

Understanding your R.V.'s AC/120v Electrical System

The information in this hand-out is general information for MOST RVs. You should consult your RV Owner's Manual to make sure that you are operating the RV by the manufacturer's guidelines.

FAQs:

What requires AC electrical power to operate, in my R.V.?

In the majority of Travel Trailers, 5th Wheels, & Motor Homes, the following items require AC power to operate; the Air Conditioner(s), Microwave oven, TVs, DVD player, the electric element in a Dual source water heater, the AC element in the refrigerator, and the Power Converter/battery charger. *(Note: some of these items require 12v (DC power) to operate as well, mainly for control boards. If your house/coach battery is not charged, is old, and/or will not hold 12v, your appliance may not work, even if you have good AC power to the RV)*

These other optional accessories and appliances, found on larger or Luxury RVs, also require AC power; Washer/Dryer, Dishwasher, Home Theater System, Heat-pump, Electric element on the hydronic heating system (such as Aqua-Hot), central vacuum, some brands/types of patio awnings (like Girard), Satellite TV receivers, Digital TV converter boxes, & Audio/Video Switchers/Controllers.

Some RVs are equipped with a **Generator** that is matched to the power needs of the RV. These generators provide 120v power (30 amp or 50 amp) to the RV when the appropriate "Shore Power" is not available. Most RV generators range from 3,000w to 12,500w and are powered by; gasoline, LP, or diesel.

Do Recreation Vehicles require 120v or 240v?

All RVs are 120v current. No production built R.V. (built under RVIA code) uses 240v. **240v-AC current will harm your RV** and will cause severe damage, and possible fire, to any or all AC equipment.

What is the difference between 15 amp, 30 amp, & 50 amp?

Most RVs are equipped with a 30amp/120v service & power cord (2 angled blades on the bottom & a round post at the top - See example 2). Some Larger RVs are equipped with 50amp/120v service and power cord. This plug has 3 vertical blades on the bottom and 1 round/U-shape post on the top – see example 3). *It is possible to find an RV equipped with (2) 30 amp power cords (usually wired after market/post manufacturer) to run a second A/C and/or a high amp appliance.*

What can I run on 30 amp?

If you have good 30amp/120v power, you should be able to run; One (1) Air Conditioner , Microwave oven, Refrigerator on 120v current, and several 12v lights. To run any other 120v appliance or items, you will need to cut off (or shed) items. 30 amp/120v will not allow you to run all of the following items at the same time; Air Conditioner, TV(s), DVD/VCR player, Water Heater on 120v, Refrigerator on 120v, Microwave, or any portable appliances plugged into outlets.

High wattage/High amp portable appliances;

Hair Dryer	15 amps	Toaster	15 amps
Coffee Pot	10 amps	Vacuum	9 amps
Portable Heater.....	15 amps	Iron/Curling Iron	12 amps

What can I run on 15-20 amps?

If you are using an AC adapter/reducer that goes from a 30 amp plug to a 15 amp plug (see example 1), you will be able to use even less AC powered items. Most roof Air Conditioners kick-on at 16-18 amps, and draw a steady current of 12-15 amps. If you are plugged into a 15 amp outlet, it will most likely trip the breaker at the plug/source, even if you do not have any other AC item on. The RVs power converter alone will require 2-6 amps, and this item is ALWAYS ON when the RV is plugged into shore power.

PLEASE NOTE: It is recommended that you do not use a 15/20 amp outlet to run an Air Conditioner. It will most likely over-heat the adapter and/or the extension cord and could cause a fire. *Continued on back > >*

It is suggested that a 15-20 amp plug only be used for the following; charging the batteries, running a few lights, and running the refrigerator. While on a 15-20 amp plug, make sure you use the water heater on LP gas and limit the use of all other 120v appliances or items that would be plugged into outlets.

What is True 50amp?

If a 50 amp outlet was wired to R.V. code, it will be (2) legs of 50 amp/120v (to make 100amps) using a double-throw 50 amp breaker. **RV 50 AMP IS NEVER 240v.** Many electricians don't understand this design and cause severe electrical damage to hundreds of RVs each year. Make sure that the outlet you are about to plug into was wired by RV code, especially if it is a newly installed outlet.

If an RV is plugged into a true 50 amp service, it can run almost anything on the RV, including; up to (3) Air Conditioners, microwave/convection oven, electric stove top, 120v water heater, Audio/Video Devices, and portable appliances. The RV user still needs to be aware of the amount of amps each item requires before turning EVERYTHING on at one time.

When you use a 50 amp to 30 amp adapter, be aware that you are actually going from 100 amps to 30 amps. You will not be able to run more than one Air Conditioner at a time, and you will be limited on the combined use of other 120v appliances, such as; the microwave, the 120v element on the water heater, washer/dryer, A/V equipment, and 120v element on the refrigerator.

What is the difference between a Power CONVERTER and a Power INVERTER?

A Converter, found in most Travel trailers, 5th Wheels, and Gas motor homes, takes AC (120v) current and converts it to DC (12v), to run lights, control boards, and charge the battery. An Inverter takes DC (12v) battery power and converts it up to AC (120v) power. A Combination unit (Inverter/Converter/Charger) can be found in most Luxury Diesel RVs and works both ways depending on the power needs of the RV.

What is an EMS and how does it work?

An EMS is an Energy Management System. These electronic devices will manage the power "Load" on your electrical system. The EMS is pre-programmed by the manufacturer (or installer) to "Shed" secondary appliances, when power is required by a priority item/appliance. Most EMS devices sense what amperage the RV is plugged into before they will allow certain controlled devices to turn on, such as; Air Conditioners, Microwave, Washer/Dryer, and the 120v element on the water heater. Most EMS devices do not control the refrigerator or regular 120v/15 amp outlets through out the coach.

Will Low or High voltage damage my RVs systems and appliances?

Yes, low voltage and High voltage will damage the RVs systems. Voltage for ALL RVs should be between 108v to 130v. We suggest that you buy a voltage meter, if not already equipped, plug it into a very visible outlet, and check it each time after you plug your RV into a new source or turn on the generator.

How can I protect my RV from power problems coming in through the power cord?

We recommend the **SURGE GUARD** brand of RV power protection systems. These devices can be either; an adapter on the end of your power cord or can be hard wired into the power cord on your RV. They will protect your RV from many possible faults to the AC system, including: excessive or low voltage, open neutral, miswired outlets, and reverse polarity. **SURGE GUARD** makes several levels of protection that range from \$250 to \$925, plus installation. **Ask our RV Service Dept. for a quote on protecting your RV.

Examples of RV Style Plugs and adapter ends >>>

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