

## Electrical Tips and Other Info

Information from the presentation by Jim Reed at Alfa National Rally, Tucson, AZ  
April 19, 2010

Coaches have 3 banks of batteries --- Inverter, Coach, and Chassis  
Inverter batteries supply 120V to receptacles when inverter is on.  
Coach batteries supply 12V to lights, sensors, etc. in coach.  
Chassis batteries supply power to start the coach.

When on shore power or generator, batteries are charged in this order:

Inverter, then coach, then chassis

When the engine is on, its alternator charges batteries in reverse order, Chassis, Coach, Inverter. (This is why, after dry camping, it may take a very long drive to bring all batteries back up to full. You might consider running the generator while driving, until the batteries are full, if you plan to dry camp again soon.)

When storing coach, make sure knife switches are all open. If you have a battery with a bad cell it could pull down the charge on all batteries joined together, possibly damaging all that are joined.

If you plan to purchase a voltmeter, make sure it can read voltage as Root Mean Square (RMS), and that it can read accurately to 1/100th of a volt (0.01 volt).

Battery levels:

12.1 volts - battery is 50% discharged (never allow batteries to go below this level, it will drastically reduce their life)

12.5 volts - battery is 80% charged

12.8 volts - battery is fully charged (if there is no current going in or out, and the battery has been sitting unused for a while (e.g. 1 hour)).

13.2 volts - float charge level

14.1 volts - heavy charge going into battery (bulk charging)

When checking batteries with a voltmeter, have all switches off in coach and let coach sit for about 1 hour.

Which batteries are which:

If your inverter is mounted in the compartment by the driver's seat, the first four batteries in the generator compartment closest to that compartment are the inverter batteries, the last two are the coach batteries.

If your inverter is mounted under the steps, the first four batteries closest to the steps are inverter batteries, the last two are the coach batteries.

Coach batteries are two 6 volt batteries, wired in series. You can check each battery individually and they should read 6.4 volts each (1/2 of 12.8).

Chassis batteries (the two in the compartment near the rear wheel on the driver's side) are wired in parallel.

The inverter batteries are wired in pairs in series, then the pairs are wired in parallel.

The easiest place to measure battery levels is at the Xantrex unit. There is a good ground wire there, and major leads to each battery bank are at the poles of the knife switches. For an excellent description of how to determine which pole is which, go to either of the yahoo group websites, log in, go to the files section and open the file submitted by jimraija (Jim Reed) labeled **12VDC Electrical System - Trouble shooting.pdf** (Here is a direct link to that page, but it may not work if you are not logged into the yahoo site. <http://autos.groups.yahoo.com/group/SeeYaDP/files/12%20VDC%20Electrical%20System/>) There is also a file on the sites describing the 120 Volt systems in our coaches.

Normal inverter system charging sequence, if batteries are low, is *bulk*, then *absorption* then *float*. If the charger follows this sequence, you know you don't have a bad cell in your batteries.

Tips:

Never change from generator to shore power, or vice versa, with any loads on the electrical system. This could damage the transfer switch (located under the refrigerator, behind the circuit breakers), and would require it to be replaced.

If you are on shore power and there is a power failure, turn off the circuit breaker at the pedestal before turning on the generator. When the power comes back on in the park, turn off all loads to the generator and wait a minute or two before shutting it down. Then turn the power back on at the pedestal.

Never turn the generator off when there are loads on it. It could damage the windings in the motor.

Chassis batteries are sealed (you can't add water to them), but they will lose water. When they do the only solution is to replace them, and replace both, not just one.

When dry camping:

Conserve energy by knowing what amperage appliances draw. Examples are:

	Approximate
• Heat pumps/Air Conditioners	12.5 amps (per compressor)
• Electric water heater	12.5 amps
• Microwave oven	12.8 amps
• Electric coffee pot	8.5 amps
• Toaster	10.0 amps
• Hair dryer	10.0 amps
• Electric fry pan	10.0 amps
• Iron	10.0 amps
• Analog TV	2.0 amps

- HD 32" TV 1.5 amps
- Crock pot 1.5 amps
- Heating pad 0.5 amps

Use gas (propane) to make coffee, rather than the inverter. Don't use an iron or other high amperage appliances if not necessary. Heat water with propane.

CO (carbon monoxide) detectors: Jim suggests getting aircraft type, digital CO detectors because they alert at 20 ppm rather than at 50 ppm like those that came with our coaches. They can be obtained at: <http://aeromedix.com> The unit is the CO Experts, Model 2010. List \$249, Aeromedix price \$179. These are battery operated and can be mounted on the wall above the A/C-Furnace controller using Velcro.

Water, grey water and black water tank sensors are located at  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  levels on the tanks. Therefore, when the sensor light just starts to show full when filling the fresh water tank, the tank is really only  $\frac{3}{4}$  full. The same is true for the sewer tanks.