Fox Valley Electric Auto Association

PO Box 214
Wheaton, IL 60187-0214

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August 2012 FVEAA Newsletter

The FVEAA is a Not-For-Profit Illinois Corporation and the Chicago Area Chapter of The Electric Auto Association

Note: New Meeting Place! Christian Community Church

Next Meeting

Friday, August 17 7:00 PM to 9:15 PM

THIS MONTH We'll be at

Community Christian Church
1635 Emerson Lane, Naperville IL 60540

DIRECTIONS Community Christian Church (the "yellow box")

DOORS OPEN 6:30 p.m. MEETING STARTS 7:00 p.m. ENDS 9:15 p.m.

NOTE DATE, DAY, TIME, AND LOCATION

Agenda

- Call to order
- Welcome
- Program:
- Committee Reports
- Old business
- New Business
- Nominations
- Report of the 2012 Pike's Peak Hill Climb, in particular EV's racing (Rich Carroll)

President's Words *Bruce Jones*

Hi EVeryone
Last month we met at Phillips Chevrolet and I'd like to thank them for being so hospitable to the FVEAA. Everyone had a great time trying the Volts and I appreciated Rich Hirschberg leading the meeting in my absence.

Rebates and Incentives
If you are thinking of buying an electric vehicle like the Volt here's how to be sure you qualify for the federal tax credit. Each individual's tax situation is unique. Consult your tax professional prior to claiming any credits to confirm the vehicle benefits for which you may be eligible. You must be the owner after the purchase of a new electric vehicle. Per
http://www.phillipschevy.com/custom/volt-charging-station/
Step 1:
Go to www.fueleconomy.gov/feg/taxphevb.shtml to determine your eligibility for the federal tax credit and download the appropriate tax form (Form 8936 if the vehicle is for personal use or Form 3800 if it's for business purposes). The vehicle must be new and available for purchase only. The rebate is from $0-$7,500 depending on your federal tax liability. Go to www.fueleconomy.gov/geg/taxphevb.shtml to determine your eligibility.
Step 2:
Go to www.illinoisgreenfleets.org for complete details on the state rebate including eligibility and submission requirements, and to download a vehicle rebate application form. The vehicle must be purchased only, not leased. Vehicle must be purchased from an Illinois dealership and purchase invoice must show that the dealership is located in Illinois. No out-of-state vehicle purchases are eligible. Go to www.illnoisgreenfleets.org for complete details on the details on the state rebate.
Step 3:
Submit your completed paperwork to the appropriate sources and enjoy your new Plug-in Electric Vehicle.

Elections
It's that time of year to start thinking about your participation in the FVEAA, and this month we'll be holding nominations and then the elections next meeting on September 21st.

As a reminder per the bylaws:
C. ELECTION PROCESS. Nominations for Officers and Directors commence at the August meeting with closing the day of the September meeting. The four officers and additional board member shall be duly elected by a majority vote of the members present at the annual meeting each September and shall serve a term of one year from the date of election or until their successors are elected.
See you on Friday the

Sincerely
Bruce Jones

Pike's Peak Hill Climb 2012 (by EV's) *Rich Carroll*

We'll have a short presentation about the Pike's Peak Hill Climb, where EV's finished 6th, 8th and 13th overall.

Photos

No photos this month from Phillips Chevrolet

Rich's Ramblings *Rich Carroll*

A funny thing happened on the way to the forum . . . As I talked to Ryan Bohm at NetGain Controls the other day, it occurred to me that it would be useful to have a comparison of several mid-level

controllers. I do think that an article with a comparison chart is needed by someone selecting components for an EV build. I started to do my research, and found there was a really good article written on the subject in December 2009. By Rich Carroll. Hmmm. Well, it needs to be updated, even though some of the major players have not changed much. I did limit this discussion to those mid-level EV controllers that are air cooled.

Discussion

The comparison standard has been the Curtis 1231C for years, and it has modest performance for normal sized cars and small trucks. It can be useful in limiting the energy used per mile, as it cannot deliver huge amounts, and therefore might be useful in achieving maximum range. I kept this for comparison purposes. The Logisystems controllers have disappeared from the market, and were dropped from the comparison. The liquid cooled controllers, the Zilla and the WarP Drive Industrial are great controllers, but don't fit the mid level, air cooled comparison specification either. I also left the Raptor controller off the comparison, as it is considerably more expensive, but does not have as many features. I pondered the Soliton 1, which is optionally liquid cooled, and left it in the comparison.
The MaxForcer SL (SL – street, low voltage) is a feature rich controller designed for typical street conversions with battery systems of 156V or less, and providing healthy 1000 Amps. Future models may include SH and RH (R - racing) with voltage ratings in the 350 V range. It can be wired to simply replace a Curtis controller, however, it has extra inputs for motor temperature and speed sensor, and outputs for main contactor coil, tachometer and a dash light. The default configuration provides smooth and silent operation, although various parameters such as motor current limit, motor voltage limit, battery current limit, rpm limit, battery voltage sagging limit, accelerator response are user-programmable via included serial cable and RS232 or USB connection. Battery current limit and sagging control capabilities are especially useful for battery protection and extended range. The serial connection also provides streaming data that includes motor and battery current and voltages, controller and motor temperature, watt-hours, rpm and more. The data can be copied into an computer spreadsheet and graphed. MaxForcer Controllers are made here in Illinois by Miodrag Zubic, a long term member of FVEAA.

The Soliton 1 is a popular controller, although higher priced than the others in this group. Soliton has an ethernet port for data logging, built in web browser interface for settings and updates (preconfigured only in Windows with DHCP turned on) Other computer configurations (Windows without DHCP, Mac, Linux) may be used with several system setting changes. It uses both liquid and air cooling, although with brisk use, it will go into thermal cutback fairly quickly without liquid cooling. Either a standalone program can be used for updates, or you can use a web browser to interface with the data in the Soliton 1. Soliton 1 low amperage connections are made by screw in connectors on a terminal strip behind a plastic cover.
Soliton gives the option of throttle input from either a 0-5V+ input, or from a Hall Effect sensor. Most Hall-effect sensors (pedals and assemblies) were designed to translate the pedal movement into two signals. In most automotive applications some checking is done to assure both signals indicate a similar demand, for example, acceleration. In the best EV controller systems, if the two channels appear to disagree on the request, an error code is generated. Soliton uses an optional brake input to their logic, but it is unclear if they also use both signals from a Hall-effect sensor.

The Synkromotive controller is one of the newer controllers in this market, and has some interesting features, but a few drawbacks. This is a 750A controller, well suited to conversion use. It has a plethora of safety features: required zero state on throttle to start, priority braking (braking overrides any throttle signal), direction change lockout, reverse power limit, temp monitoring (and cutback), and voltage monitoring (limiting or stopping output).
It accepts as many as three alternate inputs (speed sensor, etc.) and three alternate outputs. In addition, it has two CANBus ports, although the manual does not describe this interface fully. It does

use a proprietary program to interface a laptop/desktop with the controller, but the program runs within the Microsoft .net framework, and only Windows XP is suggested. This means that interfacing with Macs, Linux, Palm, iPhone, Android, and any devices that use a serial connection (HP 4700 pocket computers come to mind) are completely unable to connect. In addition, any changes made in the configuration are not immediately transmitted. The configuration file must be uploaded after your session, making fine tuning more difficult. Data is streamed, but the format is XML, so while it can be read by some text readers, import is a little more difficult if you plan to use a spreadsheet. The manufacturer does not list what data can be received through the stream. The stream can only be read by the Synkromotive proprietary software on a Windows machine.

The Belktronix system is difficult to compare to the other controllers. It includes a controller, a battery management system for PbAc or LiIon, a 675W DC-DC converter and a charger, all packaged together. Available in 500 amp versions, or 800 amp versions, it is intended for systems with a maximum nominal voltage of 156 volts. An option on the larger charging system is a dual 120VAC input, for charging at 1200W on each AC input. This would come in handy for charging at work, using 2 outlets (would be harder to get a dedicated 240VAC outlet). It is an interesting design that integrates charging and battery management along with the controller functions, which is a logical way to approach the whole picture. We know that other major controller manufacturers are planning to add the charging to their controller in the near future, but this appears to be the first on the market.

Objective Data	**Curtis®**	**Soliton 1 ®**	**Synkromotive DC750 ®**	**MaxForcer SL ®**	**Belktronix®**
Voltages	up to 144*	9-300V(actually up to 342V)	9-300V(actually up to 342V)	48-160V operating at up to 200V	120-144V (up to 185V charge limit)
Amperages (Maximum – short spurts)	up to 500 Amp*,up to 550 Amp*	1000 A liquid cooled,1400 A w/ racing agreement	750 Amp	1000 Amp	500 or 800 Amps
Main Connects	End	End	On both ends	End	End
Throttle input	0-5K pot	0-5 V+ source, or Hall-effect. May use Curtis type pot box if rewired with pullup resistor	0-5 V+ source	0-5k pot, (Future-Hall- effect planned)	Mechanical plunger /optical pickup
Other Inputs	none	Tach, Brake and Reverse input, can limit overspeed, or idle motor for Auto. Trans.	Tach, speed, reverse, brake, others	Tach input, Motor temperature monitor input	Vehicle integration module
Style of Low Amperage Connects	¼ inch spade terminal	Screws on terminal blocks, covered	23 pin AMPSEAL	¼ inch spade terminal	Protected ¼ inch spade terminals

Data Connection	no	Ethernet port	2 CANBus (RJ45)	DB-9 (serial port)	N/A
Key Switch Interface	Needs Pack Voltage	12V only	12V	Pack voltage	24 Volt from part of pack. Vehicle Integrator uses start and run connections from vehicle wiring harness.
Need for precharge resistor	Yes, not included	Built in	no	no	Internal to Vehicle Integrator.
Additional interface	No	3 programmable outputs for driving 12V nominal and < 1A, tachometer, PID loop to "idle" motor	"Fuel" gauge output. User interface written for Windows® only. (uses Microsoft .net)	Trigger of main contactor, tach output, motor temp. input, Data logging	Vehicle Integrator sequences DC-DC, softstart, main contactor, cooling fan and controller enable
Remote dash light	N/A	Yes, fault output can drive light, offers 'slow blink' to indicate temp. problem or RPM, 'fast blink' to indicate voltage problem, and continuous light for other errors. (no further codes)	N/A	On for controller operation. Flash (# indicates undervoltage, motor current out of bounds, controller heat is reducing output, controller heat has stopped output, runaway condition, short inside motor, accelerator pot is "open"	N/A
Data available to be logged	N/A	Yes, not described in manual	Unclear, but in XML format	Motor voltage, motor current, battery voltage, battery current, wH since powerup, 2 differnent temps. ASCII text format	N/A

Data frequency	N/A	unknown	1-1000 ms (0.001-1 sec)	100 ms (0.1 sec)	N/A
Settable parameters	N/A	HTML configurable, Min. battery voltage, max. batt. current, max. motor current, max. motor power. Settings effective immediately.	Settings must be uploaded to unit.	Motor current, battery current, motor voltage, accel and decel ramps, motor RPM upper limit, motor "idle" voltage (speed). Settings effective immediately	N/A
Cooling	case heat sink	Liquid (built in) or air	air	air	Heat sink and larger fan
Absolute maximum wattage	72 kW	342 kW	135 kW	156 kW	72kW, 115kW
Power reduction with higher controller temp.	Yes	Rate of 2.5%/°C above 55°C	Linear reduction	Yes, gradual onset. Also allows monitoring motor temp. and amp. cutback with incr. Motor temp.	Yes
Silent Operation	Controller whine at low throttle	Adjustable 'whine" to inaudible, very quiet	yes	yes	Quiet fan. PWM @ inaudible 14khz
Retail Price	$1,500 - $1,600	$3,050	$2,195	$1,950	Hard to compare, system includes battery monitors and charger. Also, 675W DC-DC included in charger enclosure 120V PbAc system $2150 up to 144V LiIon system $2890

My thoughts in summary. The Curtis was the standard for the industry. It certainly now pales by comparison to some of the newer designs. If you were thinking that you would need to double the amount spent to get a more technologically advanced controller, you are

wrong. For about $400 or $500 more than the price of a Curtis, you can get a wonderfully reliable controller with many advanced features. Look over the features, think about how you would need to interface with the system on both a daily basis, and on a periodic maintenance basis, and ask questions.

Meeting Minutes - *Virginia Hanson*

On Friday July 20, 2012 the FVEAA meeting was held at Phillips Chevrolet in Frankfort, IL. Phillips has an eight bay solar charging station for electric vehicles with five Eaton EVSEs. This is the first solar charging station at an auto dealership in Illinois.
Vice President Rich Hirschberg opened the meeting and he introduced all the people sitting at the tables. There are 108 paid members in the FVEAA.
Membership in the club is $15 per person per year.

The dealership manager of Phillips Chevrolet spoke and talked about how it is a family operated business started in 1996 and it is the number one dealership in Illinois. GM Managers were introduced as well as Volt specialists. There were six Volts to explore.
Dick Trost the Volt Manager was introduced. People who own electric vehicles become passionate about them. A discussion was held on battery technology, and the history of the car, including Bob Lutz who left GM but created the Volt.
The Volt has a 1.4 liter engine in addition to two electric motors, providing four different driving modes. The Spark is a battery electric car coming out. There were questions about the Volt sitting idle, and there are no problems with it sitting for long periods of time. The tires may lose a pound of air though, and fluctuations of air temperature may affect it.
Range decreases in winter and increases in summer as is natural for batteries.
Rebates for the cars include up to $7,500 federal tax credit plus a $4,000 State of Illinois EPA rebate through Green fleets.
Pizza was served and everyone enjoyed it. Then numbers were handed out and four mugs, four cups and an I-Pad were given out as door prizes.

Meeting adjourned at 9:15.

Membership Form

Ted Lowe

FVEAA Membership Application Form

Name:_____
Address:_____
City, State Zipcode:_____
Phone:_____ Phone Type: Home ___ Work ___ Cell ___
Email:_____
Please check one: New Member _____ Renewal _____

How did you hear about the FVEAA ? _____

Member Types and Annual Dues (Please circle one)	Newsletter Delivery Types (Please circle one)

Individual	$15	No Newsletter	$0
Family	$20	Electronic Only	$0
Business	$100	Postal Mailed	$15
Premier Business	$250	Postal Mailed and Electronic	$15
Charter Business	$500		

Total Due from Both Columns:

Please make your check payable to "FVEAA" and postal mail it with this membership application form to:
FVEAA
PO Box 214
Wheaton, IL 60187-0214
Attn: Membership

1988 Mazda RX-7 Convertible EV Conversion.

I am selling my eRX-7. It is a fun peppy convertible and has been a great daily driver for more than two summers. The car has been stored in doors for much of its life and is very solid. I hope to be able to sell it to another club member. A few of the specs are: Advanced DC 4001 motor, New Max-Forcer 1000 Amp. controller, Zivan k2 charger, 144 Volts (12) Trojan T-1275, 30-40 mile range with new batteries. Please contact Nathan Stowe for more details (773) 456-6322

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Exclusive worldwide distributor of WarP™, ImPulse™, and TransWarP™ electric motors for use in electric vehicles and electric vehicle conversions.

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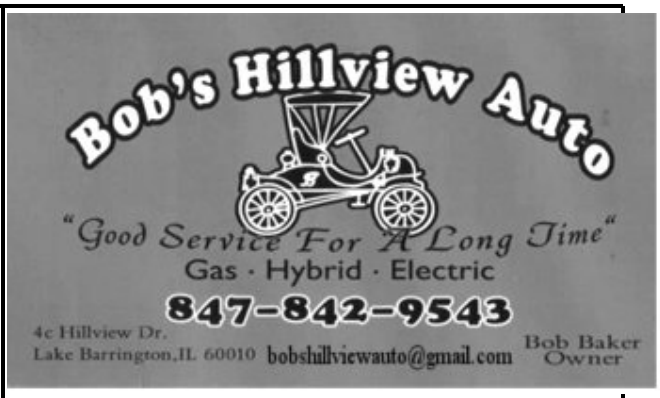

Harris Precision Tools, Inc.

Harris Precision Tools
Robert Harris
10081 Anderson Ave
Chicago Ridge, IL 60415
Phone: 708-422-5808
Email: harrisprecision@comcast.net

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773-604-4300
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Ecological Products Company, Inc.
Glenn Hunter
739 N Elmwood
Oak Park, IL 60302
Phone: 708-445-0341
Email: info@illinoiselectricvehicles.com
Web: www.illinoiselectricvehicles.com

Plug-In Vehicle Solutions, Inc.
Mike Piscitelli
1104 Coventry Circle
Glendale Heights, IL 60139
Cell: 630-248-8810
Email: mpiscitelli@getplugging.com
Web: www.getplugging.com

The Solar Electric Vehicle Company
Bob Kopach
3100 Dundee Rd
Northbrook, IL 60062
Phone: 847-656-8100
Email: bob@solarevco.com
Web: www.solarevco.com

Carbon Day and Carbon Day Automotive
Brian Levin
Cell 847 903 6652
Email:brianl@carbonday.com
Web: carbondayautomotive.com