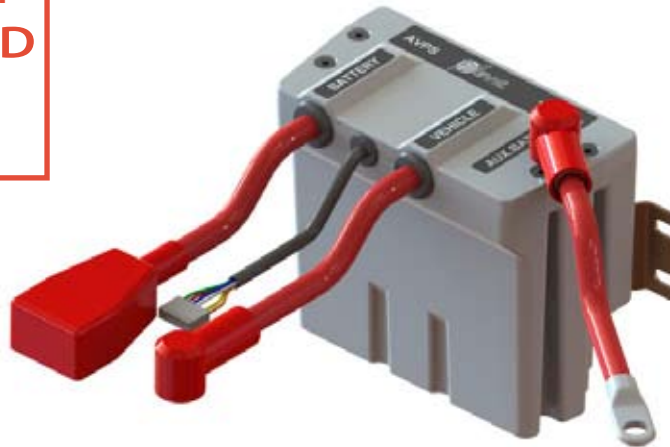




Auxiliary Vehicle Power Supply-2

INSTALLATION BY
EMC CERTIFIED
TECHNICIAN
ONLY!



INSTALLATION & OPERATION MANUAL

AVPS-2 Installation Manual

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1.1 WARNINGS, CAUTIONS, AND NOTES

Throughout this manual there will be three different colored boxes (Red, Yellow, and Gray) that will indicate different warning levels. These warnings are critical and should always be adhered to.

WARNING:

INDICATES A STRONG POSSIBILITY OF SEVERE PERSONAL INJURY OR LOSS OF LIFE IF INSTRUCTIONS ARE NOT FOLLOWED.

CAUTION:

INDICATES A STRONG POSSIBILITY OF EQUIPMENT OR VEHICLE DAMAGE IF INSTRUCTIONS ARE NOT FOLLOWED.

NOTE:

INDICATES A SUGGESTION OR TIP THAT WOULD SPEED UP INSTALLATION TIME OR ADD TO THE OVERALL AESTHETICS OF THE INSTALLATION.

The purpose of this manual is to provide a trained technician with the required information and instructions for a successful mechanical and electrical installation of an AVPS-2 system into a motor vehicle.

This manual is to be used as an installation guide only. The application of this information will vary from vehicle to vehicle depending on the system being installed and vehicle options.

ALWAYS REFER TO THE OEM MAINTENANCE MANUAL FOR ADDITIONAL INFORMATION.

NOTE:

IT IS STRONGLY SUGGESTED THAT YOU TAKE THE TIME TO READ THIS MANUAL COMPLETELY BEFORE BEGINNING SO THAT YOU ARE FAMILIAR WITH ALL ASPECTS OF THE INSTALLATION.

FOR BEST RESULTS, FOLLOW THIS MANUAL STEP-BY-STEP. KEEP THIS MANUAL HANDY AT ALL TIMES DURING THE INSTALLATION TO USE AS A REFERENCE.

While performing the installation of the AVPS-2, keep the following items in mind:

- Wear proper protective equipment at all times to avoid injury.
- Comply with all Society of Automotive Engineers (SAE) practices.
- Do not disassemble or modify any of the EMC supplied components.
- When routing wires, use grommets when passing through any openings. Use sealant to fill any openings to prevent water from entering the vehicle. Avoid areas that may chafe any wiring. Apply proper clamps or wire ties to secure wires along routes to prevent possible snags.
- Before drilling in the OEM vehicle, check all areas above and below to avoid drilling through anything critical.

1.2 OVERVIEW

The AVPS-2 (Auxiliary Vehicle Power Supply) is designed as the world's first "intelligent" dual battery system. Because today's modern computer controlled vehicles have charging systems that are capable of delivering over 120A at 12VDC, simple solenoids and diode isolators cannot address the needs of today's adapted vehicles. AVPS-2 determines whether the primary or back-up battery receives the charge coming from the OEM alternator to assure both are kept at peak charge. It also determines which battery supplies power out to the vehicle to operate lifts or ramps, preventing someone from finding themselves unable to get out or back in when the primary battery is overused.

1.3 HOW IT WORKS

A microprocessor within the AVPS-2 unit controls the 100 amp contactors that switch the vehicle load from battery 1 (BATT1) to battery 2 (BATT2). This is done with "make before break" logic which ensures that battery power is always available to the vehicle regardless of driver input or system failure. The small Display provides easy identification of the status of both BATT1 & BATT2 and can be mounted almost anywhere in the cockpit.

The AVPS-2 also provides two methods to ARM the AVPS-2 and switch power to BATT2 if BATT1 is low. The first is by using the ARM switch on the Display and the second is by installing a **momentary** remote ARM switch at various points in the vehicle including the lift area. AVPS-2 only needs a ground pulse on the WHITE ARM wire to ARM the system. Once the AVPS-2 Unit has been ARMED when the vehicle is off, it acts as a 'watchdog', monitoring the voltages of both batteries. If at any point during the 2 minute period the voltage of BATT1 drops below the allowable level, AVPS-2 switches to BATT2 (if it is above the allowable level). This ensures the person using the ramp or lift does not get stuck part way in or out of the vehicle.

After installing the AVPS-2 Unit, the biggest thing to remember is that the positive terminal on BATT1 and BATT2 are no longer the source of power for any other system in the vehicle (GPS, stereo equipment, lifts/ramps). The supplied **LOAD** bracket, with its battery terminal, is where any auxiliary system should get power. If BATT1 or BATT2 were used to supply power to any auxiliary system, they could accidentally drain the battery, potentially leaving someone stranded without power. The terminal on the **LOAD** bracket allows the AVPS-2 Unit determine and switch accordingly between BATT1 and BATT2, depending on their voltage levels.

WARNING:

NEVER, NEVER, NEVER CONNECT ANY AUXILIARY SYSTEM (GPS, STEREO EQUIPMENT, LIFTS/RAMPS, ETC) TO THE POSITIVE TERMINALS ON BATT1 OR BATT2. ALWAYS USE THE TERMINAL ON THE LOAD BRACKET FOR THESE AUXILIARY SYSTEMS.

1.4 WHAT IS INCLUDED

The following items are included with the AVPS-2:

| Item | Description | Qty |
|-------------------|-----------------------------------|-----|
| AVPS-2 Unit | Main Control Unit | 1 |
| Installation Kit | Battery bracket & Misc components | 1 |
| Under-dash Module | Control module for AVPS-2 | 1 |
| Wiring harness | (3) wire harness | 1 |

The following items are included in the AVPS-2 Installation Kit:

| Item | Description | Qty |
|------------------------|--|-----|
| Load Bracket | BATT1 standoff bracket & terminal for Vehicle LOAD connections | 1 |
| 2 AWG terminal boot | AUX.BATT terminal boot | 1 |
| 2 AWG Lug | Field Connections | 2 |
| 250A Fuse w/ Holder | BATT2 Fuse Holder | 1 |
| 3/16" Exploding Rivets | Attaching Fuse Holder to plastic batt. case | 2 |

1.5 WHAT IS NOT INCLUDED (ADDITIONAL MATERIALS REQUIRED)

The following items are **NOT** included with the AVPS-2:

| Item | Description |
|---------------------------|---|
| Misc Hardware | Attaching AVPS-2 Unit to vehicle |
| Wire Ties or Cable Clamps | Securing cables to vehicle |
| 2 AWG wire | Battery cable between BATT2 & AVPS-2 Unit (15LF or less) |
| 1/0 AWG wire | Battery cable between BATT2 & AVPS-2 Unit (greater than 15LF) |
| 2ft Black Battery cable | Negative cable for BATT2 |
| 1ft Red Battery cable | Positive cable for BATT2 |

EMC does not supply the battery cable that runs between the AVPS-2 Unit and the 2nd, auxiliary Battery since this can be sourced locally at most auto or welding supply stores. For most vehicle installations, this cable will not exceed (15) feet so EMC does supply the 2 AWG ring terminals and protective boot. If the cable length exceeds (15) feet, install 1/0 AWG cable instead and also source the appropriate ring terminals and the protective boot.

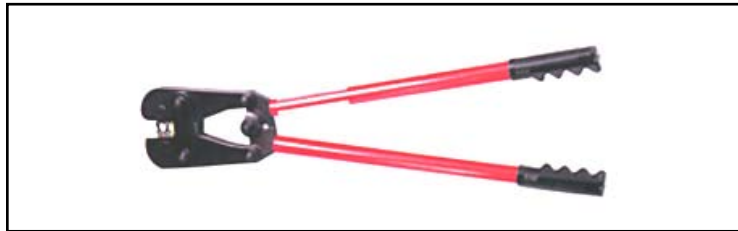
When the AVPS-2 battery cable is being built, a proper crimp tool is required to make solid connection(s). EMC has determined that part number #990000 from Del City Inc. (www.delcity.net) works fine.

1.5 WHAT IS NOT INCLUDED (ADDITIONAL MATERIALS REQUIRED) (CONT.)

In addition to the battery cable between the AVPS-2 Unit and the 2nd Battery, there are (2) additional battery cables needed for this installation that EMC does not supply. A Black battery cable is required to connect the (-) negative post of the battery to the chassis of the vehicle. This cable should be approximately (2) feet long and capable of 200Amps. A Red battery cable is required to connect the (+) positive post of the battery to the 250A fuse. This cable should be approximately (2) foot long and capable of 200Amps. Both of these cables can be sourced locally at most auto supply stores.

WARNING:

A PROPER CRIMP TOOL CAPABLE OF HANDLING 1/0 WIRE GAUGE IS REQUIRED TO MAKE THE CONNECTION(S) FOR THE AVPS-2 BATTERY CABLES.

**1.6 BATTERIES**

Because OEM batteries are not typically a high performance battery and they may have been drained and jump started several times before AVPS-2 is installed, EMC recommends that the original OEM battery be replaced and (2) brand new batteries with at least 700 CCA (Cold Cranking Amps) each be installed at the same time AVPS-2 is installed. These batteries are not supplied by EMC. EMC recommends either Interstate or Optima brand batteries for the best performance. If the 2nd, auxiliary battery is going to be installed inside the vehicle, a vented case is required.

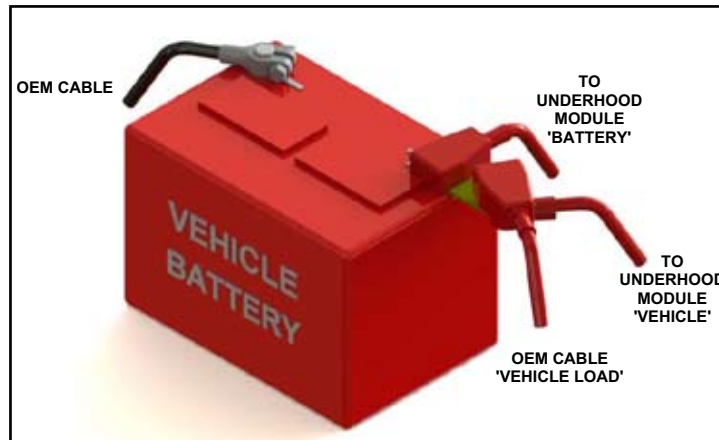
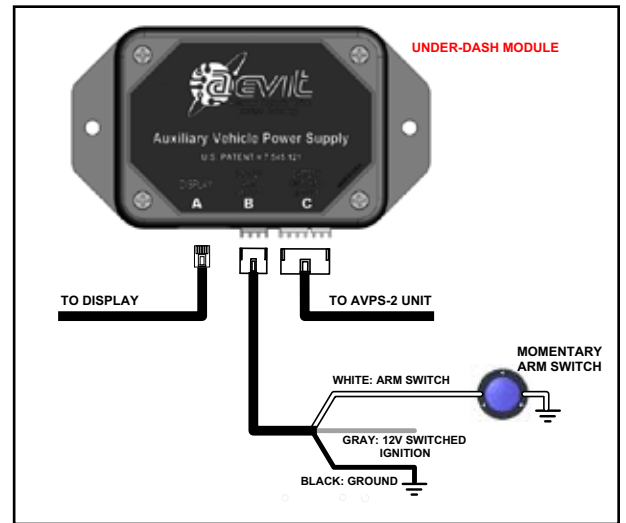
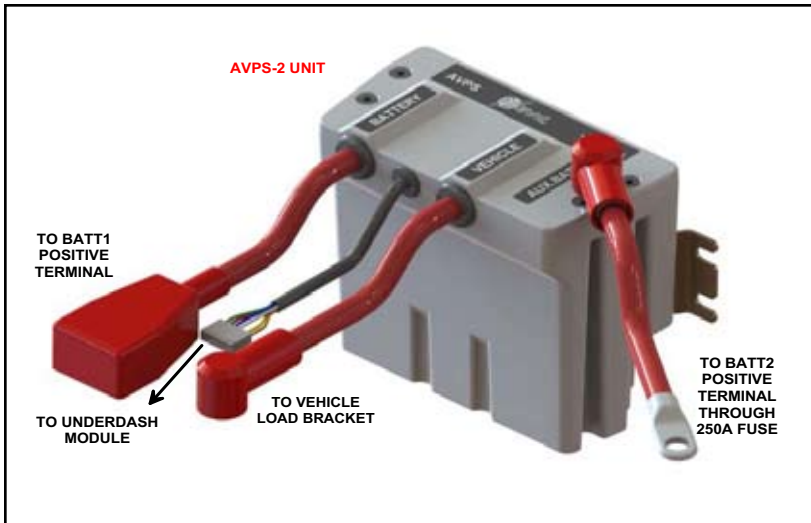
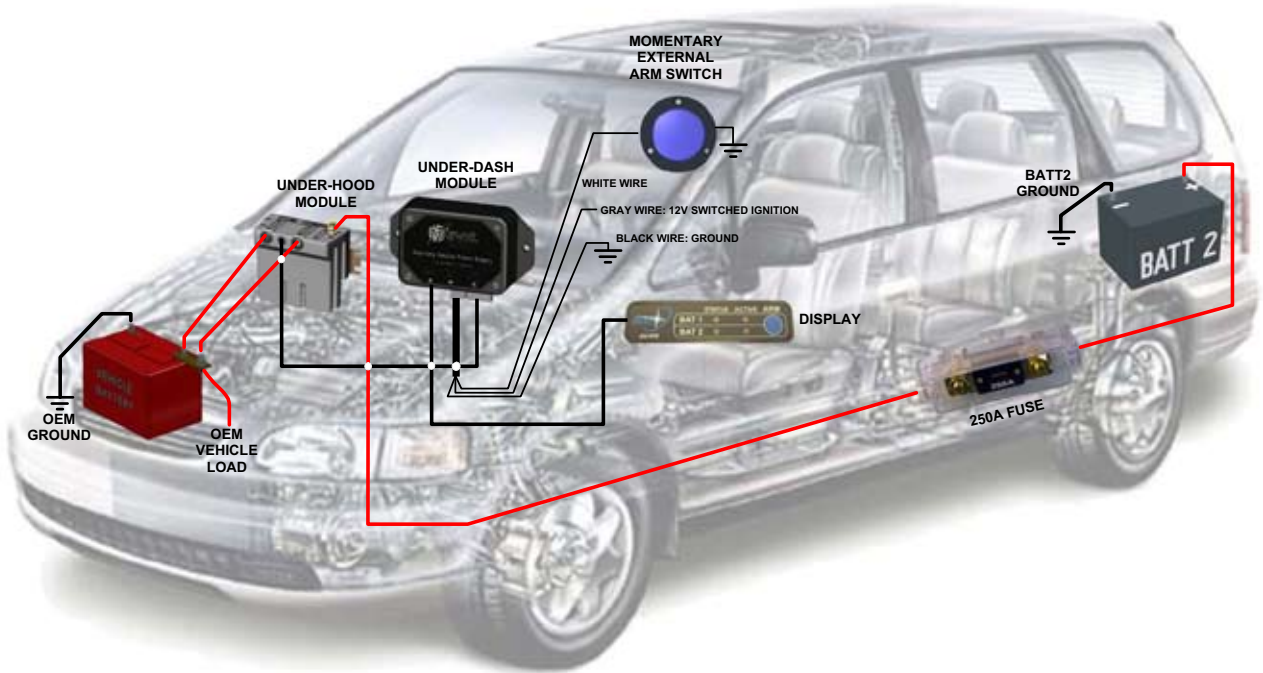
CAUTION:

EMC RECOMMENDS THE REMOVAL OF THE MAIN OEM BATTERY AND THAT TWO BRAND NEW BATTERIES CAPABLE OF 700 CCA EACH BE INSTALLED WHEN AVPS-2 IS INSTALLED.

2.0 WIRING

AVPS-2

2-1



3.1 INSTALLATION STEPS

STEP 1

Disconnect the negative (-) cable from the OEM battery. Look for an OEM battery charging sensor on the clamp or cable.

STEP 2

Disconnect the positive (+) cable from the OEM battery. This cable is connected to the OEM alternator or generator that supplies all the charging potential to the battery and is also connected to all the functions of the vehicle. From this point forward, this cable will be called the **VEHICLE LOAD**.

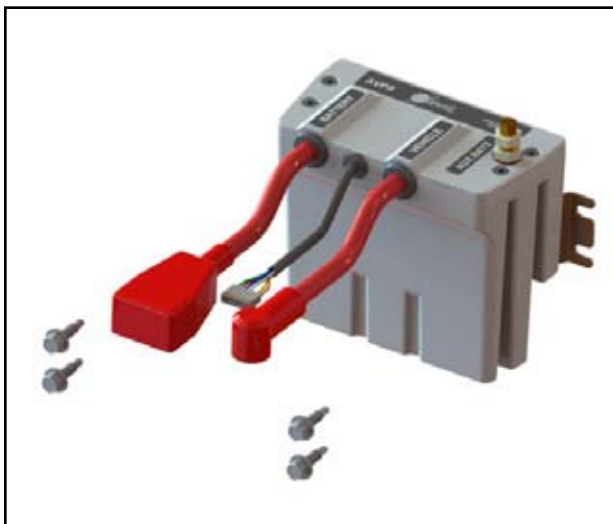
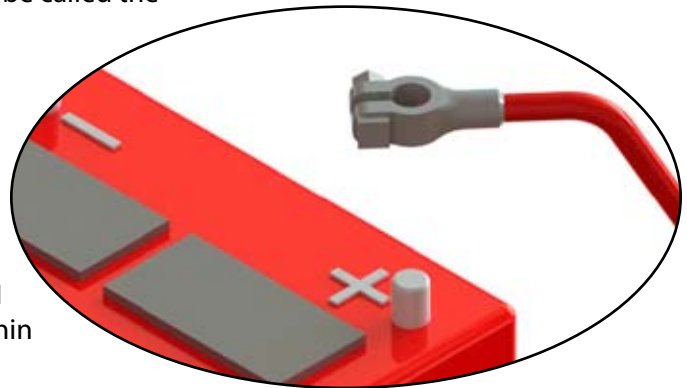
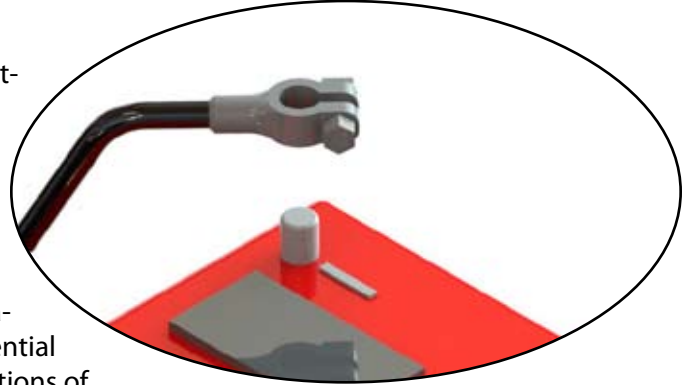
STEP 3

Determine location for the AVPS-2 Unit. The AVPS-2 Unit is mounted **inside** the engine bay of the vehicle to something structural - the firewall or steel supports near the bumper. The cable labeled **BATTERY** must reach the positive terminal of BATT1 meaning it **must** be within 3 LF. It must also be within 15 LF of BATT2.

It is preferable to have the Unit mounted vertically (labels on top), but if space is limited the Unit can be mounted horizontally. There are drain holes in the bottom of the case so **NEVER** mount this upsidedown. Fabricate any extra mounting plates as needed to hold the AVPS-2 Unit.

Pre-drill or use self-drilling 1/4" hardware in (4) locations on the AVPS-2 mounting bracket. Be sure this location must be solid enough that the Unit will not vibrate when the vehicle is going down the road.

Route the (2) large red battery cables over to the OEM battery. Secure them along the way with wire ties.



WARNING:

AVPS-2 MUST BE INSTALLED TO SOMETHING STRUCTURAL WITHIN THE ENGINE BAY OF THE VEHICLE.

STEP 4

Determine the location for the second battery. It **must** be mounted within 15 LF MAX of the AVPS-2 Unit. Mount BATT2 in accordance with all local, state, & federal regulations.

WARNING:

BATT2 MUST BE INSTALLED IN A VENTED CASE IF LOCATED INSIDE THE VEHICLE.

STEP 5

Mount the 250A fuse holder within 12" of the positive terminal of BATT2. If BATT2 is installed inside the vehicle, the plastic vented case is the best location for the fuse holder. Remove the plastic cover of the fuse holder and use the mounting holes at either end of the fuse holder as a guide for drilling (2) 3/16" through holes into the mounting surface. Use the provided (2) 3/16" exploding rivets to secure the fuse holder.



WARNING:

IF THE FUSE HOLDER IS TO BE MOUNTED ON THE BATT2 PLASTIC CASE, BE SURE THAT BATT2 IS NOT IN THE CASE WHEN THROUGH DRILLING TO MOUNT THE FUSE HOLDER.

STEP 6

Insert BATT2 into the plastic battery case. (if used)



STEP 7

Install a 12" Red battery cable from one side of the fuse holder to the positive terminal of BATT2.



STEP 8

Construct the BATT2 cable which runs between the AVPS-2 Unit and BATT2. EMC has supplied 2 AWG ring terminals and a Red terminal boot for installations where BATT2 is within 15 LF of the AVPS-2 Unit. For longer distances, up the cable size to 1/0 AWG with corresponding ring terminals and terminal boot. Crimp and heat shrink both connections according to industry standards.

STEP 9

Install the AVPS-2 BATT2 positive cable to the other side of the 250A fuse holder. This is the cable end without the terminal boot.

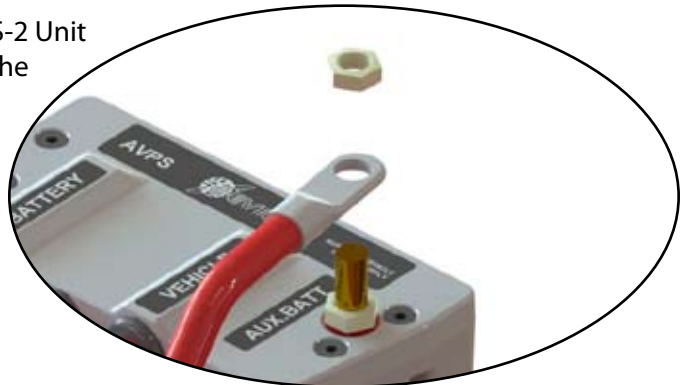


STEP 10

Begin routing the BATT2 cable directly towards the AVPS-2 Unit mounting location but leave the last 3 or 4 feet free. Be sure to properly wire tie and secure the cable. If BATT2 is located in the rear of the vehicle, route the cable under the vehicle along a frame rail and use cable straps to secure the cable to the vehicle. If the cable travels through the floor of the vehicle be sure the hole has a grommet installed so the cable will not be damaged from chafing.

STEP 11

Remove the top hex nut from the stud on the AVPS-2 Unit labeled AUX.BATT. Connect the BATT2 cable from the 2nd battery to this stud and reattach the hex nut. Slide the supplied Red boot over the connection to prevent shorting. Route the braided harness exiting the center of the AVPS-2 Unit to the inside of the vehicle, securing along the way with wire ties. When the harness passes through the firewall into the vehicle, use a grommet to prevent damage from chafing.

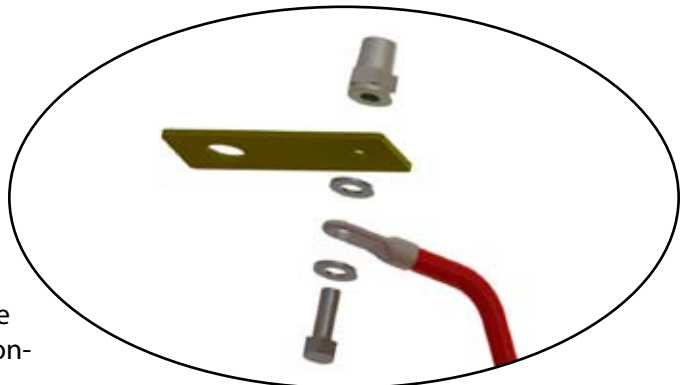


STEP 12

Remove the original OEM battery from the vehicle and replace with a new battery. **The VEHICLE LOAD cable will NOT be connected back to the battery.** Do not reconnect the OEM ground cable at this time either.

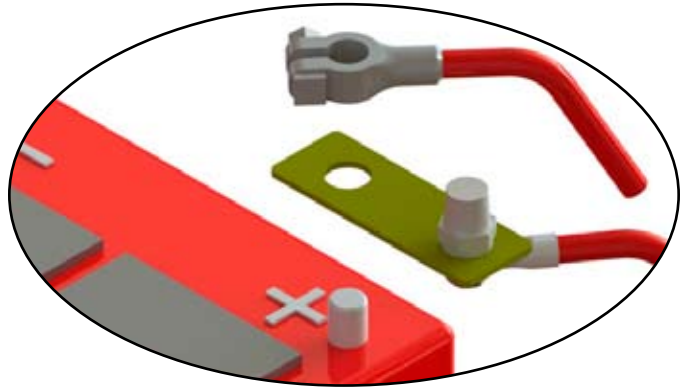
STEP 13

Remove the hex bolt from the bottom of the **GREEN** battery load bracket so that the cable from the AVPS-2 Unit labeled **VEHICLE** can be attached. Be sure to locate the ring terminal between the (2) flat washers. Use caution not to strip the treads when tightening the hex bolt to the battery lug. Slide the Red terminal boot over the connection to prevent shorting.



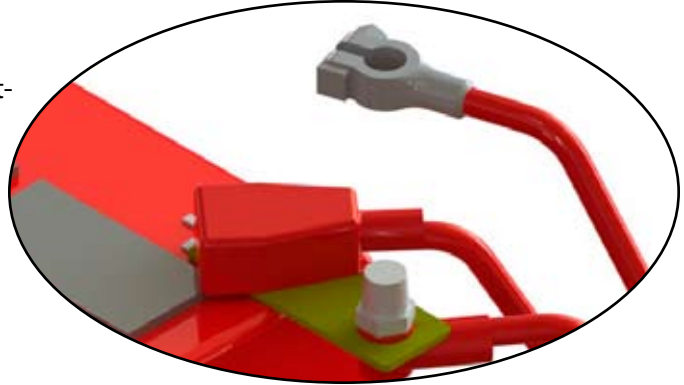
STEP 14

Place the supplied AVPS-2 **GREEN** battery load bracket over the positive terminal of BATT1 and secure to the battery with the **BATTERY** cable from the AVPS-2 Unit. Slide the Red boot over the connection to prevent shorting.



STEP 15

Return the **VEHICLE LOAD** cable (OEM positive battery cable) to the terminal on the supplied **GREEN** load bracket. If there are any power connections needed for this vehicle (i.e. AEVIT, EMC's Power Kit, Lifts, etc) they should be connected to this terminal, not any of the other terminals.



WARNING:

ONLY CONNECT VEHICLE LOAD WIRES TO THE TERMINAL END OF THE AVPS-2 BATTERY BRACKET. DO NOT CONNECT ANY ADDITIONAL WIRES TO THE BATT1 OR BATT2 POSITIVE BATTERY TERMINALS.

STEP 16

Locate the AVPS-2 Underdash Module within the vehicle in a convenient location under the dash within reach of the braided harness from the AVPS-2 Unit. Secure it to the vehicle using wire ties or self-drilling hardware.

STEP 17

The braided wire harness from the AVPS-2 Unit that was routed into the vehicle during Step 11 will connect to the Underdash Module in port C.



STEP 18

Connect the ARM/IGN harness to the AVPS-2 Unit in port B.

Route and connect the GRAY wire to a 12 VDC switched ignition source. If you are using the optional EMC Power Kit, connect this wire to pin J1 on the Ignition Sense circuits.

Route and connect the BLACK wire to chassis ground.

The WHITE wire should connect to any SPST momentary or magnetic reed switch. This is used for an External ARM switch and can be located by the lift/ramp or any number of locations, inside and outside, as required for emergency egress from the vehicle. The other side of the switch is connected to chassis ground. See Wiring Diagram on page 2-1. The AVPS-2 only requires a single ground pulse on the WHITE wire to ARM the system. ARM the system before exiting or entering the vehicle to assure yourself that if BATT1 runs low partway during the process, AVPS-2 will switch to BATT2 to finish the job.



STEP 19

Connect and route the telco cable for the AVPS-2 display unit. The display should be located on the dash of the vehicle or in plain sight for the end user. Remove the film from the back of the display and press on the front of the display to secure it to its mounting location.



STEP 20

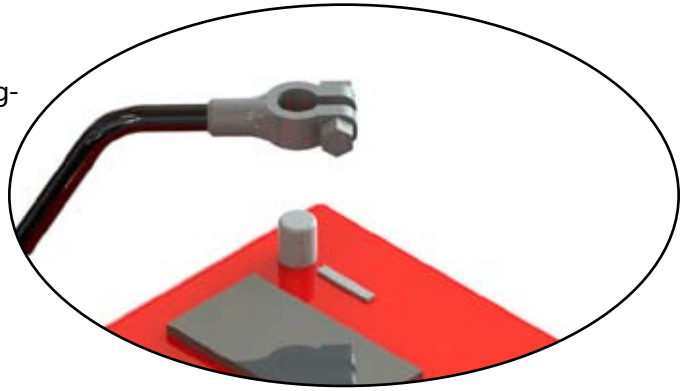
Connect the 2 LF BATT2 Ground cable to the negative terminal of BATT2 then the lug end to the chassis of vehicle. Be sure the lug is properly secured to the vehicle using a 1/4" ground cut washer. The grounding point on the vehicle must be capable of 200 Amps.

WARNING:

THE GROUND WIRE FOR BATT2 MUST BE AT THE SAME GROUND AS BATT1 GROUND. USE A DMM TO VERIFY CONTINUITY BETWEEN THE TWO POINTS. THE READING MUST BE <1.00 OHMS. IF THE READING IS HIGHER, YOU MUST PICK A DIFFERENT GROUND POINT FOR BATT2.

STEP 21

Reconnect the OEM ground cable to the BATT1 negative terminal. If a Gold Series Console is already installed, it will automatically go into reset mode and turn on the ignition, lights and wipers. Turn them off using the Gold Series touchpad.



WARNING:

THE GROUND WIRE FOR BATT2 MUST BE AT THE SAME GROUND AS BATT1 GROUND. USE A DMM TO VERIFY CONTINUITY BETWEEN THE TWO POINTS. THE READING MUST BE <1.00 OHMS. IF THE READING IS HIGHER, YOU MUST PICK A DIFFERENT GROUND POINT FOR BATT2.

STEP 22

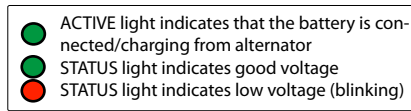
If an AEVIT Primary Driving Control is to be installed, connect the Red wire from the AEVIT power cable to the VEHICLE LOAD connection on the battery terminal of the GREEN AVPS-2 battery load bracket.

STEP 23

Seal all remaining air gaps in the through holes that were created in the floor to route the AVPS-2 harnesses or cable(s). Use standard automotive style silicone sealant.

4.0 OPERATION

This section will describe the **NORMAL** and **LOW BATTERY** states that AVPS-2 will indicate. It will also explain the ARM Backup mode. The graphic symbols shown below will appear throughout the Operation section to visually assist you in understanding the 4 STATES that AVPS-2 can be in when operational.

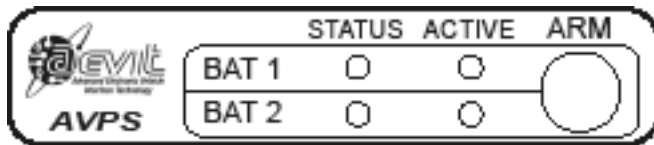



4.1 NORMAL OPERATION

In this section we are assuming that both batteries are good as indicated by the **GREEN** STATUS lights.

Please note that the **ACTIVE** light indicates which battery is being used (charged)

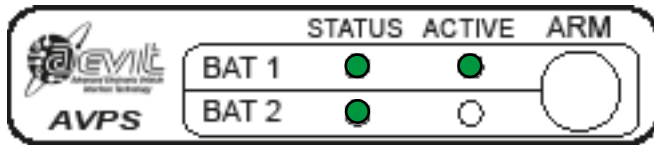
STATE 0




 All contactors are OFF. **BATT1** is connected to the alternator. **BATT2** is isolated.

Vehicle ignition is now **OFF** and the main vehicle battery (BATT1) is connected to the alternator and the vehicle electrical circuits. Once the vehicle is turned on, AVPS-2 will change to **STATE 1**.

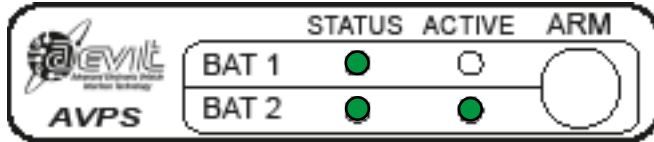
STATE 1




 **BATT1** is connected to the alternator. **BATT2** is isolated.

Vehicle ignition is **ON**, the engine is running, and the alternator is **only** charging **BATT1**. If the charge voltage at the battery is **12.2 VDC** or higher for **2.5 minutes**, this indicates that **BATT1** is charged. After 2.5 minutes AVPS-2 will change to **STATE 2**.

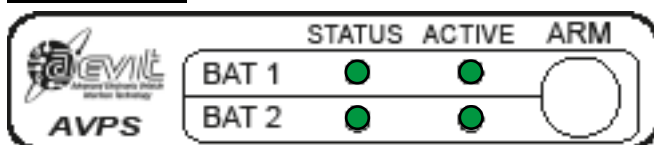
STATE 2




 **BATT2** is connected to alternator. **BATT1** is isolated.

Vehicle ignition is **ON**, the engine is running, and the alternator is now only charging **BATT2**. **BATT1** is isolated. If the charge voltage at the battery is **12.2 VDC** or higher for **2.5 minutes**, this indicates that **BATT2** is charged. After 2.5 minutes AVPS-2 will change to **STATE 3**.

STATE 3



 **BATT1** and **BATT2** are connected to alternator.

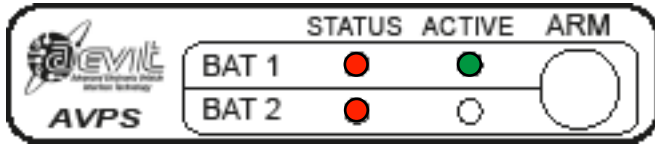
Vehicle ignition is **ON**, the engine is running, and the alternator is now charging **BATT1** and **BATT2**. The charge voltage at both batteries was **12.2 VDC** or higher for **2.5 minutes** each, indicating that **BATT1** and **BATT2** were charged to the threshold of **12.2 VDC**. Both batteries are now in parallel and will **stay there** unless the voltage drops below **12.2 VDC**.

4.2 LOW BATTERY (NORMAL OPERATION)

The **STATUS** lights may change from **GREEN** to a blinking **RED** if either battery falls **below** the **threshold voltage** with the engine running and the alternator charging. **STATES 1 & 2** are each depicted in two different scenarios that could cause AVPS-2 to drop out of **STATE 3** and alarm.

Remember, AVPS-2 will try to return to State 3 after cycling through States 1 & 2.

STATE 1

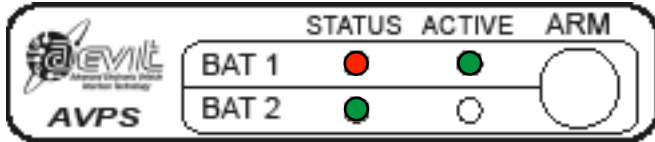


BATT1 is connected to the alternator. **BATT2** is isolated.

BATT1 is *active* and voltage *below 12.2 VDC* threshold
BATT2 is *isolated* and voltage *below 11 VDC* threshold

- Probable Cause:** 1) Alternator defective
 2) Both batteries discharged

OR

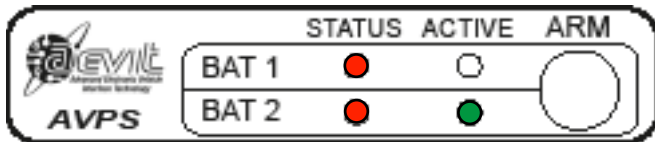


BATT1 is connected to the alternator. **BATT2** is isolated.

BATT1 is *active* and voltage *below 12.2 VDC* threshold
BATT2 is *isolated* and voltage *above 11 VDC* threshold

- Probable Cause:** 1) Alternator defective
 2) **BATT1** discharged

STATE 2

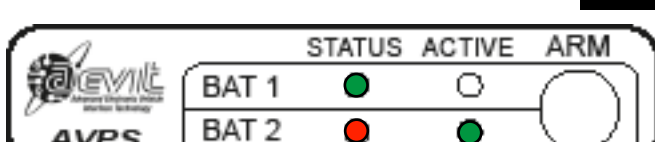


BATT2 is connected to the alternator. **BATT1** is isolated.

BATT2 is *active* and voltage *below 12.2 VDC* threshold
BATT1 is *isolated* and voltage *below 11 VDC* threshold

- Probable Cause:** 1) Alternator defective
 2) Both batteries discharged

OR



BATT2 is connected to the alternator. **BATT1** is isolated.

BATT2 is *active* and voltage *below 12.2 VDC* threshold
BATT1 is *isolated* and voltage *above 11 VDC* threshold

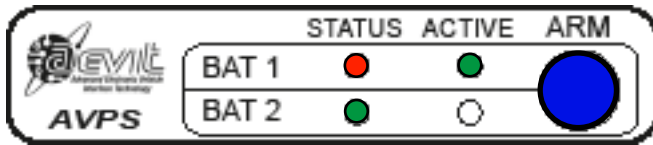
- Probable Cause:** 1) Alternator defective
 2) **BATT2** discharged

4.3 ARM BACKUP OPERATION

AVPS-2 has **2 ARM MODES** to facilitate accessing the Backup auxiliary **BATT2** battery in the event the main vehicle battery has become discharged. **ARM MODE 0** operates when the vehicle ignition is **OFF**, and is typically used for **emergency egress** equipment such as wheelchair lift/ramps, electric doors, and transfer seats. It will provide available battery power for **2-minute** cycles or until discharged. **ARM MODE 1** operates when the vehicle ignition is **ON**, and is typically used to provide **emergency engine starting**. It will not allow this feature to activate if **BATT2** is **below 11 VDC**. This will ensure that power is available for emergency egress or **ARM MODE 0** to function.

The examples will show the BATT1 light blinking **RED** as we are assuming it to be discharged.

ARM MODE 0



If ARM button is pushed, AVPS-2 will change from STATE 0 to STATE 2 for 2 minutes. **BATT1** is isolated.

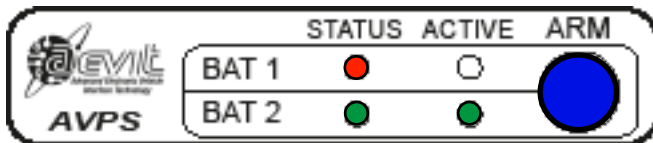
If vehicle ignition is **OFF**, the **BATT2** status light will be **GREEN** only if voltage is **11 VDC** or higher. After **2 minutes** AVPS-2 will change to **STATE 0**.

WARNING:

ARM MODE 0 IS TYPICALLY USED FOR EMERGENCY EGRESS TO POWER A 12 VDC WHEELCHAIR LIFT/RAMP AND DOORS. FAILURE TO ADHERE TO THESE WARNINGS COULD RESULT IN YOU BECOMING STRANDED IN YOUR VEHICLE.

DO NOT ATTEMPT TO OPERATE YOUR VEHICLE AFTER USING THE ARM MODE 0 UNTIL YOUR BATTERIES AND AVPS-2 HAVE BEEN CHECKED BY AN AUTHORIZED DEALER.

ARM MODE 1



If ARM button is pushed, AVPS-2 will change from STATE 1 to STATE 2 for 2 minutes. **BATT1** is isolated.

If vehicle ignition is **ON**, the **BATT2** status light will be **GREEN** only if voltage is **12.2 VDC** or higher. After **2 minutes** AVPS-2 will change to **STATE 1**. If at anytime during the **2 minute** time **BATT2** drops below **9 VDC**, AVPS-2 will change to **STATE 1** in **10 seconds**.

WARNING:

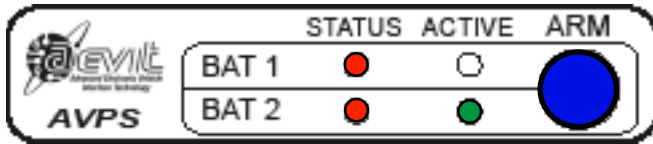
ARM MODE 1 IS TYPICALLY USED FOR EMERGENCY START.

DO NOT ATTEMPT TO START YOUR VEHICLE MORE THAN A FEW TIMES OR YOU MAY NOT HAVE ENOUGH POWER TO EMERGENCY EGRESS YOUR VEHICLE.

4.4 LOW BATTERY ARM BACKUP OPERATION

The STATUS lights will change from GREEN to a blinking RED if either battery falls below the threshold voltage for the STATE it is in.

ARM MODE 0



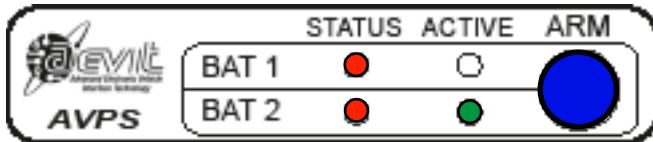
WARNING:
AVPS-2 CANNOT CHANGE TO STATE 2 IF BATT2 IS BELOW 6 VOLTS AS THE VEHICLE ELECTRONICS CANNOT OPERATE.

BATT2 is **active** and voltage *below 11 VDC* threshold
BATT1 is **not active** and voltage *below 11 VDC* threshold
After **2 minutes** AVPS-2 will change to **STATE 0**

WARNING:
ARM MODE 0 IS TYPICALLY USED FOR EMERGENCY EGRESS TO POWER A 12 VDC WHEELCHAIR LIFT/RAMP AND DOORS. FAILURE TO ADHERE TO THESE WARNINGS COULD RESULT IN YOU BECOMING STRANDED IN YOUR VEHICLE.

- DO NOT ATTEMPT TO OPERATE YOUR VEHICLE AFTER USING THE ARM MODE 0 UNTIL YOUR BATTERIES AND AVPS-2 HAVE BEEN CHECKED BY AN AUTHORIZED DEALER.
- MAINTAIN YOUR BATTERIES. HAVE THEM CHECKED AND SERVICED OFTEN, ESPECIALLY IF THEY HAVE BEEN DEEPLY DISCHARGED MORE THAN ONCE.
- ALWAYS REPLACE BATTERIES AS A MATCHED PAIR, NEVER JUST ONE.
- MAKE CERTAIN THAT YOU HAVE A REMOTE ARM SWITCH SO THAT YOU CAN RE-ARM THE BACKUP MODE IF THE 2-MINUTE TIME IS NOT ENOUGH TO COMPLETE EGRESS.

ARM MODE 1



WARNING:
AVPS-2 WILL NOT CHANGE TO STATE 2 IF BATT2 IS BELOW 11 VDC. THIS SAVES AVAILABLE BATT2 POWER FOR EMERGENCY EGRESS FUNCTIONS.

BATT2 is **active** and voltage *below 12.2 VDC* threshold
BATT1 is **not active** and voltage *below 11 VDC* threshold
After **2 minutes** AVPS-2 will change to **STATE 1**.
NOTE!: If at any time during the **2-minute** time **BATT2** drops below **9 VDC**, AVPS-2 will change to **STATE 1** in **10 seconds**.

WARNING:
ARM MODE 1 IS TYPICALLY USED FOR EMERGENCY START. DO NOT ATTEMPT TO START YOUR VEHICLE MORE THAN A FEW TIMES OR YOU MAY NOT HAVE ENOUGH POWER TO EMERGENCY EGRESS YOUR VEHICLE.
REFER TO ARM MODE 0 WARNINGS ABOVE FOR MORE INFORMATION.

1. Check BATT2 ground for continuity to BATT1 ground. The reading MUST be <1.00 ohm.
2. Turn on the ignition and start the vehicle.
3. Observe the AVPS-2 Display to ensure it cycles properly through the Normal Operation states. See Normal Operation section 3.1 to review the Status and Active LEDs and the sequence of the states.
4. When it reaches State 3, shut off the vehicle's ignition. Wait (10) seconds the push the ARM button on the display to verify that the AVPS-2 switches to BATT2 properly. As long as BATT1 & BATT2 are above 11.0 VDC, the Display will show both Status LEDs **GREEN** and the BATT2 Active LED will be **GREEN**. After (2) minutes the AVPS-2 unit will click and the Display will go dark.
5. Ensure all fasteners are secure and properly torqued.
6. Ensure both batteries are properly secured to the vehicle.
7. Ensure that there is only one cable connected to BATT1 & BATT2 positive battery terminals and only (1) cable connected to each of the (3) connections on the AVPS-2 unit.

6.0 SERVICE REQUIREMENTS

AVPS-2

6-1

The AVPS-2 should be inspected after the first 6 month or 6,000 miles, and every 12 months or 12,000 miles after.

The service should include:

1. Ensure all fasteners are secure and properly torqued.
2. Inspect all battery cables for signs of damage from chafing and improper routing.
3. Ensure that the Display is mounted in view of the end user and works properly.
4. Ensure that BATT1 & BATT2 are in good working condition. If one battery needs to be replaced, replace them both.
5. Because today's adapted vehicles have an additional current draw to operate the ramp, lift and other equipment, EMC **strongly** recommends that both AVPS-2 batteries be replaced every 3 years as a matched set.

CAUTION:

REPLACE BOTH BATT1 & BATT2 AT THE SAME TIME. DO NOT REPLACE THE BATTERIES ONE AT A TIME.

6. Ensure that no one else has attached a vehicle load wire to the positive battery terminal of either BATT1 or BATT2. The acceptable junction point for other installers (stereo, lights, etc.) is the terminal end of the **GREEN** AVPS-2 battery load bracket.

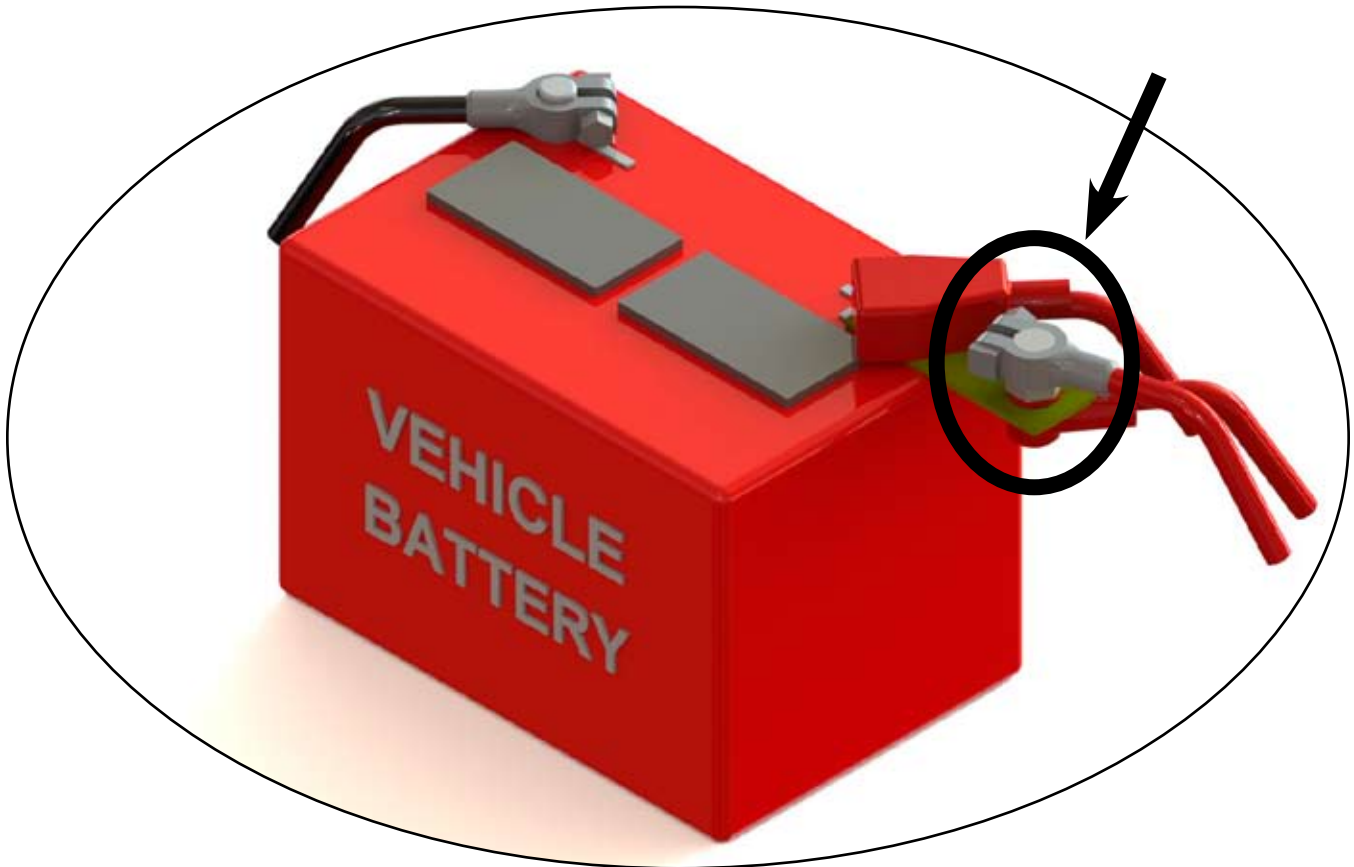
7.0 JUMP STARTING VEHICLE

AVPS-2

7-1

AVPS-2 is designed to isolate the auxiliary battery (BATT2) when the vehicle shuts off. In most cases this means BATT2 is fully charged and available for emergency egress or starting the vehicle should the primary battery be depleted. There are occasions when BATT2 also becomes depleted and the vehicle is unable to start on its own power.

Of course this means the vehicle needs to be jump started using a donor battery, another vehicle or a portable booster pack.



When connecting the red jumper cable to this vehicle, **DO NOT** connect it directly to the positive battery terminal. **ALWAYS** connect the red jumper cable to the battery terminal on the **GREEN** AVPS-2 battery load bracket. This is where the vehicle load cable is attached (see diagram above).

8.0 ADVANCED INSTALLATIONS

AVPS-2

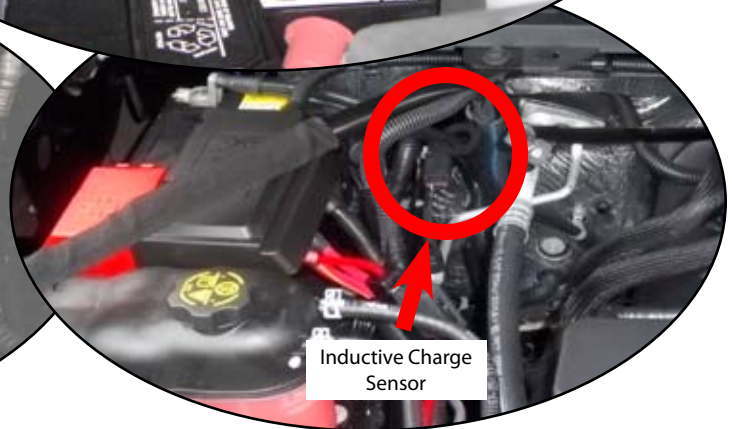
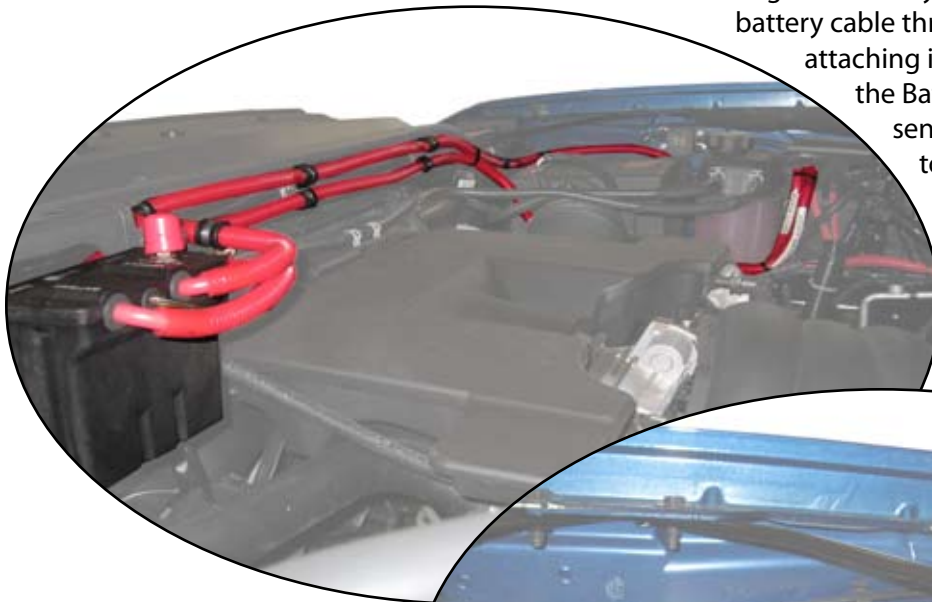
8-1

Certain vehicles can accommodate having the second battery installed in the engine bay, under the hood. This requires considerable fabrication work in minivans where the OEM battery is replaced by (2) slightly smaller batteries, and brackets made to provide the necessary support for both batteries. If you are lucky to be installing this in a GM Silverado (gas engine), they have provided you with a second battery tray already, opposite the OEM battery.

Below are examples of installations EMC has performed on various vehicles for reference.

GM SILVERADO

The AVPS-2 Unit is mounted to the Driver's side of the engine on the radiator (core) support, within reach of Batt1. Batt2 is located in the OEM battery tray on the Driver's side. The 250A fuse holder fits nicely on the outside wall of the engine bay, just above Batt2. This truck has an OEM inductive battery charge sensor around the Batt1 negative battery cable. Route the Batt2 negative battery cable through that charge sensor before attaching it to the chassis or connect it to the Batt1 negative terminal. This charge sensor needs to see the total charge to both batteries, not just Batt1.



CHRYSLER / DODGE MINIVAN

The OEM battery is replaced with (2) smaller batteries. The OEM battery tray is discarded and a new tray is fabricated to hold (2) batteries side by side, AVPS-2 Unit, 250A fuse holder and if necessary, the 50A AEVIT fuse holder. The plastic engine cover is trimmed slightly to fit around the batteries and AVPS-2 Unit.

WARNING:

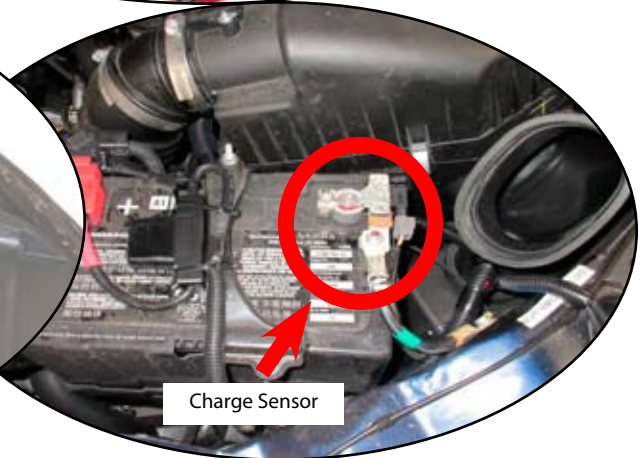
IF THE FABRICATED BATTERY TRAY IS NOT PROPERLY LOCATED, SUPPORTED OR ATTACHED, IT COULD SHIFT WHILE THE VEHICLE IS MOVING AND DAMAGE OR SHORT OUT WIRES. USE EXTREME CAUTION TO BE SURE ALL WIRES AND BOTH BATTERIES ARE SECURE SO THEY DO NOT MOVE.



HONDA ODYSSEY

The OEM battery is replaced with (2) smaller batteries. The OEM battery tray is discarded and a new tray is fabricated to hold (2) batteries staggered in height side by side, AVPS-2 Unit and if necessary, the 50A AEVIT fuse holder. The new batteries are staggered in height to fit as low as possible and still clear the OEM air intake. The 250A fuse holder fits nicely up against the wiper tray. This vehicle has a current monitoring charge sensor on the Batt1 negative battery clamp to monitor the charge of the battery. When a second battery is installed, the negative wire from Batt2 needs to be connected to the negative clamp of Batt1. This will make sure the sensor sees 100% of charging current at all times.

WARNING:
 IF THE FABRICATED BATTERY TRAY IS NOT PROPERLY LOCATED, SUPPORTED OR ATTACHED, IT COULD SHIFT WHILE THE VEHICLE IS MOVING AND DAMAGE OR SHORT OUT WIRES. USE EXTREME CAUTION TO BE SURE ALL WIRES AND BOTH BATTERIES ARE SECURE SO THEY DO NOT MOVE.



Charge Sensor

NOTES:
