SEPTEMBER 1988

MEETING NOTICE

The next meeting will be Sept. 16th, at *CRAGIN FEDERAL SAVINGS & LOAN* 333 W. Wesley St. Wheaton, Ill. -Time - 7:30 P.M. *sharp.* Guests are welcome and need not be members to attend the meeting.

THE PRES SAYS

At our August meeting Member Ken Meyers had an excellent presentation of a soldering tutorial. The subject was expanded to include printed circuit board parts identification. The meeting time expired before the subject was finished so we will continue the discussion Friday.

We will also continue our discussion of petro-electric vehicle design at the September meeting. A motorcycle engine was suggested. It would be helpful if members can bring to the meeting information about these engines. I also note there was a recent Federal settlement with Texaco which may make additional funds to Illinois. We should discuss preparation of information which could be used for a grant request to support our project.

A September or October Saturday has been selected to begin shooting our videotape. We need to select a day which is satisfactory to the persons scheduled to appear. This will also be discussed on Friday.

Bill

F.V.E.A.A.

FOX VALLEY ELECTRIC
AUTO ASSOCIATION
624 Pershing St. Wheaton, Il 60187

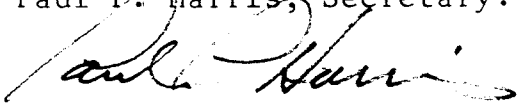
FIRST CLASS

ADDRESS CORRECTION
REQUESTED

The following is a condensation of the minutes of the July '88 meeting and the August '88 meeting.

The July 15, 1988 meeting was called to order by President Bill Shaffer at 7:38 P.M.. There were 12 members present. V. Vana gave the following treasurers report. The Now account has $820.11 and the regular savings account has $816.96 for a total of $1637.07. Vladimir Vana provided the donuts in the absence of Dana Mock. Pres. Bill Shaffer sez he was working on his car and the power components are in place and is now working on the control system. Paul Harris donated some PC boards that are being sold to club members at $5.00 each. These boards have a gear and lever system to control a pot and could probably be ideal for use as an accelerator pedal.
John Emde was driving all over his neighborhood testing different things etc. and his neighbor said the car was setting off his burglar alarm system, so the neighbor had a helicopter check around and it spotted this " Yellow car"....Tune in next month for further episodes of "Johns spurious emissions".
V. Vana talked to his insurance company regarding the bumper assembly on a 1979 Mercury. The car has a hydraulic bumper system and if a trailer hitch is put on the insurance is negated
Ken Woods is working on the club car and is to take out the motor and see what is the problem.
Ideas for the August meeting...battery charger seminar and possibly hybrid subject in September.
Meeting adjourned....9:12 P.M.
Respectfully submitted.....Paul P. Harris, Secretary

Minutes of the August 19, 1988 meeting
President Bill Shaffer called the meeting to order at 7:31 P.M. There were 17 members present. Treasurer V. Vana was downstate so no treasurers report was given although president Shaffer reported "No change" (does that mean no money in the bank?)
John Ahern didn't run his car too far..worried about transistors getting too hot.
John Stockberger finally sold his electric car to a person who is taking the car to Florida. (so John won't be married to it)
This person evidently knows something about electrics so there was probably a good deal for both the buyer and seller.
Bill Shaffer spoke to the video producer who wanted to know how many electric vehicles we could have available for TV viewing and the total came to about 5..John Emde, John Stockberger,John Ahern, George Krajnovich and Vladimir Vana.
EAA news.. They are planning a rally and a symposium and Solar and EV components Fair for September 17th and 18th. Maybe we will have some info on results in a later edition.
A discussion on hybrids followed and then a LIVE demonstration on soldering was given by Ken Myers..very instructive.
The meeting was then adjourned at 9:38 P.M.
Respectfully submitted,
Paul P. Harris, Secretary.



PERFORMANCE OF A GENERATOR HYBRID VEHICLE

From a paper by Karl V. Kordesch

There are two operating modes available for electric cars: all-electric for shorter distances with recharging from AC home power supply, and hybrid operation for extended periods. Only a hybrid car of moderate power makes good sense for personal transportation, a city vehicle to provide reasonable comfort (heated in winter), unlimited range in the city for short trips and considerable gasoline savings (4 liters/100 km).

On the basis of previous experience with a 6 KW fuel cell-lead battery vehicle, the author built and tested the following hybrid system:

Vehicle: Austin, 2-door sedan, curb weight 860 kg

Battery: 96V, 100 Ah Globe-Union, weight 180 kg

Motor-Generator: 16 hp, 7 kw, 110 V (Sears Industrial Alternator)

Electric Motor: Baker 96V DC, 20 hp peak, 10 hp continuous

Speed Control: 4-speed gear shift transmission plus electric circuit

The car is able to negotiate high-speed highways at 60 to 70 km/h for any distance and can attain a maximum speed of 100 km/h if necessary. Acceleration and hill climbing are comparable to any four-passenger small car. SLI (starter) automobile batteries of highest quality were chosen since they are needed for peak power mostly and usually they are not deep discharged. Under such circumstances they are more economical than "golf-car" batteries which may or may not have better cycle life but do lack of high current capability and cost twice as much.

The question of "what battery should be used in hybrid" cannot be fully answered by consulting any commercial literature. There is some information available about battery behavior under heavy discharge and fast charge conditions as are encountered during hybrid operation. Lead acid batteries have been optimized for high/power short pulse operation and studies for using two types of batteries simultaneously (one for heavy loads, one for high capactiy) have been published (Electrochem. Society, 1970).

The engine generator in the hybrid delivering up to 70A at 90V can be considered as a continuous primary supplier. The battery then plays the role of a load-peaking device to produce additional power for acceleration (like 200A for 20 sec) or hill climbing (100A for 5 min). "Load-sharing" occurs automatically; under fully charged condition (120V) the battery receives only a charge current of 2 to 3A, but at 90 V the full power of the engine-generator is available for driving or charging. The charge current tapers at voltages between 90 - 120 volts.

A 100 Ah SLI battery drops in capacity to 30 Ah when discharged at 100 A at -17° C, however, it keeps its "cranking power", therefore the performance of the vehicle is assured even in cold weather. During city driving the battery frequently supplies 1/2 the current and the generator the other half. Since the total power requirement is in the order of 6 kW (70 A average), the battery must supply only 35 A, which increases the available battery energy by at least 30%.

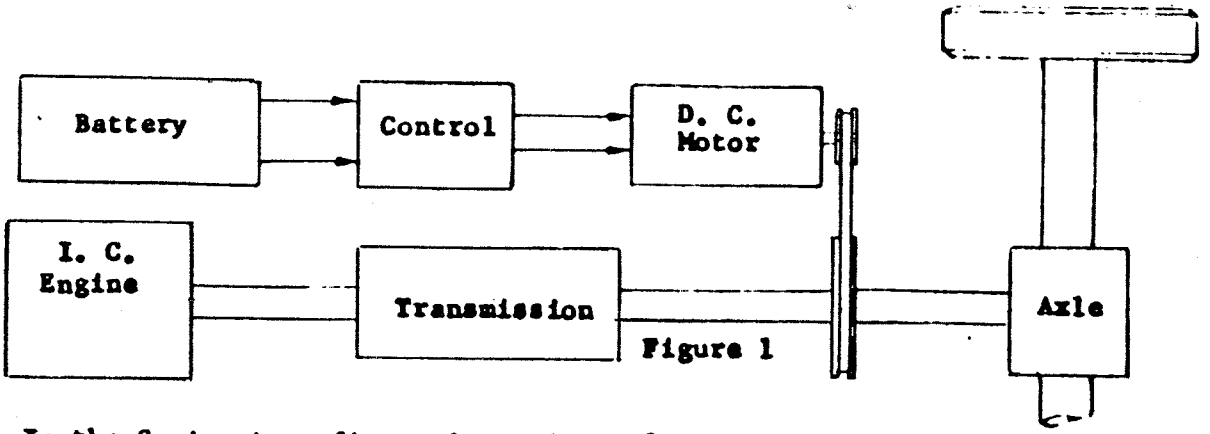


Figure 1

In the Series A configuration, Figure 2, the D. C. Motor is connected in line to the differential drive and the transmission and must be capable of supplying all the power required at the wheels, while the IC engine is cut off at the transmission. With engine running the vehicle the D.C. motor becomes a generator and charges the batteries.

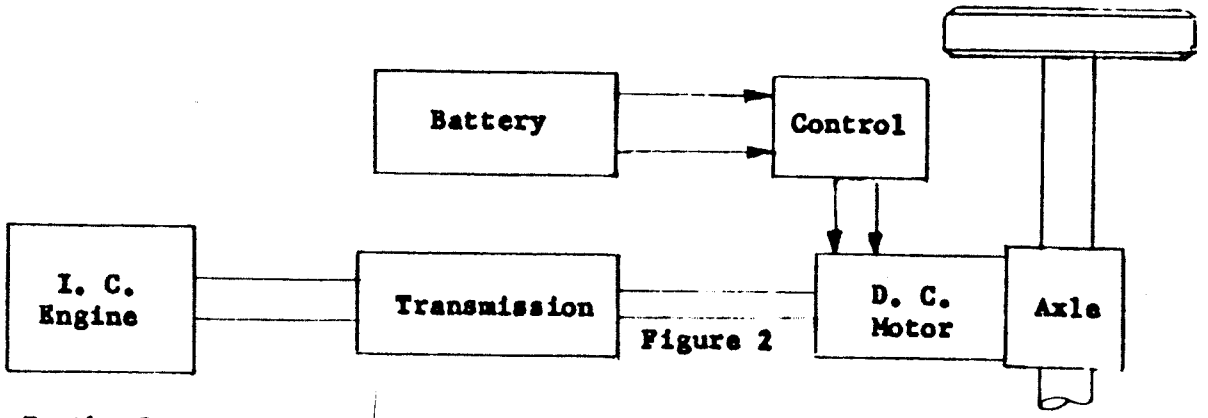


Figure 2

In the Series B configuration, Figure 3, the IC engine is used for driving the alternator to supply the power directly to the D. C. Drive Motor or for charging the batteries. In this configuration the D. C. motor is connected also directly through the differential drive to the wheels. This combination is most popular in the converting method of compacts with a rear engine drive installation.

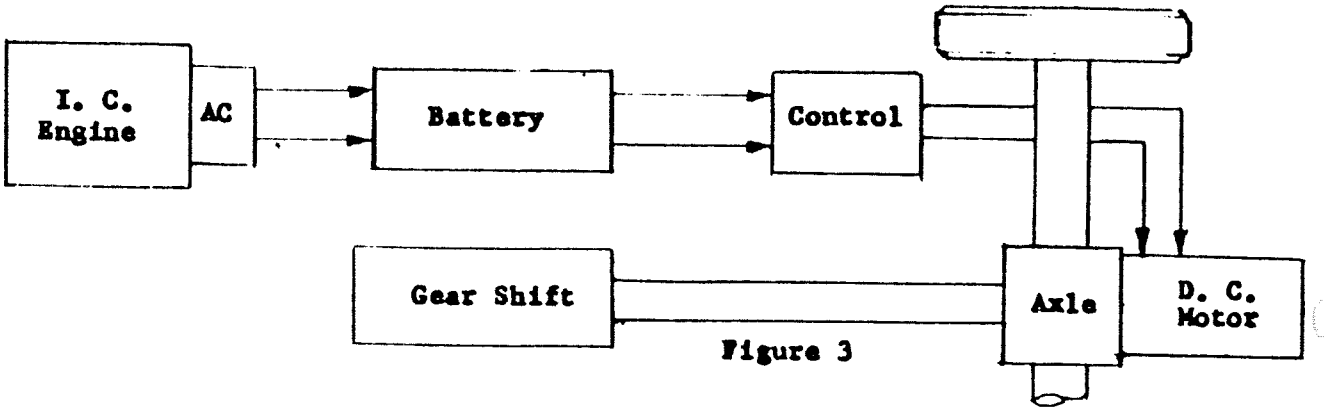
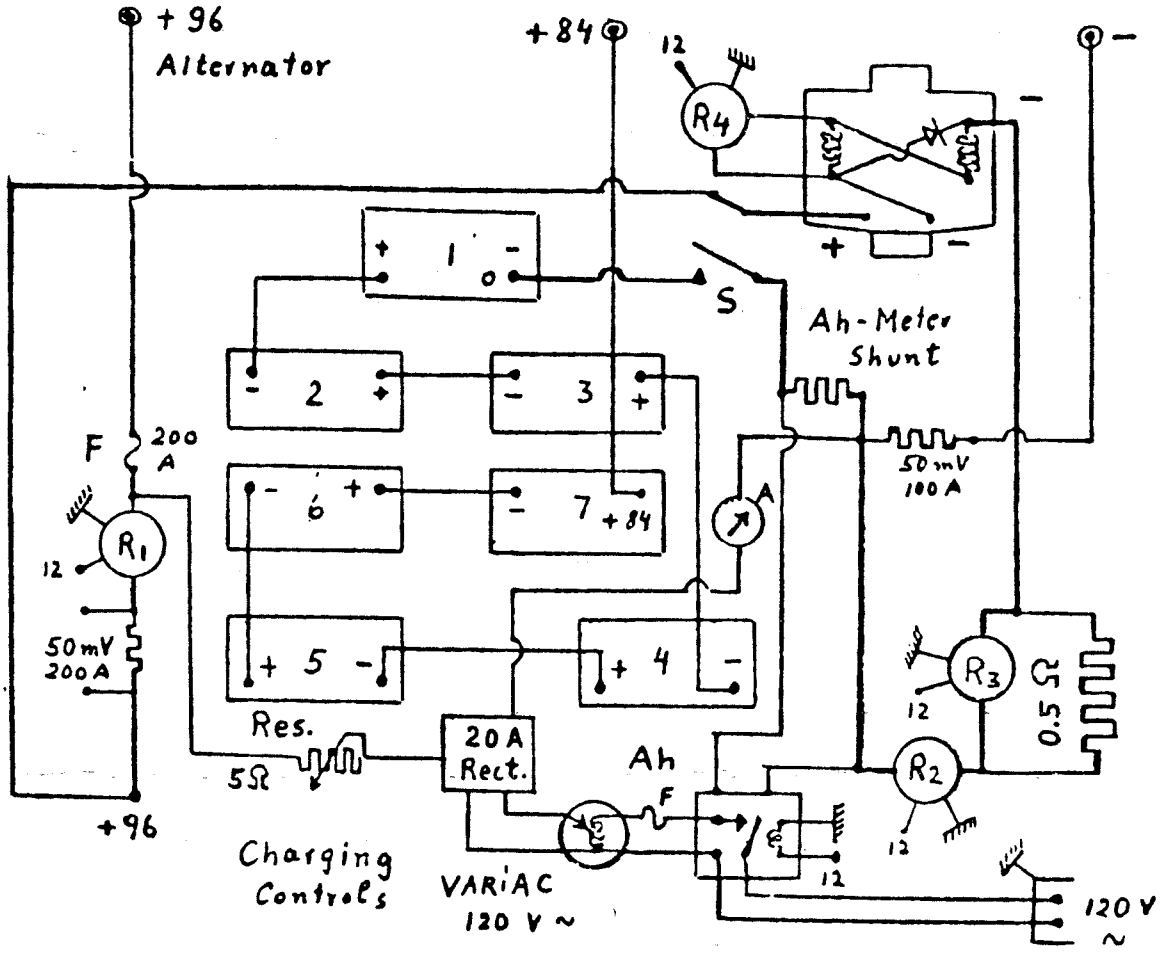


Figure 3

HYBRID-ELECTRIC SYSTEMS (CONTINUED)

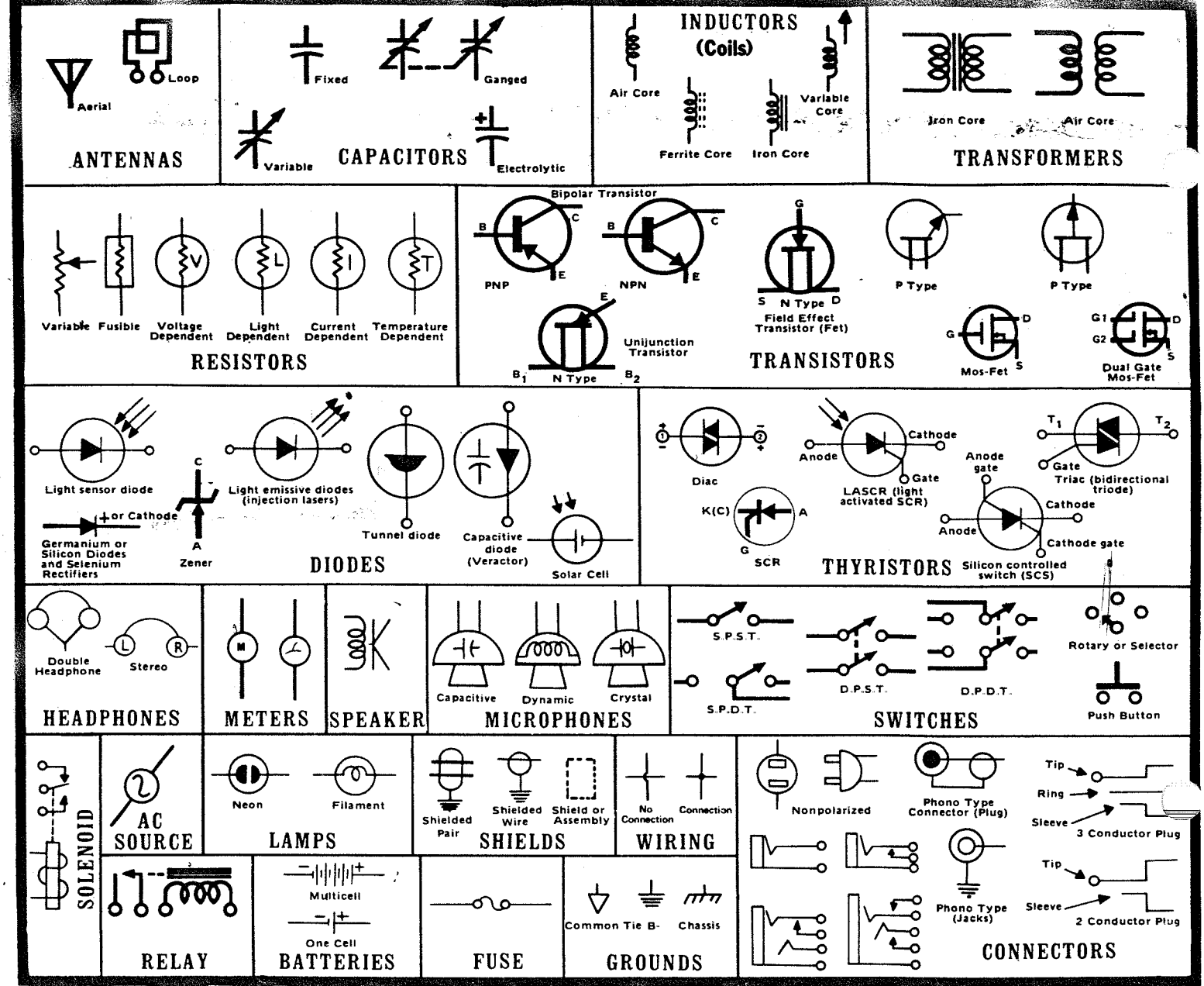
The ICE-electric hybrid built by Dr. Karl Kordesch was described in the August EAA News. Additional power circuit of the hybrid is shown below. For detailed description you may write to: Dr. Karl V. Kordesch, 2060 Arthur Ave., Lakewood, OH 44107.



BASIC SYSTEMS

There is a wide variation in the configuration of various EV hybrids which we will divide first into two basic classes. One will be electric hybrids using two distinctly different types of batteries in parallel combination, one to be used for acceleration only and the other for continuous driving at uniform speed. The other hybrid class will be the IC engine/battery combination, which we will divide into 3 basic configurations, parallel, series A and series B, depending on the combination of basic components of the power train.

In the parallel configuration, Figure 1, the D. C. drive motor is supplementary to the mechanical power supplied to the wheels by the IC engine and is capable of providing the acceleration on an intermittent basis while the engine is running at a constant speed.



ELECTRONIC SYMBOLS

OHMS LAW EQUATIONS

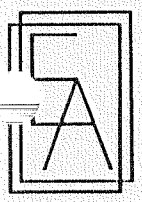
(DC Circuits)

E = Voltage in Volts
I = Current in Amperes
P = Power in Watts
R = Resistance in Ohms

Unknown Value	Formulas
E	$E = IR$ $\quad E = \frac{P}{I}$ $\quad E = \sqrt{PR}$
I	$I = \frac{E}{R}$ $\quad I = \frac{P}{E}$ $\quad I = \sqrt{\frac{P}{R}}$
P	$P = EI$ $\quad P = \frac{E^2}{R}$ $\quad P = I^2R$
R	$R = \frac{E}{I}$ $\quad R = \frac{E^2}{P}$ $\quad R = \frac{P}{I^2}$

DO YOU HAVE YOURS YET?

THE ELECTRO AUTOMOTIVE CATALOGUE



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