the Ampeer

April The EFO Officers 2013

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No Mailed Ampeer Subscriptions

The Next Meeting:
Thur., April 11, 7:30 p.m., Ken Myers' house (address above)

What's In This Issue:

Review of Hobby King's Turnigy G25 710Kv Outrunner

(http://www.hobbyking.com/hobbyking/store/__19024__Turnigy_G25_Brushless_Outrunner_710kv.html)

By Ken Myers

Dave Stacer loaned me a Turnigy G25 710Kv outrunner to test and add to the Drive Calculator database (http://www.drivecalc.de). The motor has now been added to the current Drive Calculator database.

Dave did not supply a prop adapter, so there is no information on it in the specifications and weights.

I do not take motors apart to inspect their construction, but the exterior was nicely finished. It has a 5mm shaft diameter, which is good for this size motor.

The first table shows the supplier's data and the second table is a comparison between the supplier's data and measured data.

Supplier Data:		
Kv:	710	
Weight (g):	185	
Max Amps:	44	
Watts:	600	
No Load Amps:	1.6A	11.1V
# LiPo Cell:	3-4/11.1v-14.8v	
Generic Name:	3553-710, 185g	
Poles*:	10	

Dimensions:	HK	mm #1	Inches #1
Motor diameter:	35	35	1.38
Motor length w/bump:	**NA**	**57**	**2.24**
Motor length no bump:	53	53.5	2.11
Motor Shaft Length:	**78**	**78**	**3.07**
Motor Shaft Diameter:	5	5	0.20
Prop Adapter Length:	**NA**	**0**	**0.00**
Adapter Backplate to End of Shaft:	NA	0	0.00
Adapter Shaft Diameter:	**NA**	**0**	**0.00**
oter Backplate & Prop Washer Dia.:	NA	0	0.00

Weights:	HK	Grams #1	Ounces #1
Motor w/leads & connectors:	185	185.3	6.536
"+" Motor Mount w/4 screws:	**NA**	**5.2**	**0.183**
Prop Adapter:	NA	0	0.000
Total Less Prop Adapter:	**NA**	**190.5**	**6.720**

The specifications from Hobby King, the supplier, are in the HK column and the measured data in the other columns.

Hobby King states that the Kv is 710. It was measured as 738 using a drill press and mathematical calculations and Drive Calculator calculated a Kv of 740.

Generically it is a 3554-740, 185g.

It is a 10 pole motor. The number of poles is important when using a phase tachometer, which attaches to the motor

leads to 'read' the RPM, using devices such as the Hyperion Emeter 2 (http://www.rcdude.com/servlet/the-Accessories-cln-Gadgets/Categories) or Eagle Tree Systems eLogger (http://www3.towerhobbies.com/cgi-bin/WTI0097p?P=SM&CATEGORY=&MANUFACTURER=ETR).

To clarify what poles are, Eagle Tree Systems notes:

"To calibrate the RPM sensor, you need to know the number of "poles" your brushless motor has. This information is normally supplied by the motor manufacturer. (*It wasn't for this motor! KM*) **The term "poles" refers to the number of magnets in the motor** (NOT the number of stator teeth, "legs," or "hammerheads.") For example, if you have an outrunner with 10 teeth on the stator and 14 magnets in the flux ring, the motor has 14 poles. Note that most (but not all) in-runner motors are two pole motors.

If you are uncertain about the number of poles, or want to verify you calculated correctly, a hand-held tachometer can be used to compare the RPM value displayed real-time by your recorder, in a bench test (assuming it is safe for you to do this). Real-time display is available in Recorder USB Live Mode, on the eLogger PowerPanel, or with the Seagull Wireless Dashboard. (*This had to be done for this motor. KM*) If the value displayed is incorrect, you can change the poles setting to adjust the displayed RPM value. For example, if your handheld tachometer reads 4000 RPM, and your Eagle Tree data shows the maximum RPM of 8000, you would need to double the number of poles to "2"."

Eagle Tree Web site:
http://www.eagletreesystems.com/support/Manuals/brushless-rpm.pdf

The last table shows Drive Calculator **ESTIMATES** for the **approximate** performance at an elevation of 287m or 940 ft. AMSL and a temperature of 24-deg C or 75-deg F. **Always use a power meter to determine whether the prop is appropriate for the elevation and temperature it will be used at. In general, lower elevations and ambient temperatures raise the amp draw!**

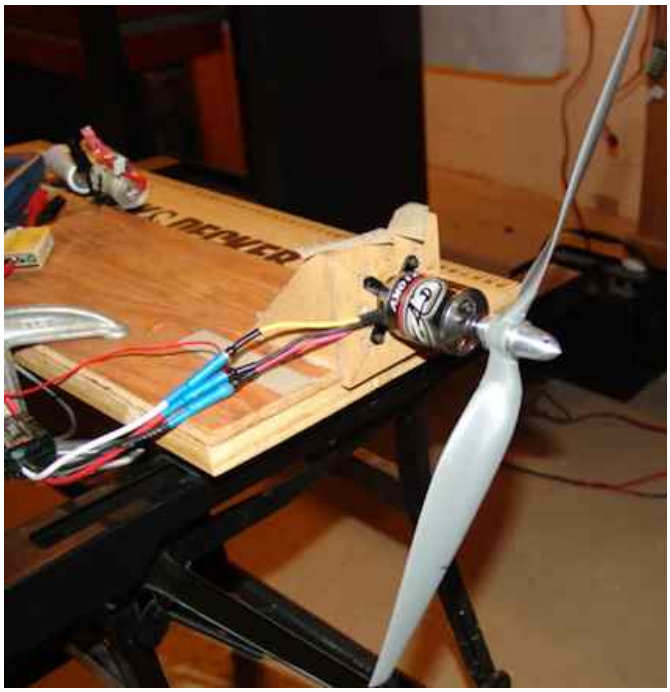
Note: The 11x10E prop with a 4S LiPo pack and the 10x7E prop used with a 5S LiPo pack exceed the recommended maximum motor watts in of 600, as recommended by the supplier.

Four and five cell "A123" 2300mAh packs would be appropriate for use with this motor.

APC Propeller	Volts	Current	Pin	Pout	System Eff. %	R.P.M	Pitch Speed mph	Thrust
12x10E	11.1	29	317	246	77.8%	6810	64	1240g/44 oz.
13x10E	**11.1**	**38**	**417**	**308**	**73.9%**	**6380**	**60**	**1499g/53 oz.**
13x6.5E	11.1	28	307	240	78.1%	6850	42	1764g/62 oz.
14x10E	**11.1**	**43**	**472**	**338**	**71.6%**	**6150**	**58**	**2155g/76 oz.**
14x8.5E	11.1	36	400	298	74.6%	6450	52	2156g/76 oz.
14x7E	**11.1**	**33**	**360**	**275**	**76.1%**	**6620**	**44**	**2182g/77 oz.**
9x9E	**14.8**	**26**	**387**	**314**	**81.1%**	**9550**	**81**	**1123g/40 oz.**
9x7.5E	14.8	21	317	260	82.0%	9800	70	1187g/42 oz.
10x10E	**14.8**	**34**	**509**	**401**	**78.7%**	**9120**	**86**	**1470g/52 oz.**
10x7E	14.8	23	339	277	81.8%	9730	64	1535g/54 oz.
11x5.5E	**14.8**	**26**	**377**	**307**	**81.3%**	**9590**	**50**	**1800g/63 oz.**
11x8E	14.8	36	537	419	78.1%	9020	68	1812g/64 oz.
11x10E	**14.8**	**41**	**610**	**466**	**76.4%**	**8770**	**83**	**1816g/64 oz.**
11x8.5E	14.8	35	524	411	78.4%	9070	73	1889g/67 oz.
11x7E	**14.8**	**30**	**443**	**355**	**80.1%**	**9350**	**62**	**1990g/70 oz.**
12x6E	14.8	35	513	403	78.7%	9105	52	2369g/84 oz.
12x8E	**14.8**	**41**	**599**	**459**	**76.7%**	**8810**	**67**	**2425g/86 oz.**
13x6E	14.8	38	556	432	77.7%	8955	51	2708g/96 oz.
8x8E	**18.5**	**27**	**498**	**410**	**82.4%**	**12135**	**92**	**1245g/44 oz.**
8x6E	18.5	19	359	298	83.0%	12575	71	1281g/45 oz.
9x4.5E	**18.5**	**19**	**345**	**286**	**82.9%**	**12620**	**54**	**1551g/55 oz.**
9x9E	18.5	39	726	577	79.4%	11440	98	1610g/57 oz.
9x7.5E	**18.5**	**32**	**599**	**487**	**81.2%**	**11820**	**84**	**1763g/62 oz.**
9x6E	18.5	23	416	345	82.9%	12390	70	1765g/62 oz.
10x5E	**18.5**	**27**	**498**	**410**	**82.4%**	**12135**	**57**	**2129g/75 oz.**
10x7E	**18.5**	**33**	**618**	**500**	**81.0%**	**11765**	**78**	**2306g/81 oz.**

The Pin/watts in, estimated thrust and pitch speed from the table suggests the power system's application.

This motor is also supplied with a supplier's stated Kv of 610 (http://www.hobbyking.com/hobbyking/store/__19023__Turnigy_G25_Brushless_Outrunner_610kv.html?gclid=CJuru9OWu7UCFSNqMgodoC4AaA) and 870 (http://www.hobbyking.com/hobbyking/store/__14401__Turnigy_G25_Brushless_Outrunner_870kv_.html).



The G25 on the test stand

Upcoming Keith Shaw Birthday Party Electric Fly-in 2013

The Balsa Butchers will once again be hosting the "Keith Shaw Birthday Party Electric Fly-In" at their field near Coldwater, MI. The event will take place on June 8 and 9, 2013.

Contest Director: Dave Grife - E-mail: grifesd@yahoo.com or Phone: 517.279.8445

Please e-mail or call with any questions.

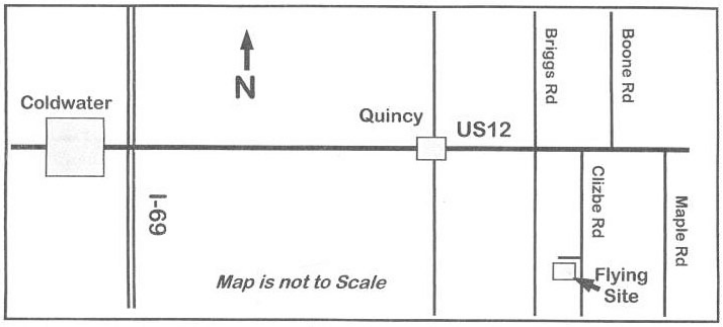
The Flying Field will be open Friday, June 7 for early arrivals

Saturday, June 8, hours are from 9 a.m. 'til 5 p.m.

Sunday, June 9, hours are from 9 a.m. 'til 3 p.m.

Landing Fee is $10 for the weekend.

Directions: Quincy is approximately 4.5 miles east of I-69. Clizbe Road is approximately 1.6 miles east of Quincy. The Flying site is approximately 1.5 miles south of US-12 on the west side of Clizbe Road.



The February EFO Meeting

The meeting was held on the evening of February 14 at Ken's house.

Several current projects were shared.

Roger Wilfong, brought along a couple of projects.

The first one he shared was his GM Glasscraft Rivets. It is a neat, little, go fast plane.

His second plane was a giant Lazy Bee purchased at a swap shop. He thought it was nicely done with a silk covering and that he could recover the fuselage with silk and dope, since the wing looked pretty good when he bought it.

Unfortunately, it was not to 'bee'. He ended up having to recover the whole model.

It is powered with an Astro Flight brushless geared motor and 5 "A123" 2300mAh cells.

Richard Utkan, EFO vice-president brought his Walt Mocha 'Or What'. It has a 60-inch wingspan and a wing area of 675 sq.in. It weighs in at 4.5 lb. (72 oz.). It is powered by an Astro Flight 25 geared and 5 "A123" 2300mAh cells.

Hank Wildman shared his latest project. He demonstrated his retracting gear unit that he intends to put in his EDF airliner. (photo - top right)

After the show and tell, **Ken Myers** took the folks to his basement to demonstrate how he collects motor data for input into Drive Calculator. Jim Young brought the motor. It was a Hacker

A50-12S that he is planning on using in his Skybolt bipe with a 6S Li-Po pack.

After the data gathering and demonstration on how to use the collected data, the members enjoyed some refreshments.

Motor Review: Hacker A50-12S V2 Outrunner

(https://www.aero-model.com/8_69_899/Motors_Hacker-Brushless-A50-12S-V2/A50-12S%20V2.html)

By Ken Myers

February 2013

Lynn Morgan, a fellow flier at the Midwest RC Society, flies this motor in his Osiris pattern plane (http://www.3dhobbyshop.com/62-Osiris--Red_p_15388.html) using a 5S Li-Po, Castle Phoenix Ice Lite 100, and PT Models 16x10E Carbon prop. He reports 1550 static watts in at wide open throttle near the beginning of the battery discharge.

I've watched him fly this plane for a long time and have been very impressed by the power. I

asked him to send me one of his recent Ice 100 Lite data files from the logging ESC. I was interested in how much over the "rule of thumb" of 3 watts in per gram of motor weight he was running this motor. It's a lot, but that's another story for another time.

Jim Young needed to replace his Astro Flight 40G brushed motor in his Skybolt biplane. He decided to use this motor with a 6S LiPo.

He brought his motor to the February EFO meeting where we collected the data using it to input into Drive Calculator.

(http://www.drivecalc.de)

The motor is nicely produced. It comes with an excellent choice of hardware including; a collet type prop adapter, bolt-on prop adapter, "+" mount and assorted screws, nuts and bolts. The motor may be mounted to a forward mount with the 'can' rotating behind it or on the "+" mount with the 'can' rotating in front of it. The mounting options, with the included hardware, make for very versatile installations!

About Our Motor Manufacturers and Suppliers

While doing some motor research, I recently ran across this quote on RC Groups.
http://www.rcgroups.com/forums/showpost.php?p=24213549&postcount=565

"Unfortunately there are a lot more "motors" than "testers with the appropriate test equipment". Since manufacturers data (if any exist) are often unreliable and don't include the necessary parameters anyway, the only way a motor becomes useful to DriveCalc is if someone tests it extensively..... even in DriveCalc, some motors are there simply because someone entered the manufacturer's Io, and maybe no-load rpm!

Cheers, Phil"

Phil is known as Dr Kiwi on RC Groups.

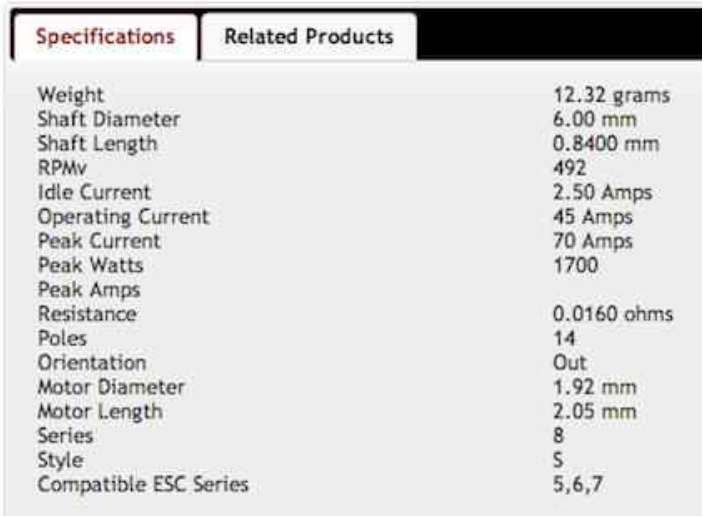
This motor certainly adds credence to his statement.

Compare the information provided by Hacker for these two motors; the A50-12S V2 492Kv
http://www.hacker-motor-shop.com/e-vendo.php?shop=hacker_e&SessionId=&a=article&ProdNr=15726701&t=3&c=31&p=31

and the A50-14S V2 425Kv
http://www.hacker-motor-shop.com/e-vendo.php?shop=hacker_e&SessionId=&a=article&ProdNr=15726702&t=3&c=31&p=31

Not only did the 'manufacturer' not get it right, the US importer's specifications are extremely 'odd'. The importer is Aero-Model, Inc.
https://www.aero-model.com/8_69_899/Motors_Hacker-Brushless-A50-12S-V2/A50-12S%20V2.html

Aero-Model is also known as Hacker Brushless USA and http://www.hackerbrushless.com.



Another USA supplier is Esprit Model. The Esprit Model specifications are located at http://www.espritmodel.com/hacker-a50-s-series-motors.aspx.

A50 Outrunner Series	A50 12S
Kv (rpm/V)	500
Max Power (W)	1250W
Max Amp (15sec)	55A
Max Efficiency	85%
Io (No load A)	2.5A
Rm (Resistance)	0.016Ohm
Shaft Diameter	6mm
Gearbox	N/A
Motor Diameter	48mm
Motor Length	56.8mm
Motor Weight	370g
Built in Fan	Yes
Max Rpm	13,000
Poles	14
Case	Outrunner
ESC Timing	20-25 deg
ESC Switching Freq.	8-16KHz

When using the supplied data from all three sites, it is very difficult to determine how to use this motor safely.

Hacker in Germany does not give a continuous amp or burst amp rating. They hint that 70 amps might be the maximum by noting that it requires a 70-amp ESC.

Aero-Model states, "Operating Current 45 Amps" and "Peak Current 70 Amps".

Esprit Model states that the maximum amp draw for 15 seconds is 55 amps.

Hacker and Esprit Model indicate that the maximum power is 1250 watts in, but Aero-Model states 1700 watts in.

Keep in mind that Lynn Morgan has been running his motor, with no problems, for a long time and many, many flights at a static maximum of 1550 watts in. His data log shows that he very seldom reaches that peak during his pattern routine.

Hacker Specifications and Other Motor Information

Weights and Measures:

Specifications:

Powerange	**max. 1250W** (15 sec.)
Idle Current @ 8,4V	**2,5A**
Resistance (Ri)	**0,016 Ohm**
RPM/Volt (kv)	**492 U/min-1**
Weight	**345g**
Diameter	**48,8 mm**
Length	**52 mm**
Poles	**14**
recom. Speedcontroler	**70A Brushless**
recom. Timing	**20° - 25°**
Shaft Diameter	**6 mm**

The specifications on the Hacker Germany Web site showed a motor weight of 345g. The motor in hand weighed 373g with its leads and three 4mm bullet connectors.

The drill press measured and calculated Kv was 507.6 and Drive Calculator calculated 506.9, once the collected data was input.

The Hacker site suggested 20-deg to 25-deg of timing. The Castle Creations Ice 50 used in the data gathering was set to low/0-deg timing.

Generic naming helps to identify similar motors.

The correct Hacker A50-12S generic name (can diameter mm, can length mm, dash Kv, wt. in grams) is Hacker 4954-505, 370g.

The Actual Testing

The first test was the Kv test using a drill press.

Next an Emeter II was used to gather all the data, **NOT the onboard data from the Castle Creations Phoenix Ice 50 amp ESC**.

Two no load runs were logged and averaged for the no load inputs into Drive Calculator. A 6S "A123" pack was used for one of the no load tests and a 6S Li-Po for the other test.

The 6S Li-Po was used to gather the loaded data.

Four props were logged, in this order, on the same battery charge, APC 10x7E, APC 11x7E, APC 12x8E and APC 13x8E. They were then averaged and used as the prop load inputs for Drive Calculator.

The testing was done in the basement in Walled Lake, MI, USA.
elevation: about 287m/942 ft.
Temperature: about 15-deg C/59-deg F
Data was submitted to Drive Calculator, Christian Perrson, in early March, 2013.

Jim had hoped to use this motor with a Castle Creations Ice 50-amp ESC and an APC 13x8E prop. An APC 13x8E was the last one used for data gathering and was recorded at 21.37v (3.56v per cell), 48.5 amps and 9377 RPM. With Drive Calculator inputs of 22.2v and a change of temperature to 24-deg C/ 75-deg F the prediction for the APC 13x8E is 22.2v, 49.3A and 9692 RPM.

This could be okay with Jim's 50-amp ESC, but I suggested that he might want to try an APC 13x6.5E first. Drive Calculator, set to 75 degrees F and our elevation, predicts an amp draw in the low to mid-40s and an RPM in the neighborhood of 9900. This yields a pitch speed of about 61 mph, which is plenty fast enough for this biplane.

In a phone conversation with Keith Shaw a few days later, he suggested an APC 14x7E, if prop clearance allows. Drive Calculator, at our elevation and 75-deg F predicts 22.2v, 54 amps and 9570 RPM. Actual power meter testing should be done with this prop and then it's up Jim whether he wants to push his ESC or not.

A report on what prop Jim Young decides to use will be in an upcoming issue of the *Ampeer*, once the weather breaks here in southeastern Michigan.

With the data for this motor now in Drive Calculator, various battery and prop combinations can be tried at elevations and temperatures appropriate to where and how the motor will be used.

The prop chart was created using Drive Calculator set for our elevation here in southeastern Michigan, 287m and a temperature of 24-deg C/75-deg F.

As always, a power meter is a must before deciding to fly any given prop. The prop chart is ONLY a guide.

Hacker implied the use of a 5S or 6S Li-Po battery by noting 17.5v and 21.0v in their examples.

5 cells – 18.5V APC Propeller	Current	Pin	Pout	System Eff. %	RPM	Pitch Speed mph	Thrust
11x11 sport	33	601	499	83.0%	8445	88	1812g/64 oz.
12x10 sport	**36**	**667**	**553**	**82.8%**	**8350**	**79**	**2252g/79 oz.**
12x12E	43	798	655	82.1%	8168	93	2302g/81 oz.
13x6.5E	**31**	**579**	**481**	**83.1%**	**8477**	**52**	**2874g/101 oz.**
13x7 sport	30	561	466	83.1%	8503	56	2651g/93 oz.
13x8E	**33**	**609**	**506**	**83.0%**	**8433**	**64**	**3138g/111 oz.**
13x8 sport	35	638	529	83.0%	8392	64	2685g/63 oz.
13x9 pattern	**36**	**666**	**552**	**82.9%**	**8352**	**71**	**2604g/92 oz.**
13x10E	43	790	649	82.2%	8178	77	2502g/88 oz.
13x10 pattern	**47**	**866**	**707**	**81.6%**	**8075**	**76**	**2912g/103 oz.**
13x13 sport	52	963	778	80.8%	7945	98	2723g/96 oz.
14x7E	**39**	**713**	**590**	**82.6%**	**8285**	**55**	**3420g/121 oz.**
14x8 sport	43	797	654	82.1%	8169	62	3372g/119 oz.
14x8.5E	**41**	**761**	**627**	**82.3%**	**8218**	**66**	**3493g/123 oz.**
14x10E	50	919	746	81.2%	8004	76	3730g/132 oz.
16x10E*	**77**	**1418**	**1081**	**76.2%**	**7372**	**70**	**4926g/174 oz.**

6 cells – 22.2V APC Propeller	Current	Pin	Pout	System Eff. %	RPM	Pitch Speed mph	Thrust
10x9 sport	27	608	500	82.2%	10344	88	1795g/63 oz.
10x10E	**31**	**681**	**562**	**82.5%**	**10243**	**97**	**1841g/65 oz.**
11x7 sport	31	680	561	82.5%	10244	68	2456g/87 oz.
11x8E	**34**	**745**	**615**	**82.5%**	**10154**	**77**	**2275g/80 oz.**
11x8 sport	33	722	596	82.5%	10186	77	2392g/84 oz.
11x8.5E	**33**	**734**	**606**	**82.5%**	**10170**	**82**	**2427g/86 oz.**
11x10E	38	844	695	82.4%	10021	95	2371g/84 oz.
11x11 sport	**44**	**967**	**793**	**82.0%**	**9858**	**103**	**2468g/87g**
12x6E	32	714	590	82.5%	10197	58	3038g/107 oz.
12x6 sport	**30**	**658**	**542**	**82.4%**	**10275**	**58**	**2757g/97 oz.**
12x7 sport	34	764	631	82.5%	10129	67	2939g/104 oz.
12x8E	**38**	**848**	**699**	**82.4%**	**10016**	**76**	**3161g/112 oz.**
12x8 sport	42	939	771	82.1%	9895	75	3143g/111 oz.
12x9 pattern	**39**	**868**	**715**	**82.3%**	**9989**	**85**	**2818g/99 oz.**
12x10E	42	925	760	82.1%	9913	94	2735g/96 oz.
13x4E	**28**	**624**	**513**	**82.3%**	**10322**	**39**	**3252g/115 oz.**
13x6.5E	43	961	788	82.0%	9866	61	4071g/144 oz.
13x7 sport	**41**	**906**	**745**	**82.2%**	**9939**	**66**	**3630g/128 oz.**
13x8E	45	1003	820	81.8%	9812	74	4410g/156 oz.
13x8 sport	**46**	**1024**	**836**	**81.7%**	**9784**	**74**	**3644g/129 oz.**
13x9 pattern	48	1069	871	81.4%	9726	83	3529g/125 oz.

An APC 16x10E was noted with an asterisk in the 5S example props. It is there to 'represent' Lynn's 16x10 carbon prop and to show that these examples **should be** on the conservative side.

I have created prop charts for 4S, 7S and 8S Li-Po batteries that MIGHT work without over taxing the motor.

Again, if you decide to go out of range, be sure to use a power meter and be willing so suffer any

4 cells – 14.8V APC Propeller	Current	Pin	Pout	System Eff. %	RPM	Pitch Speed mph	Thrust
14x10 sport	40	584	482	82.5%	6545	62	2461g/89 oz.
14x12E	**43**	**629**	**516**	**82.0%**	**6479**	**74**	**2350g/83 oz.**
14x12 pattern	44	648	530	81.8%	6450	73	2393g/84 oz.
15x8E	**40**	**593**	**488**	**82.4%**	**6533**	**49**	**3088g/109 oz.**
15x8 pattern	38	565	467	82.7%	6574	50	2920g/103 oz.
15x10E	**52**	**775**	**621**	**80.2%**	**6267**	**59**	**3159g/111 oz.**
15x10 pattern	45	662	540	81.6%	6431	61	2877g/101 oz.
16x8E	**47**	**696**	**565**	**81.2%**	**6381**	**48**	**4030g/142 oz.**

7 cells – 25.9V APC Propeller	Current	Pin	Pout	System Eff. %	RPM	Pitch Speed mph	Thrust
9x9E	32	820	671	81.8%	11959	102	1760g/62 oz.
10x7E	**26**	**681**	**552**	**81.1%**	**12145**	**81**	**2470g/87 oz.**
10.7 sport	26	674	546	81.0%	12154	81	2159g/76 oz.
10x8 sport	**30**	**776**	**634**	**81.7%**	**12017**	**91**	**2230g/79 oz.**
10x9 sport	35	913	749	82.0%	11835	101	2350g/83 oz.
10x10E	**39**	**1011**	**829**	**82.0%**	**11709**	**111**	**2385g/84 oz.**
11x5.5E	30	777	635	81.7%	12015	63	2920g/103 oz.
11x6 sport	**31**	**813**	**665**	**81.8%**	**11967**	**68**	**2945g/104 oz.**
11x7E	34	889	729	82.0%	11867	79	3347g/118 oz.
11x7 sport	**39**	**1020**	**836**	**81.9%**	**11687**	**77**	**3204g/113 oz.**
11x8E	44	1141	932	81.7%	11544	87	2912g/103 oz.
11x8 sport	**42**	**1088**	**890**	**81.8%**	**11610**	**88**	**3126g/110 oz.**
11x8.5E	44	1142	933	81.7%	11542	93	3199g/113 oz.
11x10E	**49**	**1258**	**1022**	**81.3%**	**11398**	**108**	**3066g/108 oz.**
12x6E	43	1106	904	81.8%	11588	66	4023g/142 oz.
12x6 sport	**37**	**957**	**785**	**82.0%**	**11779**	**67**	**3505g/124 oz.**
12x7 sport	44	1142	933	81.7%	11542	77	3816g/135 oz.
12x8E	**50**	**1297**	**1052**	**81.1%**	**11349**	**86**	**4090g/144 oz.**
12x9 pattern	50	1294	1049	81.1%	11354	97	3640g/128 oz.
13x4E	**37**	**962**	**789**	**82.0%**	**11772**	**45**	**4379g/155 oz.**
13x6E	44	1134	927	81.7%	11552	66	4505g/159 oz.
13x6 sport	**46**	**1197**	**976**	**81.5%**	**11473**	**65**	**4663g/164 oz.**
13x7 sport	52	1348	1090	80.9%	11288	75	4691g/165 oz.

8 cells – 29.6V APC Propeller	Current	Pin	Pout	System Eff. %	RPM	Pitch Speed mph	Thrust
8x8E	27	805	647	80.3%	13976	106	1645g/58 oz.
9x7.5E	**33**	**974**	**791**	**81.2%**	**13657**	**97**	**2392g/84 oz.**
9x8 sport	28	835	673	80.5%	13836	105	2052g/72 oz.
9x9E	**41**	**1200**	**978**	**81.5%**	**13371**	**114**	**2200g/78 oz.**
10x5E	27	795	638	80.2%	13889	66	2837g/100 oz.
10x5 sport	**27**	**791**	**634**	**80.2%**	**13895**	**66**	**2821g/100 oz.**
10x6 sport	29	849	685	80.6%	13818	79	2711g/96 oz.
10x7E	**33**	**978**	**794**	**81.2%**	**13651**	**90**	**3173g/112 oz.**
10x7 sport	32	959	778	81.2%	13676	91	2734g/96 oz.
10x8 sport	**37**	**1102**	**898**	**81.5%**	**13493**	**102**	**2813g/99 oz.**
10x9 sport	44	1292	1051	81.3%	13257	113	2946g/104 oz.
10x10E	**48**	**1417**	**1149**	**81.1%**	**13106**	**124**	**2965g/105 oz.**
11x5 sport	32	955	775	81.2%	13682	65	3604g/127 oz.
11x5.5E	**38**	**1127**	**917**	**81.5%**	**13464**	**70**	**3727g/131 oz.**
11x6 sport	39	1155	941	81.5%	13427	76	3693g/130 oz.
11x7E	**43**	**1262**	**1027**	**81.4%**	**13295**	**88**	**4288g/151 oz.**
11x7 sport	49	1440	1167	81.0%	13078	87	4003g/141 oz.
12x6 sport	**45**	**1322**	**1075**	**81.3%**	**13221**	**75**	**4299g/152 oz.**
13x4E	47	1393	1131	81.1%	13134	50	5612g/198 oz.
13x6E	**54**	**1598**	**1287**	**80.5%**	**12891**	**73**	**5600g/198 oz.**
13x6 sport	57	1686	1352	80.2%	12788	73	5795g/204 oz.
13x6.5E	**70**	**2084**	**1634**	**78.4%**	**12340**	**76**	**6799g/240 oz.**
13x7 sport	64	1891	1500	79.3%	12554	83	5812g/205 oz.
13x8E	**73**	**2148**	**1678**	**78.1%**	**12269**	**93**	**7292g/257 oz.**
13x8 sport	72	2123	1660	78.2%	12298	93	5755g/203 oz.
13x9 pattern	**74.8**	**2213**	**1721**	**77.8%**	**12200**	**104**	**5557g/196 oz.**

consequences.

I have been using O.S. Motor outrunners recently, and have had good success with them.

After looking this Hacker A50-12S over and testing it, I think I may be adding some Hacker Outrunners to my fleet soon.

I was very impressed with the complete hardware package and especially having both the bolt-on and collet type prop adapters provided.

This is a photo of the Osiris pattern plane designed by Andrew Jesky and previously mentioned. The equipment recommended by Andrew at the 3D Hobby Shop Web site works very well in it.
http://www.3dhobbyshop.com/62-Osiris--Red_p_15388.html

29th Annual Mid-America Electric Flies 2013
At the 7 Mile Road MRCS Field
AMA Sanctioned
Saturday, July 13 & Sunday, July 14
Hosted by the:
Ann Arbor Falcons and **Electric Flyers Only**
Flying Site Provided by the:
Midwest R/C Society

Contest Directors are:
Ken Myers phone (248) 669-8124 or
kmyersefo@theampeer.org
http://www.theampeer.org for updates & info
Keith Shaw (734) 973-6309
Flying both days at the Midwest R/C Society Flying Field - 7 Mile Rd., Salem Twp., MI
Registration: 9 A.M. both days
Flying from 10 A.M. to 5 P.M. Sat. & 10 A.M. to 3 P.M. Sunday

Pilot Entry Fee $15 a day or $25 both days
Parking Donation Requested from Spectators

Saturday's Awards
Best Scale
Most Beautiful
Best Ducted Fan
Best Sport Plane
CD's Choice
Sunday's Awards
Best Scale
Most Beautiful
Best Mini-Electric
Best Multi-motor
CD's Choice

Planes Must Fly To Be Considered for Any Award
Saturday's & Sunday's Awards:
Plaques for 1st in each category

Open Flying Possible on Friday

Night Flying Possible, Weather Permitting, Friday & Saturday Nights
Refreshments available at the field both days.

Potluck picnic at the field on Saturday evening.

Come and join us for two days of fun and relaxed electric flying.

Come, Look, Listen, Learn - Fly Electric - Fly the Future!

Merchandise drawing for ALL entrants

To locate the Midwest R/C Society 7 Mile Rd. flying field, site of the 2013 Mid -America Electric Flies, look near top left corner of the map, where the star marks the spot, near Seven Mile Road and Currie Rd.

The field entrance is on the north side of Seven Mile Road about 1.6 Miles west of Currie Rd. Address: 7419 Seven Mile Road, Salem Twp, MI 48167 - numbers are on the fence.

Because of their convenient location and the easy drive to the flying field, the Comfort Suites and Holiday Inn Express in Wixom, MI have been added to the hotels' listing. They are only 10 miles northwest of the field and located near I-96 and Wixom Road. See the map-hotel .pdf for more details.

http://www.theampeer.org/map-hotels.pdf

Upcoming E-vents

Tuesdays through March 26 - Indoor flying at the Ultimate Soccer Arenas, Pontiac, MI, 11 a.m. - 1 p.m.

April 3, Wednesday, 7 p.m., HORIZON Hobby Pre-Toledo Visit at Ultimate Soccer Arenas. This is always interesting! Joe Hass, 248-321-7934 or visit www.skymasters.org.

April 5th, 6th, & 7th, The Toledo RC Expo, SeaGate Centre, 401 Jefferson Avenue Toledo, Ohio 43604, Web site information at http://www.toledoshow.com

April 11, Thursday, Monthly indoor EFO meeting, 7:30, Ken Myers house, 1911 Bradshaw Ct., Commerce Township, MI 48390, 248-669-8124. Everyone with an interest is welcome.

May 18 & 19, Sat. & Sun., RCCD Watts Over Wetzel (WOW) 8th Annual All Electric Fly-In, Directions and Flyer, contact Mike Pavlock (586)-295-3053 or Email WOW Contest Director at wattsoverwetzel@gmail.com

June 8 & 9, Keith Shaw Birthday Party Electric Fly-in 2013, Balsa Butchers field near Coldwater, MI. Contest Director: Dave Grife - E-mail grifesd@yahoo.com or Phone: 517.279.8445, Flying Field will be open Friday, June 7 for early arrivals, Saturday, hours are from 9 a.m. 'til 5 p.m., Sunday,hours are from 9 a.m. 'til 3 p.m., Landing Fee is $10 for the weekend.

July 13 & 14, 29th Annual Mid-America Electric Flies, Midwest RC Society, 7 Mile Rd. Flying Field, contact kmyersefo@theampeer.org or 248-669-8124

Think Spring!!!

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

The Next Monthly Meeting:
Date: Thursday, April 11, 2013 **Time:** 7:30 p.m.
Place: Ken Myers' house (address above)