cycles)

Disadvantages – Higher cost

- **Lithium Ferrous Phosphate (LiFePo4)** – has good electrical and thermal stability

Advantages – extended life (2000 cycles)

Disadvantages – lower energy density giving slightly shorter distances

Battery Charging – how long does it take?

- **Standard Charger – 6 to 8 hours**

Advantages – Kind to the battery, suitable for low power situations

Disadvantages – you can't recharge over lunch!

- **Fast Charger – 2 to 3 hours**

Advantages – Fast!

Disadvantages – can reduce the life of the battery

- ◆ **Charging from 12V** – generally not available as a direct charger but can be done via an inverter.

Battery Charging Cost

This will of course depend on how much you pay for your electric but typically between 5 and 20 pence.

Battery Replacement Cost

May seem very expensive (£300 - £500) but when you consider the distance you can ride on them it actually is very reasonable. Even if you only do 20 miles per charge for a thousand charges that gives you 20,000 miles. For a £300 battery that equals 1.5p per mile.

Regeneration

- ◆ Some bikes offer a system whereby a small amount of power can be put back into the battery during braking or long downhill runs.
Advantages—can extend the range per charge and offer downhill braking.
Disadvantages—only effective in hilly areas. Some slight resistance when pedalling the bike without power.

Battery Position

- ◆ **Below Seat** – in front of the rear wheel, this has been a popular position for heavier batteries.
Advantages – keeps centre of gravity low
Disadvantages – increases wheelbase making some bikes too long for a standard bike rack.
- ◆ **Rack Mounted** – popular position for Li-ion batteries.
Advantages – Wheelbase can be standard. Battery can be ‘disguised’ with panniers.
Disadvantages – slightly higher centre of gravity.
- ◆ **Water Bottle** – some manufacturers ‘hide’ the battery here
Advantages – discreet and small
Disadvantages – small battery which gives lower mileage.
- ◆ **In Frame** – New lightweight bikes are being developed with the battery inside the frame.
Advantages – discrete, secure.
Disadvantages – Very high cost, harder to replace.



Motor Types

- **Hub Motors** – fitted to the centre of either the front or rear wheel.
 - **Front Hub**

Advantages – can then fit hub gears in the rear

Disadvantages – can be a bit skittish in slippery conditions.
 - **Rear Hub**

Advantages – very stable power delivery

Disadvantages – not compatible with hub gears
- ◆ **Brushed Motor**

Advantages – can be used for regenerative braking. Simple. Reliable.

Disadvantages – can cause drag when pedalling with motor off.
- ◆ **Brushless Motor**

Advantages – causes very little drag when riding with power off. Lighter. Compact. Efficient.

Disadvantages – cannot be used for regenerative braking.
- ◆ **Crank Motor** – drives the bike through the normal gear system

Advantages – efficient, changes gear with the bike.

Disadvantages – expensive, requires specialist frame, beware cheap crank motors.

Displays and Gauges

Battery Meter – ideally choose a bike that has a battery indicator on the handlebars. This can be in the form of an LCD/LED display or a series of lights that go out as the battery charge is depleted.

Some displays may also show extra features such as Speed and Distance Travelled.

On Battery Meter – some batteries incorporate a meter, which is useful if you have more than one battery and can't remember which one you have charged.

Power level – shows selected level of assistance

MISCELLANEOUS

Brakes - these can be any of the 'normal' bicycle types, blocks or discs. The important thing is that purpose built electric bikes have an additional wire from the brake lever which is for a cut-out switch that shuts off the motor when braking.

Lights – these can be powered in several ways, directly from main battery, separate battery for individual lights, dynamo. Be aware that if they are powered from the main battery and it goes flat you will be without lights.

Test Ride - wherever possible. Different models have a different feel when riding, try several to see which suits you.

The Law – In the UK the minimum riding age is 14. The bike must weigh less than 40kg (60kg for a trike). Be restricted to 15mph (25kph). Maximum continuous power output 200/250 W.

- ***Electric bikes get more use – Many people buy a bicycle with the intention of riding to work to save on parking or fuel cost, or as a way of getting fit, but the bike ends up sitting in the garage. Statistics show that people who purchase an electric bike are more likely to ride it and go out more often.***

Now you have the information to enable you to decide which bike is right for you and your needs, come and visit BATRIBIKE to try and buy or visit one of our stockists around the UK.





Electric Bikes from BATRIBIKE are available in many of the Government supported Cycle to Work schemes.



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