

AC Low Voltage – 120 Volt Service

While some of you may have autotransformers and do not have to worry about low voltage, many others don't. At a minimum, everyone should at least have an AC Voltage Meter to monitor the voltage in their coach. With the summer's hot temperatures and everyone using their air conditioners to the max, campground voltages will be at their lowest levels. Also remember, campground voltages will probably not remain constant. While you may have adequate voltage early in the morning, it may drop considerably during the day.

The information below, while elementary in nature, is based on electrical concepts and information taken from many RV magazine articles. Hopefully, it provides some insight to problems associated with low AC voltage. Also, what do you do if you have this problem in a campground and have to turn off your electrical equipment? Unplug your power cable, turn on your generator (if needed), and notify the campground manager of the problem.

Power companies are required to provide 120 volts, plus or minus five percent. That runs from 114 volts to 126 volts. Years ago, it was referred to 110 volts with an expected measurement of 117 volts. Anything below 100 volts is considered low voltage and all AC appliances should be turned off to avoid damage. Some articles said most of the AC appliances would be OK at a little below 100 volts except for the air conditioner and the microwave. Other articles said to turn off the air conditioner if the voltage drops below 105 volts. **Most of the power Surge Voltage protectors turn off the power when low voltage reaches 102 volts.** You be the judge, but 102 to 105 volts is the best and safest guideline.

Why is Low Voltage harmful? Electrical appliances and equipment produce (or consume) a certain amount of power when they are turned on. This power is measured in Watts. The relationship between Power, Current (measured in Amps), and Voltage is expressed by the formula $P = I \times E$, where $P = \text{Watts}$, $I = \text{Amperage}$, and $E = \text{Voltage}$. An air conditioner in a motorhome is going to try and produce the same amount of power regardless of the voltage applied. Therefore, if you reduce the amount of voltage, then the amount of amperage is increased. Increased amperage produces more heat in the wiring and coils and will eventually burnout the wiring and motors. For example, if your A/C at normal cooling uses 15 amps at 120 Volts, it consumes 1800 Watts. So, using the above formula it converts to $I = P/E$. Which means, if the voltage drops to 100 Volts, your A/C unit will be pulling 18 amps. Eighteen amps is going to produce much more heat in the motor windings and may even trip your circuit breaker on start up.