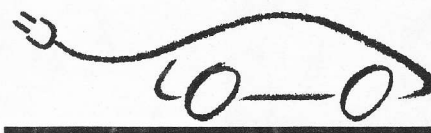


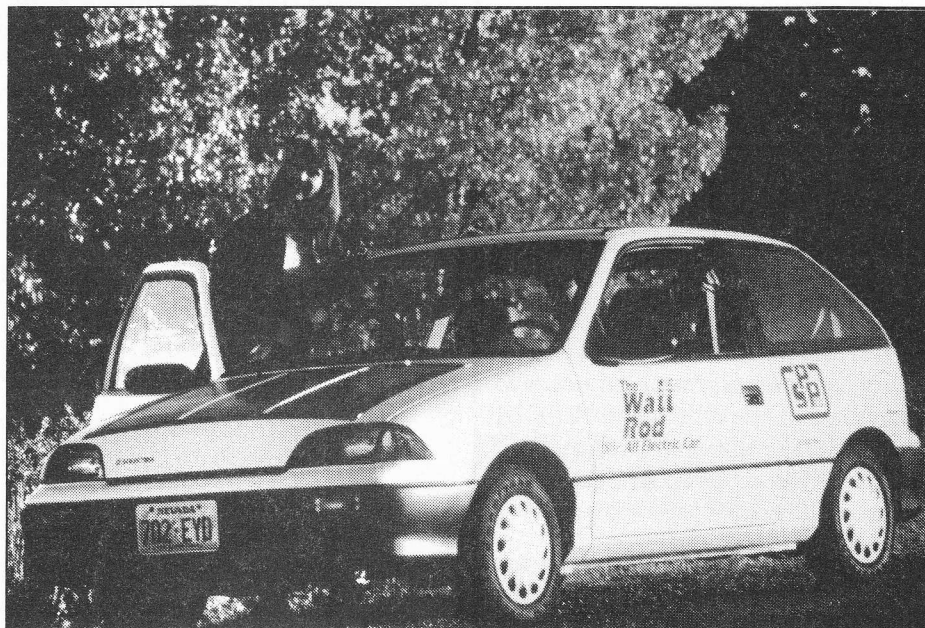
CURRENT EVENTS



March 1994

Promoting the use of electric vehicles since 1967

Vol. 26 No. 3



Clean, Green, Silver State Machine Nevada goes for "Watt Rod"

BY DAVE MCNEIL

Last September I read that Sierra Pacific Power Company (SPPCO), the major electric utility serving the northern two thirds of Nevada, had purchased a Solectria Force. (See "Tech Spec Box" on pg 6.) Shortly thereafter, I met with SPPCO's R&D Department to learn of their decision to purchase the Solectria EV, their interest in EVs, and their intention, if any, to promote EVs in their service area.

Rose Taylor, co-ordinator of the utility's EV public demonstration program, said the RD&D staff have shown the car, dubbed "Watt Rod", in several service area communities. This was not by project design, but because they received so many requests from company employees in district offices who wanted to see and drive the car. "Public acceptance of the car and EV

technology has been very positive everywhere the car has been taken. Many intelligent questions have been asked regarding the car's range, speed, maintenance, and recharging procedures," she said.

Much of the utility's interest in EVs is a result of the California Air Resources Board (CARB) Zero Emission Vehicle mandate. (2% of new car sales from any manufacturer selling over 35,000 vehicles per year must be ZEV by 1998. —Ed.)

SPPCO's research efforts concentrate on planning for EV recharging to support California EV owners who may drive over the Sierra to work or vacation in Reno. In addition, a non-polluting commuting alternative would particularly benefit the Reno/Sparks

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A. B. 2495 Unplug EV Mandate?

BY PERRY GOLDSCHNEIN

California Assemblyman Bernie Richter (R-Chico) recently drafted a repeal to the ZEV mandate. "The EV mandate is driven by ideology, not rationality," he says. Introduced by Assembly members Richter, Conroy, Harvey, and Rainey on January 11, 1994, California A.B. 2495 would prohibit the Air Resources Board from requiring auto manufacturers to produce or offer for sale zero emission or electric vehicles by a specified date. That is, unless the state board, at least 3 years prior to the effective date of the rule or regulation, conducts public hearings and certifies that electric vehicle battery technology is able to meet specified performance criteria.

The performance criteria listed include: a power density of 600 watts per liter, specific power discharge of 400 watts per kilogram, energy density of 300 watt-hours per liter, specific energy density of 200 watt hours per kilogram, cycle life of 1000 cycles, and operating environment of -45 to 85 degrees centigrade. These are not realistic cri-

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Editor's Note

BY CLARE BELL

EVs At Lightspeed on Internet

EAA members and chapters are exchanging EV information via the world-wide Internet. South Florida, Sacramento, CA and NOPEC (Olympic Peninsula, Wash.) have Internet sign-ons. Many are participating in the electronic EV news and discussion list postings from EV@SJSUVM1.sjsu.edu. Information from Internet is appearing in a number of chapter and affiliate newsletters. Subjects discussed recently include Bob Brant's book, the Tropica roadster (Bob Beaumont), the CA ZEV regulations, ultralight hybrids and the results of the Australian Solar Challenge. (Honda won.)

In order to bring Current EVents into the electronic age, the managing editor now has Internet access and subscribes to the EV news and discussion list. People on Internet are the kind of progressive and innovative individuals that EAA needs to contact. At the same time, these people want and need to know about us. All EAA members/chapters/affiliates who are on Internet, please send a note to Clare Bell/Current EVents (CBCE@delphi.com). Please state if you do or do not want your Internet userid included in an EAA Internet member directory.

I have also started an informal EV census via Internet. The reason this got started was that Oscar Suris, of the Wall Street Journal, contacted me, asking how many EVs are on the road in the US. He's got an estimate of 3,000. I think there are more, closer to 5,000. I've asked people to take a count of EVs in their area, plus descriptions if possible (to tease out the roadgoing cars from the others. The Internet EV count (last time I checked) was 189 and still rising. I'm hoping that if it does go high enough, Suris will include it in one of his upcoming WSJ articles. I'll keep you posted.

Anyone who wants more information about EAA, Current EVents or local EAA chapters/affiliates is invited to send a query. Please be patient; I sometimes get blitzed with 60 or so messages per night!

Plans for Internet postings include an electronic 2 or 4 page "sampler" version of CE, a description of EAA and a chapter/affiliate listing. Happy EV'ing on the Net.

—CB

Headlines You Could see in 1994

President Clinton's 65 mpg Mustang

The Director of Los Alamos National Lab has proposed that Bill Clinton have his 1967 classic Mustang converted to electric so that it can run on fuel cells. Presently the car gets 22 mpg. The electric fuel cell version would get the equivalent of 65 mpg and be 7 times as efficient. How about it, Bill?

(PARADE MAGAZINE, THANKS TO JOHN NEWELL)

—Maybe Bill Clinton could contact Alan Alda (in the CE classified this issue) for the purchase of an '85 Honda Accord! Not only could Bill be energy efficient but he could also help with the recycle efforts! Boy, what would Gore say to that!

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Article Submissions

If you would like to submit an article for Current EVents—the preferred form is on a floppy disk, formatted for DOS (Ascii Format) along with a printed copy of the article. Also include camera-ready photos or graphics or include TIF formatted files with your copy. The deadline for articles is the 1st of the month. Articles submitted after the 1st of each month will be retained for future issues of Current EVents. Contact Clare Bell, Managing Editor for further information.

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For information on new membership or change of address, please send your request to:

EAA Membership
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2710 St. Gile Lane
Mountain View, CA 94040

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announces

two

short courses

at UCLA

Batteries and Fuel Cells: Applications and Performance

April 27-29, 1994

This course provides a comprehensive overview of the various types of primary and rechargeable battery systems and fuel cells. Basic electrochemical concepts and terminology are presented which describe the chemical/electrical energy conversion processes. Methods for calculating and predicting key parameters are discussed.

Primary batteries are described, with applications and expected performance of zinc aqueous systems and lithium nonaqueous systems. Rechargeable (secondary) battery topics include nickel, silver oxide, lead-acid, and sodium systems, their applications, charge methodology, and performance. The newest concepts in nickel-metal hybrid, lithium rechargeable cells, state-of-the-art fuel cells, and other concepts are covered.

Specific and sample applications, from consumer to military and space, are presented for each of the systems. Recent developments in handling, disposal, and environmental regulation, and relevant manufacturing issues associated with the specific technology are reviewed.

COORDINATOR AND LECTURERS

Gerald Halpert, Supervisor, Energy Storage Systems Group, Jet Propulsion Laboratory

James R. Huff, Chief Scientist, Ballard Power Corporation

Samuel Levy, Senior Member of Technical Staff, Exploratory Batteries Department, Sandia National Laboratories

David Pickett, Jr., Program Manager, Special Projects (Development of New Business/Technology), Electron Dynamics Division, Hughes Aircraft Company

Electric Vehicle Technology

May 2-6, 1994

This course provides engineers, scientists, managers, and marketing specialists with a comprehensive overview of electric vehicle technology based on the extensive hands-on experience of the instructors. Lessons learned from the history of electric vehicles are presented, and participants examine current systems in a wide variety of vehicles. Powered roadway concepts, with their significant future potentials, are also discussed.

The primary thrust of the course is to present state-of-the-art tools and components as they are used today. Participants have the opportunity to actually drive an electric vehicle, learn how to set up computer-controlled battery tests, analyze a transistorized controller used in the winning car in the Phoenix 500 EV Race, study a new bipolar battery, and examine a switched linear induction motor (SLIM). Topics are structured to be tutorial and not programmatic.

COORDINATOR AND LECTURERS

Erwin A. Ulbrich, Jr., President, Twenty First Century Electric Vehicles

George Agortsas, Senior Project Engineer, Hughes Aircraft Company

Jeffrey Arias, President, Arias Research Associates

John G. Bolger, Owner, Inductran Corporation

David L. Harbaugh, Vice President of Engineering, Arias Research Associates

Zdenek (Stan) E. Skokan, Member of Senior Technical Staff, Hewlett-Packard Corporate Laboratories

Paul Wuebben, Clean Fuels Officer, South Coast Air Quality Management District

To request a brochure describing these two courses in detail, contact Alex Hennessy, UCLA Extension, Department of Engineering, Information Systems and Technical Management, 10995 Le Conte Avenue, Suite 542, Los Angeles, CA 90024-2883; **(310) 825-1047**; **FAX (310) 206-2815**.

APS Phoenix Electric 500

Electric 500 participants, get your paperwork in now! Feb. 17 is the cutoff according to SERA's Russ Korne. This year's racing divisions are: Electric Stock A and B, Formula Lightning, College Hybrid, High School Electric and Open Division classes I. (200-700 lbs), II. 1,100-1650 lbs and III. (1651-3307 lbs). Rulebook changes include elimination of Stock C class, requirements for full roll cages in Stock B (previously Stock B cars only needed rollbars) and the new and controversial Gross Vehicle Weight Limitations for Stock A and B.

Competitors must send in a complete application package to SERA, including SERA membership fee, application for vehicle registration and vehicle data

sheet (accompanied by proof of ownership information) plus an application for a competition licence. SERA recommends that paperwork be in by no less than 45 days before the race.

The race schedule (from the official brochure) Friday, March 18 - Education Day. High School EV Events, Qualifying Races for all classes. Saturday, March 19 - Heat Races. Electric Stock, Open Divisions I, II and III, Formula Lightning and College Hybrid. Sunday, March 20 - Final Races and Awards.

Contact Solar and Electric Racing Association for rulebooks, updates and info. SERA, 118111 N. Tatum Blvd. Phoenix, AZ 85028. Tel: (602) 953-6672. Fax: (602) 953-7733.

APS—Who's In?

Previous year participants who have signed up for 1994 include Gary Jackson, whose Stock B champion VW Rabbit got shotgunned by the new gross-vehicle-weight limit. He's fielding a Geo Metro, which should be a hot entry, if the performance of his Rabbit is any indication. Better give the Metro a wild paint job, Gary, so we can tell it from the Solectria Force entries.

Bob Schneeveis will challenge the Open Division with the legendary SnowWhite, an enthusiastic teenage pitcrew, hopefully some decent 100 MPH-plus tires and, of course #8 Electric Wheelbarrow, all-purpose Electrathon runner and pit parts hauler.

Continued on page 13

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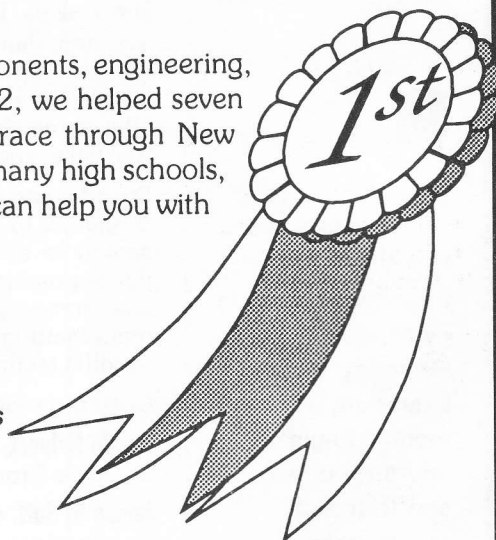
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Disneyland Sponsors Clean Air Road Rally

The International Electric Grand Prix Association (IEGPA) has announced its 1994 recordbreaking alternative energy road rally and the world's only Grand Prix race for electric formula race cars. IEGPA now has title sponsors for both.

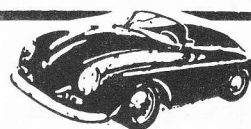
April 7-11, 1994, Thursday through Sunday, are the dates for the 1994 Disneyland World Clean Air Road Rally, the largest-ever gathering of alternative energy vehicles. On Apr. 7 and 8, Thursday and Friday, some of the most technologically advanced vehicles on the planet will converge on the ECO Expo at the Los Angeles Convention Center to challenge the daunting traffic and road conditions of Southern California. Rally stops will include Santa Monica Pier, Queen Mary and Disneyland.

The Expo will include alternative energy exhibits, model car races, and opportuni-

ties for the public to ride or drive many of the rally vehicles. IEGPA is inviting sponsors as well as participants. April 15-17, electric race cars gun their motors at the Exide Electric Grand Prix in Long Beach. TV stories about the 1993 Rally and Grand Prix were broadcast world-wide on CNN, MTV, and CBS Radio News, plus all the major LA area stations. A tape of sample news clips is available.

For more information, contact Peter Hackes, IEGPA, Tel. 310-430-9779 or fax 310-431-2052.

(FROM IEGPA PRESS RELEASE.)



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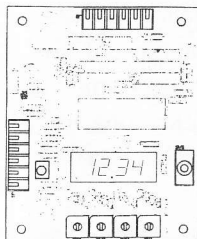
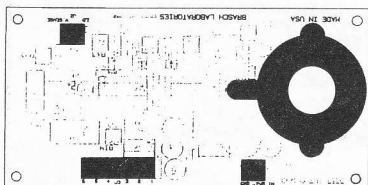
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- 84-240 Volt input
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- H-25, 2500 W H-30, 3000 W
- Coolant temp. rise, H-15, 1/2°F/sec
- Air temp. rise, H-15, 70°F
- Size 4" D x 8" H x 16"-22" L
- Weight - 6 1/4-7 lb

Model H-15
\$345

Model H-25
\$445

SAFETY FEATURES

- Double fused
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- Thermally protected
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- "Heater On" dash indicator light
- No exposed high voltage
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Model H-20
\$395

Model H-30
\$495

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Watt Rod

Continued from page 1

area where auto emissions are the primary cause of major seasonal ozone and carbon monoxide pollution.

Like other utilities who are looking to the future of a world with EVs, SPPCO faces the same cart-before-the-horse problem with respect to recharging stations. With only one EV in the area (that the utility is aware of) expenditure of limited R&D funds for a demonstration recharging station is not warranted. (*There are more EVs — Rick Doran is in Sparks — ed.*) However, greater public acceptance of EVs depends on availability of employer-based, or other community-based recharging opportunities.

According to Jack McGinley, Supervisor of RD&D, the Solectria Force was purchased in order for SPPCO to gain valuable experience with EV technology. Nevada Power Company, which serves Las Vegas, has purchased a Solectria Force for the same reason. With their "Watt Rod", SPPCO can test the range and speed of an EV, explore improvements to enhance performance, and provide service area residents with the opportunity to view this "emerging technology".

Rose Taylor said that "Watt Rod" will serve as a company motor pool vehicle after completion of its planned one year maintenance and performance evaluation. Her department will develop an owner's manual of maintenance and driving do's and don'ts. This will be placed in the car for the benefit of 'new' drivers and to share with the public and other utilities.

I found the SPPCO staff very enthusiastic about their EV R&D project. However, they made it clear that the utility is not presently promoting EVs even though it recognizes that they would offer a cheaper and cleaner commuting alternative.

The problem appears to be a perception of the largely cost-prohibitive price (for the average consumer) of new, produc-

tion EVs as a barrier to public acceptance. The relative cost of EV conversions via conversion companies or D-I-Y kits was not considered. As CE readers know, conversions are far less expensive and represent the largest percentage of EVs on the road.

SPPCO is also concerned about the present range of vehicles with current lead acid batteries as a perceived deterrent. This contrasts with the conversion-EV community's view of the technology as one well suited for EV use. Relative to other battery types, lead-acid batteries are inexpensive, easily recyclable, and currently can provide the energy needs of 85% of American drivers for commuter transportation.

Based upon my interview with the SPPCO staff, none of whom had ever heard of EAA, it was clear they had little prior exposure to the significant collective experience of conversion-EV owners. They were only aware of the information available through EPRI, Edison Electric Institute (EEI) and *Electric Vehicle Progress*. These sources have focused almost exclusively on the efforts of the world's major auto manufacturers as the bellwether of the EV experience. SPPCO is looking at the mass production of EVs by Detroit as the timing signal to move from the R&D phase to engineering and installing a demonstration recharging station.

I had prepared for my interview with the possibility of the above in mind and gave the appreciative staff several recent CE articles. These included coverage of the 3rd APS SERA 500, the Chrysler/Norvik Smart Charging System, and Shari Prange's piece on proper EV promotion etiquette. The effectiveness of these ar-

Continued on page 7

Technical Specification

Owner: Sierra Pacific Power Company

Make/Model: Geo Metro

Style: 4-seat, front-engine

Motor: Solectria Brushless 20 HP AC

Voltage: 120 VAC with eleven 12V batteries

Controller: Solectria 3-phase 150V AC drive with regen braking

Batteries: Sears Diehard

Charger: Onboard 120 VAC 8-hr full charge system. Optional 4-hr fast-charge supercharger

Solar options: 180 Watt on-board solar photovoltaic charging system

Gearing: 5-speed manual trans.

Brakes: Power-assisted

Weight: 2,042 lbs

Top Speed: 55 mph

Range: 55 miles

Passenger comfort: 7,300 BTU air cond. 1,100 watt heater

Cost: \$27,700

Watt Rod

Continued from page 6

ticles points out the important role that CE, its readers and groups like the EAA in general should play in ensuring the complete picture and truth about EVs is known and communicated to the public.

I also gave SPPCO a copy of the current EAA chapter listing, an advertisement for a VW Rabbit bolt-in kit, and showed them Philip Terpstra's *Electric Vehicle Directory* in order to update them about the great variety of existing EV conversion companies, component distributors, and EV advocacy organizations.

We ended the interview with a light discussion of ways SPPCO could promote EVs and my promise to have EAA send them membership information. I would like to thank Jack McGinley, Rose Taylor and Dave Poole of Sierra Pacific Power Company for generously giving time and enthusiasm to this interview.

Given the company's ability to offer reduced energy rates for off-peak vehicle recharging and other consumer incentives, SPPCO could be a major influence on the public's adoption of EVs as the preferred commuter transportation alternative in northern Nevada. — DN

Editor's note: Dave McNeil is a Renewable Energy/Conservation Program Specialist with the Nevada Energy Office in Carson City. He has purchased a Volkswagen Rabbit which he plans to convert using Electro Automotive's Voltsrabbit kit. He'd like to hear from other CE readers in the Reno/Sparks/Carson City area and can be contacted at P.O.Box 513, Gardnerville, NV 89410.

It is encouraging to hear that CE helped to increase SPPCO's awareness about EV technology and conversions. That's what we're here for! —CB

A. B. 2495

Continued from page 1

teria for present or near-term EV technology, and are in fact based on the U.S. Advanced Battery Consortium's long range battery technology goals.

Thus, as the bill itself states, it is intended "to delay the imposition of mandates for the production of zero-emission vehicles or electric vehicles until electric vehicle battery technology is developed to a level that meets the performance of gasoline powered vehicles in delivering power and sustained driving range...." At that point, of course, a 2 percent mandate won't be necessary.

Richter won't speculate on the odds of getting his proposal through the Assembly and on to the Senate, but he expects some support from his 31 fellow Republicans and is trying to sway some Democrats. He'll have to. A majority of 41 votes is necessary to pass the measure in the 80-member body. This is, however, the same legislature that has passed numerous laws supporting EV development and the infrastructure necessary to support it. — PG

California Electric Transportation Coalition (CETC) Rebuttal Letter Excerpts

(sent Jan 10, 1994 by David Modisette, executive director)

"...you may not have the current information about the status of EV and battery technologies..."

"...currently available lead-acid batteries are both cost effective and capable of meeting the performance requirements in well-designed electric vehicles."

"Advanced lead-acid batteries, available in the next two to three months, will further advance performance characteristics dramatically."

"The assumption that one must compromise vehicle power when driving an EV is a commonly held misconception. ... The GM Impact can travel from zero to 60 mph in about eight seconds."

"Many EVs, such as the Horlacher City II (a vehicle designed in Switzerland and soon to be built in Sacramento) carry battery packs that cost \$500 to \$1000 and weigh less than 1,000 pounds."

"When one considers that the average daily one-way commute is only 11 miles in Sacramento and 27 miles in Los Angeles (and nationwide), an electric vehicle with even a medium range should be fully capable of matching the performance of a conventional commuter car."

"...90% of the nation's households with 'second' cars drive those cars less than 21 miles per day, [which] illustrates that there are appropriate applications for electric vehicles and a viable market does exist."

"... perhaps you and your staff would be interested in driving one of the many electric vehicles being driven by the members of the California Electric Transportation Coalition."

"Assemblyman Richter, I hope the above information proves useful as you consider upcoming legislation affecting this exciting new California industry."

Members of the CETC:

L.A. Dept of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison

DIY: Gell-cell Belle

By PAUL HEBERT

Do It Yourself (DIY) Then Write About It

It's been a while since my last contribution to the DIY cause. I hadn't imagined how quickly the deadline comes up on even a bi-monthly publication. So I apologize for the irregularity of this "column", and it'll probably happen again. Of course, the best way to keep this space full is for you (no, I mean YOU) to submit articles, preferably detailing your own DIY experience. If you don't fancy yourself as a writer, well, the Current EVents editorial staff can probably fixer up, but we need still need the raw input from you.

Donor Car - Olds Firenza

With all that said, I did receive a bundle of information from John Thelking in Sana Cruz telling me all about his OHMSMBL (that's the license plate). John started with a 1993 Olds Firenza, front wheel drive, 5-speed station wagon. Stage One of the project converted the original power plant to an Advanced DC 9" motor powered by eleven 12-volt gell cells (10 Prevailor and 1 Sea Gell) and controlled with the ubiquitous Curtis PMC 1221 controller. 12 volt auxillary power is provided by a GM alternator and a 12 volt starter battery. John commutes about 20 miles a day on a hilly freeway, which he finds is close to the limit of his current battery pack (no pun intended).

John built his own charging system using a 140 volt variac, a lamp timer and a bridge rectifier. The circuit diagram he sent me included instrumentation to monitor charging current, peak and RMS output voltage from the charger. Although this charger does require periodic intervention during the charging process, it's quite a bit cheaper than other EV charging systems.

Not much later, he built a fairly ingenious heating system for the battery

pack. The heating system was actually necessitated in part by the choice of gell-cell batteries, since the boil-and-bubble equalization method often used on wet cells would damage the sealed gell-cells. Even so, John's system would work equally well on a pack of wet batteries.

John started with heating pads (the kind you use for sore muscles) — one for each battery in the pack. Each pad was modified to provide two smaller pads in series, one for each end of the battery. The pads include a safety thermostat to cutoff at 130 degrees F. John added separate control circuits for each heating zone, which monitor battery temperature and cycle the heating elements on and off according to the temperature set for the zone. This allows the operator to control charging of individual batteries in the 132 volt string by tweaking the temperature setpoint for the battery's heating pad.

The added control circuit may be beyond the comfort zone of many tinkerers, but if an op-amp, Darlington power transistors and a couple of thermistors don't scare you off, send me a SASE and I'll send you a copy of John's idea. Just in case you've already read enough to do this without the plans, one lesson John learned the hard way. If either the thermistors or the safety cutoff are mounted touching a metal surface (aka heat sink) the system can be fooled into cooking your battery.

In Phase Two of the OHMSMOBL project, John plans to add a two cylinder propane engine, mechanically coupled to the tailshaft of the Advanced DC motor as a range extender. All by itself that's a formidable do-it-yourself project. With a little luck, John'll send us the scoop on that when it's done. —PH

Look for Part II of DIY in the next issue of CE — Ed.

Technical Specification

Owner: John Thelking

Make/Model: 1983 Olds Firenza

Style: Front-wheel drive station wagon

Motor: Advanced DC 9" w/ dual ended driveshaft and air filter

Voltage: 132 V DC from eleven 12 V gell cells

Controller: Curtis PMC 1221, limited to 360 A.

Batteries: 12 V marine gell cells. Heated

Charger: 0-140 Variac w/auto shutoff

Gearing: 5-speed manual trans. with clutch

Brakes: Power-assisted

Weight: 3200 lbs (as straight electric)

Top Speed: 80 mph

Range: Average Range: 20 miles on hilly freeway

Acceleration: 0-30 in under 10 sec., 0-50 in under 30 sec.

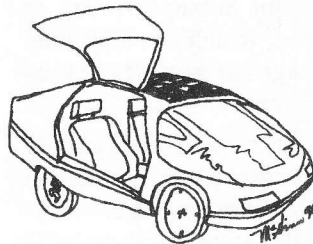
Take your EV to Earth Day

The national, regional and local Earth Day (April 22-24) celebrations are a wonderful opportunity for EAA members to exhibit and promote EVs. Public ride and drive Events are the best way to increase support for EVs. Nothing does more to explode the myths and reconceptions that a ride in a sharp-looking, high performing EV conversion.

Spiff up your EV and get together with your local chapter and participate in a rally, ride-drive or display for one of the many Earth Day Events. It's the best EV fun you can have with your clothes on, and Momma Planet will be glad you did.

5th Annual Contra Costa Earth Day Festival, Sunday, April 24, 10-6, Concord Pavillion, Concord, CA. For more information, contact: 510-376-5794. Fax: 510-938-2838.

Monterey County Earth Day '94, Saturday, April 23 from 11-5, Toro Regional Park on Highway 68, between Monterey and Salinas, CA. For more information, contact: David Johansen, P.O. Box 981, Pacific Grove, CA 93950, (408) 625-2273.



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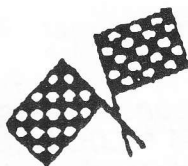
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Calling All Cars... Alternative Energy Racers: Enter Your Vehicle In The Rally

SunDay Challenge '94

Saturday, March 26 & Sunday, March 27, 1994



**For more information, contact:
Florida Solar Energy Center
SunDay Challenge Race Committee
300 State Road 401
Cape Canaveral, FL 32920**



Spectators Welcome at the Electric, Solar & Clean Fuel Vehicle Rally

News in Brief . . .

Compiled by Ruth M. Shipley from
Environmental Information Network

High Performance AC Vector Drive for EVs

Indramat (Wood Dale, IL.) has introduced a high-performance AC vector drive called the Mobile Vector Drive (MVD).

The compact, 62-pound drive can be installed anywhere in the EV and is powered by a 300-Volt battery. The drive controls an asynchronous AC induction motor with Indramat's high-resolution digital feedback unit. This feedback provides EVs with more accurate rotor position and a broad speed control range — from 0.0005 to 16,500 rpm.

The Indramat MVD drive provides full constant torque from standstill up to the base speed of the motor, allowing fast acceleration and firm, sure stops. Above motor base speed, the MVD provides constant horsepower up to maximum speed, which can eliminate one or more stages of gearing, or possibly the entire transmission.

The drive also regenerates energy while coasting or braking to partially recharge the battery, extending its range. Additionally, using the drive's built-in LCD display, keypad and easily configurable software, the drive can be customized to control 2, 4, 6, or 8-pole motors with widely varying base speeds, so one control can be adapted for cars and one for large buses.

For additional information or a detailed technical brochure about the MVD Mobile Vector Drive, contact Ronald M. Larsen, Indramat, 255 Mittel Drive, Wood Dale, IL 60191 or call 708/860-1010.

(RESSLER RELEASE: 1/24)

EPRI Awards EV Curbside-Charging Innovations

The Electric Power Research Institute (EPRI) recently presented awards to four companies for electric vehicle curbside-charging innovations.

EHV Corporation won for its EDD-7 charger, a durable and safe charging system which includes over-current

Continued on page 11

Do More and More Electric Vehicle Regulations Keep Your Head Spinning?

EV incentives, as well as other EV-related laws and regulations, have been called a complicated patchwork by Kateri Callahan, Executive Director of the Electric Transportation Coalition. Issued by the federal government as well as by various states, EV-related policies have become a popular solution to our environmental, energy and economic problems.

We're not complaining and neither should you—these policies are driving the industry and will continue to do so for the remainder of the decade. However, this complicated patchwork is getting more complicated all the time. Those involved in the industry need a resource to sort through this legislative and regulatory mess.

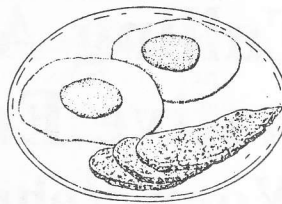
Without an understanding of existing and proposed legislation and regulations, beneficial information regarding incentives cannot be passed on to customers; business tax deductions, emission reduction credits and other benefits cannot be realized; and safety compliance cannot be achieved.

Goldschein & Gomez offers a full range of services on the legislative, regulatory and economic implications of EVs. Call us now with your questions or, for \$19, a comprehensive 60-page report.

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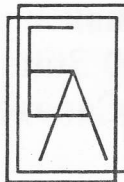
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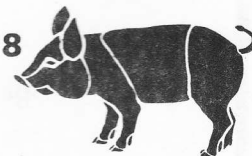
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COMMITMENT
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The chicken is only involved in this breakfast, but the pig is committed. There are a lot of people involved with electric cars these days. At Electro Automotive, we're committed. We've been building conversions and selling components since 1979. That's building from start to finish, not just modifying someone else's conversion. And we've been doing it commercially, not as a hobby. In fact, electric cars are our only business. We won't try to sell you recycled toilet paper or life insurance.

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News in Brief

Continued from page 10

protection and ground-fault interruption. Moerman, Inc. won for its Bifronic Power Pedestal, a four vehicle charger that doesn't inhibit sidewalk pedestrian traffic. Innovative Systems won for its EV Smart Card, which utilizes a computer chip to track charges. And NuSun, Inc. won for its EV Autocharge system, a remote, hands-free coupling system for EV recharges. (EPRI JOURNAL: 12/93)

Honda EV Battery Contract

Energy Conversion Devices, Inc. (ECD) and its subsidiary Ovonic Battery Company, Inc. (OBC) signed a \$1.3 million development contract and purchase agreement with Honda this week. Honda displayed Ovonic nickel metal hydride batteries together with its concept electric car at the October 1993 Tokyo Automotive Show.

According to ECD/OBC, Ovonic nickel metal hydride batteries have over twice the energy density of conventional batteries, have no memory effect, and provide the necessary range, acceleration, recharge time, life span, and costs to make EVs commercially viable. ECD/OBC is currently designing, building, and shipping battery packs to several automotive companies around the world for test and evaluation purposes. ECD/OBC is currently expanding its production facilities. For more information, contact Stanford Ovshinsky at 313/280-1900.

(ECD/OBC BATTERY CO. RELEASE: 1/4)

CARB Chairwoman Favors Retention of ZEV Rules

The new chair of the California Air Resources Board (CARB) confirmed her support for California's ZEV mandate at the Los Angeles Auto Show in January. Jacqueline Shafer said tough anti-smog rules have reduced tailpipe emissions in the Los Angeles basin by

90% over the past decade. "It's a policy we must continue if we are to meet our public health goals," she said.

Alternate fuel vehicles from numerous manufacturers were displayed at the Los Angeles show, including a flywheel-powered sedan made by American Flywheel Systems of Bellevue, WA. Other AFVs included the modified Dodge Viper, a Mitsubishi electric hybrid that claims a battery-powered range of 310 miles, a Mercedes Benz "city car," and a range of ready-to-buy EVs from US Electricar of Sebastopol, CA.

(ASSOC. PRESS: 1/7)

DOE Awards \$75,000 Grant for Fuel Cell Study

The Department of Energy has awarded a \$75,000 Small Business Innovative Research (SBIR) grant to Dr. Bret Halpern of Jet Process Corporation (New Haven, CT) to support research on improved fuel cell technology for electric-powered vehicles.

The company has developed a process called Jet Vapor Deposition (JVD) which can deposit ultra-thin, nanometer-sized loadings of high surface area Pt electrocatalyst clusters directly on the surface of polymer electrolytes such as Nafion.

(BATTERY & EV TECHNOLOGY: 12/93)

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Solar/EV Race—New York to Philadelphia

The sixth annual American Tour de Sol, the national road rally for electric and solar vehicles, will run from New York City through New Jersey to Philadelphia, May 21-28, 1994. The Northeast Sustainable Energy Association (NESEA), which is sponsoring the EVent, expects electric mass transit vehicles to join more than 40 electric cars and futuristic solar racing vehicles that are expected to participate.

Sponsors to date include the Department of Energy, the Pennsylvania Energy office, and 6 electric utility companies along the route. Those interested in entering, volunteering, or sponsoring the event, are invited to write NESEA at 23 Ames Street, Greenfield, MA 01301 or call 413/774-6051.

(NESEA Release: 1/94)

Calendar of Events

MARCH 17-20 1994 APS Electric 500 at Phoenix International Raceway, Phoenix, AZ. Electric Stock A and B, High School entries, Formula Lightning, College Hybrids, Ultralights, and others. Contact Solar Racing Association (SERA). Telephone: (602) 953-6672 fax: (602) 953-7733. Their 1994 rule book is out now!

MARCH 26-27 1994 SunDay Challenge in Florida. Alternative Energy Vehicle Rally goes from Universal Studios to Cocoa Beach. Run by Florida Solar Energy Center in conjunction with IEEE's Southcon '94. Contact Bill Young (407) 783-0300 ext.137 Fax (407) 783-2571

APRIL 8-10 4th Los Angeles Eco Expo, Los Angeles, CA. For information on show or exhibiting, call (818) 906-2700. Electric grand Prix's Chris Martin is helping to organize speakers for the expo. Please call Chris at (213) 465-4488

APRIL 7-11 Int'l Electric Grand Prix World Clean Air Road Rally. Largest gathering of alternative energy vehicles. Starts at L.A. Eco Expo and challenges daunting traffic and road conditions of 21 Southern Calif. cities. Heavy media coverage. For more info, call Peter Hackes at (310) 430-9799.

APRIL 11-13 Renew '94. Sheraton Stamford Hotel Stamford, CT. A two day conference on the benefits of renewable energy to the economy and environment. Sponsored by the U.S. Dept. of Energy, Northeast Utilities, and Niagara Mohawk Power Co. Contact NESEA (413) 774-6051.

APRIL 15-17 Alternative Road Rally Edison Grand Prix. Race on the 16th. In L.A. area at Toyota Grand Prix track in Long Beach. Call Chris Martin: (213) 465-4488

APRIL 17 Friends of the Anzar Hills is hosting a fundraising event and would like to have 10 Electric Vehicles display there. South of San Jose, in Aromas. Contact: Henry Gonzales (408) 944-0800.

APRIL 23 PG&E Earth day Toro Park, Salinas (off hwy 68) Contact Spencer Erickson (408) 755-3347.

APRIL 24 SunDay 1994. Nation-wide activities celebrating renewable energy, energy conservation, efficiency and sustainability. Includes transport, which means EVs. Fifty environmental organizations involved. Contact Ken Bossong Tel. (301) 270-2258 Fax (301) 891-2866

MAY 2-6 UCLA - Electric Vehicle Technical Course. Seven lecturers will speak on several subjects, such as Motor Tech. Call (310) 825-3344 or fax (310) 206-2815

EARLY MAY Lightnings race at Richmond International Raceway, Richmond, VA. High School Competition. SERA has not set date yet, but stay tuned. Tel.:(602) 953-6672 Fax: (602) 953-7733

MAY 21-22 Tehachapi Wind Fair at Mountain Valley Airport. Sponsored by Kern Wind Energy Assoc., So. Cal. Edison

Co., Mountain Valley Airport and others. Displays: solar panels, electric vehicles, small and large turbines. Attractions: Kite flying, sky diving, to name a few. For information call: Paul Gipe at (805) 822-7956 or Warren Grass at (805) 822-3222.

MAY 21-28 American Tour De Sol. Runs from New York to Penn. Contact Nancy Hazard: (413) 774-6051. 23 Ames St. Greenfield, MA. 01301

MAY -JUNE The Eyes of The Classics, held at the FORD estate. Classes of Antique, Indy cars, ect. Would like to invite 15 electric cars of show quality. For information, call Steve Pasteiner at (313) 852-2900.

JUNE 20-24 10th World Hydrogen Energy Conference held in Cocoa Beach, FL. call Carolyn Burby, Florida Solar Energy Center, (407) 783-0300

JUNE 25-26 Solar Prosperity Exhibition with ASES Conference (Solar 94). Sponsor is Northern California Solar Energy Assoc. (510) 869-275 Northern Calif. Energy Assoc. P.O. 3008 Berkeley, CA. 94703

JULY 8-10 Formula Lightning support race to IndyCar Cleveland Grand Prix. Burke Lakefront Airport, Cleveland, OH. Collegiate teams competing, including battery exchange pit stops. Contact Kevon Makell, Centerior Energy, Cleveland, OH. Tel.447-3552

JULY 15-17 1994. SEER is happening again! This year's SEER promises to be the biggest ever! New location: Redwood Empire State Fairgrounds in Ukiah, CA. Off of hwy 101 and appr. 100 miles North of San Francisco. Electric Vehicles, Human Powered Vehicles, Electrathons and Solar and Electric Boats. Call (707) 459-1256 Fax (707) 459-0366

AUG. 7-21 Ener-Run III This rally begins in Hardy, Arkansas and goes through 12 states before returning to Hardy. Maybe the Clintons should enter a car. Contact Ener-Run Inc. for more information at P.O. Box 665 Hardy, AR. 72542 (501) 856-3877

OCTOBER Sustainable Transportation S\EV 94. The NorthEast Sustainable Energy Association (NESEA) will host a series of workshops and a trade show at the Ramada Hotel and Rolling Green, Andover, MA. This is the one that the big three bring cars to! Exact date not set. Contact NESEA for more info. Tel. (413) 774-6051 Fax (413) 774-6053

DEC. 1-7 E.V.S. 12 at the Disneyland Hotel and Convention Center, in Anaheim, CA. Includes a parade, press events, expo, and conference. Display space: \$25/sq.ft. indoors and \$12/sq.ft. outdoors. Contact: SHO 167 South Antonio Road, Suite 10 Los Altos, Cal. 94022 Tel. (415) 949-2050

Anna Cornell, EVents Co-ordinator, 510-685-7580

Chapter News

BY RUTH M. SHIPLEY

Continued from page 4

SERA says that Eco-Electric's Mary Ann Chapman is in, but doesn't know if she's driving The Peach Crate. She's been really busy with Eco-Electric, which is great news. NOPEC's Rod Irwin, last year's Stock C Champ, is launching a mean converted Mazda RX-7. Maybe the RX-7 and Alan Cocconi's CRX can have a wheel-smoking contest in the paddock.

Marianne Walpert, who drove her SOLAR VW Rabbit in '92 is the driving force behind a new entry and a new team. WE'RE-IT is an all-women electric racing team whose members include Anna Cornell and CE's own CB. WE'RE-IT has a diesel Rabbit that has been stripped and is being electrified. #13, the Rasmussen 914 Porsche, will be driven this year by yours truly for the WE'RE-IT Team, since Electro-Automotive is all wrapped up in doing the prototype car for the 914 Porsche conversion kit. #13 is being modified to meet the GVW rule. Watch out, guys, I just completed the Skip Barber BMW Advanced Driving School! —CB

Your EV & Your Lover

The February '94 issue's Valentine piece, "Your EV and Your Lover", has struck the right chord with the *Wall Street Journal*.

Journal reporter, Oscar Suris, who has been covering technology and the politics of the EV groundswell, wants to write a story about how building an EV conversion has affected lives and relationships of couples in the EV community. The underlying theme is that EVs are a viable option for a growing number of people, and like any new technology, EVs are having definite effects on lives and personal relationships.

If you have an interesting EV experience, please send your story to CE, Clare Bell, Editor.

San Francisco Peninsula CA

Current membership is approximately 60. The Peninsula Chapter elected new officers in January. They are: Ben Compton (Pres.), Danny Ames (V.P.), Bill Carroll (Treas.), Peter Barnes (Secy.), Gus Urbach (Sgt. at Arms), and Jeanette Bardon (Hostess). The chapter may function as the central repository and distributor of all fund-raising items supplied to chapters. This will allow the Association to get bulk discounts on merchandise. Clare Bell spends a lot of time on Internet trying to compile an accurate count of operable EVs in the country.

San Diego CA

Current membership is approximately 65. At a recent meeting, members saw a video on Volvo's EV and heard the latest on state and federal EV tax credits. The chapter is compiling a list of

EVs in San Diego County. Contact Ron Larrea. Gary Jackson's "Little Guy" racing team has begun converting the Geo Metro they will enter in the APS race in Phoenix, March, 1994.

Vancouver, BC

Current membership is approximately 100. The chapter continues its restoration of a Detroit Electric. One member is developing a magnetically-driven motor. Members applied to the Attorney General's Public Gaming Branch for a two-high license at the Royal Diamond Casino, which was granted in December. Hopefully we'll hear more about this in their next newsletter!

Send contributions to:
Ruth M. Shipley 102 Brighton Rd. #3
Pacifica CA 94044
(415) 359-1541 CompuServe ID
73043,60 Internet
73043.60@compuserve.com

Member Want Ads

FOR SALE: 1985 Honda Accord, less than 3,000 miles since conversion, very good condition, power brakes, radio. \$15,000. Call Marina (310) 472-7248.

FOR SALE: VW Rabbit Conversion, 75 mph Freeway speed, runs great. 96V Lester charger DC-DC power supply, power brakes, recessed battery boxes and more. \$5000. Call (415) 323-4878.

FOR SALE: Curtis PMC 72 V - 120 V Controller, Model 1221B-7401. Never used, w/ manual. \$300 + shipping. Call (602) 443-0951.

Ford Tempo GL '90-92 Conversion help desired, have you done one? EE with power equip background, first EV, need mechanical parts. Call Ralph (206) 665-5175.

Rates for Want Ads

\$5 for the first 30 words. For each additional word, 25 cents per word.

Want Ads are available to EAA members for the sale of electric vehicles and related products. For display ads for commercial products, please see the Advertising Rates. Send your want ads to EAA/Want Ads, 18297 Baylor Avenue, Saratoga, CA 95070. The check should be payable to EAA and included with your ad. The EAA is not responsible for the accuracy of ads.

Board Highlights

The EAA Board met on January 15th, 1994 at Tandem Computer in Cupertino, CA. All board members participated except Bob Batson and Steven Lough. Hal and June Munro (Membership Records), Gordon Schaeffer (TA), John Newell and Bill Palmer also attended.

Actions

EAA new member application form—A preliminary version of the new application form was generated by Bruce Brooks. Changes implemented at this meeting included the following:

To satisfy concerns about privacy, the statement "This information will be used only by EAA, for statistical purposes only" was added to the top of the form. A statement was added that membership dues must be paid in US dollars. The reverse side will be used for basic information about EAA and space for entering info on more than one vehicle. New members and renewals will use the same form.

June Munro was concerned about checks slipping out of applications that are just folded up and stamped, instead of being put in envelopes. A request to staple or tape checks to the form was added.

Brooks made a motion for acceptance of the modified version. This would be a preliminary version of the form, to get something approved and ready for use. H. Bell seconded the motion and it passed.

Brooks motioned to adopt the Code of Ethics as modified on Jan. 15, 1994 as policy for EAA, both the Board of Directors and EAA National. It will not be included in the text of the By-Laws, but referred to as a separate document. H. Bell seconded and the motion passed unanimously. The Code of Ethics will be printed in the newsletter.

H. Bell raised the issue of what is a chapter of the EAA? What are the requirements, obligations and benefits. Cornell mentioned chapter handbooks, suggesting them as guides.

The March board meeting will be in Phoenix, AZ during the Electric 500 race, March 18, 7:30 to 9:00 at the Downtown Phoenix Arizona Public Service Co. Building, 401 N. 5th St. Arizona Center 2.

Peter Hackes of IEGP has invited the EAA Board to LA for a meeting during the Disneyland World Clean Air Road Rally, April 7-10. This event will be held despite the recent Northridge Earthquake, and the invitation is still good.

EAA Handbook of EV Technology

Bill Palmer is proposing that EAA produce an EAA Handbook of EV technology. Subjects to include EV history, components, safety, etc. Look for more details in next issue of CE. For more information, contact Bill Palmer, 44 Dior Terrace, Los Altos, CA 94022. Tel. 415-948-7677.

Board of Directors

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Maynard, MA 01754-0059
(508) 897-6740
Fax: (508) 897-9393

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FAX: (415) 306-0137

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- ▼ Ads prepaid for 3 and 6 issues will be discounted as indicated in the chart above. Placing 3 consecutive ads will provide the best reader response.
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- ▼ Deadline for camera-ready copy is the **1st of the month**. The due date for future issues of Current EEvents is as follows:

April issue	March 1st
May issue	April 1st
June issue	May 1st

Please contact Susan Hollis, Advertising Manager at (408) 374-8605 or by FAX at (408) 374-8750 for additional information or assistance. Camera-ready copy and payment for the ad should be sent to: **Electric Auto Association, Attn: Advertising Mgr., 18297 Baylor Avenue, Saratoga, CA 95070**

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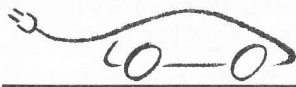
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- ◆ Curtis Instruments Battery 'Fuel' Gauges in 5 models
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- ◆ Westberg Automotive Style Gauges in 3 configurations
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