COMBAT ZONE

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Fingertech TinyESC v2 Review

● by Thomas Kenney

Just a few weeks back, Fingertech Robotics released the upgraded version of their popular TinyESC single channel speed controller. I was one of the first to have a chance to try out this new piece of hardware in the arena, and my experience so far has been nothing but positive.

The original TinyESC was released to the market in late 2008 and soon became a favorite among insect builders. Two separate versions of the speed controller were made available: one requiring an external 5V from the receiver; and the second with a 5V 100 mAh continuous battery eliminator circuit at no real weight difference and an increased cost of less than $5. It also featured reliable temperature, over-current, and over-voltage protection to help prevent the release of the infamous magic smoke that plagues most electronics in this field. Of course, the most defining attribute of the TinyESC is its namesake compact and lightweight design – take it up less than five grams and is small enough to be crammed inside a half inch cube.

The TinyESC v2 keeps all of

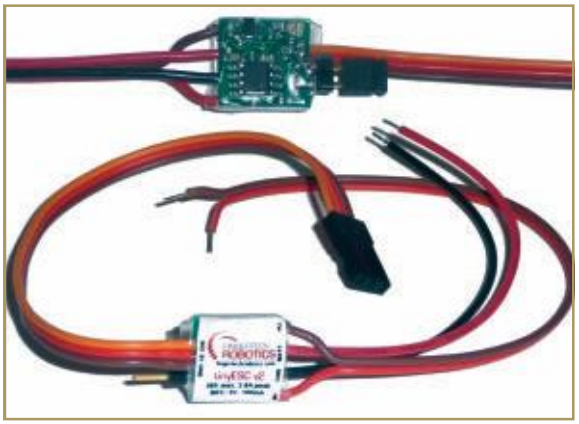

PHOTO 1, A front and rear view of the TinyESC v2 displaying the header pins and jumper used for the speed **controller's new calibration function.**

these great features, even expanding on some of them as the 5V battery eliminator is now incorporated into every speed controller at the same price of the first version, sans BEC. What's probably the most prominent new feature on this revision is the addition of a calibration function, setting the trim dead on, and eliminating the need for any adjustment on the transmitter end. The method is simple — it uses the two header pins and a small jumper (both seen on the back of the ESC in **Photo 1**) to move into calibration mode. The calibration function is also accompanied by a new set of status LEDs indicating the calibration process, as well as a directional signal. The only downside with any of these new features is the .5 grams increase in weight and .4" increase in length due to the addition of the calibration header pins. Nonetheless, for the space and weight paranoid (as I myself am with smaller bots), this menial increase can be dealt with easily by trimming the pins after the calibration is set up.

PHOTO 2. Though the robot is a bit bigger than where TinyESCs are usually used, I needed the weight, and the new TinyESCs **delivered; they didn't show a** hiccup even when running the hot wound B-series motors in a three pound robot!

Overall, I'm very pleased with the second generation of this speed controller. It keeps all the great features of the original and expands on those to create an ESC for small combat bots that's one of the most easy to use, compact, and bulletproof on the market today.

The TinyESC v2 is available from **www.fingertechrobotics.com** and should soon be carried by Fingertech's US distributer at The Robot Marketplace. **SV**

MANUFACTURING: Calculating Bolt Torques

● by Matthew Spurk with Katherine Kelly

Sparks fly as the two robots smash into each other again. Sweat drips down your forehead as you prepare for another charge across the arena. It's been a good battle, but you definitely have had the upper hand landing several solid blows, but your opponent is tough. He takes the blows and keeps coming back for more. The announcer calls out "one minute remaining in the bout." A few seconds later, you notice that your robot is beginning to pull to one side when you try going forward. Oh No! You've lost your right side drive. There's still 40 seconds in the match and now your opponent has a distinct advantage. You struggle to keep the weapon pointed at him, but with 20 seconds left in the match the wheel slips off the end of the motor shaft. Your opponent proceeds to make full box slams across the arena, and you're helpless to stop them. Time expires and it goes to a judge's decision. You enter the arena and disable your bot, then do the walk of shame across the arena to gather that missing wheel. The judges turn in a split decision and it's not in your favor. You manage a valiant shrug, shake your opponent's hand with a smile, and head out of the arena. As you pull your bot back to the pits you hear the calls of "unlucky" and "tough break" from your fellow competitors, but you know, deep down, that they're wrong.

Had you just read that article in *SERVO Magazine* on bolt torques, none of this would have happened. Here is your chance to prevent that from ever happening again!

If you've ever had to work on your car, you've probably come across a manufacturer specified bolt torque. The purpose of that torque is to ensure that the bolt will not work loose over time. As the nut is turned, it creates tension (stretch) in the bolt. This stretching creates a clamping force also known as a bolt preload. What this article explains is how to calculate how much force you need to apply to your wrench in order to achieve that force in the bolt. Calculating the force required to stretch the bolt is a relatively easy calculation provided you know a few key pieces of information about your bolt and its environment.