Electric Auto Association NEWS

MAY 1984 VOL. XVI No. 5

SEPT 8&9th

TWELFTH ANNUAL SYMPOSIUM International Rally

PLAN NOW!!! WHERE THE RECORDS ARE MADE. SEE EV MARKETPLACE. PLAN NOW!!!

Electrical SHOWPLACE '84

B.C. Place, Vancouver

EVAC

Congratulations to Axel Gringmuth our excellent host at the EVAC seminar. The seminar was presented in conjuntion with the huge electrical trade show. Axel had his AMC Pacer Electric and I had my Aztec Hybrid on display. The show was held in the new B.C. Place Stadium, the largest air supported dome in the world (the roof alone covers 10 acres.) The seminar featured 7 top people including Englands 1983 EV Man-Of-The-Year Geoffrey Harding of Lucas Chloride EV Systems Ltd.,Mr. Lewis Gerlock, Manager Transportation Equipment Development US Postal Service and Stephen A. Pertusiello as sub. for Jerry Mader, EPRI Palo Alto. The meeting was saddened by the sudden passing of Fred Johnson President of EVAC just 10 days before, I believe EVAC will continue to build on the fine foundation Fred has built. Thanks to every one in Vancouver for the wonderful reception I recieved, Clarence.

LEGISLATION

CALIFORNIA LEGISLATURE—1983-84 REGULAR SESSION

ASSEMBLY BILL No. 3630

Introduced by Assembly Member Leonard

February 17, 1984

LEGISLATIVE COUNSEL'S DIGEST

AB 3630, as introduced, Leonard. Taxation: electric vehicles.

The existing Personal Income Tax Law and Bank and Corporation Tax Law authorize specified credits against the taxes imposed.

This bill would authorize a credit against taxes under the Personal Income Tax Law and the Bank and Corporation Tax Law in an amount equal to 55% of the cost incurred, as specified, by the taxpayer for the manufacture or conversion of an electric vehicle, as defined, but not to exceed $3,000 per vehicle. The bill would provide the same tax credit to the original purchaser of the vehicle if the manufacturer or converter elects not to claim the credit.

The bill would take effect immediately - - - - -

AB 3630

Write to your assemblyman AND!!! your State SENATOR. A simular bill was defeated on the basis,of lost revenue, please point out that due to the small number of EV's the cost would be almost nothing. Sign Mike Brown's letter, but also write your own. Don't forget THE LARGER OUR NUMBERS THE LOUDER OUR VOICE.

AN ANALYSIS OF AVAILABLE ELECTRIC VEHICLE MOTORS

Part II

This Article will present the results from the test of the General Electric 2CM76 and 2CM88 motors, Jack and Heintz G 29, Westinghouse EA40, and Prestolite MTC4001, in an electric vehicle under driving conditions. Each of the motors was installed in the Russco R and D test vehicle and motor currents and voltages recorded at 10 MPH intervals. The product of motor current and motor voltage divided by the vehicle speed is expressed in Watts/MPH, and is shown in Figure 3. The aircraft motors had an additional 300 watts added for field power. The peak at 10 MPH is due to the severe losses of the transaxle in first gear. The dotted line shows the more effecient second gear starts with the Prestolite motor. Note that each motor requires about th same Watts/MPH as the others, however, each motor does indeed have its own characteristics, as will be shown. The Prestolite motor requires less Watts/MPH at the lower speeds due to its weakened field. The aircraft motors are always comsuming 300 watts of power to fully strengthen their field, thus wasting power under light loads.

Figure 1 shows the no-load speeds for the motors tested, expressed in RPM verses motor voltage. The shunt wound 2CM76, G29, and EA40 will exhibit a speed droop of only 10% under full load, due to the IR losses of the motor windings. The compound wound 2CM88 will show more of a droop under load due to the strengthening of the series field. The speed of the series MTC4001 is dependent upon load. The motor will attain a high speed under light load due to a weakened field, and conversely a severe droop in speedunder heavy loading due to a strengthened field.

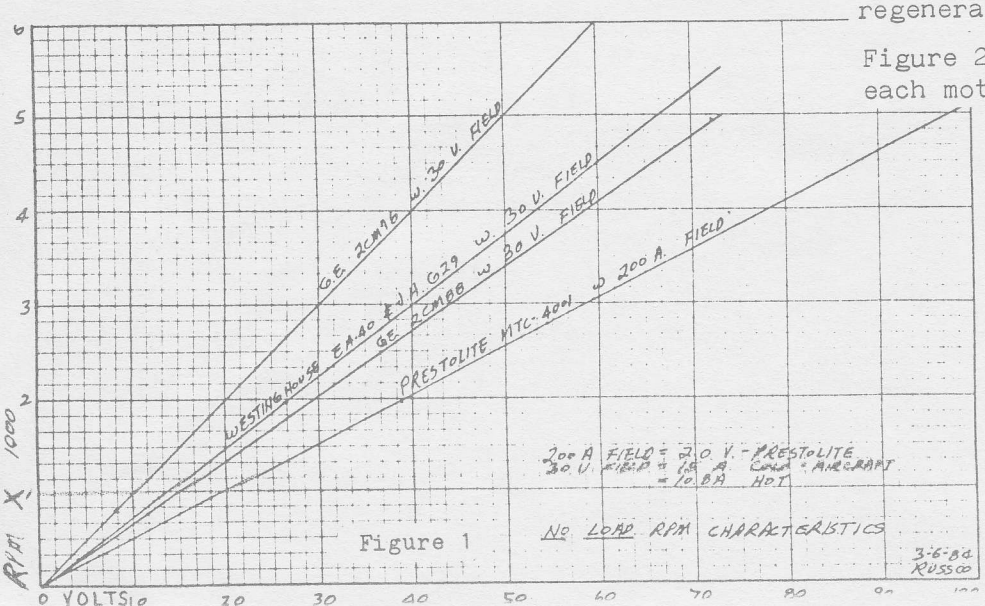


Figure 1

Figure 4 represents the unloaded generated voltage of each of the motors tested, coasting at 15 MPH in first gear. The aircraft motor fields were excited with 3[illegible] volts: the Prestolite with 1.75 volts. Under load into batteries, each motors generated voltage should droop under 10%, except the compound 2CM88, which will produce less voltage due to its bucking series field.

CONCLUSIONS

2CM76 The 2Cm76 is the lightest wieght (63#), most compact of the motors tested. It is a pure shunt machine with compensating windings. Figure 1 shows this motor to have the highest RPM-per-volt ratio. 5000 RPM can be attained with but 50 volts. Figure 2 shows a high current for 20 MPH, which is to be expected due to the high RPM/Volt ratio. Since 5000 RPM is the designed upper RPM of the typical vehicle, a 48 volt battery system will provide plenty of vehicle speed. Due to the high motor current drawn, the vehicle batteries should be paralleled--thus 16-6 volt batteries. The 48 volt system will provide high vehicle speed and the paralleled battery system will reduce battery current to 50% of motor current. The 2CM76, due to its high current demand was sluggish with the 400 amp current limit of the controller and necessated first gear for all starts. The controller current limited easily and provided poor acceleration. Setting the current limit to 500 amps was still too low to provide adequate performance. This motor was a real boiler: it ran very hot due to its high current demand. It was also a screamer: it was very noisy. For regeneration, Figure 4 shows that paralleling and halving the battery voltage to 24 volts will provide excellent regeneration down to 10 MPH.

Figure 2 depics the motor current drawn for each motor at 20 MPH.

2CM76	90 A.
2CM88	104 A.
JH29/EA40	72 A.
MTC4001	66 A.

Figure 2

G29 & EA40 The Jack and Heintz G 29 and Westinghouse EA40 motors are both the same size and weight (64#) and are both somewhat shorter and fatter than the GE2CM76. Figure 1 shows the speeds of the G29 and EA40 identical. Evidently these two motors were built to meet the same specifications, so either motor can be used. Again both motors are pure shunt machines, just like the GE 2CM76. However, Figure 1 shows a much lower RPM-per-volt ratio than the 2CM76. In this case 72 volts will provide a 5000 RPM top speed. Since the motor requires more voltage to attain the same speed, the motor current is less for the 20 MPH speed, as verified by Figure 2. In operation, the 400 amp current limit of the controller provided much better acceleration of the G29 and EA 40, again due to the lower current required per MPH. As the motor drew less current, it ran cooler and was also quieter than the 2CM76. For regeneration, Figure 4 shows that paralleling and halving the battery voltage to 36 volts will provide regeneration down to around 12 MPH.

2CM88 This motor is longer and heavier than the previously tested motors. The 2CM88 is a compound machine, with both shunt windings and series windings. Figure 1 shows a somewhat lower speed-per-volt than the previously tested G29 and EA40. Still, 72 volts will provide almost 5000 RPM. Figure 3 shows the 2CM88 to be less effecient than the other motors tested, as verified by drawing the highest current at 20 MPH from Figure 2. The 2CM88, due to its series winding, provides more torque than any ofthe aircraft motors tested and is considered a major advantage of this motor. The 2CM88 was the only aircraft motor that could ascend a 22% grade; the other aircraft motors stalled out. The 2CM88 had more torque during start-up and acceleration. The controllers 400 Amp current limit was adequate for this motor, but still required first gear standing starts.

Due to its high current requirements, the 2CM88 ran hot and like the 2CM76, was very noisy. Regeneration down to 12 MPH is possible by paralleling the battery voltage to 36 volts.

MTC4001 The Prestolite MTC is the largest and heaviest (106#) of the motors tested. It is a simple series wound motor, which will provide the highest torque of any motor type. Figure 1 shows the MTC to have the lowest RPM-per-volt rating: it takes 96 volts to turn 5000 RPM under full load. This is to be considered a high voltage, low current motor. Figure 2 verifies this, with only a draw of 66 amps at 20 MPH. As the MTC runs at low current, the 400 amp controller current limit is more than adequate for quick acceleration and hill climbing ability. Starts may be made in second gear, eliminating the first gear losses. Since the MTC runs at a lower current, it runs very cool and is as quiet as a whisper.
By exciting the series field with a 2 volt cell, the MTC will generate 67 volts, from Figure 4. Halving the battery system to 48 volts will provide regeneration down to 10 MPH.

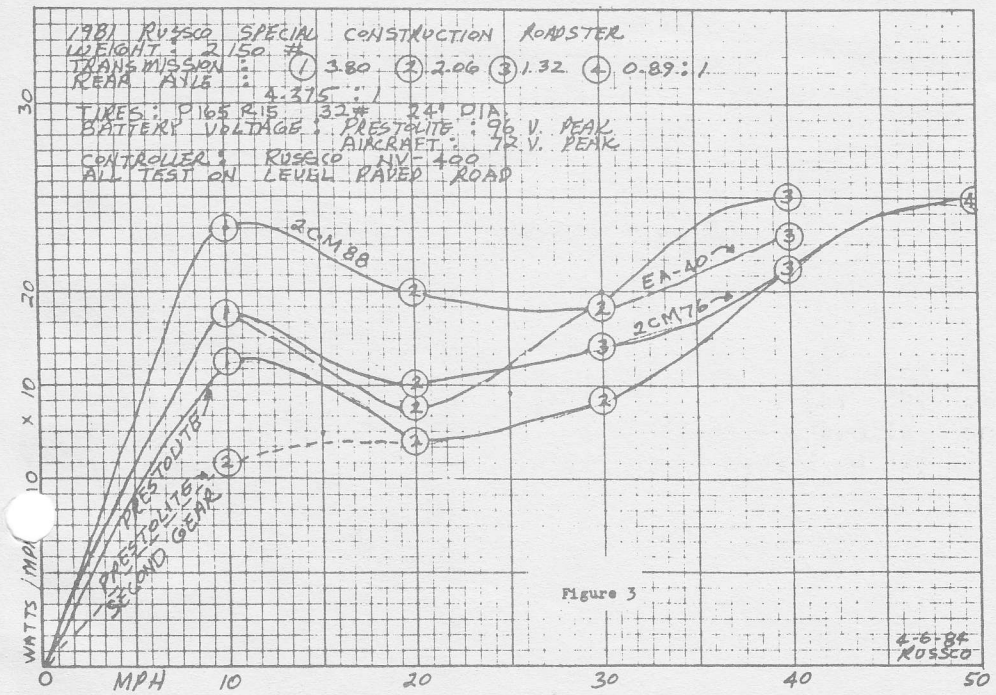


Figure 3

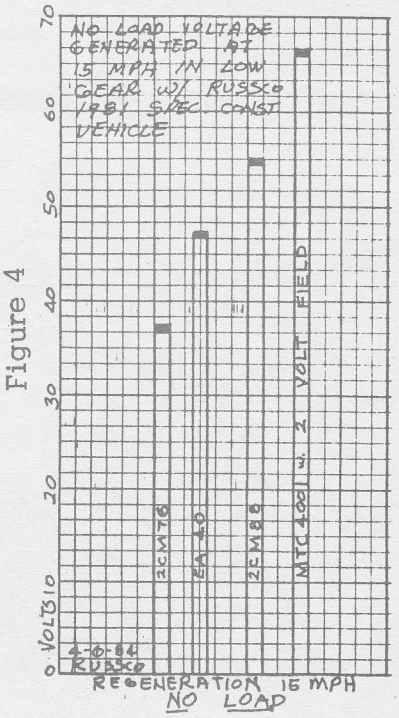
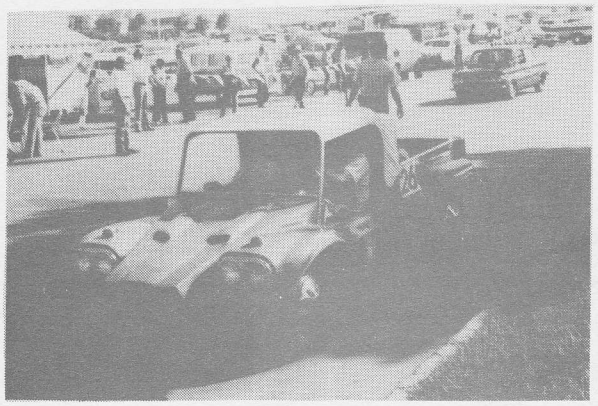


Figure 4

MOTORS CON"T.

SUMMARY

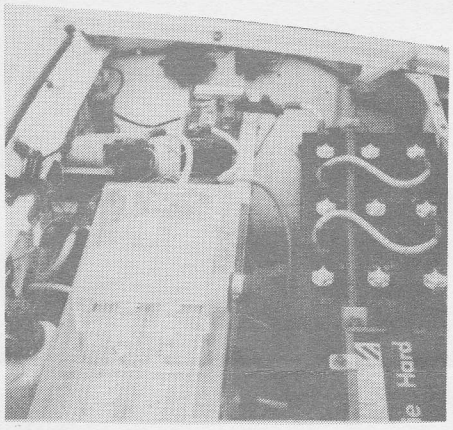
Any of the motors tested will provide adaquate vehicle performance. The aircraft motors will require forced cooling and full usage of the transmission. The 2CM76 should be used with a 600 amp controller for adequate performance. The 2CM88 is desireable due to its higher torque output. All aircraft motors were noisy, alerting all that either a jet or electric vehicle was approaching. The Prestolite MTC is quiet, runs cool, provides the most torque, but is heavy and cost 2-3 times the typical aircraft motor.



TEST VEHICLE

CONVERSION ? **CHOOSING** A CAR BY CLARENCE ELLERS

THINK PUBLIC OPINION

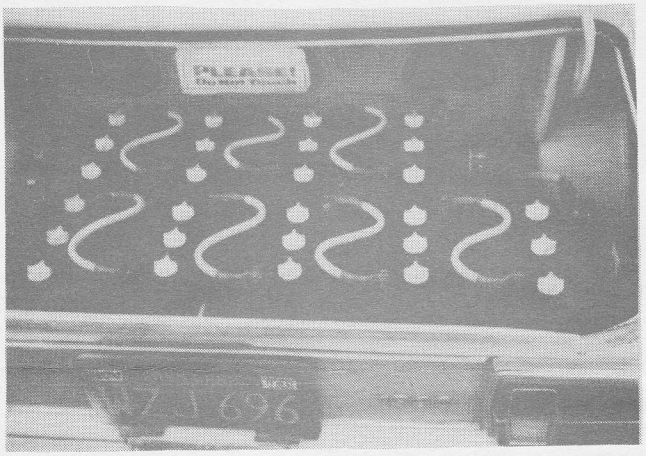


FOLD DOWN

MOUNT RACKS ON FOLDED SECTIONS

H CUT

FOLD DOWN

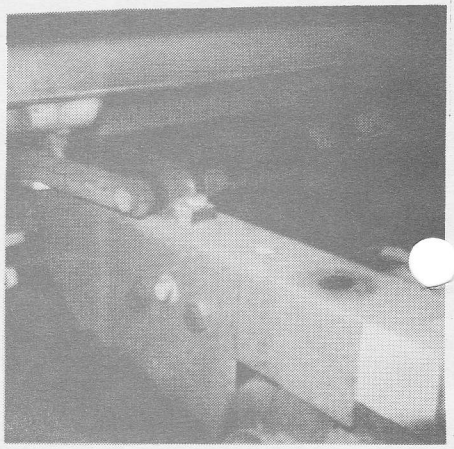


1. LOOKS: Build a machine you will be proud to show and demonstrate.
2. BATTERY LOCATION: No batteries in plain view inside vehicle. Cut rear deck, under seats etc. to lower profile of the batteries.
3. INSTRUMENTS: Use the existing holes--gas gauge, temp, etc. Don't swiss cheese your dash. No side-cars please.
4. WEIGHT; Shoot for 3000lbs. or less. Original curb weight of around 2500 lbs. You will remove 2 to 300 lbs. and add 7 to 900 lbs.
5. GEAR RATIOS: Any compact that gets 40 to 60 MPG must have a very efficient drive train, therefor would make a good electric. Four of our nine 100 mile cars are Honda's. I would say 1. Honda, 2. Rabbit, 3. Vw Bug, in that order. My rabbit 4 speed is a little slow with 48 volts on 2CM77 aircraft generator, around 50MPH in 3rd. Too much current in 4th.

Most cars I've seen could have more batteries under the hood. THINK BALANCE half in front and half in rear. Equal wieght distribution is very inportant. I have never had to beef up suspension.

BATTERIES UNDER BED MY PU TRUCK

This linkage made from (4) cheap 1/2" pillow blocks and (4) pieces of 1/4"x1" alum. 6" long, allows me to slide my bed back 12" so it can be lifted "dump style".



EV Marketplace

INTERNATIONAL RALLY SEPT. 8&9 th

WE MAY BE ABLE TO SAVE YOU SOME MONEY AND GET OUR HOSPITALITY ROOM FREE

IF YOU PLAN TO STAY AT THE SHERATON PLEASE LET US KNOW ASAP; NAME _____No. In Party____

FOR SALE: VW Bug complete but disassembled. 1- Taurus charger 36v 25amps.: 2-2CM76: 1-Dual relay 400amps: 1-400 amp sp relay. 1-Kaylor adaptor $400. Sue Tucker (408)379-2376.

FOR SALE: 175amp hour (group2) batt. almost new 6v $12.50 in quanity. REBUILDERS SUPPLY 1265 Old Oakland Rd. San Jose, CA (N.13th) San Jose,CA95112

FOR SALE: Precision, production-run adaptor plates for Baldor, Prestolite, etc. motors, $70 to $80. Shaft couplings $35 to $65. Ask for Bulletin #2 (has engineering data). 3E Vehicles, Box 19409,San Diego, Ca 92119

FOR SALE: Karmen Ghia. New Paint, uphols, tires. 72v system. Baldor Motor, Electronic control, On Board Lester Charger. 55mph 60m range-Excellent. Will sacrifice. Dr. Gerald S. Rosenthal 5640 S. Wasatch Dr. Ste.D. Ogden, Utah 84405 (801)479-8801 or 9083

FOR SALE: 73 Mazda, 10hp Delco Comp. Aircraft gen/starter, 24v field, 48v armature. motor & drive-train complete. Needs batt. & controller. Rich Buch Box 18044, Milw. WI 53218.

FOR SALE: '80 Freeway El.Car Mfg. HMV 659mi. $2000 or trade anything. 15210 Tresch, Webster, TX. 77598. (713)480-1443.

FOR SALE: PMC controller, 96v-350amps. $700. EVC Inc. Controller, 12-96v, 500amps new $400. HB SCR controller 48-96v out $200. Meters & Shunts from $5. Roger (619)453-2231 or 277-3166

FOR SALE: D.C. Aircraft gen. 8000RPM. Willey 7 Controller, Spline Mtr. connector, 1v Meter, 2 Shunts & 1 amp. Meter, 10-6v batts. 2-36v Chargers. Total $925. W. C. Melton 331 S. Oildale, Bakersfield, Ca 93308. 1-(805)399-3462.

FOR SALE: '68 FIAT Sport Cpe, PMC controller, 2CM77 motor, 12 new ALCC batt., towbar, LESTRONIC 12/72v charger. 72v system. $4200 value for $2500. Also 12 used DIEHARD batt. make offer. Bob McGrew (408)732-7324.

ADS must be received with payment by the 10th. of the month, for the following month's issue. AD rate is min. 1 to 5 lines $5.00, 1/4 Pg. $15.00, full Pg. $50.00,full Pg. 2 sides $80.00. Wanted,Trade, For Sale, etc. Mail to EAA 1249 Lane St. Belmont, CA. 94002

WHATS HAP'N

Peninsula

May 5

San Bruno Library 10 to 12 noon meeting of Peninsula Chapter. You will see and hear about "Electric Cars of the Past, Present and Future" from Mr. Stanley Blois. Mr. Blois has been actively involved with electric vehicles for many years.

May 26 and 27

Tanforan Electric Car Show!

Members of Peninsula Chapter will attend the cars and will answer the questions in regard to Electric Cars.

INVITE YOUR FRIENDS.

EAST BAY

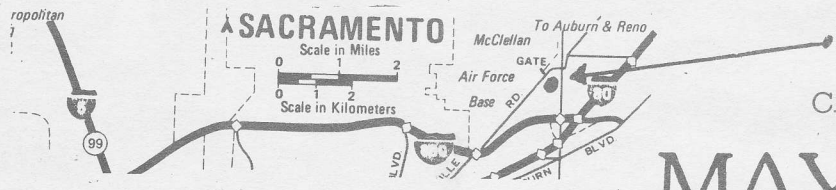
JUNE 9th SOUTHLAND MALL EV EXPO

AUG. 11th OAKLAND RALLY

OCT. 13th SOUTHSHORE ALEMEDA EV EXPO

Rally

CALL CHUCK HUNTLEY
After 6: (415) 431-8179



SECOND EVER!! EFFICIENCY RUN

CALL MIKE FOSTAR (916) 635 3095
643-2693

MAY 19

ATTN!! SANTA CLARA CHPT. MEETING PLACE HP Stevens Ck. Between Lawerance & 280 Over Pass'es

MAY 2 EASTERN EVA ANNUAL DINNER MEETING
FORT WASHINGTON PA CALL (215) 722-8378

JULY ? SEATTLE (BIG MONEY PRIZE) ELECTRIC CAR RALLY
CALL STEVEN LOUGH (206) 325-2600 STEV SEND INFO!

EDITORS: - Walter Laski - John Newell - Bill Palmer - Paul Brasch - COMPILED AND PUBLISHED By Clarence Ellers. SEND IN YOUR PERSONAL AND CLUB NEWS AND COMING EVENTS. ARTICLES _ COMMENTS etc. all correspondence to address below.

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