

BUZZING ABOUT

Need a little more power to keep pedalling? Richard Peace looks at the pros and cons of electric retro-fit kits

Probably thanks to Sir Clive Sinclair, in 1983 Britain was one of the first countries to give electrically-assisted pedal cycles legal recognition (see sidebar). The Sinclair C5 was a flop and although several more sensible electro-bikes were launched around the same time, all suffered a similar fate. Twenty-three years later and on another continent, nine million light electric vehicles – many of them two wheelers – are forecast to be sold this year in China alone. Most will be heavy and crude, but cheaper to run than a car, which is probably the key to their success in the Far East. Electric bike sales have even been creeping upwards in the UK, with more (and more effective) models appearing.

Whilst the electrical side is improving, most ready-made electro-bikes remain rather heavy and awkward to pedal. 'Moped-like' and 'not sporty enough' are typical criticisms. So

if you already have a good quality bike, you'll probably get a better result from converting it. With this in mind I've looked at how to retro-fit three different electric-assist kits, all with a good track record here in the UK.

There's still the question of whether the help you get is worth the extra weight and cost of a motor and battery. For a fit, active cyclist, the answer is probably not – not unless you deal with *heavy* loads, like a rickshaw rider.

What kind of cyclist might need or want a bit of extra assistance? Those whose cycling is restricted by age, dodgy knees, or a bad back, right through to those who have more serious injuries or disabilities. Most UK enquiries to CTC about electrical assistance are from elderly existing cyclists, who can pedal okay on the flat but no longer cope with hills. So the uphill performance of this equipment is vital.

CURRIE ELECTRO-DRIVE



PRICE: From £399

FROM: E-go, tel: 07974 723996, www.e-go.gb.com

FITTED TO: GT Zaskar mountain bike

KIT WEIGHT: Motor kit 3.8kg. Battery 9.2kg (standard, sealed lead acid) or 5.1kg (Ni-MH)

RANGE: 10-20 miles, depending on bike, weather and terrain (with standard lead acid battery – larger than my test SLA battery).

RECHARGE TIME: 4-5 hours

PROS: Easily fitted by a competent 'non-expert' bike mechanic. Fits to the majority of bikes with 36x3 rear spokes. Easily the most powerful option here, so if you live in a very hilly area or regularly tow heavy loads, the Currie is well worth considering. It powered my GT Zaskar mountain bike, fitted with very wide knobblies, up one-in-five off-road ascents with only moderate pedalling effort. It'll give at least some assistance up even the very steepest of tarmac climbs. It's the cheapest of the three



options here, representing excellent value for money. And it's great fun to ride!

CONS: Not the most elegant looking solution, with an almost DIY appearance when fitted. On a practical level, most annoying was the lack of a battery level indicator. It means you've no idea when the battery is about to run out. The hose clamps used on the torque arm (and with the frame fit battery option I didn't use) need tightening up considerably and so won't do much for a cherished paint job. The full-sized lead acid battery option will be too heavy for most; the Ni-MH option is strongly recommended. I fitted a Gripshift-style throttle option, recommended for those with Rapidfire gear changers – although the shifter and brake lever next to the throttle needed spacing in a slightly awkward position. And power application tends to be 'all or nothing'. You would get more battery life and some extra, gentle exercise if you could feed the power through more gradually.

FITTING: 3-4 HOURS

- 1 Remove your rear wheel and clamp it into the cut-out block (easier with gear cassette removed). You will need a new or respoked wheel if your existing one isn't 36 spokes with a 3-cross pattern. Also check you've sufficient dropout space to accommodate the hub/spoke cut out block.
- 2 Refit the rear wheel and clamp the motor to the chainstay using the torque arm extension of the motor.
- 3 Fit the battery into your frame using the mounting bracket and key-lock fitting or onto a rear rack.
- 4 Attach the throttle control to your handlebars and route throttle and battery connection cables appropriately, attaching to frame with cable ties.





The Canyon Speed Drive offers lots of power, but it's difficult to maintain. Good for hills and heavy loads, though.

OFF-THE-PEG
OPTIONS

GIANT TWIST RANGE

Price: £899 to £1199

Reliable, comfortable and not super-heavy (20-some kilos depending on the model) with smooth, sure power assistance. A quality Panasonic crank motor matches your pedal power and a decent range of 20-plus miles makes Giant Twist bikes hard to beat. Mudguards and dynamo lighting on all models.

Models: The basic Lafree Twist has 3 hub gears. The Twist Comfort has Sram 5 speed hub gears, hub brakes, hub dynamo, a suspension fork and seatpost. The Comfort ST comes with all that but Sram 57 hub gears instead.

Giant are due to launch a cheaper model – possibly retaining the Twist name, but essentially replacing it – this autumn. Giant also offer the £1499 Giant Spirit Revive electric semi-recumbent. See www.giant-bicycle.com.



EZEEL SPRINT AND HI TORQ

A lower spec than the Giant Twist but still reliable with adequate power and a reasonable weight (around 30kg). The lower spec Sprint is good on price (£795 Nexus 3 speed version, £895 Nexus 7 version). The Hi-Torq should be available in the UK by the time you read this and promises higher performance (8 derailleurs gears; £1095 with Ni-Mh battery or £1195 with Lithium-Ion battery). See www.50cycles.com.



The Heinzmann motor needs to be built into a wheel. Front and rear options are available

HEINZMANN



PRICE: From £425 from E-go with lead acid batteries and some non-Heinzmann parts to £845 plus from Kinetics with the Ni-MH battery and all standard Heinzmann parts.

FROM: Kinetics, tel: 0141 9422552, www.kinetics-online.co.uk or E-go, tel: 07974 723996, www.e-go.gb.com

FITTED TO:

Claud Butler Enduro hack bike.

KIT WEIGHT:

Motor and controller around 5kg. Ni-MH battery 5.8kg (though I used the same small lead acid battery as on the Currie).

RANGE: 15-20

miles, depending on bike, weather and riding surface with the Ni-MH battery option. (The normal Heinzmann rack – not tested – is able to carry a spare battery.)

RECHARGE TIME: About 3 and a quarter hours for the Ni-MH battery

PROS: Billed as the Rolls-Royce of hub motors with unbeatable reliability. Lovely smooth power application, ideal for long rides into headwinds or up naggingly long, steady climbs. A good choice of power, from road legal 200/250w versions to much more powerful ones – illegal on public roads – and gearing to suit 20", 26" and 700C wheels. Kinetics will custom-fit the kits to Bromptons.

CONS: Price is the real downside of all this reliable quality. The obvious and bulky hub has a separate controller, which means more cable routing – unlike the other two kits here which have integral controllers. Relatively old technology.

FITTING: 1-2 HOURS, NOT INCLUDING WHEELBUILD

- 1 Install the wheel built around the hub motor into the forks/rear dropouts (separate front and rear hub motors available).
- 2 Fit the controller to the luggage carrier and then mount the carrier on the bike. Fit the battery onto the luggage carrier. (Note: my Claud Butler was supplied with non-standard battery and controller, fitted to a standard pannier rack and to the bottle cage respectively – this ensured these parts were common to both the Currie and the Heinzmann, so they could be interchanged.)
- 3 Mount the throttle to the handlebars then connect, route and tie wrap all cables.

ELECTRIC BIKES AND THE LAW

The Electrically Assisted Pedal Cycles Regulations (1983) give exemption from the usual (i.e. moped) licence, tax and helmet requirements, allowing such a bike to be used just like a purely pedal cycle by anyone over 14, with the main proviso that the motor gives no assistance above 15mph. The total weight of the cycle and power of the motor are also limited to 40kg and 200W, or 60kg and 250W for tricycles and tandems. That's continuous power output; peak output may be higher.

Other countries have more or less similar regulations. Some allow higher powered motors or even small petrol engines, but most European nations are more restrictive than the UK, by not allowing any assistance except when the rider is actually pedalling. The one common factor is the motor cut-out speed of 15mph to 25km/h; and as UK experience clearly shows, that is enough to ensure that the resulting vehicle behaves like a pedal cycle. But in order to sell in more countries, most ready-made electric bikes are 'pedelecs', meaning that they have a pedal-operated motor switch. Some even match the motor power to pedalling power, which is fine for the young and fit but not for the aged and infirm: those who need most help get less! For once it appears that UK legislators, by letting the rider rest from pedalling whenever necessary, have a better appreciation of cyclists' needs than their European neighbours!

More good news for British users of electrically-assisted pedal cycles is that (since 1997) the full range of membership benefits are available to those joining CTC.



SRAM SPARC

PRICE: £728 (kit only, to fit yourself or via a bikeshop)

FROM: Fisher Outdoor, tel: 01727 798345, www.fisheroutdoor.co.uk

FITTED TO: Oyama Victor 1 folding bike

KIT WEIGHT: Hub only 2.45kg. Battery 2.4kg. SRAM gear gripshifter 89g. Remote handlebar mounted switch/battery indicator 45g. Total: 6.19kg

RANGE: 10-16 miles, depending on bike, weather and riding surface

RECHARGE TIME: 4-5 hours

PROS: Unique in combining hub motor and hub gears. Lovely, smooth, just

perceptible assistance up moderate hills. Excellent on-off switch with Eco setting and integral battery level indicators. Sleek-looking and very light, making it a good option to fit to folders.

CONS: Lack of power and the fact the power cut-out came into operation at relatively modest speeds. A smaller niggle is

the fact the battery box is made to clip onto a Dahon rack only meaning I had to use the less elegant solution of bungee cords. Overpriced.

INTO THE FUTURE

Electric bikes are still in their infancy. While big names like Giant and to a lesser extent Sram have staked a significant amount on growing sales (Giant produced



around 250,000 electric bikes in 2005), the other names here are hardly household ones. Currie, Henzmann and Ezee have nevertheless showed that the technology works. It's already reached the point where it can keep someone cycling who otherwise might not.

The main area for improvement is in the power-to-weight ratio of the motors and, more importantly, the batteries. The lighter that motors and batteries become, and the longer those batteries can last, the more attractive electric assistance will be to a wider range of cyclists.

If you're interested in following electric bike developments further, it might be worth subscribing to A to B magazine (tel: 01963 351649, www.atob.org.uk).

FITTING: 1-2 HOURS, NOT INCLUDING WHEELBUILD

- 1 Secure gear sprocket and dustcap on the built-into-a-wheel hub using the special tools provided.
- 2 Fit the Gripshift gear shifter to the handlebars and the clickbox to the hub and index the gears.
- 3 Fit battery to rack and bar mount remote switch then route and tie on all cables.