

The Officers:

<p>President: Ken Myers 1911 Bradshaw Ct. Walled Lake, MI 48390 phone: (810) 669-8124</p>	<p>Vice-President: Richard Utkan 240 Cabinet Milford, MI 48381 phone: (810) 685-1705</p>	<p>Secretary/Treasurer: Debbie McNeely 4733 Crows Nest Ct. Brighton, MI 48116 phone: (810) 220-2297</p>
<p>Board of Directors: Keith Clark 2140 E. Highland Rd. Howell, MI 4848843 phone: (517) 546-2462</p>	<p>Board of Directors: Jeff Hauser 18200 Rosetta Eastpointe, MI 48021 phone: (810) 772-2499</p>	<p>Ampeer Editor: Ken Myers 1911 Bradshaw Ct. Walled Lake, MI 48390 phone: (810) 669-8124</p>

Ampeer subscriptions are \$10 a year U.S. & Canada and \$17 a year world wide.

The Next Meeting:
Date: Thursday, Jan. 2, 1997 Time: 7:30
Dublin Community Center, just N. of the village of Union Lake on Union Lake Rd. across from St. Patrick's Church

Ampeer

Ammeters Revisited:

It is very early on a Saturday morning and I just came up from the "vault". I was prompted to look through the Ampeer archives for the information on how to build a shunt, so that a digital multimeter can be used to measure high currents. That article follows, as well as other info on measuring current. The last time this info was published here, in the *Ampeer*, was 1994.

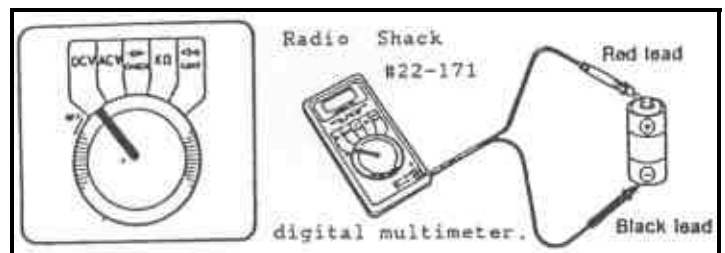
What intrigued me, was the amount of information I had to go through, to find the original article. There was some "neat stuff" in those old Ampeers, and I'll be digging it out for you. For example, and I didn't even remember this, I'd published the plans for my Senior Skyvolt, based on the Bob Kopski Skyvolt design. There is also a neat little float plane, Mitch Poling design, that I'd had permission to publish. A quick look revealed that it just might be suitable for the "new" Speed 400s, that seem to be the rage. Wow, an

editor's gold mine! Stay tuned for some oldies but goodies! And now - the shunt....

Meter & Shunts
by **Vic Walpole**

from the *Electric Model Flyer*, Feb. 1991 newsletter of the Electric Model Flyers of Southern Ontario (EMFSO)

Not long ago I noticed that the Digital Multimeter, that I was using had no current measuring capability. On a closer check, I was amazed to find that the lowest voltage scale was measuring in Millivolts. I have three different Digital meters and this is the cheapest and newest acquisition to my stock of electrical tools. It was also the only one to have this sensitive scale. What can I do with it, I asked myself. It does raise some possibilities.



What's in this issue?

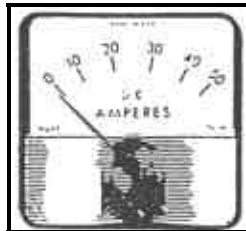
Ammeters - Christmas '97 - Miss Philly Meet - Plane Ratings SR Batteries Techniques Index

It is horrifying to me to find a person flying an electric powered aircraft without a meter to tell him to what current he is subjecting his motor, let alone anything else. A lot of electric modellers have, at the most, a meter on their charger as their only source of electrical info. In most cases, this is only a moving vane type of cheepo indicator at best. A close friend of mine got a new charger with automatic voltage cut-off and preset current. The preset unadjustable level was supposed to be set at 4.5 amps. The meter on the charger registered 5.4 amps. He brought it to me to check it out before he did some damage, either to it or his batteries. My tests showed that it indeed did actually put out the required 4.5 amps, quite accurately. The meter was over 20% out.

Now then, Meters can be used to read comparative readings or absolute readings. Some relative readings still require being very accurate while others require just ball park figures. In the case of our checking the current when you change props, it doesn't need to be that accurate. 5% is usually close enough.

Back to the case of the meter on the charger. Seeing as only a small percentage of flyers are even faintly knowledgeable on accurate electrical readings, the 20%+ inaccuracy would be within the manufacturers tolerance requirement. As you can well figure, it is not within my requirements, or a lot of good electric flyers that I know. 2% is close for me, 5% is tolerable for many readings, but never 20%.

Most of the problem with the charger, is the use of the moving vane type of meter construction. A sample is pictured. It is an easy one to tell what type it is. The pointer moves in an oscillation motion when it is disturbed by moving it sideways & stops quickly. Like a car without shocks, bounce, bounce, bounce, etc.



A much better type of movement is called a D'Arsenal type. This meter has a winding around an armature, much like an electric motor. This is set between magnetic poles and restricted in movement by two coil springs, one at each end of the armature. The springs are mounted in an opposing configuration. They are very delicate to adjust for a proper balance so that the needle normally sits at zero and will move to full scale reading when the full scale current is flowing through the winding. This type of movement is not that expensive, really. They can be picked up at the surplus store for \$5.00 or less.

You may have noticed that I said that Current flowed through the meter winding. Does that mean that this is only good for reading amps or something? Not quite. All meters

of this type work on a certain amount of current. It could be 1/1000th of an ampere or more, down to microamps.. 1/10,000th of an amp is quite popular these days.

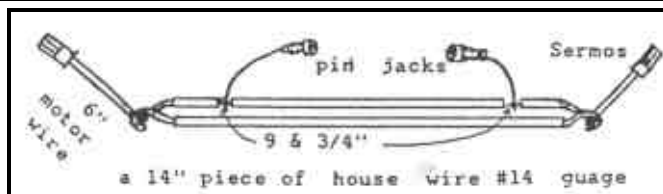
So what kind of meter do you need to read, say, volts? This same meter will do it nicely. Just take that 10,000 and multiply it by the number of volts you wish it to read at full scale and the answer you get is the size of resistor that you connect between, say, the plus of the meter and the plus test lead and you will have a working voltmeter that takes 1/10,000th of an amp to run this current meter. Of course you need to calibrate the scale between the zero point and the full scale point so you can tell what else you may measure.

Say you wish to read amperes with this same meter. That's easy, you put a heavy shunt across the meter winding. This lets most of the heavy current bypass the delicate meter winding and only a small portion goes through the meter. The hard part is in figuring out the electrical and mechanical size of the shunt. Believe me, leave it to the manufacturer to do this.

So what else can we use to read our motor or charging currents? Now about that **Radio Shack #22-171** digital multimeter. A couple of years back, I wrote in this newsletter on how to make an ammeter shunt to check your motor current when you change props or add cells to an existing motor/prop set-up. It required 49" of #14 gauge house wire.

When I saw the Millivolt scale on this Radio Shack digital multimeter, I automatically said to myself, 10 times as sensitive a meter cuts the wire shunt down to 4.8". But, that would make it too critical to make with reasonable accuracy. Lets make it 9.6" (that's 9 and 5/8") or for safety 9 and 3/4" with two strands of #14 gauge in parallel, (that is side by side).

To make this shunt, take a 14" piece of house wire, cut the outer sheath back 3" or 4", pull out the bare ground wire, remove the insulation from the two wires at each end for about one inch, then roll the bared wires ends into a "U" shape, put a 3" to 6" piece of heavy motor wire, with its end bared for about 1/4", into the "U" and squeeze it tight with the pliers. Do the same with the white and black wires at the other end. Now solder this joint, and make sure the solder gets hot enough to flow into and around the joint. When it cools, cut out about 1/2" of insulation on one of the wires, (say the black one), about one inch from one of the soldered ends. Wrap a 6" piece of small wire onto the middle of this area and solder it on the shorter side. Do the same to the other end of the shunt, only before soldering it up measure the distance between the nearest parts of the two small wire wrappings. It should be adjusted to 9 & 3/4" apart, as close as possible. Now solder and tape all the



solder joints.

Fold up the wire to fit a small container, bring out the two heavy leads through two holes, solder Sermos connectors on each wire, connect the small wires to test lead pin jacks, and, voila, you have a meter shunt to fit this type of digital meter that will safely carry 40 amps with less than 100 millivolts loss.

* * * * *

Vic's solution works well. I built one and used it for several years. There are other alternatives:

More Ammeters for Motor Battery Testing

The first is the SR Batteries Smart Charger. One of its functions is an ammeter that will read up to 250 amps. At first glance it appears a bit pricy for just reading amps, but is a wonderful, all around electric flight tool. It has a



lot of very useful features including: charging up to 36 cells fast or slow, Fast Field Charging of R/C Tx and Rx batteries, cycling motor and Tx/Rx batteries, and expanded scale volt meter. It allows custom set up of cell count, load, charge time, etc. It also has a low source voltage shut off so that you can actually start your vehicle and leave the field. I highly recommend this piece of equipment.

SR Batteries, Box 287, Bellport, NY 11712 (516) 286-0079 or 74167.751@compuserve.com --- batteries, motors, speed controls, chargers & more. Sponsor of the Mid-America Fun Flies

The Astro Flight Astro Digital Meter measures both amps and volts. This is what I'm currently (ha, ha) using. I like it very much, and it is highly recommended! Well worth the price for such a useful tool.

Astro Flight, Inc., 13311 Beach Ave., Marina Del Rey, CA 90292 (310) 821-6242 --- A world leader in motors, speed controllers, chargers and electric accessories. Home of the Electric Motor Handbook - A MUST HAVE! Visit the

Astro Flight site at <http://www.astroflight.com>

There was an interesting article in *Electric Flight International* - May/June 1995. It was on how to build a probe ammeter. This is the type that is not put into the circuit. The the intact circuit runs with the ammeter around it. Think of a donut with your motor wiring passing through it, that is how it operates. I've seen commercial versions, but the price has been around \$200. With this one, you order the parts from an electronic supply house and use your own volt meter. Check with EFI to see if back issues are available. Let me know if they are not, and I will then contact EFI and see if I can get permission to reprint the article.

Quiet Flight International & **Electric Flight International** are two leading British magazines devoted to e-power. QFI has more soaring type, as well as PSS, and true soaring, but some sport & e-motor articles as well. EFI is, well, it is Electric Flight International! - articles from all over the world on e-power. Friends Martin Irvine (Canada) & Dave Durnford (UK) write for EFI. Visit the QFI/EFI site at <http://www.traplet.co.uk/traplet> or Electric Flight International, Traplet Publications Ltd., Traplet House, Severn Drive, Upton-upon-Severn, Worcestershire WR8 0JL United Kingdom

From the April 1995 *R/C Reports*, Current News by Charlie Spear and Dr. John Mountjoy, came the following: *To measure the currents our motors draw, you can get Astro's new meter or a shunt (Steve Kowalski, 32 Hollo Dr., Holbrook, NY 11741, for \$10.00) that inserts into the circuit via Sermos connectors. A digital volt meter measures the millivolt drop across the shunt.*

Whether this information is still current, I don't know. You could drop Steve a line. Let me know what you find out.

As my generation used to say, "Power to the people!"

EFO 1997 Christmas Party and Meeting

As usual, Debbie and Jim McNeely hosted a fantastic party at their new mansion, oops, house. Wow, what a great place to host such an affair. They had the house decorated for the season, lots of food set about and the fine folks of the EFO there to enjoy it. Several planes showed up including the first ERTF, a fun fly type and Keith's Zlin, with a new wing. The new wing features foam construction and is just

.2 of a gram heavier than the built up version. Keith also had the prototype Astro Flight brushless out of the Zlin, and passed it around for all of us to look at. This motor really motivates the little Zlin. You can see the "old" wing on one of the tables in the pictures.

Of course, past videos were on the TV, as can be seen in another picture. Pop, beer and pizza were provided by the EFO, along with the other goodies and pop provided by the McNeelys. It certainly was an enjoyable evening, and we all owe Jim and Debbie a huge **Thank YOU!**

Images from the party:



Planes on the floor, planes on the table, planes on the TV, food in the mouth, ahhhh!



Food, Friends & Fun



Needs an Astro Flight Partenavia

Dick Corby would like to get hold of the old AF kit of the Partenavia. His Email is altacom@earthlink.net If you want me to reach him, give me a call (see front) Thanks -



Plan for the Summer - Meet Announcement



Due to unprecedented enthusiastic early response we have changed to a TWO DAY CONTEST. This announcement supersedes all previously distributed information Dated before November 4,1996 Changes made: Pre- registration by mail requested, Test flying on Friday, 27. All Diesel event added.

SAM 100 "The Second Chance Squadron"
presents: A "Miss Philly" R/C Contest! A
"Old Birds Over Pennsylvania"
MAXWELL BASSETT & BILL BROWN

"COMMEMORATIVE"

AMA Sanctioned, Class "C" Special Rules Contest
Saturday, June 28 and Sunday, June 29, 1997 9am - 4pm
"Rain or Shine"

VERNON LEININUER FIELD of
"The COCALICO Prop Busters", Denver, PA

Model: Maxwell Bassett's Historic, Circa 1935 model, "Miss Philadelphia" Build from plans of any of the five or more different variations available, (Cabin or Parasol). You can scale up or down to fit your power choice.

Power: Bill Brown's History making * "Brown Junior Engine" (Original or Replica) or any Spark Ignition, any Diesel, any Glow or any Electric.

ENTRY FEE: Pre-registration is requested..\$10.00
Includes first event. \$7.00 each additional event to max of \$25.00 . Registration at field will be \$15.00 and includes the first event and \$10.00 each additional event. Early arrivals may register and/or test fly at Leininger field on Friday June 27th. 1:00pm to 5:00 PM. Saturday and Sunday you may Register from 7am to 9am. Contest Flying starts 9am and last flight must be in air before 4 PM.(both days).

Banquet: Holiday Inn, Denver, PA Sat. Eve, June 28,1997. Social hour 6 PM to 7:15 PM, Dinner 7:30pm

Why not start now and build any of the Historic (1933-1937) "Miss Philly's" and come fly in a once in a lifetime Commemorative Contest. Trophies/Prizes to third place in all events, plus prize for the largest, the Smallest, and the most authentic model. Build the "Miss Philly" from Klarich partial kits or scratch build from John Pond plans. Scale to any size. RADIO CONTROL, No minimum wing loading (except in 1/2ATexaco event). Model must be stick build-up as plans show, however, wood sizes may be changed.
OBJECTIVE IS TO BUILD AS HISTORICALLY ACCURATE AS POSSIBLE All models must R.O.G. (Rise Off Ground) All events are Climb and Glide. In some cases the Same model may be flown in more than one event.

For more information , plans, kits, motors, etc. write or call the following . (please include S.A.S.E.)

*CD. John C.Delagrange 1822 Longview Drive, Lancaster, PA 17601 (717) 569-7243

Alt. CD: Paul Ahnert 442 West Marion Utitz, PA 17543 (717) 626-2779

ELECTRIC: Dick Miller 193 Huntzinger Road, Wernersville, PA 19585 (610) 678-3545 (Thanks for this info Dick km)

PLANS: John Pond Plan Service 253 N. 4th ST. BOX 90310 SAN JOSE ,CA 95109 (408) 292-3382

KITS: KLARICH CUSTOM KITS, 2301 Sonata Dr.,

Rancho Cordova, CA 95670 (916) 635-4588

"SAM 100 has plans scaled down for:(65" ign. glow or .05 elect)(46" 1!2A Tex.or elect.)(34", 22", & 16"Mini-electrics)

*CONTEST SPECIAL RULES: AMA Sanctioned Class "C"Non Rule Book Flying Events:

(Flyer a must hold current AMA license. SAM membership NOT required)

SATURDAY, JUNE 28 EVENTS:**1. GIANT SCALE EVENT:**

"Miss Philly" 80 inch span or larger. No minimum wing loading Any type of power, Any size Glow, Spk. Ign., Diesel, or Electric.

45 second limited Engine Run

10 minute maximum flight time

3 attempts for 2 official flights, best single flight is score

2. BROWN JR, ENGINE EVENT:

Any size "Miss Philly" may be used, No minimum wing loading

Engine must be a Brown Jr. or Replica Brown Jr.

90 second Limited Engine Run

30 minute maximum flight time

3 Attempts for 2 official flights, Best single flight is score

3. SPARK IGNITION EVENT:

Any size "Miss Philly" may be used, No minimum wing loading

Any size Spark Ignition Engine (No Hall Electronics)

45 second Limited Engine Run

10 minute maximum flight time

3 attempts for 2 official flights, best single flight is score

4. DIESEL EVENT:

Any size "Miss Philly" may be used, No minimum wing loading

Any size Diesel engine

45 second Limited Engine Run

10 minute maximum flight time

3 attempts for 2 official flights, best single flight is score

SUNDAY, JUNE 29 EVENTS:**5. GLOW ENGINE EVENT:**

Any size "Miss Philly" may be used, No minimum wing loading

Any 2 or 4 stroke GLOW engine

20 second Limited Engine Run

10 minute maximum flight time

3 attempts for 2 official flights, best single flight is score

6. SAM .05 ELECTRIC:

Any size "Miss Philly" maybe used, No minimum wing loading.

7 cell 800 mAh battery pack

Ferrite motors: 90 second LMR. Cobalt motors: 75 second LMR

15 minute maximum flight time

3 attempts for 2 official flights, total of two flights is score

(NOTE: 110 Volt AC available at field for charging packs)

7. MINI-ELECTRIC:

"Miss Philly" 47 Inch or less wing span, No min. wing loading

Any electric motor, any battery pack

90 second Limited Motor Run

10 minute maximum flight time

3 attempts for 2 official flights, best single flight is score

a. SAM 1/2A TEXACO:

Any size "Miss Philly" Wing loading must be 8 ozs, per sq.

Cox reed valve .049 with 5 cc fuel tank

15 minute maximum flight time

3 attempts for 2 official flights, total of 2 flights is score

All Events: Model must R.O.G. (Rise of Ground) Take off boards will be provided for small models

SCALING OK IN ALL EVENTS !

BANQUET- HOLIDAY INN, DENVER, PA AT TURNPIKE EXIT 21. June 28, 1997. Social hour 6 PM to 7:15 PM, Dinner 7:30 PM If you are planning on attending the Banquet you must pay in advance by May 31, 1997. Cost \$ 15.95 per person. Sit-down Dinner Menu: Chicken Cordon Bleu, Sirloin Tips, or Stuffed Flounder with Crab meat. Send check made out to SAM 100 to: Paul Ahnert 442 W. Marion St. Lllilz,PA 17543 (please indicate your dinner preference.)

Our guest of Honor, Maxwell and Bill, will take us back to "those thrilling days of yesteryear", as they relate their true story of the 1932-1933 flights of the first gasoline engine powered model airplane. Even if you don't come to fly, you won't want to miss this moment!

Plane Rating Service
from Ken Myers

Orville Shields had an idea so good that I decided to make it a regular feature of the Ampeer and an archive on the EFO WEBSITE at

<http://members.gnn.com/KenMyers/ratings.htm>. If you would like to submit your opinions on aircraft that you have personally flown, please use Orville's rating system of 1 to 5 * with the following modifications

You may have only one ***** as the BEST EVER

electric plane you've ever flown and only one * as the worst electric plane you've ever flown or TRIED to fly. Use ***** for outstanding/really good, *** for good/middle of the road, ** for yes it flies. Comments would be greatly appreciated. Be sure to give details for the specific aircraft flown. The more details you can supply, the better. . (Note that only Orville's original opinions will be published not following my modified guidelines. If you give me more than one ***** or *, I'll ask you to make a choice before I will publish your rating.)

The disclaimer: These are the personal opinions of the pilots involved and may or may not reflect my personal opinion, or the opinion of anyone associated with the Electric Flyers Only, Inc. If your opinion differs with that of one expressed here, please contact the pilot making the statement, and not ME! I will be happy to print anything you have to say that differs with another pilot's opinion, as long as it is civil! Folks, this is for informational purposes only. Only YOU can determine what is BEST for you and what has worked BEST for YOU.

Dennis Weatherly's Five *** Choice!**

dennis_weatherly@mentorg.com

(503) 685-1176

Wilsonville, Oregon U.S.A.

I just read the December Ampeer and wanted to add a model to the rating list. My current all-time favorite, five-asterisk electric model is my Ace Cloud Dancer 40. I fly it on an Astro 25G, Astro 210 controller, Graupner Super Nylon 12.5x6 prop and 16 1700SCRC cells. Total weight is 5.75 pounds. It does nice, smooth aerobatics for about seven minutes, from taxi out to taxi back. One of these days RCM is supposed to publish my conversion article, but it's been ten months since they accepted it!

Keep up the good work on the Ampeer. I enjoy seeing the East Coast perspective. I also _really_ like the online delivery of it.

Tony Turley's List

Sender: tonytur@aol.com

Freedom 20 (Goldberg) ***** Aveox 1409/5D, 2.3:1 Superbox, 14 SR1100Max, 11x9 APC. Awesome!!!

Freedom 20 (Goldberg) ***** Aveox 1409/5D, 2.3:1 Superbox, 16 1700SCRC, 11x9 APC. Superior wind penetration, but aerobatic performance is actually a little better with the 14 SR1100's.

Freedom 20 (Goldberg)**** AF Co 15G, 14 SR 1100Max, 11x9 APC.

Astro Sport (Astro Flight) **** AF Co 05, 7 SR1100Max, Cox 7X4.

Sig Four Star 40 (Sig) **** AF Co 25G, 16 1700SCRC, APC 12x8 or 11x9.

GP ElectriCUB (Great Planes) **** AF Co 05G, 8 1700SCRC, Kypsho 9x8 "spoon" prop.

PuddleBlaster **** w/ two AF Co 02G, 10 Sanyo 1000SCR, 9x7 APC.

Skyrunner (Hobbico) **** Speed 300, 6 N650SC, stock 7x6. (Flew great, but HARD on motor!).

Union Challenger (same as Skyrunner) fuselage hybrid with Union Champion wing/tail **** geared Kyosho GP28BB, 7 N650SC, stock 7x6. **Special Note:** For those unfamiliar with the Kyosho GP28BB, it is actually manufactured by Sagami (as is the AP29), and has ball bearings and replaceable brushes. Same diameter as Speed 300, and 1/4" longer. It costs \$35, but is a HOT little motor!

PuddleBlaster ***1/2 (Puddlemaster fuselage/tail w/Duet wing), two geared AP29R, 7 SR1100Max, 7x6 Kyosho.

Freedom 20 (Goldberg)*** AF Co 05G, 7 SR1100Max, 11x7 MA "standard" prop.

Astro Sport (Astro Flight) *** (kit bashed to look like a crop duster!), AF Co 02G, 5 800AR, 9X7 APC.

Skyrunner (Hobbico) **1/2 w/Tamiya Mini-Black, 7 N650SC, stock 7x6. 10 minute full power flight time.

Megowcoupe ** with Hyperthrust 075, 8x4 prop, and 7 SR1100Max.

Stock Hobbico Skyrunner (Hobbico) * (not mine, thank goodness!!!). *

Jim Marinelli's List
james.marinelli@snet.net

HOTS (Midwest) scratch ***** 05 Cobolt direct, 7/6 prop, 7 - 1000 or 1700SCR's, 150mah RX pack. The kit was discontinued so I bought the plans and used contest grade balsa wood. A little tricky to build from scratch with funny

angles in fuse. I get from 5 minute flights with 1700SCR's. Plane flies on rails and can climb up at 40deg rolling (at start of flight) going up. Rolls axially and FAST!

Must be "flown" at all times no looking away. Controls twicthy with small wing. Would have like to try a gearbox. It Sanyo releases their new 2200SCR's then I could skip the gearbox. My favorite plane to fly! Gets the heart going!

Mirage (Golberg) **** 05 Cobolt/gearbox 11/7 - 7 1700SCR's, Benson SC, 225mah RX battery, This plane REALLY came alive with the gearbox! Flight times 12-15 minutes with some aerobatics, very good climbout. Excellent kit!

Elf1 (IdealAir) : **** Ap29, 6/4 prop, 6 -1000SCR's, Undercambered wing that flew very well and was great for small fields. Easy to build and I would have loved to try a gearbox! 8-9 minutes flight times on direct drive.

Elf2 (IdealAir) : **** 05 Cobolt/gearbox, 11/7 prop, 6 - 1000SCR, Benson SC. Another easy kit to build that other flyers loved the looks of! Around 8-9 minutes of flight with gearbox with aerobatics. Flies inverted very nicely. I put battery hatches in both Elf's. Very nice flyer! PHIL WE MISS YOU !!!!

Electra (Golberg) : **** 05 Astro/Gearbox, 13/8 prop, 8 cells 1700SCR or 1000SCR depending upon contest. Great kit and flyer..one of the best gliders around....very steep (almost vertical) climbout esp. in the wind with above setup!. I won several contest with it and it still flies and looks great after 7 years. Added in flaps and spoilers later in life and it would never come down! Build it stock BUT USE a gearbox and you won't be disappointed.

Sky Knight *** 05 car motor, 6 -1000SCR's, 7/6prop. This was the first electric plan I ever saw back in 1986(?) and I bought the plans without knowing how to fly. I bought the kit later on. I felt it was too heavy with 1700SCR's and landed like a brick. Nice kit that flew fairly well..mine loved to tip stall but that's my building and probably not the plane.

LeCrate (Davey) ** 05 /gearbox 11/7 prop, 7-1700SCR's. This kit was stick built and had a flying stab probably from the free flight conversion. Very large fuse and a nice looking plane. I didn't like mine as far as flying. It would never turn with power off and kinda lumbered around in the sky..in no big hurry compared to my Mirage. Came with a very detailed instruction manual on electric flight and motor/battery combo's. I'm giving this kit another try as I'm adding ailerons to the wing and going to a bigger motor.

SR Techniques

A Journal published by SR Batteries, Inc.

Index as of 10/96

Note: All R/C flyers should review Electric Flight Techniques Volumes E-1, E-3, E-11, and E-12

R/C Techniques**Volume R-1: Rx/Tx Battery Pack Testing**

- How can you know how much flying time you will get from a receiver or transmitter battery pack?
- How can you determine the capacity of an older receiver or transmitter pack?
- What is "critical cutoff voltage?"
- Won't your Expanded Scale Voltmeter tell you how much charge is in your pack?
- Is there a way to make an ESV more accurate?
- If you know the capacity of a pack, how can you know how much flying time you will get?
- Is there a more precise way to calculate the average current draw of your system?
- How can you tell if you're using a large enough receiver battery pack?
- How can you tell if you're using the right charge rate for trickle charging?
- How can you tell how much charge your Fast Field charger is pulling into your receiver and transmitter packs?
- Will the charger that came with your radio charge a five cell receiver pack properly?
- How does outside air temperature affect the capacity of your receiver and transmitter packs?
- How can you determine if your receiver pack was damaged in a crash?
- How can you tell in the Spring if your packs are ready for the coming flying season?
- Can you still use a pack that's five years old?
- Does a bad reading on a cyclor mean you have a bad pack?
- How can a cyclor cost you an aircraft?

Volume R-2: Rx/Tx Battery Pack Charging

- How long should I charge my receiver and transmitter packs?
- You said 10% for 14 to 16 hours. Why isn't it 10% for 10 hour? Isn't that 100%?
- What does "ma" and "mah" mean?
- At what rate does the standard charger that came with my radio charge?
- All of this is fine for 500ma charger but my radio didn't come with a 500mah pack. It came with 700mah pack.
- How large a pack can be charged with the standard 50ma charger that came with my radio system?
- What about a 1500 mah pack? Can it be charged at 50ma too by lengthening the charge time to 36 hours or more?
- Why doesn't lengthening the charge time work?
- How critical is the timing? What if I forget and charge for longer than 14 to 16 hours?
- Does that mean that I can leave a pack on charge at the 10% rate all the time?
- With trickle charging the pack is on charge all the time. Why doesn't that hurt the pack?

- How long can I leave a pack on trickle charge and will it do any damage?
- Can a partially charged pack be trickle charged?
- Trickle charging sounds great. Where can I get a trickle charger?
- What about a pulsed or timed charge instead of a trickle charge?
- Can I just plug my charger into a timer?
- Can I charge a pack in less than 14 to 16 hours.?
- I notice that you cut 14 hours in half to get 7 hours rather than cutting 16 hour in half. Is there any reason you chose 7 hours?
- What about fast charging?
- I hear a lot about using a five cell receiver pack. What are the advantages of a five cell receiver pack?
- Can I use the charger that came with my radio system to charge a five cell pack?

Electric Flight Techniques**Volume E-1: Motor Battery Pack Charging, Part 1**

- The right way to treat a new Electric Flight battery pack.
- How to know what the "real" charge rate is.
- The advantages of "slow" charging.
- Proper use of the Ace DMVC and HD-500 chargers.
- How and why it's important to "equalize" a pack.
- Should you ever discharge a pack completely?
- Why do cells reverse polarity?
- The do's and don'ts of "paralleling" two packs.
- SR's recommended charging procedures.
- How to choose a 'last' charge rate that won't ruin your pack.

Volume E-2: Motor Wiring Systems

- Should you use a fuse between your motor and battery pack?
- Does it matter where you put a fuse if you do use one?
- The right way to make a wiring harness for your aircraft.
- Why isn't a 20 amp fuse a 20 amp fuse?
- The right way to use Sermos fuse holders.
- What affect does a SEC have on fuse placement?
- Should you use an "arming" switch?
- How do you choose the right one?
- What does SPST, SPDT, DPDT mean?
- How can you use a 6 amp arming switch in a 30 amp circuit?

Volume E-3: Motor Battery Pack Charging, Part 2

- How to properly charge your Electric Flight battery packs.
- When should you use the timed "slow" charge method?
- How can you use the temperature of the pack to know when to stop the charge?
- Is "absolute voltage" of any value?
- What's the best way to "Fast Field Charge" your receiver and transmitter packs?
- What is "Peak Detection" all about?
- Should you use a peak defection charger to charge your receiver and transmitter packs?
- What features would the perfect Electric Flight charger have?

Volume E-4: Motors and Motor Timing

- How do electric motors work?
- What is motor timing?
- Why do you have to adjust a motor's timing?
- What's the right way to adjust timing?

- How do you "read" the motor's no load current?
- Can you adjust the timing of a motor that doesn't have adjustable timing?
- How much should the timing be changed?
- When would you want to use-"neutral" timing?
- Does a gear drive motor need to be timed differently from a direct drive motor?

Volume E-5: Motor Break In

- What is "breaking in" a motor?
- Do all motors need to be broken in?
- How long does it take?
- How do I know if the brushes are seated properly?
- How do you break in a motor using the dry method?
- What is the wet method of breaking in a motor all about?
- Why is it important to check the no load current of the motor?

Volume E-6: Performance Problem Solving

- What should you check if your aircraft isn't performing as expected?
- Are you sure that all of the cells in your pack are working properly?
- Why is it important for the pack to be warm after charging?
- How can you tell if your speed control is working properly?
- How can you tell if you're using the wrong connectors?
- What gauge wire should you use?
- How do you set the timing of an Astro Flight motor?
- What are the sure signs of excessive motor wear?
- How can you be sure the motor's brushes are installed properly?
- How much down thrust should you use in an Electric Aircraft?

Volume E-7: The ABC's of Electric Flight

- How does the name of a motor relate to its power output?
- How can you determine how many watts are going into a motor?
- What factors determine how many watts a motor will draw?
- How does prop diameter, prop pitch, gear ratio, and the number of cells being used affect the input wattage of a motor?
- Can you run a seven cell motor on five cells?
- Can you run a seven cell motor on ten cells?
- What's the difference between a motor and an engine?
- What do the names of NiCd cells mean?
- What's the difference between an "R" cell and an "E" cell?
- What's the difference between a Magnum and a Max cell?
- How is the capacity of a pack determined?
- Can Electric Flight cells be used for receiver and transmitter packs?
- What is the "internal impedance" of a cell?

Volume E-8: Motor Speed Controls

- How can you control the speed of an electric motor?
- What's the simplest way to control a motor?
- When would you want to use a simple on/off motor control?
- What are the advantages of a proportional speed control?
- What's the difference between a frame rate and high rate motor control?
- Why would you want to use one or the other?

- Could using the wrong speed control damage a motor?
- Which kind of speed control will increase the length of your motor runs by 50%?
- What is a BEC?
- What are the advantages of using a BEC?
- What are the disadvantages of using a BEC?
- What is an electronic brake?
- Why would you want one?
- What's the best radio system to buy for Electric Flight?
- Which Electric Flight radio system shouldn't you buy? Why?

Volume E-9: The Defiant and the '95 Electric Nats

- What were the unique construction details of the "Defiant" Electric Sailplane that won Class A Sailplane at the '95 Electric Nats?
- What motor, prop, gear ratio, battery pack, and speed control were used to win Class A and B Sailplane and Class A and B Old timer at the '95 Electric Nats?
- What was the wing span, wing area, airfoil, weight, controls, and construction method of each of the winning aircraft in Class A and B Sailplane and Class A and B Old Timer at the '95 Electric Nats?
- What did it take to win the Nats?

Volume E-10: Electric U-Control

- Can you fly U-Control with an Electric motor?
- What size aircraft can be flown with Electric Power?
- What length lines can you use?
- What motor, gear ratio, prop, and battery pack should you use?
- Can you get full stunt performance?
- How long are the flight times?
- How can you optimize motor, gear ratio, prop, and battery pack for the longest possible motor runs?
- Can a gas stunt ship be converted to Electric Power successfully?
- What kind of speed controls are there for Electric U-Control?
- What does it take to set a new speed record in Electric U-Control?

Volume E-11: Props, Part 1

- Why do prop blades have a twist to them?
- What does the "diameter~" of a prop mean?
- What is meant by the "pitch" of a prop?
- Why is pitch measured in inches rather than degrees?
- Is there a rough guide as to how efficient props are?
- Why is the tip of the prop blade at a lower angle of attack than the center or hub area of the prop?
- How do diameter and pitch affect each other?
- What does increasing the diameter of a prop do for you?
- What does increasing the pitch of a prop do for you?
- Why can't you usually increase both diameter and pitch at the same time?
- If you increase pitch, what should you do to the diameter of the prop so that you don't draw too much current?
- How do you determine the optimum prop diameter and pitch for a particular aircraft and motor combination?
- How can selecting the right prop increase your motor run times dramatically?

- How much more power does it take to fly faster?
- Can you slow down a boat by decreasing its prop's pitch?
- List the specific recommended props and maximum current draws for direct drive and geared Speed 400, Speed 500, Speed 600, Astro 05, Astro FAI 05, SR Max7, Astro 15, and SR Max 10 motors for Sport, Sailplane, and Old Timer applications.
- How do you measure current draw?
- How should you connect the Amp Meter?

Volume E-12: Props, Part 2

- When should you balance a prop?
- How to make your own simple prop balancer.
- Is there an easier way to balance an Electric prop?
- How can you be sure your folding prop will fold every time?
- How can you make sure your folding prop won't fold in Old Timer competition?
- Folding prop bps and modifications that every Electric Flyer should know.
- Simple wood Electric prop modifications for increased performance.
- A preview of new Electric prop shapes that are sure winners.

©1996 SR Batteries, Inc., Box 287, Bellport, New York 11713
 Phone: 516-266-0079 Fax: 516-266-0901 CompuServe:
 74167,751 Internet: 74167.751 @compuserve.com
 \$2.00 each plus \$.50 postage for as many as you order at once.
 Subscription for '97 R/C Techniques or EF Techniques \$15 ea.

Upcoming Events:

January 2, 1997 EFO meeting, 7:30, Dublin Community Center
Jan. 19 Metro Miniature Aircraft Club R/C Swap "N" Shop,
 Opens to the public at 9 AM - Wayne Ford Civic League, 1661
 N. Wayne Rd., Westland, MI - info contact Larry Dalrymple
 (313) 722-2489

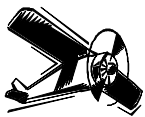
June 28/29 - Knights of the Air R/C Club, Springfield, Illinois,
 Tim McDonough, 127 S. Oaklane Road, Springfield, Illinois
 62707 (Email: tpm@inw.net)

July 12/13 - Mid-America Electric Flies, Ann Arbor
 Falcons/EFO, location, Midwest R/C Society Field, 5 Mi. Rd,
 Northville Twp, MI Ken Myers/Keith Shaw

Aug. 2 - 5 - AMA Headquarters, Muncie, IN Doug Ward,
 R.D. #1, Box 189. Irwin, PA 15642 (412) 446-5891
 DWard79207@aol.com

To Reach Ken Myers, you can land mail to the address on
 the front page. My **E-mail address** is:
 102575.3410@compuserve.com

New EFO WEBSITE: <http://members.aol.com/KMyersEFO/>



The Ampeer
 Ken Myers
 1911 Bradshaw Ct.
 Walled Lake, MI 48390

**Next Meeting: Thursday, Jan. 2, 1997,
 7:30 PM Dublin Community Center
 Just N. of Union Lake on Union Lake Rd.**