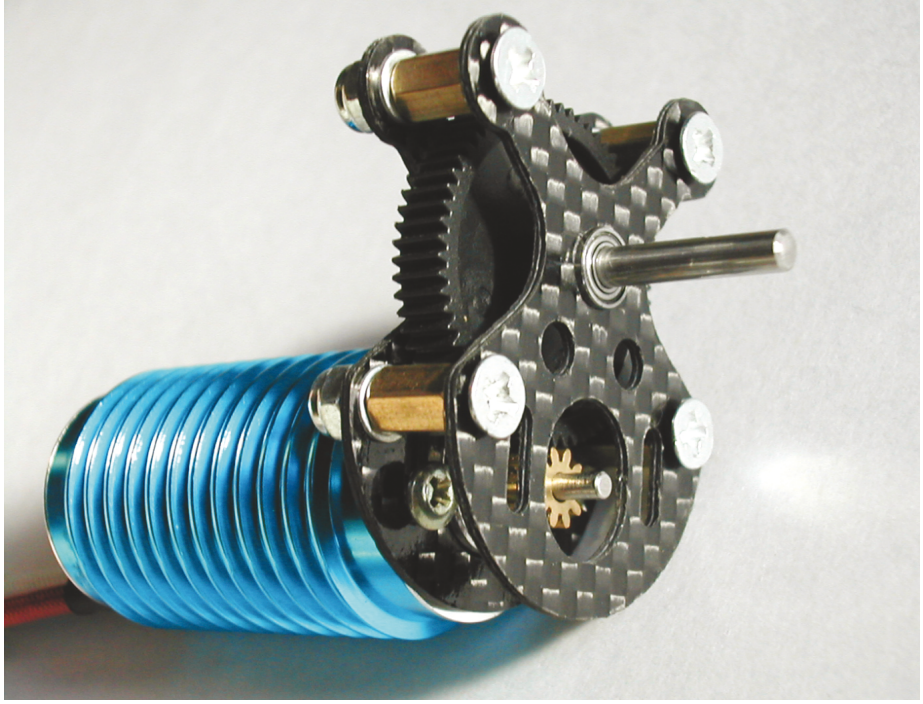
Product Review

Precision Aerobatics Brushless power set up

by
James Armstrong



In the last issue of RCM NEWS I reviewed Precision Aerobatics Katana Mini electric ARF and provided some general information about the set up of the model.

When getting further into electric you find that the airframe is just a small portion of your investment and most of your money goes to the set up. The good thing about it is that you can always "re-locate" the entire set up in your next model in the same category.

PA tell me that they are now designing few new electric models that can be powered with the same set up but this of course can be used with many other models around.

This review involves PA latest releases: PA 2000mAh 3s lipo pack.
PA blue shark brushless motor.
PA 25A ESC. PA carbon fibre gearbox.

These four components complete the power system for the PA Katana Mini. After many hours of flight I can say that this setup is very well suited to that plane, making it capable of pretty much anything!

The 2000mAh 3s LiPo pack has a rating of a constant 10c and weighs just 130g with the appropriate deans ultra connector attached. This pack was designed for those demanding high power at a light weight. PA informed me that they start producing 1700mAh and 2200mAh 3s packs with 12-15C. Those new packs will also have balancing connectors that allow to charge and balance each individual cell.

The "Blue Shark" is a 65g in-runner intended for a gearbox. Its case has fins machined-in that wrap around the perimeter of the motor. These help with cooling with the increased surface area and also act as a spacer when fitting the motor into a "GWS style" gearbox as the actual motor diameter is only 20mm. The motor is made for 200-250watts, just have to be careful on the throttle stick when running up and over 220watts as things can start to heat up after lots of hard throttling.

For the "Blue Shark" to turn an appropriate size propeller for the Katana Mini, a deep gear reduction is used. PA offers a carbon fibre gearbox that is super strong and also looks very nice with its hi-tech carbon look. The gear reduction follows the basic single stage gearing and unlike the "GWS style" gearbox's, the PA carbon fibre one is mounted direct to the firewall and not to a 10x10mm stick. The gearbox is made from two CNC machined carbon fibre plates that are spaced with screws, nuts and machined metal stand offs. It weights only 14g and I found it very efficient.

The PA 25A ESC has a continuous rating of 25A as the name suggests and is fully stick programmable. That's a good 270w available watts from the ESC. Once you read the manual it is easy to program following the beeps and red led.

The system offers excellent performance in the Katana Mini.

Installing the gearbox

The new gearbox has 4 screws that hold the gearbox together, to the very front firewall. This provides a very secure mount that is un-affected by torque. The spacing of the 4 screws allows a very big anchor point for the gearbox where as the 10x10mm stick mount gearbox's has very little anchorage.

For the motor to be attached to the gearbox, it needs to have the front plate taken off. The motor is secured to the rear plate with 2 screws. The gearbox is then attached as per instructions to the firewall.

Having the adjustable gear mesh is great. Once I had it assembled I tightened the motor in a position that gave very smooth mesh in between the gears. I could tell by eye as well as by spinning the shaft.

I attached the battery by Velcro into the Katana mini's fuselage and the ESC to the motor cage by zip ties. Zip ties and Velcro, if used properly are a very easy and effective way to mount components.

Running and flying the power system

This setup provided plenty of power on the bench, running 220w through an 11x5.5E APC prop, it was doing some serious RPM's. I couldn't take a reading of rpm, but it was very high.

With a balanced prop and gear mesh adjusted, it was very smooth. It did take a few goes to find the perfect mesh. It is easy to tell when you find the right mesh as it is a very sweet and smooth sound.

As wrote in the last issue of RCM news in the Katana mini review (which used this exact power system), it all performed flawlessly, power wise it was fantastic. I myself didn't think that 220watts was much on a 24-27oz model, it sure is plenty. The 11x5.5E APC prop shone in all attitudes of

flight as well, with its aerodynamic shape and the power of the motor, it spooled up very quickly and had no lag.

The carbon fibre construction of the gearbox makes it very stiff, which doesn't let torque twist and wear the mounting. The Katana Mini motor box is also very structurally strong, so the whole front end is built like a truck and can take a fair amount of abuse. I really put the gearbox through its paces, my mind was set on stripping the spur gear. Over many flights I have seen no wear, still runs smooth as it did to begin. The adjustable gear mesh really lengthens the life of the spur gear. Even under heavy loads, there is no slipping or anything of the likes. I also had a few nose overs with the Katana mini at a good speed, leaving the prop receiving a sharp and heavy force. I haven't come back from any of them with a snapped shaft or even a bent shaft.

The power source is the 2000 mAh three cell Lipo pack.

The motor and battery were warm after a very hard flight, not hot enough to harm them though. The battery gave very good power all the way until low voltage cut off turned on. With the pack freshly charged, a one minute motor run of staying over ¾ throttle had the battery holding a constant 10.5V on the wattmeter. The voltage will of course sag after time though, when powering the motor, this is normal.

I am very pleased with each component of the power system, especially the gearbox for its strength, and looks. The adjustable gear lash was a great feature as spur gears will last a long time with the ability to fine tune the gear mesh. The motor, running close to its maximum power out put, powered the 680-770g Katana Mini with ease. I find it outstanding performance for a motor of this size on a plane of that weight. The performance of this power system combo can be seen on a video of the Katana Mini on Precision Aerobatics website – www.precisionaerobatics.com.

The items mentioned in this review can be purchased from
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