

## Phoenix Model Products

### September 2012 News Letter

Welcome to our September newsletter which we hope you find an interesting read! Firstly well done both team GBs in the Olympics. What a performance. Last Christmas my son bought me a years subscription to Time magazine as a present. I enjoy reading Time magazine as it gives an introspective insight into the world and the UK in particular from the outside. Recently there have been two articles in there about the UK. One posed the question of how come a little state like GB was able to punch above its weight in world politics and the second questioning our success in the Olympics! I was left with the impression, which I already had, that the UK is not a bad place to live. Back to business.

### Loose Props.

The occasional day of tropical sunshine regularly catches us out. Forget the sunburn and going out for the day dressed in Artic clothing in 30 degrees plus. What about our models! A couple friends have lost props on their electric models on one of these dreamed of days. The models have been flying without incident for months. My speculation is that this is the result of different rates of expansion between the steel motor shaft and the aluminium prop adapter. Both props were fitted in cooler times and both incidents occurred when it was hot. Added to this aluminium will stretch under tension so the combination of both resulted in the prop not being on as tight as it should be so it is well worth checking the tightness of the prop nut occasionally not only from a safety viewpoint but quality electric folding props are not cheap!

### Brushless Motors

We have had a couple of burnt out brushless motor returns in the last few months. On investigation and doing the arithmetic it is apparent the motor(s) have been over-propped. Electrics is not a black art when the mist is lifted! It just needs to be explained in simple language. As a nuts and bolts person I parallel electrics with the mechanical world which I more readily understand. To help lift the mist I have written a number of articles which are available on our website [www.phoenixmp.com](http://www.phoenixmp.com) which, for those wandering around in the mist, we recommend printing them off and reading over a leisurely cup of something.

As a starter, ask yourself if this model was a powered by an IC engine what motor would I fit, what prop would I use and what do you expect the full throttle RPM to be. In my experience it is likely to be around the 8-9000 mark. Using the internet, find out the max power (HP / Kw) for the motor. If quoted in HP convert it to watts by multiplying HP x 750. Most IC motors when propped for sports flying are only producing around two thirds of this figure so if you select a brushless motor within 90% of this figure then you have a comfortable safety margin. The next decision concerns motor Kv (RPM per Volt). Multiplying Kv x Volts gives the theoretical RPM of the motor. In reality the most efficient operating RPM will be around 75% of this figure. The voltage of a LiPo battery under load should be around 3.5v per cell. Multiply this by the number of cells being used and you have the pack operating voltage. Divide this by prop RPM and this will yield the motor Kv x 0.75. Divide this by 0.75 and you have the Kv of the motor you require.

Typical example for a 0.25cu. in engine using a 9x6 prop

Max power output  $0.6\text{HP} = 750 \times 0.6 = 450\text{w}$   
Battery 3S Lipo =  $3.5\text{v} \times 3 = 10.5\text{v}$  operating voltage.  
Required motor RPM 9000  $9000/10.5\text{v} = 857$   
Motor Kv =  $857 / 0.75 = 1142$

So motor specification would be 2-4cell operating voltage. 1140 Kv or there about and 4-500watt rating. An Outrunner motor of this spec. would normally be in a 35mm diameter case.

### Prop Selection

To aid prop selection a **rough** formula for prop loading prop loading is Diameter squared x Pitch i.e. for a 10x5 this would be  $10 \times 10 \times 5 = 500$ . A 9x6 would be 486. To increase Thrust **reduce** pitch. To Increase speed **increase** Pitch. The higher the cell count (operating voltage) the **smaller** the prop!

### Chargers

Still on the 'brain numbing' theme we have had a couple of customer moans re charge times for their LiPo batteries. Again doing the maths it is obvious that they were expecting more from the charger than it could deliver. Whilst a typical 50w charger can charge at 5 amps and can charge 6 cells it cannot meet both criteria at the same time. The charge voltage for a single LiPo cell is approximately 5v. Therefore a 6 cell pack needs a charge voltage of 30v.  $30\text{v} \times 5\text{A} = 150\text{w}$  way beyond the capability of the charger! In fact the largest 6 cell pack that can be charged at 1C (C=Battery capacity) is  $45\text{w} / 30\text{v} = 1.5\text{Amps}$  allowing a 10% safety margin. Most modern chargers have output limiters which reduce the charge current to avoid damage. This of course extends the charge time. Other reasons why the charge will take longer than expected is that energy is lost in the conversion and also in the balancing process. If you wish to charge at 1C or higher on more than a 3S 3000mA pack then the only answer is to buy a higher output charger such as the Sigma Hyper (ACDC 200w) or Overlander 8S (12v DC 150w).

### Multiplex GPS Sensor

A local model club has found a new use for the MPX GPS telemetry sensor in pursuant of a Change of Use planning application. Apart from relaying height and GPS position this sensor can also be set to sound an alarm when the model goes above a predetermined height or beyond a certain distance i.e. 500ft / 300 metres. Often, at planning inquires, a lot of statements are made without any substantive evidence to back them up but with the aid of a GPS fitted to a model and flown at the site in question the club has the ability to support their claim with verifiable evidence.

### AeroNaut Props and Spinners

Good news on this front. We now have stock in depth of the full range of AeroNaut of electric folding props and spinners available. I mention this because in conversations with a number of customers it is apparent many are unaware that we stock AeroNaut. On a lighter note on a social visit (no work this time!) to our son Terry in Boston MA we visited the Aerospace museums in Washington. In the drone section there was a small 1.5m plus twin electric drone fitted with AeroNaut folding props!

## Stan's Kits



During the 'summer' despite other distractions we have still been working hard on the re-introduction of a number of our pre EPP wooden kits. The Mk2 versions of the Carrera, Cariba and a second batch of the Pzazz are now on the shelves. It has been great fun re-introducing these kits. The way the models fly has been a bit of an eye opener, almost like re-inventing the

wheel! I have particularly enjoyed flying the Cariba. I still had the original built in 1981 until recently when a battery failure at St Agnes gifted it Neptune! A big plus with the new kits for those who are allergic to glues like epoxy and cyno is that 99% of the construction can be done with PVA. Epoxy and Cyno (Superglue) are only used in very small quantities. The Pzazz and Cariba are priced at £69.95 whilst the Carrera is £74.95.



## Special Offers

The model retail sector in line with other areas of business is responding to the straightened times by either cutting prices or adding incentives to existing packages. The Futaba 6 & 8J combos come with a free 6 channel Rx whilst the Spektrum DX6i and DX8 combos come with two extra receivers. Multiplex have dropped the price of the Royal Pro 7 and 9 channel combos. MPX have also upgraded the 9ch set by packaging it with the more expensive Pro 9 Rx. We

understand these are all limited time offers. The Spektrum DX8 offer has already run its course but we still have offer sets in stock!

### At Last

If you have got this far well done and many thanks for your perseverance! I am sorry if it got a bit heavy in the middle and I do apologise to the theorist if I took a too simplistic approach re the electrics but one step at a time. And thank you once again for your loyal support.

Happy landings

*Stan & Sheila*

PS Do not forget to visit our website <http://www.phoenixmp.com>. It is more than a shop. There are over twenty articles on various topics. It is not just an on-line shop!

