

CHARGERS

The best chargers provide four stages of computer chip controlled charge current. This type of charger will provide the best battery performance and the longest useful life. They usually have switches and sensors to optimize charge parameters for different types of deep cell batteries and the ambient temperature. This allows you to keep the batteries on continuous charge. If you have a source of shore power your batteries can be left in the RV during the winter months with no danger of freezing. Once I changed to a computer chip controller, I have kept my batteries on charge, continuously, since 1989 . They are always charged and ready to go on one of my winter camping trips.

1. The **BULK** stage brings the battery up to about 80% of a full charge and essentially provides whatever current the battery will accept. The charge current is constant and should not exceed about 20% of the amp/hour capacity of the battery bank. Typically this is about 20 amps per battery which results in a charger capacity minimum of 40 amps for the trailers with Group 27 batteries. The voltage is in the range of 14.2 to 15 volts.
2. The **ABSORPTION** stage where the charger voltage is constant and the current decreases until the battery is fully charged. This represents a voltage of around 14.1 to 14.8 volts that provides the last 20% of recharge.
3. The **FLOAT** (trickle charge) stage is used to keep the battery in a fully charged condition in order to overcome the self-discharge rate. This is typically in the 13 to 13.6 volt range
4. The **EQUALIZE** stage is a controlled overcharge designed to mix the acid evenly in the cells and remove sulfate crystals that have built up on the plates. This is typically in the 15.5 volt range of charge voltage. It can last for 6 hours and should be done every 2 or 3 months. This can bring a seemingly dead battery back to life. Before using this stage the battery should be fully charged and the water levels should be checked (before and after).

These chargers also have sensors, attached to the battery terminals, which change the various stage parameters as a function of the battery temperature. They also have switches which optimize the charge parameters based on the kind of battery being charged (Flooded, Gel, AGM). Yes they are more expensive, but that is how you get the best performance and longest life out of a set of batteries. Reference 3, (<http://batterytender.com/resources/battery-basics.htm>) provides more details on the charging algorithms.

Figure 4, illustrates how the float voltage (trickle charge) varies as a function of temperature. As you can see there is a wide range of charging voltage as the battery temperature changes. All of the quality chargers, that provide four stage computer controlled voltage, include a battery temperature sensor to modify the output charge voltage. The sensor is bolted to the battery ground terminal with output wires that couple the voltage to the charger. The charge voltage must be significantly increased at lower temperatures in order to get a good charge.

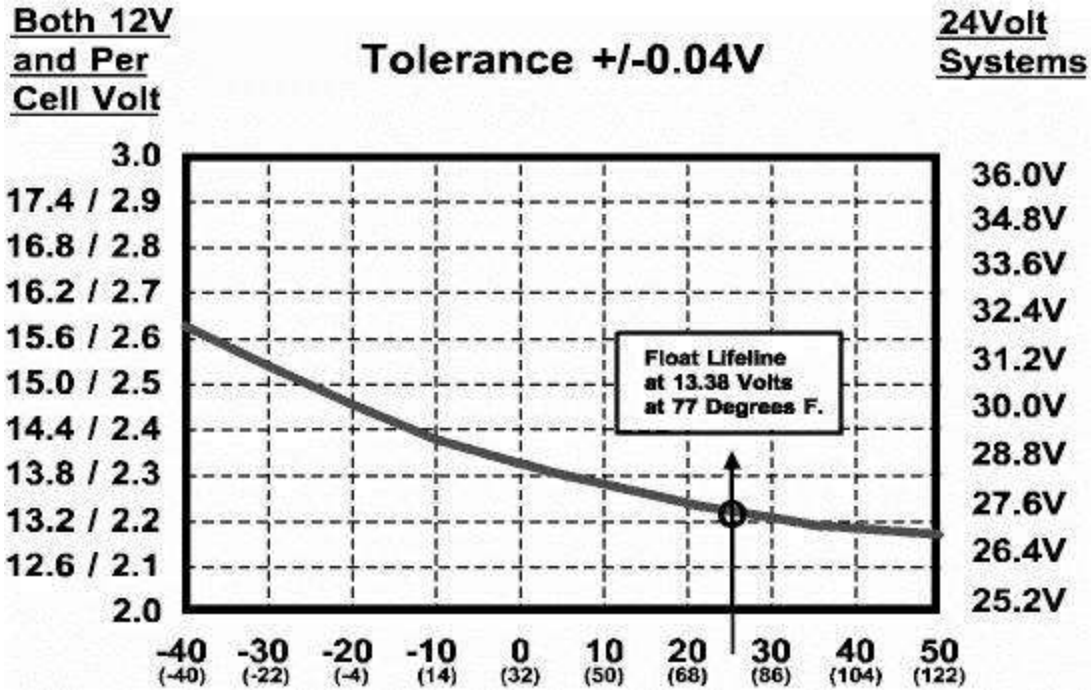


Figure 4. Optimum Charge Voltage versus Temperature

My first Airstream motor home had a transformer type charger similar to the early Univolts. Batteries seemed to last 2 or 3 years, after 2 years they constantly needed water, I had to bring them in the house during the winter because the charger would boil out the water. I finally had enough and purchased a factory rebuilt marine type Statpower (now named Xantrex) charger. This was one of the first available computer controlled chargers. It even had two complete channels so that two sets of batteries could be charged independently. I hooked up one of the channels to the engine start battery and the other channel to the two deep cycle batteries. It included a temperature sensor and an equalize stage which I used once every two months. Now my batteries typically lasted for 5 years and were always fully charged, since I kept the Coach plugged into shore power during the winter months. Twenty years later the charger still worked fine and it is now running around the countryside in England.

Remember; a quality charger can turn a cheap battery into a winner while a cheap charger will turn a quality battery into a piece of junk.

To fully charge a battery that is in a deep cycle will take about 8 hours. You will need a charger that can supply at least 20 amps to get the charging started. Let's assume your tow vehicle can supply this current level, as long as your starter battery is almost fully charged and you are not using any high current options in the tow vehicle. So, after a night of dry camping you should be able to bring the batteries back up as you drive to the next stop. Not likely, since most tow vehicles do not have either a high enough output voltage or the proper size wire run to deliver that level of current to the Coach batteries. To check this, after a night of dry camping, hook up the trailer and have a friend run the engine at about 2500 rpm while you take your new digital voltmeter and measure the voltage on the deep cycle batteries. You should be getting around 14 volts in order to bring the battery out of a deep cycle.

I am not saying you should throw out your current charger and buy a new one. More recent

trailer models have multistage chargers that provide a reduced trickle charge, when needed, and work fine for most applications. Some of the older trailers, however, have way too high a voltage that can lead to battery overcharging, boiling and water loss. If you have to replace the charger, for whatever reason, then you should definitely consider a computer controlled unit.

Prices vary from 230-360 dollars for 45 to 80 amps.