# *EVAmerica CATALOG*
# *COMPONENTS AND SERVICES*
# *FALL 2007*

***ELECTRIC DRIVE SYSTEMS FOR…….***

***Cars & Trucks***

***Industrial – Airport Tug***

***Electric Boats & Sailboat Auxiliary***

***Organic Farm Tractors***


***ELECTRIC VEHICLES OF AMERICA, INC.***
***P.O. BOX 2037***
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***EVAmerica@aol.com***
***www.EV-America.com***


## *EVA "Customer Service is No.1 !"*

# *EVA COMPONENTS AND SERVICES*
# *TABLE OF CONTENTS*

***SECTION*** ***Page***

# *SECTION 1.0*
# *INTRODUCTION*

## ***Mission Statement***

*Thank you for your interest in* ***Electric Vehicles of America, Inc. (EVA****); our mission is:*

- *To serve the Customer with* ***quality components*** *at a* ***reasonable price****.*
- *To provide* ***One Stop shopping*** *for Electric Vehicle Drives!*
- *To provide* ***Engineering Services*** *to help you succeed.*

## ***OverView – Our Manufacturers/Suppliers***

*Our major manufacturers and product lines include:*

***Advanced DC Motors***
*2-30 HP 24-144V*
*Motor Diameters 6.7" – 8.0" -9.1"*
*UL Approved*

***Albright Contactors – Hundreds to choose from including***
*SW-80 Series (100 amps continuous)*
*SW-180 Series (150 amps continuous)*
*SW-200 Series (250 amps continuous)*

***ALLTrax Controllers***
*24 – 72V 300 – 600A*
*Programmable using RS-232 serial to PC*
*Epoxy potted for maximum environmental protection*

***Bussman Fuses***
*ANN Fuses for 0-80 V systems*

***Curtis Instruments***
*Battery Discharge Indicators*
*DC-DC Converters*
*Hour Meters*

***Curtis PMC Controllers***
*Series Motor Controllers (24-144V)*
*Sepex Motor Controllers (24-80V)*

***Lester Battery Chargers***
*24-120V wet battery chargers*

***Littelfuse***
*L25S Fuses for higher voltage systems*

***RTC MachineCompany***
*Adaptor Plates & Couplings*
*Clutchless Design*

***Scott Permanent Magnet Motors***
*24-36V for light duty applications*

***Trojan Batteries***
*Golf cart, Marine, & Industrial Batteries*

***Westberg Manufacturing***
*Ammeters, Voltmeters*

***Zivan Battery Chargers***
*900 watts – 4800 watts*
*115V – 230V Input*
*Programmed for your specific battery*

*This Catalog is fastest way to introduce* ***Electric Vehicles of America, Inc. (EVA****) and the quality products that we distribute. As your project develops, you will need additional information. We can fax Manufacturers' data sheets, drawings, and more.*

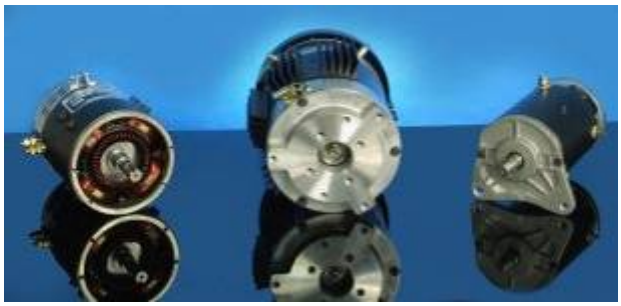
*Our objective is to ensure that your battery-powered vehicles operates reliably and safely.*

*So let's get started!*

*Bob Batson*
*President*
*Electric Vehicles of America, Inc.*

## *SECTION 2.0*
## *DC MOTORS*

### *2.1 Industrial Motors*



***Advanced Motors and Drives*** *(www.ADCMotors.com ) manufactures Series and Separately Excited Motors to meet the requirements for material handling, golf cart, mining industry, and others.*

*Series Motors are frames sizes from 4.5" (114mm) to 11" (280mm) diameter; voltages to 192V. Pump Motors and Traction Motors. Hp varies from 0.5 hp to 35hp continuous. All Motors are produced to meet class "H" temperature ratings and are UL approved.*

*After market parts are also available.*

*To discuss your application, call (603) 569-2100.*

## *2.2 EV Motors*

*Advanced DC Motors offers series wound DC motors specifically designed for EV applications with high efficiency and peak performance. Motors range from 24-144 V and 2-30 HP continuous. Peak horsepower is 2-3 times continuous. Motor Curves are available via fax. See the Table below to select your motor and controller.*

*Continuous Rating is important because it typically identifies the point of maximum efficiency. The following tables list the continuous horsepower for the most popular Advanced DC Motors.*

***Advanced DC Motors***
***Continuous Horsepower vs. Voltage***

| | *Lower Voltages* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Series Motor* | *24* | *36* | *48* | *60* | *72* | *96* | *108* | *120* | *144* |
| *A00-4009* | *2* | *4* | *6* | *10* | *12* | | | | |
| *K91-4003* | | | *5* | *6* | *8* | *10* | | | |
| *L91-4003* | | | | | *12* | *14* | | | |
| *X91-4001* | | | | | *10* | *12* | *14* | *16* | *20* |
| *203-06-4001A* | | | | | *16* | *19* | *22* | *26* | |
| *FB1-4001A* | | | | | *18* | *21* | *23* | *26* | *30* |

*Peak Horsepower is **2-3 times the continuous rating** and in most cases, the controller limits the peak horsepower of the motor. Therefore, to determine the peak horsepower for the controller, the following formula is used:*

*Horsepower = (Voltage x Amperage x Efficiency) / 746*

# *SECTION 3.0*
# *MOTOR CONTROLLERS*

## *3.1 Series Motor Controllers*

***ALLTrax CONTROLLERS***
*www.alltraxinc.com*


*Application*
*Series DC Motors* *Frequency* *18 Khz*
*Throttle Input 0-5000 ohms* *Key Input Voltage* *8V-1.5x Max*
*Quiescent Current < 25 mA* *Thermal Cutback Begins at 75C, 90C shutdown*
*Programming RS-232 serial to host PC running freeware Windows Interface*

*Programmable Functions*
*Throttle ramp profile, throttle response rate, plug brake on/off, plug brake current High Pedal Disable on/off, battery undervoltage and overvoltage cutback, Maximum input & output current in 5A increments.*

*Construction*
*All drives are epoxy potted in an extruded aluminum case for maximum environmental and vibration protection. All three control inputs are fault tolerant to rated input voltage. AXE-xxx4 series matches Curtis 1204 footprint & size. AXE-xxx5 series matches Curtis 1205 footprint & size. 2 year warranty.*

## *Available ALLTrax Models*

| ***Model*** | ***Battery Voltage*** | ***Current Limit*** | ***2 Minute Rating*** | ***5 Minute Rating*** | ***1 Hour Rating*** |
|---|---|---|---|---|---|
| *AXE-2444* | *12-24* | *400* | *400* | *350* | *200* |
| *AXE-4834* | *24-48* | *300* | *300* | *200* | *125* |
| *AXE-4844* | *24-48* | *400* | *400* | *300* | *150* |
| *AXE-4845* | *24-48* | *400* | *400* | *300* | *175* |
| *AXE-4855* | *24-48* | *500* | *500* | *350* | *250* |
| *AXE-4865* | *24-48* | *650* | *650* | *400* | *250* |
| *AXE-7234* | *24-72* | *300* | *300* | *200* | *125* |
| *AXE-7245* | *24-72* | *450* | *450* | *350* | *200* |

*The above modelas are also available with plug braking, for example AXE-4834P. AXE controllers can be configured to match your requirements and are being offered as replacements for discontinued Curtis controllers.*

***CURTIS PMC CONTROLLERS***
*(www.CurtisInst.com )*


*Curtis controllers are designed for permanent magnet and series wound motors with voltages from 12-144 V. Features include:*

*Current Multiplication*
*High Speed switching*
*Current Limitation*
*High Pedal Protection*
*Low Voltage Protection*
*Runaway Protection*

***Most Popular Curtis Controller***
***Selection by Voltage***
***(maximum amperage shown)***

| ***Series Controller*** | ***Voltage*** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *24* | *36* | *48* | *60* | *72* | *96* | *108* | *120* | *144* |
| *1209B-6402* | | | *400* | *400* | *400* | | | | |
| *1221C-7401* | | | | | *400* | *400* | *400* | *400* | |
| *1231C-7701* | | | | | *550* | *550* | *550* | *550* | |
| *1231C-8601* | | | | | | *500* | *500* | *500* | *500* |

*Curtis makes over 1000 different controllers; the above models are the most popular series controllers.*

*Potboxes*
*The accelerator potentiometer or potbox translates the mechanical movement of the accelerator pedal to an electrical control signal to the controller. Curtis has a wide range of potboxes. The standard PB-6 is right hand operation; the PB-9 is left hand. The PB-6 and PB-9 come with a micro-switch.*

*The Electronic throttles (ET-103) and the Footpedal Potbox ( FP-2, FP-5, etc) are also available.*

### *3.2 SepEx Motor Controllers*

*Curtis SepEx programmable controllers assure smooth, seamless control for separately excited motors in low lifts, stackers, fork lifts, personnel carriers, and other industrial vehicles.*

*All SepEx models offer full bridge control of the motor field which allows reversing without the use of forward/reverse contactors.*

*Performance range from 24 -80V and up to 700 amps. Hundreds of models available.*

*To help select the SepEx controller for your application, call EVA at (603) 569-2100 or Email at EVAmerica@aol.com.*

# *SECTION 4. 0*
# *OTHER DRIVE SYSTEM COMPONENTS*

## *4.1 ALBRIGHT CONTACTORS*

*www.albright.co.uk*

*Contactors are essential in any EV to isolate the Battery System from the Drive System. They are essential for safety. Contactors must be selected based on voltage and amperage of the controller as well as experience.*

*Albright Contactors are required to turn the high voltage system on and off. Contactors come with magnetic blowouts for on-road Evs and with protected enclosures for marine applications. Albright makes several hundred different contactors. We stock the most popular for immediate delivery. These include on/off and Forward/Reverse contactors.*

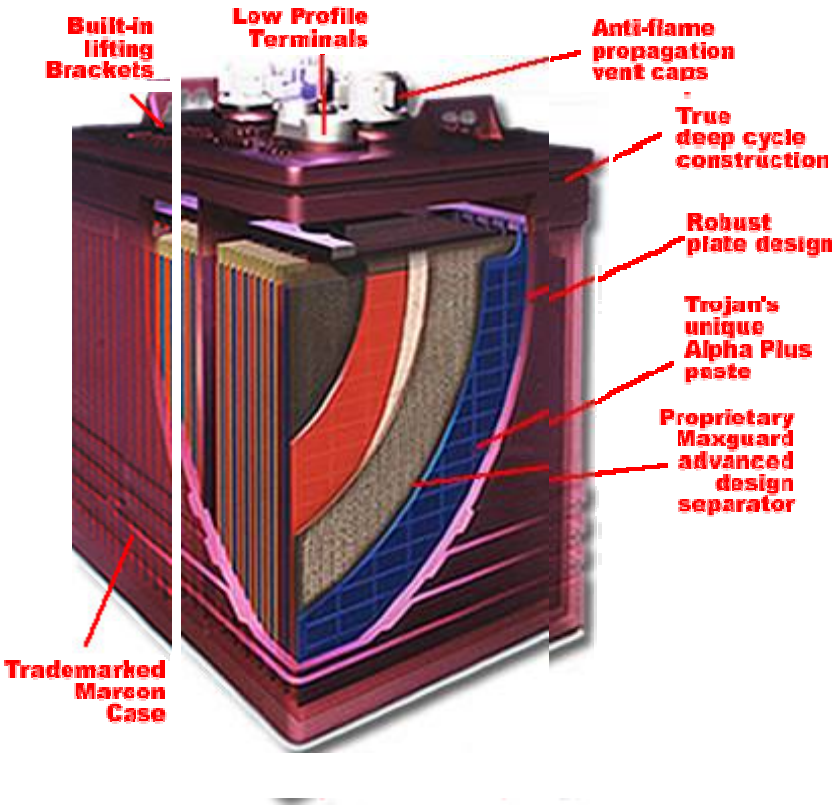
*The contactors typically are separated by the following series:*

| *Series* | *Max Voltage* | *Continuous Current* | *Fault Current* |
|---|---|---|---|
| *SW-80 Series* | *48-96V* | *100 amp* | *800 amps@96V* |
| *SW-180 Series* | *96 V* | *150 amp* | *1000 amp@96V* |
| *SW-190 Series* | *120 V* | *150 amp* | *600 amp@120V* |
| *SW-200 Series* | *96V* | *250 amp* | *1500 ap@96V* |

## *4.2 BATTERY SYSTEM*

*Trojan Batteries*
*www.TrojanBattery.com*

*Electric Vehicles of America, Inc. works with the Trojan Master Distributors/ dealers across the country in order to provide our customers a complete system with local delivery.*




*Trojan batteries provide long life, have a greater water reservoir, and are quality constructed. EVA customers have achieved 18,000 -20,000 miles on a set of T-145 batteries. Battery life is directly related to how they are used and maintained. EVA will gladly help you select the best battery for your application and vehicle.*

*These are the most popular wet batteries:*

| *Battery* | | *Weight* | *Minutes* | *Dimensions (inches)** | | |
|---|---|---|---|---|---|---|
| | *Voltage* | *(lbs)* | *@75amps* | *Length* | *Width* | *Height* |
| *T-105* | *6* | *61* | *105* | *10-3/8* | *7-1/8* | *11-1/4* |
| *T-125* | *6* | *66* | *125* | *10-3/8* | *7-1/8* | *11-1/4* |
| *T-145* | *6* | *72* | *145* | *10-3/8* | *7-1/8* | *11-1/2* |
| *T-875* | *8* | *63* | *75* | *10-3/8* | *7-1/8* | *11-1/4* |
| *SCS225* | *12* | *66* | *57* | *13-1/4* | *6-13/16* | *9-3/4* |
| *30XHS* | *12* | *66* | *57* | *13-1/4* | *6-13/16* | *9-3/4* |
| *T-1275* | *12* | *82* | *70* | *12-7/8* | *7* | *10-7/8* |

** Height dimension may vary with terminal*

### *4.3 CHARGERS*

***Zivan Chargers (On-Board or Off-Board)***
*www.zivan.com*

*Zivan NG Chargers are fully automatic chargers and compact enough to be on-board. Many models to chose from with 115 VAC or 230 VAC capability. 230 VAC provides a faster and more complete charge. If the battery pack weight is greater than 1000 lbs; 230 VAC is recommended for charging. These chargers are programmed for your specific battery pack to provide the best charge. These are our most popular charger!*

***Lester Chargers (Off-Board)***
*www.LesterElectrical.com*
*Lester Chargers are fully automatic chargers with patented electronic timers which sense the charge condition of the batteries and charge them fully and properly charged every time. Many models come with both 115 VAC and 230 VAC capability. 230 VAC provides a faster and more complete charge.*

*Currently, Lester prices are non-competitive because of their high cost of materials.*

***K&W Chargers (On-Board)***
*The BC-20 is a popular battery charger for voltage 60 -108V. It includes a programming resistor which can be changed to allow different charging voltages. Its advantage is in 96V and 108V systems because it is less expensive than the Zivan chargers. These chargers can be located on-board to charge lightweight battery packs (<1000 lbs).*

### *4.4 WIRING, CABLE, and LUGS*
*www.QuickCable.com*

*Our lugs are plated and 80 percent heavier than standard lugs. This minimizes the resistance and improves range. One customer got a 30 percent increase in range just by switching to our lugs!*

*Our design uses flexible welding cable (available in black and red), heavy duty plated lugs, heat shrink with sealant, and industrial crimping tools. Only the best!*

*Why spend thousands on an efficient motor and controller only to lose that energy in poor connections!*

### *4.5 ADAPTOR PLATES AND COUPLINGS*

*Clutchless Designs by RTC Machine Company*
*EVA offers clutchless adaptors for the conversion of electric cars and trucks. These standard designs use a generic aluminum adaptor plate (1/2 inch thick x 18 ins sq) with 1/2 inch aluminum spacers. These are machined to match the specific motor. An alignment tool is used to center the adaptor plate to the bell housing. Then one can transfer the hole pattern and shape from the bell housing to the adaptor plate.*

*Adaptor Plates and Couplings (Clutchless Design)*
*Our unique clutchless design allows easy conversion of all vehicles. The design eliminates the clutch and the flywheel and uses a direct drive to the transmission. This minimizes weight and potential overspeeding of the motor. Gear changes can be made because there is no inertia to the electric motor. This design facilitates the conversion of vehicles that had an automatic transmission, because the clutch does not have to be installed. The Coupling uses a stainless steel coupling body with an aluminum disk for mounting the clutch disk of the vehicle. The use of the clutch disk allows the springs to accept the initial shock of the motor, and the splines allow a perfect match to your vehicle.*

*Adaptor Plates and Couplings (Clutch Design)*
*Please call so we can discuss your requirements.*

*For details, review Tech Paper* ***"EVA Clutchless Design"***

## *SECTION 5.0*

# *INSTRUMENTATION*

*Instrumentation is essential to help you drive efficiently. Without instrumentation, you cannot assess the benefit of minor improvements or the performance of the design.*

### *5.1 Westberg Ammeters and Voltmeters*


*Automotive style meters (2 inch) are our standard which are backlit.*

*Our stock meters are:*

*Voltmeters*
*20-60V*
*0-100V*
*60-160V*

*Ammeters*
*0-200*
*0-400*
*0-500*

*Ammeters require a shunt specific for the amperage. For example, a 500 amp meter requires a 500 amp 50mV shunt. The shunt is a calibrated resistance. The 50 mV identifies the resistance at a fixed amperage.*

*Special meters can be made for your specific requirements.*

### *5.2 Curtis Fuel Gauges*

*900R Meters*


*Curtis fuel gauges identify the status of your battery pack. With 10 LED increments, driving confidence is gained. The 900R is directly connected to the battery pack as a simple two wire connection. The 900R Curtis fuel gauge is for wet lead acid batteries.*

*enGage II with Hour meter*


*The enGage II is designed for operation between 24-48V and is programmable for the specific battery. The Hour Meter keeps track of the operating time of the vehicle. This is beneficial for many applications, such as electric boats, tractors, etc.*

# *SECTION 6.0*
# *SAFETY COMPONENTS*

*EVA is the Leader in EV Safety using …...*

## *6.1 POWER BRAKES*

*Vacuum Equipment is required to maintain your power-assisted brakes. The 12V Gast pump operates automatically thru the Sq D vacuum switch. The vacuum gauge assists in initial installation.*

## *6.2 DC/DC CONVERTERS*

*DC/DC Converters charge the 12 V auxiliary battery by converting the voltage of the battery pack. They maintain head light brightness, a safety feature. They are the equivalent to an alternator in an ICE vehicle.*

*Zivan offers DC/DC Converters which are 400 watts continuous for 144V. The wattage decreases with reduced voltage. These are the same footprint as the NG1 chargers. These are used in cars and trucks with a grounded 12V battery system.*

*Astrodyne DC/DC converters are now being offered with auxiliary components; they are a low cost alternative to the Zivan DC/DC converters.*

*Transelectric DC/DC Converters are available for vehicles using a floating 12V system with their traction pack floating system, such as electric boats. These DC/DC converters are low cost.*

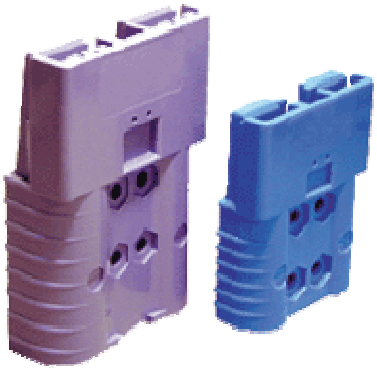
| | | ***Output*** | | |
|---|---|---|---|---|
| ***Model*** | ***Input*** | ***Voltage*** | ***Amperage*** | ***Efficiency*** |
| *SM2412-5* | *24-48V* | *13.7-13.9V* | *5* | *85 %* |
| *SM2412-10* | *24-48V* | *13.7-13.9V* | *10* | *85 %* |
| *SM2412-25* | *24-48V* | *13.7-13.9V* | *25* | *88 %* |
| *SM7212-25* | *72-96V* | *13.7-13.9V* | *25* | *80 %* |

## *6.3 FIRST INERTIA SWITCH*

*First Inertia Switch opens the contactors in case of an accident. This shuts down the power to the controller and motor. The power is off! A must on all Evs!*

***ANDERSON DISCONNECTS***

*Anderson connectors for the power cables disconnect easily to perform maintenance. We disconnect our Anderson every time we open the hood; eliminating power to all high voltage components. Nothing is live!*



*The SBX model is recommended because the connections are recessed so that fingers cannot touch the live connections.*

***FUSES***

*Our fuses are designed to operate in the short circuit condition. No nuisance blows during acceleration. A fuse holder is available.*

*EVA fuses control circuits and the 12V wiring with a unique 4-fuse holder for mounting on the control board or an in-line fuse holder.*

*EVA supplies Bussman (0-80VDC) and Littelfuse fuses (0-200VDC).*

# *SECTION 7.0*
# *EV CONVERSIONS*

## *7.1 TRUCK CONVERSIONS*

*EVA started the truck conversion market in 1990. We selected trucks because their:*

- *Payload capacity is greater.*
- *Curb weight is similar to many cars.*
- *Cab size minimizes heating.*

*Unique features of our design are:*

- *Tilt bed construction with the batteries under the bed.*
  *This lowers the center of gravity, provides better crash protection, and allows full use of the bed. It remains a truck!*

- *Our electrical components are located on MDO board over the motor. The board can be removed in 5 minutes; the motor in 30!*

- *The control board is hinged so it tilts up for easy inspection of the motor.*

- *Four separate battery boxes minimize exposure to less than 48 volts when performing battery maintenance.*

## *7.2 AUTOMOBILE CONVERSIONS*

*Tom Nangle's BMW*

*Although automobiles are limited by their Gross Vehicle Weight Rating (GVWR), they can be safely converted. If the GVWR is exceeded, the vehicle is there will be additional brake wear, handling problems, and possibly structural failure. Therefore, automobiles can sustain only lightweight battery packs, typically 12 V batteries, to ensure their safety. Design considerations include:*

- *Battery location and weight to maintain the weight distribution of the original vehicle.*
- *Component arrangement for accessibility.*
- *Battery boxes venting to prevent the buildup of hydrogen gases.*
- *The use of two contactors, an EVA standard. The primary contactor closes with the ignition switch; the secondary contactor closes with the accelerator pedal.*
- *No power cables inside the passenger compartment*

## *7.3 LIGHT WEIGHT VEHICLES*

*EVA can assist you with lightweight vehicles, such as go-karts, motorcycles, riding lawn mowers, and more. The design typically uses 24-48 volt systems. These vehicles provide an opportunity for a high school or individual to become aware of EV technology at a reasonable cost.*

## *7.4 ELECTRIC BOATS*


*Jim Hulm's 24 ft Thames Launch*

*EVA can assist you in designing an electric boat and providing components.*

*Electrics as sailboat auxiliaries make economic sense. EVA has provided components for sailboats up to 50 ft in length. We have also provide systems for bass boats.*

### *7.5 INDUSTRIAL VEHICLES*

*EVA has designed the drive sysem for a number of industrial vehicles. This includes a number of rail vehicles; the largest was 150 tons for moving steel ingots. Recently, we have been working with Bangor International Airport in the electrification of their Ground Support Vehicles. This tug is one example…..…*

### *7.6 PROTOTYPES*

*EVA has helped numerous companies, colleges, and individuals build new and unique Evs. This includes industrial vehicles, electric Tuks-tuks in Thailand, electric jet skis, electric snowmobiles, submarines, golf carts, and more.*

## *Tell us your requirements!*

# *SECTION 8.0*
# *COMMERCIAL CONDITIONS*

## *8.1 PRICES OF EVA COMPONENTS*

*The following identifies many of the available components. To assist you, we will prepare a detailed quotation by system. This will help you understand how each component fits into the total picture.*

*We do not try to be the lowest on each component. We realize that someone can always offer lower prices. We offer reasonable prices with the best Customer Service. If you do not believe us – simply ask our customers!*

***IF YOU DO NOT SEE WHAT YOU WANT – JUST ASK***

| *COMPONENT* | *PRICE* |
|---|---|
| ***Advanced DC Motors - includes 5% copper surcharge effective June 1*** | |
| *A00-4009* | *$575* |
| *K91-4003* | *$650* |
| *L91-4001* | *$880* |
| *X91-4001* | *$890* |
| *203-06-4001A* | *$1350* |
| *FB1-4001A* | *$1550* |

*Clutchless Design (Advanced DC Motors)*

| | |
|---|---|
| *Adaptor Plates (1/2" Thick)* | *$220* |
| *Spacer (Two typically required)* | *$90 each* |
| *Motor Coupling* | *$325* |

***ALLTrax Controllers – Programmable***

| | |
|---|---|
| *AXE-2444 (12-24V 400A)* | *$400* |
| *AXE-4834 (24-48V 300A)* | *$320* |
| *NPX-4834 Non Programmable* | *$250* |
| *AXE-4844 (24-48V 400A)* | *$390* |
| *NPX-4844 Non Programmable* | *$300* |
| *AXE-4845 (24-48V 400A)* | *$420* |
| *AXE-4855 (24-48V 500A)* | *$550* |
| *AXE-4865 (24-48V 600A)* | *$630* |
| *AXE-7234 (24-72V 300A)* | *$480* |
| *AXE-7245 (24-72V 400A)* | *$640* |

*The "P" version with Plug Braking adds $25 to the above pricing.*

*Curtis Controllers - More than 100 models are available The following are the most popular.*

| | | |
|---|---|---|
| *1209B-6402* | *(48-72V 400A)* | *$780* |
| *1221C-7401* | *(72-120V 400A)* | *$1075* |
| *1231C-7701* | *(72-120V 550A)* | *$1495* |
| *1231C-8601* | *(96-144V 500A)* | *$1495* |

*EVA Heat Sink/ Fan (12V)* *$50*
*Recommended for 1209, 1221 & 1231 controllers*

*Potboxes*

| | |
|---|---|
| *PB-6* | *$90* |
| *PB-9* | *$90* |
| *FP-2 Footpedal* | *$255* |
| *FP-6 Footpedal* | *$155* |
| *Potentiometer (98191) Replacement* | *$20* |

*Batteries* *Let us calculate your specific needs.*

*EVA works with the local Trojan Dealers across the country to eliminate shipping.*

| *Trojan Batteries* | *Pricing based on minimum of 10* |
|---|---|
| *T-105 (6V)* | *$129* |
| *T-125 (6V)* | *$148* |
| *T-145 (6V)* | *$189* |
| *T-875 (8V)* | *$139* |
| *30XHS* | *$169* |
| *T-1275 (12V)* | *$180* |

*Battery Prices may vary slightly due to location. Sometimes lower.*

| *DC/DC Converters* | |
|---|---|
| *Zivan (96 thru144V)* | *$500* |
| *Astrodyne (72-144V*)* | *$175* |

*With additional hardware and/or modification*

| *SME (24-48V)* | |
|---|---|
| *10 amp* | *$100* |
| *25 amp* | *$215* |

*Albright Contactors – Other special contactors are available*
*There are more than 1000 models available; these are the most popular.*

| | |
|---|---|
| *SW-80 (On/Off 100A)* | *$70* |
| *SW-80P (Protected)* | *$80* |
| *DC-88 (Reversing 100A)* | *$150* |
| *DC-88P (Protected)* | *$160* |
| *SW-180 (On/Off 150A)* | *$90* |
| *DC-182 (Reversing 150A)* | *$185* |
| *SW-200 (On/Off 250A)* | *$150* |
| *SW-202 (Reversing 250A)* | *$325* |

*Zivan Chargers –*
*The charger is for a specific voltage; our pricing groups different chargers together.*

*NG1 115 VAC 12-60V 900 watts $500*

*NG3*
*230 VAC Input*

| | | |
|---|---|---|
| *NG3 12-80V* | *2800 watts* | *$900* |
| *NG3 84-120V* | *2800 watts* | *$940* |
| *NG3 132-216V* | *2800 watts* | *$980* |
| *NG5 36-240V* | *4800 watts* | *$1350* |

*Available in 120VAC but at reduced power*

*Options*

| | |
|---|---|
| *Thermal Compensation Probe* | *$40* |
| *Charge Interlock Relay* | *$15* |

*Lester Chargers – Discontinued- Pricing too high*
*Model 6430 (36V)*
*Model 9695 (48V)*
*Model 9387 (96V)*
*Model 7740 (120V)*

*K&W Chargers – No longer manufactured*
*BC-20 (48-108V)*

*Standard Instrumentation*

| | |
|---|---|
| *Voltmeter (Westberg)* | *$65* |
| *20-60 V* | |
| *80-180 V* | |
| *Ammeter (Westberg)* | *$65* |
| *0-200 Amps* | |
| *0-400 Amps* | |
| *0-500 Amps* | |
| *0-1000 Amps* | |
| *Shunt – 50mV* | *$30* |
| *Shunt – 50mV 1000A* | *$45* |

*Fuel Gauges*
*Curtis Instruments*

| | |
|---|---|
| *900R Fuel Gauge (12-48V)* | *$130* |
| *900R Fuel Gauge (60-96V)* | *$150* |
| *900R Fuel Gauge (120V-144)* | *$250* |

*Vacuum Equipment*

| | |
|---|---|
| *Gast Vacuum Pump (12V)* | *$225* |
| *Square D Vacuum Switch* | *$135* |
| *Vacuum Gauge – Set up* | *$15* |

*Power Cable & Lugs*
*Cable is drop shipped from our supplier*

| | |
|---|---|
| *1 Ga Cable – Black (ft)* | *$2.50* |
| *2/0 cable – Black (ft)* | *$3.25* |
| *2/0 cable – Red (ft)* | *$3.25* |

*Heavy Duty Lug – You cannot find better!*

| | |
|---|---|
| *1 Gauge* | *$2.00* |
| *2/0 Gauge* | *$2.50* |

*Round Automotive Lug*

| | |
|---|---|
| *2/0* | *$3.50* |

*Heat Shrink w/ sealant* *$6/ft*
*This heat shrink is unique in sealing your connections!*

*Safety Components*
*EVA is the Leader in Safety*

*Anderson Connectors (each half)*

| | |
|---|---|
| *SB-50 (10 ga)* | *$10* |
| *SBX-175 (1 ga)* | *$24* |
| *SBX-350 (2/0)* | *$32* |

*Buss Fast-Acting Fuses (limited to 80V Maximum)*

| | |
|---|---|
| *ANN – 100* | *$25* |
| *ANN – 300* | *$25* |
| *ANN – 400* | *$42* |
| *ANN – 500* | *$42* |

*Buss Fuse holder* *$25*

*Littelfuse Fast-Acting*

| | |
|---|---|
| *L25S-400* | *$55* |
| *Holder* | *$25* |

*First Inertia Switch* *$45*
*Fuse holder (4 Fuses)* *$15*
*For Automotive Fuses – ATO Type*
*In-Line Fuse holder* *$5*

*Electric Heater Package* *$180*
*Package includes 1500 watts ceramic heater, wiring, SB-50 connectors, Albright SW-80B contactor, mounting plate, fuse and schematic*

*Neoprene Rubber (3 ft wide)* *$12/ft*
*Terminal Protective Covers* *$1.50*
*Vinyl hose (Clear)* *$1.50*
*Clamps for Vinyl hose* *$1.00*

*FOR TRUCKS*
*Motor Mount* *$180*
*Truck Rear Pneumatic Lifts*
*150 lb lifts with Hinge & Reinforcement $150*
*200 lb lifts with Hinge & Reinforcement $200*

*Tools*
*Cable Cutter* *$18*
*Hex Crimp Tool* *$240* *To assist you, we also rent this tool.*
*Quick Heat Gun* *$45*

*EVAmerica Membership* *$30*
*Quarterly EVA newsletter*
*with $30 Discount Coupons*

*Installation DVD* *Free**

*EV Conversion Guidelines* *Free**
*This One Inch Notebook*
*Includes Schematics, Drawings, etc*
*With Motor/Controller Purchase*

** with purchase of Motor/ Controller/ System*

*Tool Rental(Deposit Required)*

| | |
|---|---|
| *Industrial Crimper/Cutter/Lugs* | *$250 deposit, $15/wk* |
| *Heat Gun* | *$50 deposit, $8/wk* |
| *Alignment Tool* | *$50 deposit $0/wk* |

*Visa/ MasterCard/ Discover/AmEx*
*This will expedite your shipment*
*Same day shipment in most cases.*

### *8.2 SHIPPING*

*All items weighing less than 150 lbs are shipped by United Parcel Service (UPS) or Federal Express. Heavier components will be shipped by motor freight (Yellow Freight).*

### *8.3 WARRANTY*

*Most EV components have a one-year replacement warranty. These warranties do not cover damage due to improper installation, abuse, disassembly of the component, or damage to other components or assemblies. The manufacturer determines the extent of the warranty and its applicability.*

### *8.4 DISCLAIMER*

*Electric Vehicles of America, Inc. is not responsible for the installation, maintenance, use, or abuse of these components. The Purchaser is responsible for proper and safe installation, operation, and maintenance of components and the use of all tools used for that purchase. It is the Purchaser's responsibility to follow correct and proper conversion procedures for the specific vehicle and to adhere to safety precautions related to high voltage DC electrical systems. Therefore, the Purchaser agrees by placing the order and accepting delivery of the components from Electric Vehicles of America, Inc. that all components are used at the Purchaser's risk.*

*The Purchaser will indemnify and hold Electric Vehicles of America, Inc., its stockholders, its employees, and its representatives free and harmless from all loss, liability, or damage resulting from any use of these components.*

### *8.5 RETURNS*

*Prior to returning any component, EVA must be contacted and will provide specific instructions.*

*Any return on an electronic component normally stocked requires verification of proper operation and a new condition. Any refund may include deductions for additional shipping costs, any repair costs for damage, and/or a restocking charge depending on the "as received" condition of the returned component. The customer is responsible for proper shipping and insurance with any returned component.*

*Special orders cannot be returned unless in new condition and authorized by the original manufacturer.*

*Returned components in an unused condition will be charged a re-stocking fee. This fee is 20% of the price.*

# *SECTION 9.0*
# *EVA DOCUMENTATION*

### *9.1 EVA INSTALLATION MANUAL*

*With the order of the motor or controller, EVA provides the EVA Installation Manual and "Safety First" and "S-10 Installation" Videotape. The Installation Manual is a 1-inch notebook, detailing the installation of each component as well as schematics, etc. We can email the Table of Contents.*

### *9.2 EVA VIDEOS*

*Our "Safety First" (12 minutes) shows how our technical paper "Safety First" is designed into a vehicle.*

*Our "S-10 Installation" (approximately 45 minutes) shows an S-10 being assembled. The installation includes a control board design and a tilt bed with the batteries under the bed.*

### *9.3 "EVAmerica" NEWSLETTER & MEMBERSHIP*

*Our quarterly newsletter "EVAmerica" helps you build and maintain a better EV. Each newsletter provides new ideas in building and maintaining your EV.*

*Each newsletter comes with a coupon for a 10 percent discount on components up to $30 every quarter. Yes, that's $120 worth of coupons annually. The subscription cost is only $30/year or free with your first order over $300.*

*If you are not satisfied with your EVAmerica membership, we will refund you money.*

# *SECTION 10.0*
# *EVA ADDITIONAL SERVICES*

***10.1 TECHNICAL SUPPORT*** *(calculations, motor drawings, etc.)*

*In addition, we are here to support you through the conversion process and as you drive your EV. Not only do we have the "hands on" experience" of building Evs (trucks, vans, cars, parade vehicles, etc.) but we also have the skills to troubleshoot your problems, if they occur. You can contact EVA through E-Mail, phone, or fax .*

***10.2 TOOL RENTAL***

*EVA rents the crimping tool so that you can make the best connections possible. Our rental package includes the crimper, cable cutter, extra lugs.*

***10.3 CREDIT CARDS ACCEPTED***

*Remember, EVA accepts Visa, MasterCard, Discover, and America Express to make your order as simple as a phone call. You call one day, and delivery can be the next day. Please do not forward your credit card information via email.*

***10.4 OTHER FORMS OF PAYMENT***

*Personal Checks, Money Orders, Cashiers Checks*
*Items will not be immediately because of the possibility of fraud, bad checks, etc. EVA will wait up to 2 weeks for checks to clear before sending merchandise. Unfortunately, EVA learned the hard way that not all people and businesses are honest.*

*Bank Transfers*
*For international business customers, we accept bank transfers.*

*We look forward to working with you on your EV Project!*

***Bob Batson P.E.***
***Electric Vehicles of America, Inc.***
***Wolfeboro, NH 03894***

***(603) 569-2100 (603) 569-2900 Fax***
***www.EV-America.com EVAmerica@aol.com***

## *"EVA – Customer Service is No. 1 !"*

# *APPENDIX A*
# *EXPERIENCE*

*EVA was founded in 1988 to serve individuals, high schools, colleges, businesses, and electric utilities. We provide "one stop" shopping to help you purchase the electric components that will meet your specific requirements. Part of our service is to provide calculations that will identify the required hp, amperage, and range of your vehicle before you make any purchase.*

*Some of our Customers include:*

| *Government/Utility* | *Industry* | *Educational* |
|---|---|---|
| *Braintree Light* | *Briggs & Stratton* | *Bolton High School* |
| *CMEEC* | *Consolidated Yacht* | *Cornell University* |
| *Museum of Science* | *Disney Imagineering* | *Dartmouth College* |
| *Kansas Electric Research* | *Dow Chemical* | *Great Oaks High School* |
| *Utility Projects* | *Energy Partners* | *Hong Kong University* |
| *NC DOT* | *Ethan Allen* | *20 High Schools in NC* |
| *NYSTEC* | *Evonyx* | *University of Michigan* |
| *Taunton Light* | *Millennium Cell* | *University of New* |
| *U.S. Air Force* | *Nuvera Fuel Cell* | *South Wales* |
| *U.S. Coast Guard* | *Saturn Corporation* | *University of Tennessee* |
| *U.S. Military Academy* | *Steven King Red Rose* | *University of Wisconsin* |
| | *Trix Rods & Racers (Batmobile)* | |

*We share our experience in:*

- ***SAFETY.***

*EVA is the leader in EV safety. Be sure to read our "Safety First" technical paper.*

- ***QUALITY COMPONENTS.***

*We only sell it if we will use it in our own conversions. We stress reliability and affordability.*

- ***EV CONVERSIONS.***

*Our conversions include trucks, cars, vans, parade vehicle, and more.*
*Hands-on experience to help you solve any problem.*

- ***SERVICE.***

*EVA is the leader in Customer Service. You are No.1 !*

# *APPENDIX B*
# *DESIGNING YOUR EV*

## *B.1 ESTABLISHING YOUR CRITERIA*

*A good design is the result of careful consideration of each component and its potential impact on the safety of the overall vehicle. Therefore, it is important to establish your safety criteria.*

*At EVA, our criteria for a safe design is:*

- *Design for a "Single Failure".*
  *No component should jeopardize safe operation!*

- *Provide "redundancy" of safety components*
  *(e.g. fuses, contactors, etc.)*

- *"Separate" high voltage components,*
  *especially the positive and negative side.*

- *Allow accessibility around components*
  *so maintenance can be performed safely.*

- *Keep high voltage power cable out of the passenger compartment.*

*Next, we developed engineering criteria.*

- *The vehicle must accommodate the weight of the batteries.*

- *The batteries should be located outside the*
  *passenger compartment and restrained.*

- *A small passenger compartment will minimize*
  *heating and/or cooling requirements.*

### *B.2 SELECTING A VEHICLE*

*To help you select an EV to meet your needs, we provide the following guidance:*

- *Define the propose for your vehicle and its design features. Define its daily range, loads, typical speeds, terrain, weather conditions, etc. Will you use it for commuting? Will your employer let you charge?*

- *Review the vehicles manufactured that might meet your requirements.*

- *Select one or two specific vehicles. Compare their weights, available room for batteries, rolling resistance, aerodynamic drag, and other characteristics.*

*EVA has written a technical paper "Selecting A Vehicle for Conversion"; this paper is available via E-mail.*

### *B.3 SELECTING COMPONENTS*

*You will invest thousands of dollars in your EV as well as many hours. These guidelines are offered to help you select components:*

- *Large diameter motors are more efficient.*

- *The peak horsepower of a motor is 2-3 times its continuous rating. (nameplate)*

- *Every 1000 lb. of vehicle weight requires approximately 6 HP continuous.*

- *Higher voltage provides better acceleration.*

- *Range is a function of pounds of fuel, in this case, the fuel is lead.*

- *The more fuel the greater your range, but the heavier the EV.*

*In addition to the basic components, you will also need contactors, instrumentation, cable, lugs, and more. These additional components are critical, because they directly affect performance. For example, using poor quality lugs and undersize cable can decrease your range significantly. All of the components should function together as a system.*

### *B.4 FINALIZING YOUR DESIGN*

*At EVA, we will assist you in selecting the best EV component package by:*

- *Performing EV calculations comparing various designs (vehicles, voltages, batteries). These calculations are available via E-mail.*

- *Developing a detailed quotation. This is also available via E-mail.*

### *B.5 BUILDING YOUR EV*

*EVA will assist you by providing our "EV Installation Guidelines" and "Safety First" video. The guidelines include installation instructions, manufacturer's drawings, electrical schematics, arrangement drawings, and more.*

*Most important, we are as close as your phone or computer. If you have a question during the conversion, just call. We are always available by phone, FAX or E-mail at EVAmerica @aol.com. We are here to support you and make your EV the very best!*

***Bob Batson P.E.***
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***November 2007***