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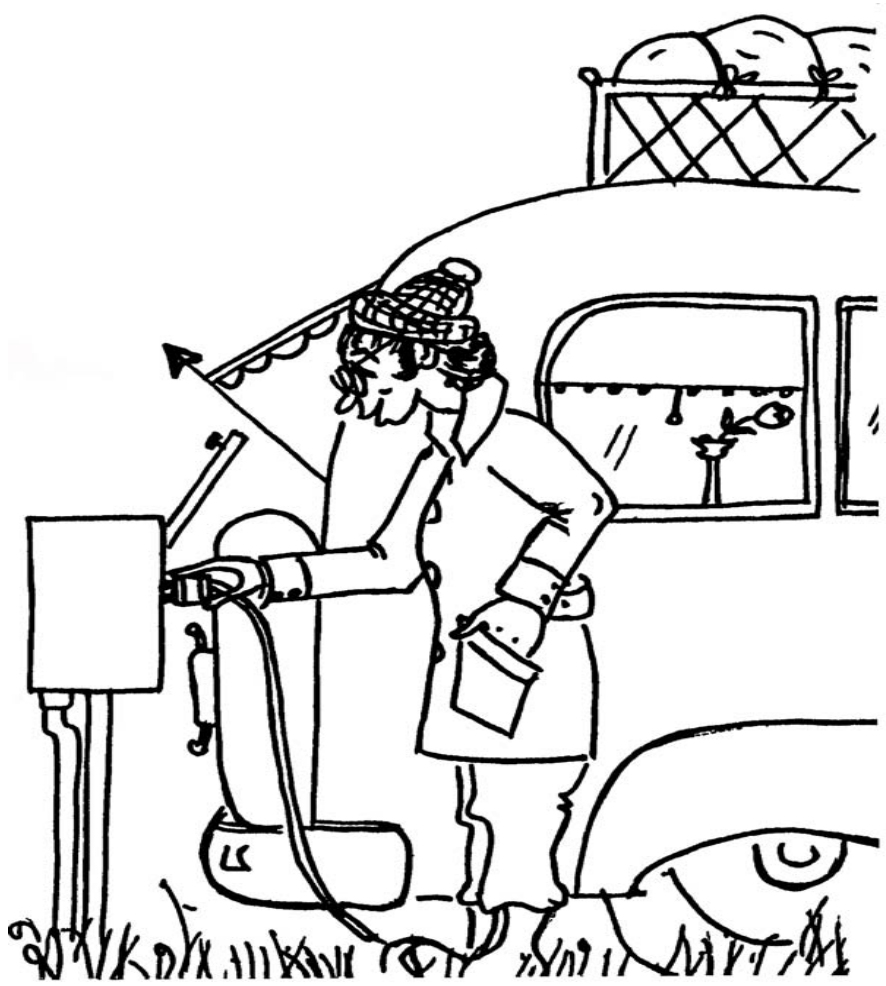
RV Electrical Safety for Campers



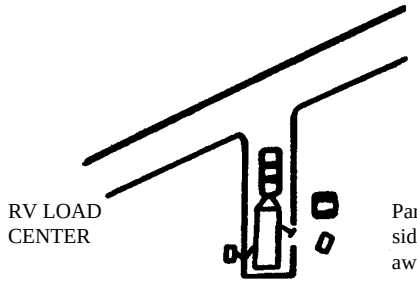
RV ELECTRICAL SAFETY

Man has been camping since year one with and without shelter. At some unrecorded time in history he started carrying his shelter with him. Later in time he hooked up electricity to his transportable shelter. As this mobile home became popular for recreational use, it was necessary to develop safety rules governing the distribution of electrical power to recreational vehicles (RV) and for the wiring of the RV itself. These safety rules are now laid out in the National Electrical Code (NEC).

Electricity is like fire, if controlled and properly used, it makes life easier and more comfortable. Most RV manufacturers build their units to meet the NEC and provide them with appliances that are. Underwriters Laboratory (U.L) listed for the use intended. Likewise, most campgrounds are built with appropriately listed U.L. parts which are assembled into a system meeting the applicable building and safety codes. To be safe the camper needs to use his RV and the campground electrical equipment properly. This pamphlet was written to help the camper do just that.

Before using any piece of equipment, one should become familiar with it. A good place to find information is in the Operator's Manual provided by the manufacturer. It is important to remember that RV equipment is subject to road vibration and, therefore, extra care is necessary to assure that it remains serviceable and safe. If you have problems or are in doubt about the safety of your unit, have it inspected by a competent electrician who is familiar with Section 551 of the NEC, and all appreciable U.L. specifications.

The power cord (See Figure 1) that connects your RV to the campground electrical supply (Figures 2 & 3) is a very important safety element in your system. It should contain 3 or 4 wires. The most important wire of the 3 or 4 is the "Equipment Grounding Conductor" which is usually colored green. Your lights will turn on and your appliances will operate without it, but your safety will be in peril. Never use a two wire cord or one with the ground pin removed. The cords provided with RV units are generally 20 to 26 feet long. Park your unit close enough to the campground electrical supply box or RV load center so you won't need an extension cord. Place your RV next to the RV load center such that the RV load center is on the driver's side of your RV unit. (See Figure 4) **EXTENSION CORDS ARE NOT RECOMMENDED.** Some campgrounds forbid extension cords to be used outside the RV itself. Make sure your RV's cord has wires as large or larger than the size shown in Figure 1. When placing your power cord down, be sure it doesn't lay near or on a campfire, roadway, or path. Remember, you cannot drive over a power cord without damaging it and damaged cords should never be used. Good power cords are expensive, but they are necessary and worth the cost.



Park so that load center is on driver's side of RV unit. This will keep cord away from high use areas.

PARKING YOUR RV
FIGURE 4

Notes for those who are electrically inclined.

The NEC, Section 551, along with various U.L. specifications form the basis for electrical safety in campgrounds. Most local building codes have not been written to include the unique factors necessary for safety in campgrounds. Campground wiring is both similar and very different from house wiring. If you don't understand the differences, don't work on RV systems! Do remember; the **NEUTRAL MUST NOT BE GROUNDED ANYWHERE ON THE LOAD SIDE OF THE SERVICE ENTRANCES AND THAT THE EQUIPMENT GROUNDING CONDUCTOR (GREEN WIRE) MUST RUN FROM THE SERVICE ENTRANCE TO EACH AND EVERY ELECTRICAL EQUIPMENT** in a campground, including those in the RV itself. The green wire is grounded in the service equipment and it may have any number of additional grounds in the system, although additional grounds are not normally necessary.

Normally only one camper should use an RV load center, except where dual site boxes are provided. It is not acceptable to have several RV units connected to a single box with each limiting its input of power. Wiring sizes throughout campgrounds are based on one RV per campsite. Demand factors do not take into consideration the possibility of reduced loading by more than one RV per electrical site.

Generally electrical receptacles and wiring are protected by circuit breakers. These devices, which look like on-off switches, automatically turn off when the current through them exceeds their rated value. This protects the electrical equipment connected to them from over current damage. Most campgrounds are equipped with special circuit breakers which protect people, too. These are called "ground fault interrupt" or GFI breakers and they trip and switch off when they sense that a very small electrical leakage has occurred. They, in affect, are constantly testing your RV unit and its power cord. If they switch off, you usually have an electrical problem in your RV, its power cord or some item connected to them. To confirm that it is your RV that is faulty, you need only move your RV to a new campsite and plug in again. If that breaker trips too, then you can be sure the problem is in your equipment. Although you may not be happy that you were not able to use a campground's electric service, you can be very pleased to know that the GFI device may have just saved your life by detecting a problem before it could do harm.

If a campsite's GFI circuit breaker trips when an RV is plugged in, one should suspect that the RV wiring or its power cord have an electrical problem. Power cords, which appear okay, should be tested with an A.C. "Hi POT" or "Megger" for leakage or shorts. Also check for moisture, dust, loose, open or shorted wires, neutral to equipment ground connections, etc.

If you observe any damaged or loose electrical receptacles or other electrical campground equipment, report them to the campground operator. Do not use loose or damage equipment.

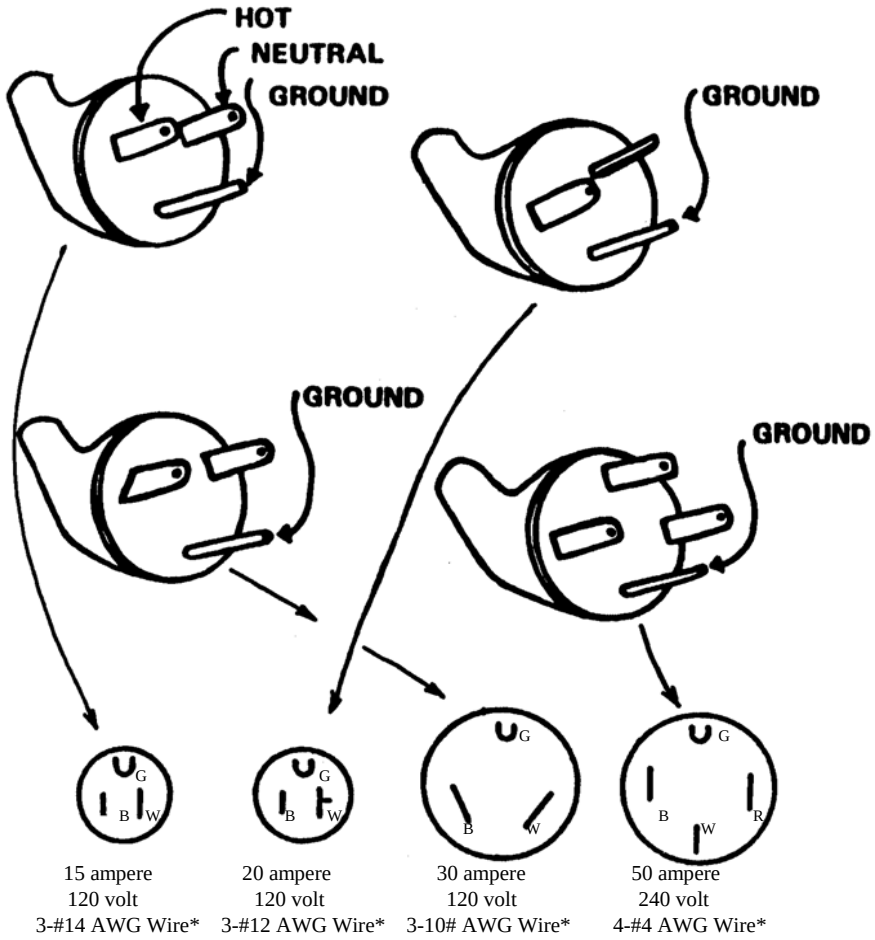
One last tip on cords, do not use a power cord adapter that converts a low power cord for use with a higher power receptacle. For example if you have a 20 ampere cord, do not use an adapter and plug into a 30 ampere receptacle.

Some campers like to use portable electric appliances outside their RV units. That can add to the pleasure of your outing. There are, however, some things you can do to help make their use safe. A few of these are:

(A) Use only appliances intended for outdoor use that carry a U.L. listing mark or label. This label will be affixed to the appliance case, Labels on an appliance cord covers only the cord and in no way implies its proper use or matching to the application.

(B) If an appliance has a metal case, use it only if it has a three (3) wire cord which has a ground pin on its plug.

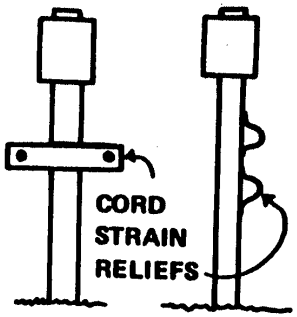
(C) If portable lights are used, they should meet the above requirements.



15 ampere	20 ampere	30 ampere	50 ampere
120 volt	120 volt	120 volt	240 volt
3-#14 AWG Wire*	3-#12 AWG Wire*	3-10# AWG Wire*	4-#4 AWG Wire*

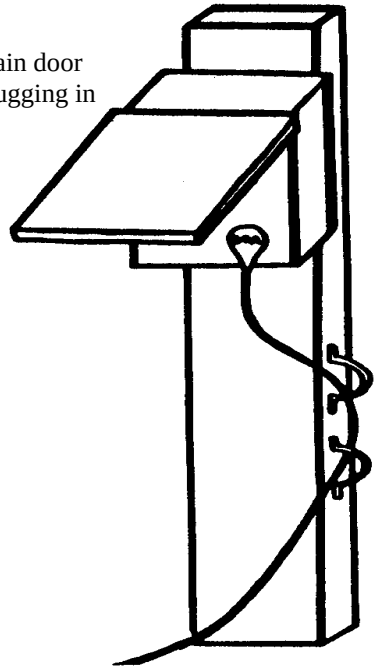
* Recommended Cord Size. Use only cords manufactured for hard use. Never use a cord with only two conductors or one which does not have a ground pin on its plug. Cord length should be at least 20 feet and normally not more than 26 feet long. If longer cords are used they should be at least one wire gauge (AWG) larger. Extension cords are not recommended and if used may cause GFI circuit breakers to trip out.

RV POWER CORDS & THEIR EQUIPMENT GROUNDING PLUGS
FIGURE 1



TYPICAL RV LOAD CENTERS WITH DIFFERENT CORD STRAIN RELIEFS

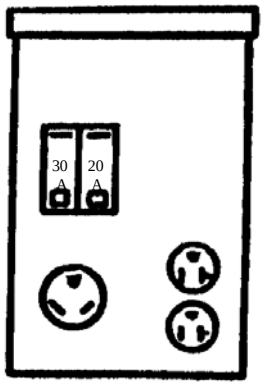
Close rain door after plugging in cord.



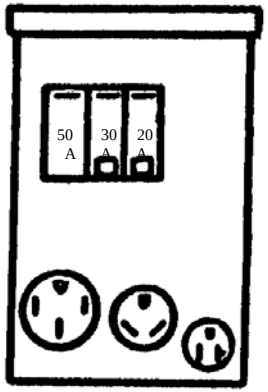
RV LOAD CENTER
(Receptacle Box)

RV cord strung thru reliefs to protect plug and receptacle from damage by accidental pulling of cord.

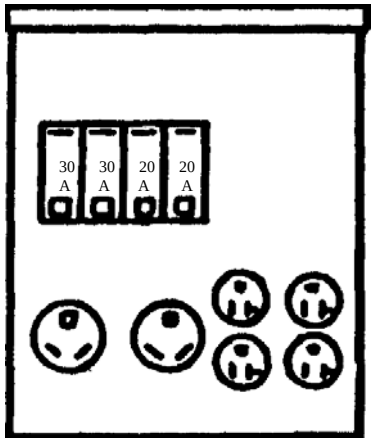
RV LOAD CENTER STRAIN RELIEF FOR POWER CORDS
FIGURE 2



Type A
Single campsite load center with 20 and 30 ampere receptacles. RV is limited to a maximum of 24 amperes.



Type B
Single campsite load center With 20, 30 and 50 ampere receptacles. RV is limited to a maximum of 40 amperes.



Type C
Dual campsite load center with 20 and 30 ampere receptacles. Each of the two RV units using the panel are limited to a maximum of 24 amperes. This type used only in older campgrounds.

NOTE:
RV load centers offer a choice of receptacles. Wiring to and within the limits the number of RV units that can safely use each box (i.e.: Type B (above) load center has a choice of either 20 or 30 ampere 120 volt or 50 ampere 240 volt service, but only one of the three choices should be used at one time for the RV.

TYPICAL CAMPSITE LOAD CENTER PANEL DETAILS
FIGURE 3