



'Power is 50 per cent to conserve energy. We're geared for 190mph but if we used that we'd run out at Kirk Michael.'

Mark Miller bounces over Ballaugh Bridge on the old (but better-looking) Elpc

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ELECTRON GUZZLER

The MotoCzysz Elpc: probably the most technically advanced racebike in the world

To petrolheads the MotoCzysz is an anathema. The Elpc digital superbike is stripped of the soul that makes a 'real' racing machine. There's no snarling exhaust. No vibration from spinning crankshaft assemblies, or valve-train clatter. No dry-clutch rattle. No clunk of gear dogs engaging. Not even the smell of burnt hydrocarbons.

You simply twist and go. The rolling rubber makes more noise than the 'hair-dryer' driving it. It's not... well, it's not a real motorcycle is it?

Tell that to Michael Rutter, who clocked 149.5mph along Sulby Straight on his way to winning the TT Zero race. In fact, the bike's geared for 190mph but he couldn't use it because battery charge conservation is everything on the 37.73mile lap.

Taken for what it is, rather than a petrol-head's preconception, the latest Elpc is

probably the most technically advanced racing motorcycle in the world. Although superficially similar to the 2010 TT Zero race winner that American Mark Miller rode again this year, the 2011 bike is heavily revised: new motor, new controller, new cooling, new chassis, new aerodynamics.

And while Rutter won from Miller by 18 seconds, he came up 0.396mph short of winning the Manx Government's £10,000 bonus for the first 100mph electric lap.

It was still a momentous occasion for Michael Czysz, who built and designed both bikes at his Portland, Oregon base. We asked him to talk us through the bike's extraordinary technology.

Motor

'It's made by (Indian-based) Remy. This year it's much more specific to the needs

of a motorcycle. There's a better window for torque and better over-run. We didn't have that before and when you shut the throttle the thing just stopped. It's all been achieved with the winding strategies on the stator, electronics and gearing.'

Controller

'This is like the fuel injection system of a conventional motorcycle. It's all-new and incorporates a KERS (Kinetic Energy Regeneration System) type system for the first time. It doesn't create power but it does recover it. We have a partner to do the firmware; we do the software.'

Batteries

'We've been working on trying to get the most energy into the smallest space. These dual-core lithium polymer batteries are



Left: Quick-change battery system on Miller's 2010 bike. Below: battery bulk – the big problem with electric bikes. A rumoured 285kg is five stone more than a ZZ-R1100



made by Dow Kokum (world leaders in battery technology). We could add more batteries but that just adds weight. Racing is always a compromise, but even more so with electric bikes. I haven't got the scope within the design of this motorcycle for weight distribution changes."

Carbon chassis

"It's based on our C1 'frameless chassis' (Czysz's radical, but stillborn, 990cc MotoGP prototype project) but this features even more carbon fibre. The suspension is unique, and comes from our hot-swap battery change system. It's always been part of our strategy (the original electric TT proposed a two-lap race) so the suspension has to be out of the way. We had some space inside the dummy tank cover so we located the shock absorbers for the forks and swing-arm in there. I'm into the word 'efficiency' now. Never was before."

Forks

"With no need to incorporate the suspension within the forks, we made them oval shape for improved aero. They transfer energy to the shock via a titanium/carbon fibre pushrod."

Above left: Rutter's 2011 bike runs oval 'aero' forks. The system is like Paul Taylor's Saxtrac, or BMW's Telelever. Cranks and pushrods at both ends work the shocks

Swingarm

"Again we use a titanium/carbon fibre pushrod to transfer energy from the swing arm movement to the shock. The swing-arm is much lighter than last year's and although final drive is still by chain, we use an internal gear reduction drive. Last year's was chain driven."

A theoretical 200bhp

"When a race team with a conventional petrol engine claim horsepower there is no way to check it. I have a Desmosedici that has a claimed 200bhp. On our Superflow dyno it produces 175. And if you took it to another dyno the horsepower figure would vary."

"With electricity there is a mathematical formula of volts x amps to give you kilowatts, and there is a direct correlation to horsepower. So when I quote 200bhp, that is 200bhp - our peak power. My goal was to create 95 per cent of peak power but Michael Rutter was riding our bike at 50

per cent because we had to conserve energy to complete the lap. We were geared for 190mph but if we used that potential then we'd run out at Kirkmichael. But at 50mph we could do 150miles!

That's the equivalent of asking John McGuinness to drop eight tenths of his fuel and then do the six laps of the TT course. We're only six per cent into the development so, in real terms, we're not even walking yet. People forget that the petrol bikes have well over 50 years of development. We're three years into ours and I'd say we're at between an eighth and a tenth of our potential for energy right now."

Will batteries catch on?

"There are so few bikes in the TT Zero race (five, against 13 for the inaugural 2009 event - ed) because there are not enough fanatics. I've put passion ahead of business to do this, but the next generation of electric bikes will happen. We're excited by the technical advances we have made for 2011 and these advancements will eventually be available to other motorsports teams. That will help deliver that same advantaged performance to passenger vehicle electrification as well." 