F.V.E.A.A. NEWSLETTER

JUNE 1991

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Newsletter items should be submitted to the Editor by the first friday of the the month

Nonmembers are always welcome

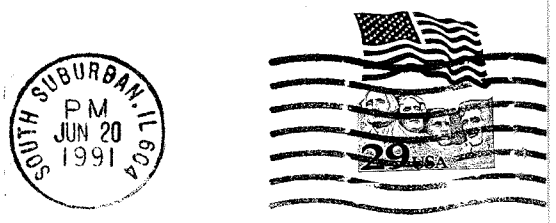
NEXT MEETING
JUNE 21st 7:30 P.M. SHARP
Room 157, doors open @ 7:00
Use Northeast entrance of
Building K, College of DuPage
22nd & Lambert, Glen Ellyn

THE PREZSEZ

Our next meeting on June 21st will be at the College of DuPage on the first day of summer. Several members, including some officers, will be at the FVEAA Exhibit at the Midwest Alternative Energy Fair in Amherst, Wisconsin on that day. Paul Harris, our Secretary, has agreed to act as moderator for a general discussion for those at the meeting.

This issue of the Newsletter features electric motors. Included is data on motors offered by Warfield in Frankfort, IL and RMA Associates in Palatine who represents Advanced DC Motors, Inc of Syracuse, NY. The latter company is successor to Prestolite. Only technical data for one motor type for each is presented. If anyone wishes additional information they can call or write the company.

Bill



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FIRST CLASS

ADDRESS CORRECTION REQUESTED

John Emde
6542 Fairmont Avenue
Downers Grove, IL
60516

MINUETS OF FVEAA MEETING ON MAY 17, 1991

The meeting was convened by President Shafer at 7:35 PM. There were 18 members present and 4 guests attending for the first time.

Treasurer Vana reported a balance of $ 946.88 in the savings account and $ 2040.21 in the checking account.

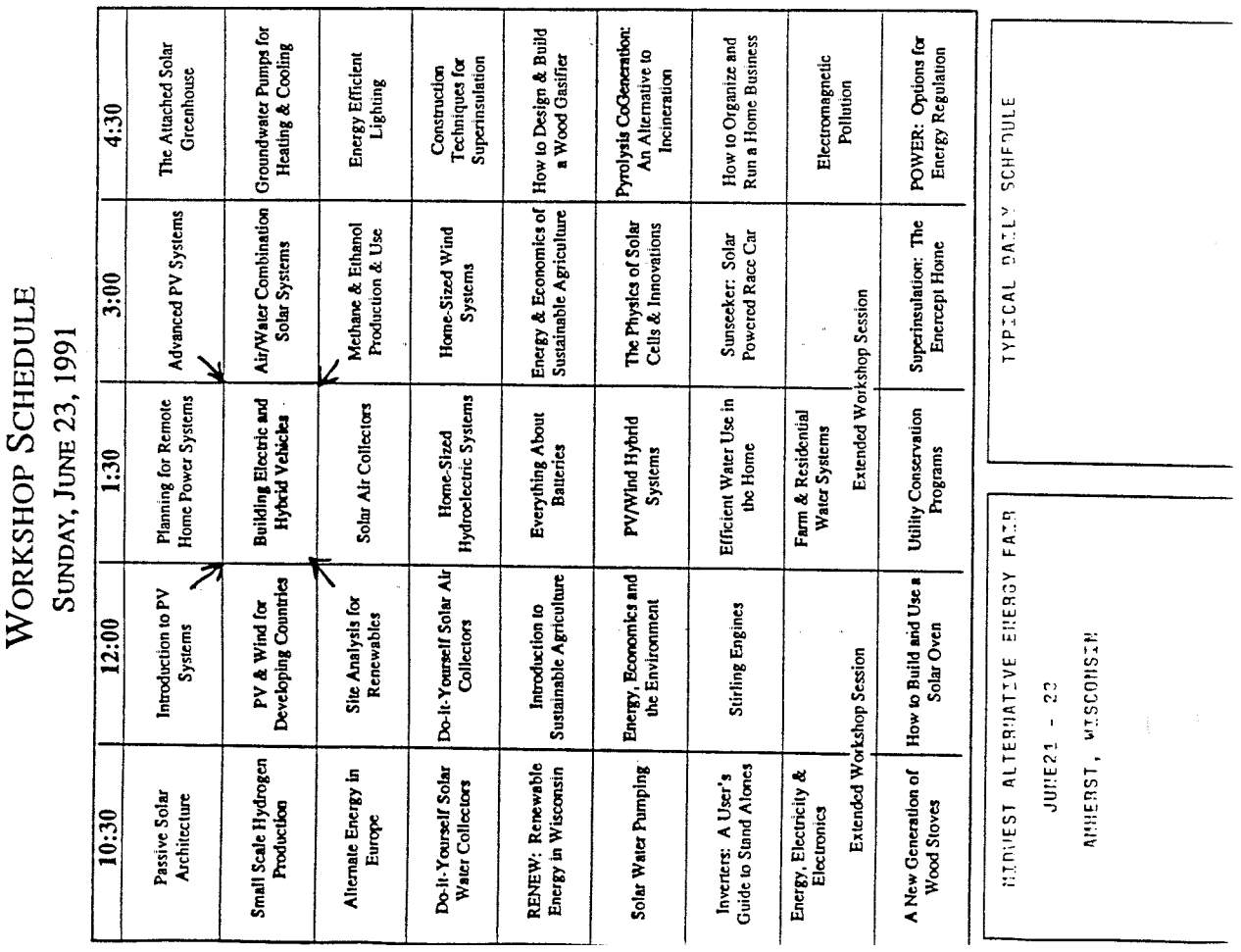
Members approved expenditures for a FVEAA Banner and magnetic vehicle signs.

Member Rubino reported on the difficulty he experienced when he tried to buy electric vehicle plates for his new car from a local currency exchange. Members were advised to deal directly with the Secretary of State for these special plates.

A brief discussion of member Vana's problems with "popping" coming from his disconnectged batteries. This subject was mentioned in the World Electric Transportation May issue. According to John Anderson, President of US Batteries, the sound originates by trapped air and normal chemical reactions between the plates which continue, even after charging is terminated. He also noted these noises may be due discharging in a defective battery.

Bill Shafer

William H Shafer
Secretary, Pro-Tem



WORKSHOP SCHEDULE
SUNDAY, JUNE 23, 1991

10:30	12:00	1:30	3:00	4:30
Passive Solar Architecture	Introduction to PV Systems	Planning for Remote Home Power Systems	Advanced PV Systems	The Attached Solar Greenhouse
Small Scale Hydrogen Production	PV & Wind for Developing Countries	Building Electric and Hybrid Vehicles	Air/Water Combination Solar Systems	Groundwater Pumps for Heating & Cooling
Alternate Energy in Europe	Site Analysis for Renewables	Solar Air Collectors	Methane & Ethanol Production & Use	Energy Efficient Lighting
Do-it-Yourself Solar Water Collectors	Do-it-Yourself Solar Air Collectors	Home-Sized Hydroelectric Systems	Home-Sized Wind Systems	Construction Techniques for Superinsulation
RENEW: Renewable Energy in Wisconsin	Introduction to Sustainable Agriculture	Everything About Batteries	Energy & Economics of Sustainable Agriculture	How to Design & Build a Wood Gasifier
Solar Water Pumping	Energy, Economics and the Environment	PV/Wind Hybrid Systems	The Physics of Solar Cells & Innovations	Pyrolysis CoGeneration: An Alternative to Incineration
Inverters: A User's Guide to Stand Alones	Stirling Engines	Efficient Water Use in the Home	Sunseeker: Solar Powered Race Car	How to Organize and Run a Home Business
Energy, Electricity & Electronics	Extended Workshop Session	Farm & Residential Water Systems	Extended Workshop Session	Electromagnetic Pollution
A New Generation of Wood Stoves	How to Build and Use a Solar Oven	Utility Conservation Programs	Superinsulation: The Energept Home	POWER: Options for Energy Regulation

MIDWEST ALTERNATIVE ENERGY FAIR
JUNE 21 - 23
AMHERST, WISCONSIN

TYPICAL DAILY SCHEDULE

Electric motorist drives future today

Mark Otnes pulled his car to a stop at the intersection of Prospect Avenue and Green Street in Champaign and looked at the cars all around him.

"Everybody sitting at the stop

light is burning energy, but we're not," he said.

More specifically, the cars driven by the other drivers were burning gasoline. The car driven by Otnes is electric and runs as clean as a whistle.

"This has to be the most environmentally benign way of traveling, second only to a bicycle," said Otnes.

Casual readers of newspapers and magazines may be familiar with electric cars as an idea of the future. General Motors plans to introduce one to the public in 1996.

News-Gazette photo by Darrell Hoemann

Mark Otnes of Champaign shows off his 'Electrica 007.' The car is a converted Plymouth Horizon powered by an electric motor and 20 6-volt batteries, located in both the front and back.

BUT TO OTNES, the future is now and has been since 1988. That's when he sold his muscle car; a 1970 Plymouth AAR Barracuda with a 340-cubic inch V-8 engine and a six-barrel carburetor.

"(The Baracuda) was the ultimate gas guzzler," said Otnes.

For a total investment of $2,600, he bought an electric car, which had been converted in November 1980 from a Plymouth Horizon with a gasoline engine. Now the only time he takes his electric car to the gas station is when he needs air for his tires.

"There's no tuneup. There's no filling it with gasoline. You have to buy tires, just like any car," he said. "Electric cars probably worry auto parts suppliers because a lot of things they sell wouldn't be needed."

Otnes, a 30-year-old free-lance commercial illustrator who lives in Champaign, has always been fascinated by cars.

"It's a typical American pastime," he said.

His tastes ran to fast cars with big engines. He's had a Corvette. He's had a Camaro.

BUT HE STARTED having second thoughts about the amount of fuel they consumed and the consequences to the environment. And there was the small matter of paying for gasoline and tuneups.

"Those big engines require lots of tuneups," Otnes said.

His interest in electric cars was piqued when an acquaintance won an electric car in a contest. After a trip to the library and a letter to the publisher of a newsletter about electric cars, he located one of his own to purchase, one that had been produced by Jet Industries in his hometown of Austin, Texas.

He bought the car for $1,700 and spent another $900 putting in 20 new 6-volt batteries. He buys distilled water every couple of months for the batteries and recharges the car from an electrical outlet in his house.

It's easy and inexpensive to do.

"We've seen virtually no increase in our electric bill," he said.

EXCEPT FOR markings on the side that identify it as an "Electrica 007" and license plates that read "ELECTRC," the car looks like any other. But pop open the hood, and there's no gasoline engine with filters and wires running everywhere.

Everything related to a gasoline engine has been removed. In its place are the batteries, all connected, and an electric motor that weighs 30 to 40 pounds. Instead of the roar of an engine, a turn of the car key produces a low fan-like sound.

Accelerating produces a series of low whines that Otnes characterized as the car singing.

He uses the electric car for traveling around town and logged a total of 18,000 miles. It can go 60 miles at speeds up to 65 or 70 mph before it needs to be recharged, so he and his wife, who teaches at the University of Illinois, have a second car with a gasoline engine for long trips.

Otnes said he's found the car to be a continuing source of fascination to people he meets.

"The general public still doesn't know much about them," he said. "Everywhere you go, you get the standard questions. How far will it go? How fast will it go? You just have to smile and tell them."

Otnes is currently restoring the body and interior of his electric car. Once that's done, he said, it should be in fine shape for years. That's good because he has every intention of keeping it.

"I see no reason to sell it," he said.

Jim Dey is a member of The News-Gazette staff. His column appears on Saturday and Monday.

5/6/91

Lightweight, High-Energy Lead/Acid Battery

Woven electrodes would increase the energy-to-weight ratio.

NASA's Jet Propulsion Laboratory, Pasadena, California

A concept for a lead/acid battery calls for woven-grid bipolar electrodes. In a high-voltage configuration, the battery would have higher specific energy and power than do conventional lead/acid batteries. It would be rugged, longlived, and maintenance-free. Made from readily available, low-cost materials by standard lead/acid production methods, the battery would be particularly well suited for use in electronic equipment, aircraft, and electric vehicles for industrial and passenger service.

The proposed battery would be composed of stacked cells. Each cell would include a bipolar electrode — an electrode with positive and negative areas. The electrodes would be supported by continuously woven fiberglass yarn. An extruded lead sheath would cover the transverse weave. The longitudinal weave would be merely coated with sizing: because longitudinal conductivity is not needed, the lead covering would be eliminated to save weight. A strip of hot-melt tape would be applied

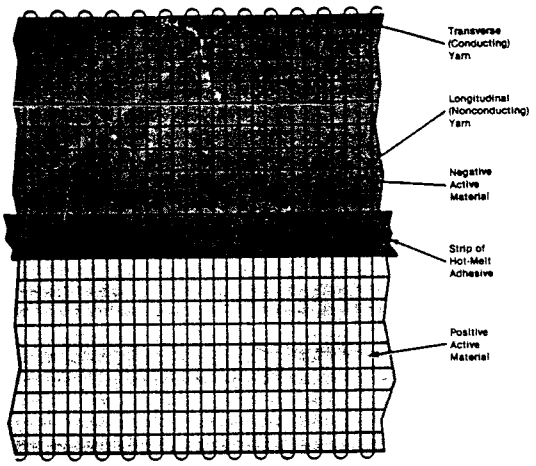


Figure 1. **Pastes on the Woven Electrode** make half negatively active and half positively active.

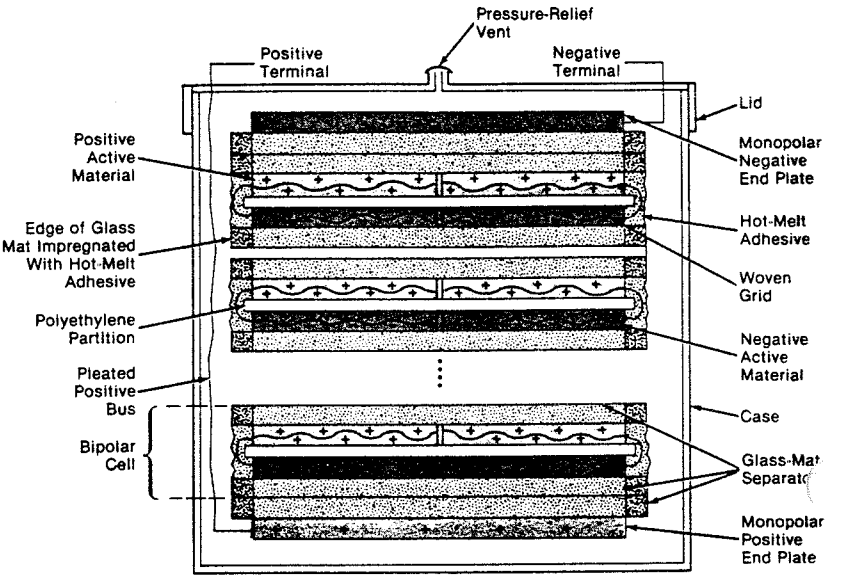


Figure 2. The **Stack of Bipolar Cells** forms a lead/acid battery. Each cell contains a pair of folded electrodes, like the one shown in Figure 1, that are negative on one side of the fold, positive on the other.

along the middle of a woven electrode.

The electrode, while still flat, would be coated on one side of the middle tape with a positive paste and on the other side with a negative paste (see Figure 1). The electrode would then be folded in half along the tape.

A pair of folded electrodes would be slipped over opposite edges of a polyethylene partition sheet, so that the negative halves of the two bipolar strips would be on one side of the partition and the positive halves on the other. The electrode would then be folded in half along the tape. The electrode-and-partition subassembly would be sandwiched between a pair of glass mats and sealed on the edges by an adhesive. Electrolyte would be immobilized within the cell so that acid would not be released if the battery case were damaged. A small tube in each hot-melt border would allow excess gas to be vented.

Final assembly would consist of filling the cells with the electrolyte, placing conventional monopolar electrodes at the ends of the cell stack, connecting the end electrodes to the battery terminals via lead buses, inserting the stack into the case, and sealing a lid on the case. The stack (see Figure 2) would be force-fit into a housing to ensure the optimum cell pressure.

According to design calculations, an assembly measuring 7.12 by 10.5 by 5.25 in. (18.1 by 26.7 by 13.3 cm) and having a mass of 11.8 kilograms would have a capacity of 5.72 ampere-hours. Its specific energy would be 58.6 watt-hours per kilogram at 58-percent positive-plate utilization. The output voltage would be 20 volts per in. of stack height (7.9 volts/cm). The inactive mass would be only 29 percent of the total, compared with about 40 percent for conventional designs. The assembled battery could be operated in any orientation.

This work was done by Wally E. Rippel and Dean B. Edwards of Caltech for **NASA's Jet Propulsion Laboratory**. *For further information, Circle 108 on the TSP Request Card.*

In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to

Edward Ansell,
Director of Patents and Licensing
Mail Stop 305-6
California Institute of Technology
1201 East California Boulevard
Pasadena, CA 91125

Refer to NPO-16962, volume and number of this NASA Tech Briefs *issue, and the page number.*

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MYRON BOYAJIAN

WARFIELD ELECTRIC COMPANY, INC.

Specializing in Motors for Electric Lift Trucks
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Chicago/Elk Grove
175 Industry Avenue
Frankfort, Illinois 60423
FAX: 815/469-4168

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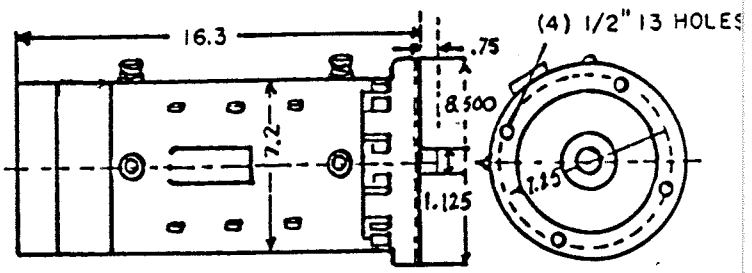
PRODUCT BULLETIN

MOTOR MODEL 99500



D. C. Electric Vehicle Motor Specifications

VOLTAGES AVAILABLE:

- *36 VOLT THRU 100 VOLT*

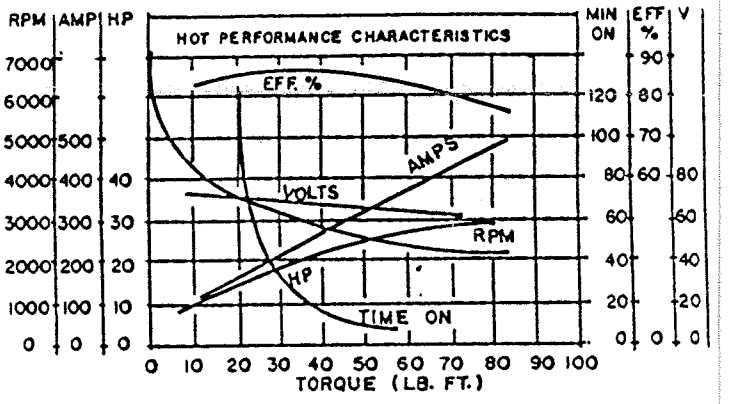
STANDARD FEATURES:

- *CLASS H INSULATION*
- *VENTILATED*
- *INTERNAL FAN*
- *SERIES WOUND*
- *SEALED BALL BEARINGS*
- *WELDED ARMATURE*
- *BRAZED INTERNAL CIRCUITS*

OPTIONAL FEATURES:

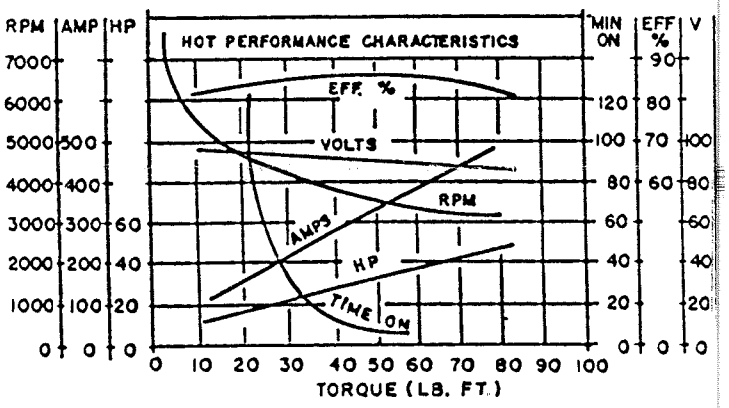
- *BRUSH WEAR SENSORS*
- *TEMPERATURE SENSORS*
- *RPM SENSORS*

72 VOLT • TYPICAL PERFORMANCE CURVE



OPERATION: 1 Hr. Rating 15 H.P. 3300 RPM
180 Amps 88% Efficient
Series Wound
Reversible Rotation

96 VOLT • TYPICAL PERFORMANCE CURVE



OPERATION: 1 Hr. Rating 20 H.P. 4400 RPM
180 Amps 85% Efficient
Series Wound
Reversible Rotation

WARFIELD ELECTRIC COMPANY

175 INDUSTRY AVE. • FRANKFORT, ILLINOIS 60423-1685 USA
USA & CANADA 800/435-9396 • 815/435-9396 • FAX: 815/469-4168

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RMA ASSOCIATES

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Fax (315) 432-9290

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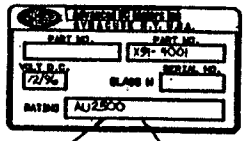
Palatine, IL 60078
(708) 705-3993
FAX (708) 705-3994

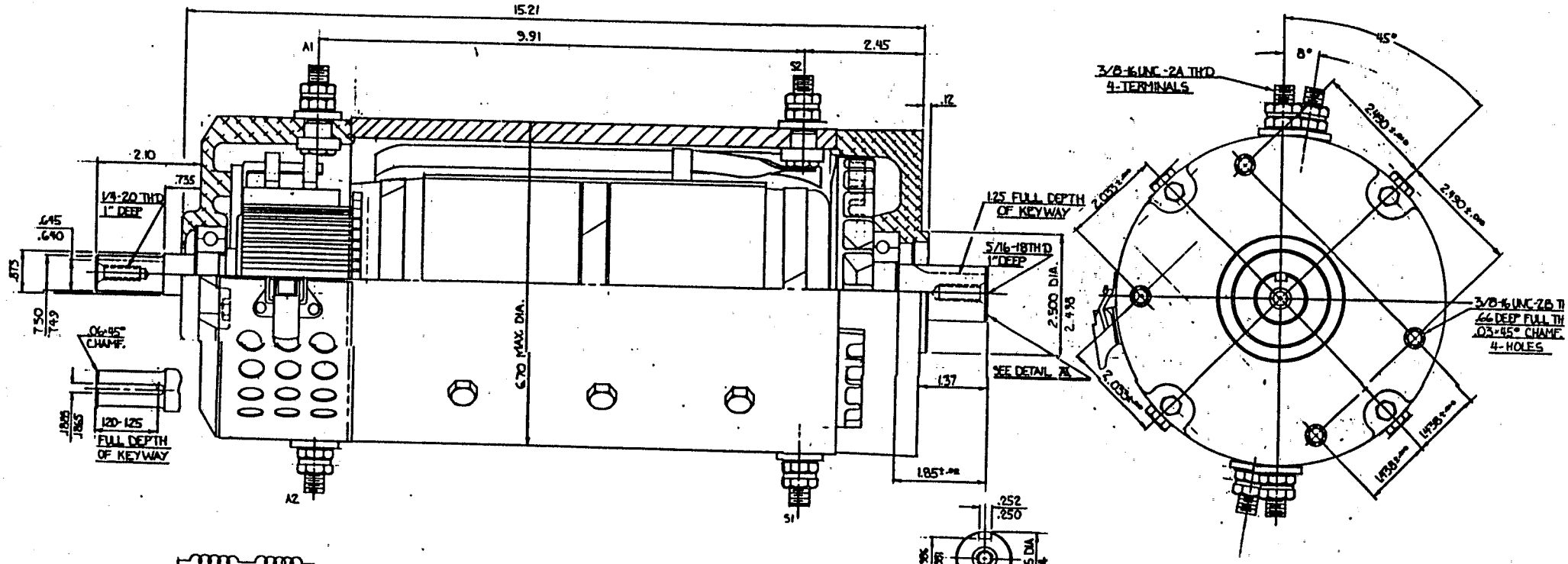
Ⓔ NAMELABEL STAMPED AS FOLLOWS:

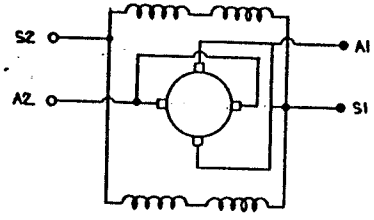
ADVANCED PART NO. X91-4001
CLASS "H" & 72% VOLT
CODE DATE STAMPED ON FRAME NEAR NAMELABEL



RATING BOX STAMPED AS SHOWN

CURRENT DATE





WIRING DIAGRAM

ROTATION - REVERSIBLE
C.W.D.E.
CONNECT S1 TO ONE BATTERY TERMINAL
CONNECT S2 TO A1
CONNECT A2 TO OTHER BATTERY TERMINAL
C.C.W.D.E.
CONNECT S1 TO ONE BATTERY TERMINAL
CONNECT S2 TO A2
CONNECT A1 TO OTHER BATTERY TERMINAL

CLASS "H" INSULATION
DESIGNED WITH INTENT TO MEET U.L. SPEC., NO. UL-583 LATEST EDITION FOR TYPE "E" "EE" INDUSTRIAL ELECTRIC TRUCK
FINISH: FRAME - BLACK ENAMEL
END HEADS NATURAL ALUMINUM
PERFORMANCE CURVE NO: C-99 Ⓐ
FOR ENCLOSED MOTOR USE KIT NO.: EK-0002
Ⓗ DESIGNED TO OPERATE IN CCW ROTATION - FORWARD VEHICLE OPERATION

72% V.

REV.	DWG	BY	DATE	REV.	DWG	BY	DATE
				H	ADDED ROTATION NOTE	GD	1-7-90
				G	WAS XC-44	MM	12-27-89
				F	WAS XP-11577	"	"
				E	REDRAWN	"	"

Advanced D.C. Motors, Inc.
Syracuse, N.Y.

TRACTION MOTOR OUTLINE

SCALE	DRAWN	DATE
FULL	MM	12-11-85

DRAWING NO. Ⓟ X91-4001

ADVANCED D.C. MOTORS

X91-4001 DRIVE MOTOR

MOTOR RATING

VOLT	AMPS	TORQUE FT/LB	RPM	PEAK H.P. DEVELOPED	KW
75 - .03I	360	80	1600	24	18
96 - .03I	360	80	2100	32	24
20 - .03I	360	80	2700	41	30.7

CONTINUOUS MOTOR RATING

VOLT	AMPS	TORQUE FT/LB	RPM	H.P.	KW
75 - .03I	125	20.2	2600	10.0	7.5
96 - .03I	105	16.1	3750	11.5	8.6
	15 MINUTE MOTOR RATING				
75 - .03I	170	30.1	2270	13.0	9.8
95 - .03I	150	26.0	3125	15.5	11.60
20% ON-TIME BASED ON 5 MINUTE DUTY CYCLE					
75 - .03I	220	43.1	1950	16.0	12
96 - .03I	205	39	2650	19.7	14.8

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RMA ASSOCIATES

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