

EAA NEWS

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Walter V. Laski, Editor

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To charge or not to charge - that is the question.

There is a controversy among the EV owners on the method of charging power batteries; which is better for the life of the batteries to charge after deep discharge or trickle charge every time the vehicle is used. The answer to this depends on the daily mileage of the vehicle and the average speed.

We must admit that everybody believes that we must get at least 100 miles driving distance from one charge of the batteries - in fact DOE specs consider this a minimum standard - but, is this really an average daily EV travel? The standard tables tell us that the average use is 27 miles per day - the 100 mile distance is traveled only by a tiny minority.

Besides that, we have already proven that we can make the 100 miles on one charge, but at city driving speed of 35 mph. So, the question is, do we wait to charge the batteries until they are almost discharged, or do we "trickle" charge them every time we have used the car? The answer is: "trickle" charge, because it has been proven a long time ago by many EV users that this method prolongs the battery life up to six years or more.

There is also another method of conserving battery life in connection with the charging method - it is the use of low current and high voltage in the power train since high current discharges the battery faster than high voltage does; that is why European EV makers use 120V power systems, while we are still fiddling with 48V-72V systems.

Must EVs use transmissions?

The reason an electric car can get away without a transmission is that DC traction motor has a very steep speed-torque curve, compared to IC engine; so the electric doesn't need extra starting torque; it has plenty without a gear reduction. Even comparing a series-wound motor to an IC engine with a four-speed transmission leaves the motor with an edge in torque over almost all of the speed range and the motor can be reversed electrically, eliminating the need for a reverse gear.

The problem inherent in such drives is that high torques at low speeds demand high currents. High currents boost heat losses, cut driving range and reduce battery life. In addition, EVs required to pull up steep grades for long periods may generate enough waste heat to damage the motor. This is where a transmission gives an advantage. Even the addition of a simple two-speed transmission can substantially increase power for hill climbing and at the same time cut current drain.

This reasoning applies to the most common EV motors, the low speed DC traction motor. Other motors running at higher speeds have definite advantages in power-to-weight ratio, but require some form of transmission.

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ATTENTION: ALL ADVERTISERS. Beginning January '82 all advertising in the EAA NEWS will be payable as follows: 3-4 line AD under ELECTRIC CARS, PARTS, ETC. will be \$10/month, 3-4 line AD under FOR SALE will be \$5/month and 3-4 line AD under NEW BOOKS will be \$10/month.

ELECTRIC CARS, PARTS, ETC.

EVI - Electric Vehicles, Inc. now offers reduced prices on complete car conversions from \$5,000 to \$8,000 - slightly used factory-built JET 600 for \$8,000 - brand new '81 JET 007 and '81 ELECTRICA for \$9,995. New Transistor Speed Control, 3½ x 7 x 10 inches, introductory price \$550. For more information call EVI at (415) 964-3974.

EVS - Electric Vehicle Services offers a full line of Components, Motors, Controllers and supplies. Bradley EV parts and Service also available. "Flight Systems Components Catalog" available at \$3.00. EVS, 6512 Pemba Drive, San Jose, CA 95119. D. Gillis (408) 225-5446.

SES - Siskiyou Energy Systems is presently offering the WILLEY MODEL 8 Controller providing 400A armature current and up to 15A field current from 36V to 120V. SES, 16892 Mitchell Avenue, Los Gatos, CA 95030. Call Ric Barline at (408) 356-0289.

AA ELECTRACAR, INC. is now located at 2170 Old Middlefield Way in Mountain View, and has in stock EV Conversion Kits, Components; they also do Electric Conversions and Service. For information call Alfred Hardage (415) 968-5329.

Custom Motor-mount Adapters with motor shaft-to-flywheel couplers for most cars and motors made to order. For description write or call Bill Palmer, 44 Dior Terrace, Los Altos, CA 94022 or phone (415) 948-7677.

FOR SALE

New ElectraVan 600-Bought for Resale - \$12,900 - Bob Wing
615 Winding Way SE, Salem OR
97302 (503) 370-7350

HB SCR Controller 450A/96V
\$900 Complete, EVC Trans. Contr.
500A/96V as new - \$600, 2CM77
Motor-\$200. Roger (714) 453-2231

New 20 Hp Prestolite Motor
VW Adaptor Plate, SS Control
Make Offer-S. Mabry, Rt. 7 Box 992
Tyler, TX 75707

'75 Citi Car - Rebuilt Motor
New Brakes - \$2,300 or offer
Roy Paulson (408) 269-7937

2CM76 Motor with Hydro
Transmission Drive
A. Kamasz, 6764 NE Davis
Portland, OR 97213

(2) 2CM73, 200A, 30V
8 Hp - Excellent Condition
\$300/each - Ed Schantz
(408) 245-6322 after 6 p.m.

2CM77 Motor-Excellent Condition
New Paint/Brushes - \$400
(408) 867-5930 eve.

FOR SALE

Datsun Pickup - 14 Batteries
under Bed-J&H G-32 Generator
Relay Controllers - \$3,500
C. Ellers (408) 296-8532

'68 Toyota Corona
72V Willey Controller
Battery Charger, Tow Bar
V.R. White (415) 583-2761

Willey Controller - 96V or
120V with Field Control.
Ideal for Compound Baldor
Asking \$400. (408) 356-0289

2CM76 Motor/VW Adaptor
Excellent Condition - \$400
(408) 356-0289

'67 VW Bug - G-29 Motor
Best Offer - 700' #3/0 Cable
at \$1.00/foot - Call
Dan Rivest (415) 388-0838

'72 Vega Hatchback w/Adapter
and G-23 Motor-Not Finished
\$650/offer - L. Telstad
(408) 252-7818

G.E. 2CM76 Generators
\$290 and \$170
A. Weitzman (408) 253-4075

FOR SALE

'71 Datsun Wagon - Hybrid
EA-40 Motor-Resistor Cont.
Lester Charger-Make Offer
S. Shigematsu (415) 435-2726

Sunbeam Imp with Adapter
J&H 500A Generator - \$500
R. Senechal, 938A Avenida
Majorca, Laguna Hills, CA 92653

'59 Renault Dauphine - \$150
200A Generators (3) - \$75
2 Cyl. Air Cool. Onan - \$100
C. Meyer (408) 248-8594

(3) Unused 2CM73 Gen. - \$150
(1) Ac/DC Gen. Motor - \$100
N. Gaefe (209) 245-5617

2CM76 Motor-\$275 - '61 VW
Beetle w/sun roof, 72V G.E.
Motor, G.E. SCR Controller
Gino (415) 523-2101, 236-8863

'72 Chevy Vega-New Batteries
Willey Controller-New Paint
J. Haraughty
(918) 835-0302

'75 Citi Car - New Paint
and Top - Good Batteries
R. Weston (918) 622-8680

Honda 600 Sedan Conversion

by Lloyd Gano

In converting the Honda, the same concept was used as that which I conceived for my first electric car. For this car, which was built in 1968, I used a single high voltage pack along with a clutch and multi-speed transmission. Incidentally, this car (the Gano-Ford "T" Electric) is still being used and has been located in the state of Michigan for the last seven or eight years.

High efficiency and simplicity are the main features of my electrified Honda 600 Sedan. It has been driven almost daily since September 1979, and close to 10,000 miles have been logged on it as an electric. Other than adding water to the batteries, very little maintenance has been required.

Total weight of the car is 1,920 pounds, and it uses a minimum amount of energy. During a twenty-two mile commute between Los Altos and Stanford University Hospital, it uses approximately 3 KWH or 15 to 20 cents' worth of electric power.

On a level stretch of road, after the initial acceleration, the motor required only 22 amps to maintain 30 MPH and 36 amps to maintain 38 MPH (top speed on the level).

During the last EAA Rally, my Honda (#35) covered a distance of eighty miles and still had 1.83 volts per cell left at the end. I completed three additional laps after the official end and got the total from my odometer.

Getting back to the Honda, the battery pack consists of ten Trojan EV-30's. They are 12 volt, 100 A.H., and weight 68 pounds each. The batteries are all connected in series for a total of 126 volts and 680 pounds.

The motor is a Baldor 3.2 H.P., 115 V.D.C., compensated, and series wound. I bought it new, surplus from C & H Sales for \$99.50. It is physically larger than the surplus generators being used, but it is very efficient (89% at full load). Let's face it — the motor needs a specific amount of iron for efficiency at a given output. Also, a high voltage motor has a lot less brush and commutator loss than a low voltage motor.

When you consider the weight of the batteries, a 50% increase in the weight of the larger, more efficient motor doesn't add much to the total weight of the car. However, it can make the difference between good performance and poor performance. A light weight, inefficient motor is a poor investment.

In addition, a larger motor does not overheat or need a blower. In my opinion, when a blower is required to keep a motor from burning up, this should tell you something! The energy wasted in heat is coming directly from your batteries, along with the power required to drive the blower.

The Honda utilizes a front wheel drive that is well designed. I removed the cylinders and crankshaft, but used the original clutch and four-speed syncro-mesh transmission. My electric motor drives the light flywheel through a dual roller chain.

I found that a Solid State Controller is not necessary. A simple knife switch, of my own design, attached to the emergency brake handle is used for the motor control.

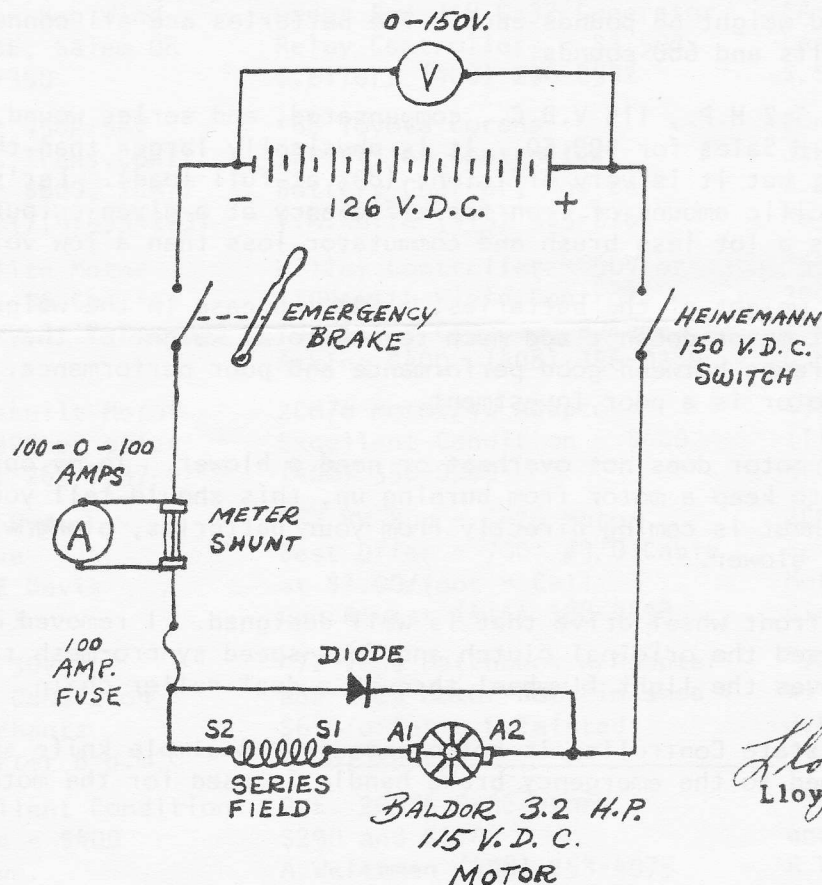
Since the brake handle is located alongside the driver's seat, it is very convenient to use. The switch is closed only when the emergency brake is completely "OFF" so it prevents starting the car with the brake "ON".

Acceleration through the gears is quite smooth using the clutch and the motor has no tendency to "run away" between the shifts, even though there is no real load on it. All of the power from the batteries goes directly to the motor with a minimum of loss.

I do have a second switch and 100 amp fuse in the circuit as a safety precaution. I also have a .4 ohm resistor shunted by relay contacts that I can use if I want to go slow without slipping the clutch. I do not use this very much, so it is now shown on the schematic diagram.

A great advantage of the high voltage system is that the conductors can be relatively small in size. I used a #6 gauge wire. My average current draw is 30 amps. Ten feet of #6 wire with 30 amps flowing only produces one-tenth of a volt drop. Since my system uses 126 volts, it isn't even noticeable. In twenty-six months of operation, I have never blown the 100 amp fuse!

In May 1981, I completed a second Honda Electric using a 5 H.P. Baldor 20% compounded, shunt wound, 120 volt motor. After gaining experience with both types of motors, I have come to the conclusion that a 5 H.P. motor is close to ideal for all around performance. It provides good acceleration with a practical range for a car of this size and weight.



Lloyd D. Gano
Lloyd D. Gano 11/19/81