the Ampeer

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The Next Meeting:
Saturday, Nov. 03, **11 a.m.**, Midwest 7 mi. Flying Field

What's In This Issue:

The Power Meter, a MUST HAVE Tool
AEO Tech P1 HV Review

Ken Myers
Sept. 26, 2012

Prolog:

This was a difficult review to write. The article required a total revision at the beginning of the seventh day of testing the unit, September 24, 2012.

There were test days when I felt that the AEO Tech P1 HV watt meter was worthless and other days where it appeared to have some merit. The original six first full days of testing and data collecting, along with the original review, were scrapped. It was extremely difficult to get a handle on the best way to use this unit, although it would apparently seem to be easy!

In the article, "Getting Started in Electric Flight: An Introduction and Some BASICS", I recommend a power meter as the first electric flight purchase.
http://www.theampeer.org/e-basics/e-basics.htm

My personal preference is the Hyperion Emeter 2 and RDU (remote data unit). It is relatively expensive, compared to other power meters, but it exactly suits my needs. It has a **Hold** button and many other features. The article "Emeter II: First Impressions and Use" is located at
http://www.theampeer.org/emeter2rdu/emeter2rdu.html

Hoping to find a less expensive alternative to the Emeter 2, I explored the $49.99 Jun-Si PowerLog 6S with a review in the August 2011 *Ampeer*.
http://www.theampeer.org/ampeer/ampaug11/ampaug11.htm

Progressive RC is a PowerLog 6S supplier.
http://www.progressiverc.com/index.php/powerlog-6s.html

One of the reasons that I purchased the PowerLog 6S unit was because it had a **Hold** button.

In the early days of electric flight, the Astro Flight Whattmeter was the only commercially, readily available, power meter.

To capture data that appeared on the screen at the same time with the AF Whattmeter, I had to set up a video tape camera to tape the information during

any motor testing, play back the tape, hit pause, record the data and continue.

A **Hold** button on a power meter seems to be a very good idea!

Unfortunately, the **Hold** button on the PowerLog 6S is a bit of a deceiving name. It is really a key or push button for capturing and recording data.

I continued to search for a reasonably accurate power meter with a true **Hold** button.

The AEO Tech P1 HV Watt Meter

The Aero Electronics Operations (AEO Tech) aka aeorc.com P1 noted a **HOLD** button.

AEO Tech actually had three different versions; the P0, P1 and P1 HV. Their Web pages tried to describe the differences in broken English. The P1 version is no longer available and it's manual can no longer be downloaded from the aerorc Web site.
http://www.aeorc.com/english/?article-87.html

Hobby King sells the units as;

HobbyKing P0 Wattmeter 100A
http://www.hobbyking.com/hobbyking/store/__14624__HobbyKing_PO_Wattmeter_100A.html

Hobby King X1 Wattmeter & Voltage Analyzer
http://www.hobbyking.com/hobbyking/store/__10349__Hobby_King_X1_Wattmeter_Voltage_Analyzer_.html

P1 High Voltage Wattmeter (100Amp) by Hobby King
http://www.hobbyking.com/hobbyking/store/__17142__P1_High_Voltage_Wattmeter_100Amp_.html

All were in stock at the end of September, 2012 at the Global warehouse. Surprisingly, no watt meters are stocked at the USA warehouse.

Nitroplanes/HobbyPartz/XHeli/NitroRCX carried the;
AEO P0 Watt Meter/Electronic Power Measurement (in stock end of Sept.)
http://www.hobbypartz.com/aeo-p0-watt-meter.html
AEO-RC P1 Digital Watt Meter / Electronic Power Measurement (out of stock end of Sept.)
http://www.hobbypartz.com/88e-aepm300-p1-watt-meter.html

Before I ordered one of the units, I read about them on RC Groups.

A Wattmeter In Your Pocket-AEO P1
http://www.rcgroups.com/forums/showthread.php?t=1101847

Two attractive Wattmeters?
http://www.rcgroups.com/forums/showthread.php?t=1239444

P1--More accurate and have higher resolution
http://www.rcgroups.com/forums/showthread.php?t=1118758

I also watched this video on You Tube.
http://www.youtube.com/watch?v=yW3B8kR2_mk&feature=player_embedded

When watching the video, petty much ignore the narration. Some statements are wrong and some of the advice is inaccurate. Just watch and study what the meter is doing.

True RC (http://www.truerc.com) showed the P1 in stock and it was ordered on Friday, Sept. 14, 2012.
http://www.truerc.com/index.php?main_page=product_info&cPath=30&products_id=90

It arrived in the mail on Monday, Sept. 17.

Upon opening the package, there was a surprise inside. It was the P1 HV (high voltage).

I immediately called the supplier to ask if there had been a mistake. Dan, of True RC, said that this is the upgraded version and his Web site still had the info for the older version. The site has since be updated.

Dan noted that the P1 HV can do a larger range of voltages and therefore, it is useful over a wider range of batteries.

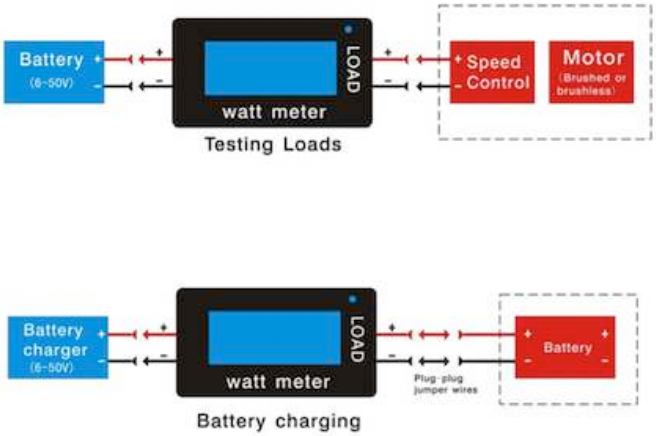
Unit as received w/double-sided one page "manual"

Preparing the meter:

The P1 HV is shipped without connectors. The unit arrived with blue and black 12-gauge leads. There was no indication as to the polarity in the one page double-sided manual/instruction sheet.

http://www.aeorc.com/download/manual/Electronic_Product_User_Manual/P0P1HV_Wattmetermanual_UserManual_ENG.pdf

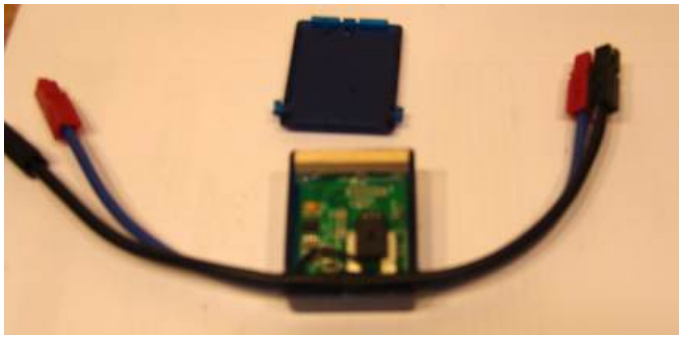
The only indication regarding polarity, in the manual/instruction sheet, was two diagrams on the back of the sheet. The diagrams are not of the P0, P1 or P1 HV. The diagrams are for a generic watt meter of different design than the AEO Tech products.



Watt meters shown in the manual/instruction sheet

Both diagrams show the black wire as negative and a red wire as positive. Besides having no red wire on this meter, the diagrams show something, how to set up a typical power meter to read mAh returned to the battery during charging, that cannot be accomplished with this meter. There is no provision to indicate mAh returned to the battery.

The pre-soldered ends were clipped from the 12-gauge leads. "30-amp" Anderson Power Poles (APP) were crimped onto the leads. The black housings (indicating negative) were put onto the black wires and red housings (indicating positive) onto the blue leads.



The unit could not be calibrated as delivered. The **Hold** button was not protruding through the top of the case. The case back was removed. The glue (possibly hot glue) used during manufacturing to hold the circuit board to the top of the case not holding the circuit board to the side of the plastic case.

I fabricated a 3/16" x 5/16" by 1-3/8" piece of balsa to fit across the case and hold the circuit board to the top of the case so that the **Hold** button protruded through its hole in the case. The 5/16" dimension was used to secure the **Hold** button through its opening in the case and can be seen in the photo of the unit with the case back removed.

P1 HV with APP connectors added & Multimeter used for voltage calibration

The method used to enter calibration mode is incorrect in the manual/instruction sheet.

To enter calibration Mode, the **HOLD** button is held down and THEN the battery connected. After a few seconds of holding the button, it enters calibration Mode.

A Radio Shack Digital Multimeter (Cat. No. 22-168A) was used to calibrate the P1 HV's voltage.

Because the **HOLD** button is inconsistent and intermittent in its contact, it takes quite awhile, and an extreme amount of patience, to calibrate the unit

to an acceptable level. The display is small and not backlit. This also makes the unit difficult to calibrate and use. Pressing the button with the right forefinger obscures the voltage number when trying to calibrate the unit.

In calibration Mode, there is a pause as the software moves the highlight between ADD, SUB, LOAD, and SAVE. The voltage is adjusted up or down on the calibration screen by pressing the **HOLD** key while ADD or SUB are highlighted. The newly calibrated and adjusted voltage can change by the time the software finally moves to highlight the word SAVE and be out of synchronization with the calibrating multimeter. When it does, the process must be repeated, often repeated many, many times to finally get an accurate calibration.

Warning! DO NOT accidentally press the button when the calibration highlight moves to the word LOAD. It may take a myriad of presses to return the unit to the desired calibration voltage.

Once the meter is calibrated and the battery is plugged in, the information about the meter, including the software version (2 in this case) appears briefly on the screen. The next screen shows volts (U), current (I) and power in/Watts in (P). There is an unexplained notation THRxxx% under the highlighted word **HOLD**.

The P1 HV's voltage was very carefully calibrated to the resting voltage of a recently charged 3S "A123" 2300mAh pack (10.42v) using the multimeter as a reference to adjust the volts displayed on the P1 HV's calibration screen.

The multimeter's setting was changed to amps. The P1 HV's screen read U=10.42V, I=0.2A, P=2.4W. The multimeter indicated 0.12 amps. The multimeter suggests that the power in at 10.42v would have been 1.3 watts in (rounded up from mathematical 1.2504 watts in). These numbers do not match very closely.

The P1 HV only displays the current to one tenth of an amp. 2.4W / 10.40v = 0.23 amps. It appears that the displayed number was rounded down from 2.3 amps to 0.2 amps.

After this short test, the P1 HV's voltage displayed 10.41v and the multimeter 10.39v. The P1 HV was carefully calibrated to the multimeter's voltage display once again before further testing was completed (10.37v).

For the next test, a load test with the prop on, the perviously calibrated Emeter 2 was placed inline with the P1 HV; battery, Emeter 2, P1 HV then ESC. The **HOLD** button on each device was pressed as simultaneously as possible. The readings:
P1 HV: Um=8.36V Im=31.9A Up=8.44V Ip=31.9A P=268.8W
Emeter 2: 8.55 Volts, 32.5 Amps, 278 Watts

According to the P1 HV manual/instruction sheet, Um means minimum voltage, Im means maximum current, P means the maximum power, Up means maximum voltage and Ip means maximum current corresponding to the maximum power. It appears that Im and Ip are always the same.

The power shown on the P1 HV was 268.8W and both currents were 31.9 amps. 268.8 / 31.9 amps equals 8.43 volts. The closest displayed voltage was 8.44V for the Up display. This matches the statement on the manual/instruction sheet, "Up and Ip means the maximum voltage and maximum current corresponding to the maximum power."

The Emeter 2's displayed voltage of 8.55 was 1.3 % higher than the P1 HV's Up of 8.44V. The Emeter 2's displayed 32.5 amps was 1.8% higher than the P1 HV's 31.9 amps. The Emeter 2's displayed amps of 278 Watts was 3.3% higher than the P1 HV's 268.8W.

After the test, the voltage calibration of the P1 HV was compared to the multimeter. Their voltages were an identical 10.06 volts.

What happens when the now very well calibrated P1 HV watt meter is run on a 6S "A123" 2300mAh instead of 3S "A123" 2300mAh?

The same set up of battery, Emeter 2, P1 HV and ESC was immediately used with a 6S "A123" 2300mAh system using the same procedure.
P1 HV: Um=16.89V Im=27.2A Up=17.00V Ip=27.2A P=463.1W
Emeter 2: 17.06 Volts, 28.2 Amps, 481 Watts

The power shown on the P1 HV was 463.1W with the Ip (power corresponding current) 27.2 amps. 463.1 / 27.2 amps equals 17.03 volts. The closest displayed voltage was 17.00V for the Up displayed. Again, this matches the statement on the manual/instruction sheet, Power displayed is Up times Ip.

The Emeter 2's displayed voltage of 17.06 was 0.4 % higher than the P1 HV's Up of 17.00V. The Emeter 2's displayed 28.2 amps was 3.5% higher than the P1 HV's 27.2 amps. The Emeter 2's displayed amps of 481 Watts was 3.8% higher than the P1 HV's 463.1W.

After the 6S test, the voltage shown on the P1 HV was compared to the multimeter reading for the original 3S pack. The P1 HV read 10.06V while the multimeter read 10.07 volts.

The Compare Mode

To enter the compare mode, according to the manual/instruction sheet, the **HOLD** button is pushed **before** the throttle is opened.

3S "A123" 2300mAh readings in compare mode.
Um=8.39 V Im=33.0A Up=8.63V Ip=33.0A P=285.1W

6S "A123" 2300mAh readings in compare mode.
Um=17.39V Im=29.6A Up=17.68V Ip=29.6A P=523.1W

Compare mode seems to be the best way to use this meter. It captures and displays, if only for an instant, the peak amps Ip and peak watts in or power. This shows whether the power system is within limits for the ESC and motor, since all other measurements using the same battery, motor, prop combination will be lower after the peak.

The 3S battery was allowed to rest and recover for more than an hour and then the voltage on the P1 HV was compared to the multimeter. Both units read 10.03 volts.

Conclusion:

It appears that this type of meter is **best used in comparison mode** to check to see that the amps are within the limits of the power system under investigation. It works best when the unit's volts are freshly calibrated to the battery pack in question, especially when using a 2S "A123" or 2S Li-Poly.

To measure the peak amps, I recommend that the freshly charged battery be connected to the power system with a prop based on the manufacturer's recommendation and run for approximately 10 seconds to 15 seconds, just counting one thousand one, one thousand two, etc., for each second. If the Up (volts used to calculate power) is greater than 12 volts and the amp draw is 10C or greater, repeat the test. It is not unusual to see a valid Up in the low 12 volt range at around a 5C amp draw.

Next connect the P1 HV inline with the battery pack and ESC. Once connected, press the **HOLD** button and moderately run up the motor to full power. Read the meter noting the Ip and P numbers.

Keep in mind that even when the unit is not in use, it appears that it does not stay in voltage calibration with the meter used for the voltage calibration, such as a digital multimeter. Heat appears to affect the P1 HV as well.

The P1 HV watt meter works well enough, but since it cannot measure mAh returned to the pack during charging, has tricky calibration, questionable design, an inconsistent push button and other quality control issues, my search for a **Hold** button on a power meter continues.

Using the P1 HV to Check Maximum Amp Draw, an Example
Sept. 25, 2012

A 3S "A123" 2300mAh pack was charged and then rested for a couple of hours to attain a resting voltage. The P1 HV had not been used since the previous day. The P1 HV's voltage reading was checked against the Radio Shack multimeter and both meters displayed 10.89 volts.

The battery was hooked up to the ESC and the power system run for approximately 10 seconds to move the battery voltage down from the 'peak' area near the beginning of the discharge.

The Emeter 2 and P1 HV were then connected between the battery and ESC. The Emeter 2's Logging function was started and the **HOLD** button pressed on the P1 HV to put it in Compare Mode. The throttle was advanced, at a moderate rate, to full power and then shut down.

3S "A123" 2300mAh readings in compare mode.
P1 HV: Um=8.27 V Im=32.1A **Up=8.47V**
Ip=32.1A P=271.7W
(use the **bold** numbers to compare to the Emeter 2 readings)
Emeter 2: 8.57v, 32.7 amps, 280 watts in

Once again the difference between the two meters was relatively small. The voltage difference was 1.2%, amperage difference 1.8% and power difference 3%.

The voltage was checked on the P1 HV and multimeter several hours after the test and they both displayed 10.03 volts.

The ESC in this power system is a CC Phoenix 45 (45-amp) and the motor is a Hyperion Z3019-10 rated for maximum efficiency between 28 amps and 37 amps with a peak current of 46 amps for 60 seconds. Both meters show that this system is operating well within the acceptable safety margin for the ESC and motor.

Again, the P1 HV watt meter appears to be a 'good enough' tool for the job, as long as its voltage is calibrated to the battery being tested.

Midwest RC Society
24 Annual
R/C Swap Meet

Sunday, November 4, 2012
9:00 a.m. to 12:00 p.m.

Location
Northville Senior Center Community Center
Northville, MI
Admission Charge
$5.00 per person
(active duty military, kids under 12, and women are admitted FREE)

Vendor Table Cost
$20 - $25 per table, depending on location
The Vendor *table cost includes on admission,*
Vendor setup time is 8:00 a.m.
Advance table reservations are HIGHLY recommended. Last year we sold out in advance!

For Information call Rudi Reinhard
248-631-8205 or email wwtbi@comcast.net

Directions
Take the 8 Mile Rd. Exit off of I-275 and go west 2.5 miles on 8 Mile Rd. to Center Street
Go south, left, on Center Street for 0.5 miles and then turn left, west, on Main Street.
The Northville Senior Community Center is located at 303 W. Main St. in downtown Northville.
There is FREE parking in the back of the building, off of Cady Street.

This is the BEST and LARGEST swap meet in southeastern Michigan!

Agri-duck Power System Problem
From Kyle Matthew via email

Hi,

Here is my situation. I've got an Agri-duck and have been having some power issues.
RC Groups thread:
http://www.rcgroups.com/forums/showthread.php?t=1725238
Video of first flight with a different prop than noted:
http://www.youtube.com/watch?v=pZa_icNmcLs

This is my latest setup:

Motor: Hyperion Z4035-12 generic name: 4860-343, 446g
(*Motor specs per Hyperion: wt. 446g, eff. current 36-53, Max current 65 amps (30 sec), power range 800W ~ 1400W (1600W short time KM*)
Battery: Zippy 6s 5000mah 25c
Prop: APC 20x13E
ESC: CC PHX ICE 100a

Bench test:
Watts: 1477
Amps: 74
Volts: 20.21
W/lbs: 98
(*At 98 watts in per lb., plane weight = 15 lb. 2200 sq.in. KM*)

The last flight was looking good and about **4 minutes into it**, while backing off the power and turning base to final, the motor died. I made a hard landing in some medium height weeds. It took me about 4 minutes to get to the plane. While picking it up, I touched the motor shaft and burned my hand!

Next I noticed the battery was super hot and puffed. It was puffed so much that I couldn't get it out. With the real fear that it could catch fire at any moment I ranked it out and the wires came out.

The battery was a little crunched in the front but I don't think that is what made it puff.

After that I noticed the ESC was really warm.

When I got home I hooked up my Castle Creations Phoenix Ice to the laptop and saw the maximum watts recorded was 1710, maximum amps was 95, and the maximum temperature was 236.

These were all peaks and not for long, average amps were in the 60's and average watts in the mid-1400s. I wasn't at full throttle hardly at all.

One more big note, the PHX Ice 100a has a BEC but I also used a 4.8v receiver pack. I forget to disconnect the red wire on the ESC. Do you think this could have been the problem or something else?

The motor is rated for 1400W continuous and 1600W "for a short time". The battery and ESC were both within their operating ranges. I'm not sure what failed. Any help would be great. I ordered a Turnigy G160 (290kv) (*generic name: 6466-245, wt. 649g*) from Hobby King with a APC 19x12E prop, same ESC and same battery (I had 2). Do you think this will be better? Thanks

Kyle

My Reply, Sept. 19

Hi Kyle,

From your description, the motor stopped in the air.

It sounds like the ESC is usable and you were able to retrieve data from it. If it is still working in all other respects, then that is probably not the issue. I do use the CC ESC with the red wire unhooked. So far I haven't forgotten it, as I use a short aileron extension with the red wire removed to do it to make it easy when switching planes if I want to use the built-in BEC. I have read that folks have found it not to be a problem, but I have no firsthand experience, yet, with that.

If the motor was still trying to turn while it was in the weeds, it was most likely stalled and drawing huge current, but you should have seen that with the CC software.

You didn't say how the motor was after the crash, besides hot. Did the motor throw a magnet? Is it still usable? Just curious.

You should 'see the crash' with the ESC data record, something should have shown up after you throttled down while turning base to final. What do you see there? Again, just curious.

Keep me informed with what you find out,
Ken

A follow-up from Kyle

Ken,

Thanks for writing back. I tested the motor later that evening and it worked fine along with the ESC. It seems the only casualty was the battery.

Here is the data from the ESC (*attached csv file KM*), you said you also use CC ESCs so I'm assuming you also have the CastleLink Graph View software. Looks like I was ramping up the power to clear some trees and then the battery failed. You can see the voltage drop off until it hits the Low voltage cut-off. When I noticed the plane wasn't staying level I quickly pulled the throttle to idle to

try to reset the ESC and then went back to full throttle in a last ditch effort to make the runway. At that point the voltage comes back up but the motor didn't respond (no RPM). That leads me to believe the battery failed then the motor failed. Can you take a look and see what you can make of it?

Note: On the graph my flight starts at about the 500 second mark. The data prior to that was engine test runs and maybe some from the person I bought the ESC from.
(*Actually Session 4 is the flight and Session 5 the recorded data after the LVC reset. KM*)

Thanks,
Kyle

I received a follow-up email from Kyle regarding the LVC setting.

It was set at 3.2v. I raised it up to 3.4v and couldn't get to full power for more than one second before it cut off. Battery isn't up to the challenge, ordering a pair of Turnigy Nano-tech 6s 5000 45C LiPos soon. Hopefully they will work.

The following is from an email I sent back to Kyle

After many days of evaluating the Session 4 csv (***comma-separated values***) file in a spreadsheet and with the Castle Creations graphing software, I realized that I had missed the BIG, HUGE clue in this sentence of the first email, "The last flight was looking good and about **4 minutes into it**, while backing off the power and turning base to final, the motor died."

I should have started my original reply to Kyle from the beginning.

The first flight of the power system should have been only 3 minutes, not 4. Why? 'Best practices' suggest that a 5000mAh Li-Poly, for long life, should not have more than 80% of the capacity removed. In this case, that is 4000mAh or 4Ah. 4Ah * 60 minutes equals 240 amp minutes. 240 amp minutes divided by the measured maximum amp draw of 74 equals 3.24 minutes. It would have been wise to land when the timer hit three minutes and recharge the pack noting the mAh returned. The flight time could then have been adjusted based on the returned mAh figure.

In the article in the July 2012 *Ampeer*, regarding the Ice logging, I noted that the CC data and other measuring devices data do not coincide very well, except for the RPM.
http://www.theampeer.org/ampeer/ampjul12/ampjul12.htm#ICE50

In the following, the mAh determined by the CC logging software is noted, so it should be taken with a grain of salt.

At 3 minutes (180 seconds) the data record of the flight, which was actually 315 seconds after the ESC was initialized, indicated that 3310mAh had been taken from the pack for an average amp draw of 66.2 amps. (66.2 amps * 3 minutes = 198.6 amp minutes or 3.31Ah * 60 minutes = 198.6 amp minutes.) This could have been verified had the plane been landed and charged near the 3 minute point of the flight.

According to the recorded data, 4000mAh of the flight was reached at 215 seconds or 3.58 minutes into the flight. That is 350 seconds from the ESC initialization. The average amp draw at that time was 66.9.

The throttle had been reduced significantly at 211 seconds into the flight (346 seconds from initialization). Had the plane been on final at that time, all should have been well.

A careful study of the spreadsheet created from the csv file and the Castle Graphing Software showed that the LVC (low voltage cutoff) circuit "kicked in" at 210 seconds or 3 seconds into the flight. Once the throttle was "ramped down" by the LVC circuit, the battery continued to be "drained" for another almost two minutes. The CC graphing software indicated that 5.5Ah was taken from the 5Ah battery.

The new power system:

The APC 20x13E on the new Turnigy motor and battery should pull in the neighborhood of 76 amps or 77 amps after the initial peak battery "burn off". The APC 19x12E will be lower.

The initial flight with the new pack, a single 6S1P 5000mAh, should be the same as the first power system should have been, three minutes, and then the recharge and mAh returned to the battery noted. With only 4000mAh available from a single 6S 5000mAh pack and a 70+ static amp draw, this will plane will never fly for very long. A better

solution would be to put the two new 6S 5000mAh packs in parallel (6S2P), NOT SERIES! That would double the flight time, as well as the initial flight time, which would be 6 minutes.

The wing cube loading at 15 lb. is a very light, 4.02. The extra Turnigy Nano-tech 6S 5000mAh pack, weighing 813g, 28.68 oz., or 1.79 lb., should make very little difference to the flight characteristics as the wing cube loading would be 4.5 at 16.79 lb. Wing cube loadings in this range indicate that the plane "flies like" a backyard flyer, even with the extra pack in parallel.

Here's an example power system that I would have recommended for use with 5000mAh Li-Poly packs;

Scorpion SII-5525-195 *generic 6660-195, wt. 708g*
http://www.innov8tivedesigns.com/product_info.php?cPath=21_25_145&products_id=1148&osCsid=753f77dc9180b57802d197cba869e528
approx. 59g heavier than Turnigy G160
http://www.hobbyking.com/hobbyking/store/uh_viewItem.asp?idProduct=18181
or the
Turnigy Aerodrive SK3 - 6364-190kv *generic 5973-190, wt. 697g approx. 48g heavier than Turnigy G160*
http://www.hobbyking.com/hobbyking/store/uh_viewItem.asp?idProduct=18181
9S 5000mAh pack made up of 4S (526g) & 5S (650g) **in series**, *approx. 392g heavier than a 6S 5000mAh*
Castle Creations Phoenix Ice2 HV 60

According to both the Glow to Electric Conversion Worksheet for Outrunner motors & Lithium Polymer Cells for the Agri-duck (http://www.theampeer.org/ampeer/ampnov12/agriduck.xls) and Drive Calculator (http://www.drivecalc.de) using a Hyperion S5525-195Kv as a similar motor, a 9S system, similar to the above, should pull about 50 amps static and provide about 1550 watts in to 1600 watts in, depending on where in the discharge the static numbers were gathered and how "good" the battery is.

Note about the agriduck.xls: The 'Mfg. Max. Weight' (B9) was noted at 16 lb. to allow for the increased weight of the 9S power system. The 'Desired watts in per pound' (B11) was decreased to 27 to yield a 'Suggested Power' (B16) of about 1600 watts in for the 16 lb. plane.

Good luck with the 'Duck'.

More follow-up from Kyle

Ken,

WOW...thanks!! I got the motor, Turnigy G-160 and I also got two new batteries, Turnigy Nano-tech 6s 5000mAh 40C. I planned on putting them in parallel for more flight time. Should I keep my first flight to 6 min? Also, I ran the motor and battery and when I got to full throttle the motor sounded like it was rumbling. At about 3/4 throttle, all was good and it was producing nice power. Once I hit full throttle, the rumble started again. I've got my ICE 100 set to low timing (0) and PW set to outrunner. Cutoffs are set to hard. They were set to soft for prior flights and LVC is set to 3.2. Even with the rumble it's still pulling the plane like no other. Bench test showed approximately 1800 watts in, 84 amps and 22 volts. That was peak for about 2 seconds because I wasn't sure if I should leave it at full throttle with the rumbling.

Any ideas on what that could be?

Kyle

My reply

Yes, the initial flight can be about 5 minutes with the 6S2P. Not sure how you measured your bench test, but at 84 amps then 8Ah (80% of pack stated capacity) * 60 = 480 amp minutes divided by 84 amps = 5.71 minutes or 5 minutes 42 seconds. To error on the safe side, 5 minutes would be a good place to land and then see how many mAh you return to the packs. During that 5 minutes you should fly the plane as you intend to fly it, not in any special way, which might negatively affect the results.

I'm not sure what the rumbling might be. You already did what I would do, that is place the timing at low.

You didn't say which prop you used to pull 84 amps. (He later let me know that it was the APC 20x13E.) You might want to check the balance on the prop. I don't believe that is it, but worth a check. Also, the various Turnigy motors are not known for very good balance. Be sure it is not vibrating too much with a balanced prop on it. Any little 'extra' vibration will be amplified by the firewall with the fuselage acting as a sounding board.

When checking your amps, not with the ESC, but other meter, I'd recommend running a fully charged pack down about 15 seconds before taking that static reading.

The LVC circuit cutoff shouldn't come into play, and we don't really want it to, if things are going as expected.

Sounds like you are getting it under control,
Ken

Success: October 12, 2012

Kyle posted the video on RC Groups of his 4.5 minute successful flight today.
http://www.rcgroups.com/forums/showpost.php?p=22982714&postcount=25

The 4.5 minute flight only took about 2000mAh out of each 6S pack. That's an average of about 55 amps.

Upcoming E-vents

Nov. 3, Saturday, EFO flying meeting at the Midwest 7 Mi. Rd. field, **11 a.m.** Everyone welcome, AMA membership required to fly

Nov. 4, Sunday, Midwest RC Society Swap Shop, Northville Senior Recreation Center, Main St., Northville MI, 9 a.m. to noon (more details in this issue)

Indoor Flying Starts at the Ultimate Sports Arenas

Skymasters R/C Club
Indoor Electric Flying

Ultimate Soccer Arenas 867 South Blvd.,
Pontiac, MI
2 miles south of the Pontiac Silverdome

Tuesdays from 11 AM to 1 PM November 6, 2012 thru March 26, 2013 Holiday Sessions and Special Events

Single 2 Hour Session $10.00
Five 2 Hour Sessions $30.00
Season Pass $100
*Special Family Rate With Parent Supervision
Additional Charges for Special Events & Holiday Sessions
Large Enough For Simultaneous Sport, 3 D, Micro, and Heli. See rules for size and weight limits.

All Pilots must have proof of current AMA Membership
For more information call Roger Schmelling 248-321-7599 Visit the Skymasters' Web site at www.skymasters.org

The Ampeer/Ken Myers
1911 Bradshaw Ct.
Commerce Twp., MI 48390
http://www.theampeer.org

The Next Monthly Meeting:
Date: Saturday, November 3, 2012 **Time:** **11 a.m.**
Place: Midwest 7 mi. Rd. Flying Field