

Chapter 5: Electrical System

The electrical system in recreational vehicles is a combination 12 Volt DC (Direct Current) and 120 Volt AC (Alternating Current) system. Every facet of the electrical system is carefully engineered and installed to comply with the “American National Standard #A119.2” and the “National Electric Code.” To understand this system, simply put, the 12 Volt system is what an automotive uses and the 120 Volt system is what most households use.

12 Volt System - DC

The 12 Volt system can be powered in three different ways: a separate RV battery, the converter changing 120V AC to 12V DC or by the tow vehicle’s 12 Volt system. The water pump, certain lights, power vents, and other appliances are powered by the 12 Volt system.

The heart of the 12 Volt system is the battery. Batteries are essentially storage devices for electrical energy. Most batteries used in RVs are RV / Marine Deep Cycle, Lead-Acid types. These batteries contain lead plates and liquid sulfuric acid electrolytes in sections called cells.

Electrolytes are lost whenever a battery discharges energy or is recharged. The level of the electrolyte must stay above the plate in each cell. Many premature battery failures occur because the electrolyte level was not maintained. For maintenance and storage information see the Care and Maintenance Section.

110 Volt System (Also referred to as 120) - AC

The 120 Volt system is supplied by plugging the power cord (shore cord) into an outside source. It furnishes current to the 120 Volt appliances and fixtures like the roof air conditioners, the refrigerator, lighting and all 110V receptacles. It also supplies power for the 12 Volt trailer system through the converter.

The AC circuits are protected by circuit breakers and can handle from 15 to 30 Amps depending upon the circuit. The most common cause of a circuit breaker to open is an overloaded circuit. An example of an overloaded circuit is when a space heater is plugged into the same outlet as the toaster. If this happens, reduce the load on the circuit and reset the breaker.

Power Cord / Shore Cord

The power cord, often referred to as shore cord or shoreline, is a heavy-duty cable with a 3 or 4 prong grounding plug on one end and connects directly to the power converter inside the unit on the other end. This cord is used to plug into an external 120V source. Most cords are typically 30 Amp plugs (3 prong), although certain components or ordered options on some units will require a 50 Amp (4 prong-plug).



Do not plug shore cord in while under load. Make sure all appliances are turned off prior to connecting shore cord.



Before plugging in the RV shore cord, turn off all electrical appliances so as not to start under a” load”, which could cause a breaker to open. Reverse this process before unplugging.



The power cord prongs should always be clean and solid. Clean with a contact cleaner, emery cloth and or a nail file. Electrical connections work better when clean.

WARNING

Never replace circuit breakers or fuses of higher current rating than those originally installed. This could overheat the wiring and start a fire.

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30 Amp, 50 Amp and Available Power

30 Amp Capability

30 Amp service is 120 Volt service limited to a total draw of 30 Amp. The power cord from the RV is three pronged. 30 Amp service is the most common in the RV industry and used widely in campgrounds through the United States. With 30 Amp service any appliance in the RV can operate by itself. However, due to the 30 Amp limitations, you may not be able to run a certain group or all appliances at the same time. For instance, most air conditioners will draw up to 16 Amps on start up and about 11 Amps when running continuously. While running the microwave and pulling 15 Amps, you decide to turn on the air conditioner, the initial draw of up to 16 Amps may overload the circuit, causing a breaker to blow. Below a reference chart has been supplied to show typical amperage draw on common appliances and fixtures.

APPLIANCE	AMPERAGE CONSUMED
Roof Air Conditioner (Continuous)	13 - 15
Convection Microwave	16
Electric Water Heater	10
Microwave	10
Converter	5 - 9
Space Heater	10-15
Washer/Dryer	10
Refrigerator	3 - 4
TV or VCR	1
Hair Dryer	9
110 Volt Light	1
Curling Iron	3 - 4
Toaster (2 slice)	7 - 13
Coffee Maker	7

50 Amp Capability (Optional)

30 Amp service has a three-prong cord while 50 Amp utilizes a four-prong. With the 30 Amp plug, only one prong carries the 120V power. With the 50 Amp plug, two of the four prongs carry 120 Volt allowing for the ability to set up power needs according to appliance application. As such, if your unit has 50 Amp service two air conditioners can run at the same time if they are routed on different feeds, while running other appliances commonly used within an RV. If your unit has below 50 Amp service, alternate appliance use according to the chart above to prevent popping breakers.

Available Power

Despite the power system built into a recreational vehicle, the power system is only as good as the power supply. If the campground has only 30 amp service available, an RV with 50 amp service will only be able to use 30 amps of service. Some campgrounds have only 15 amp service available which is not adequate to properly run an air conditioner or certain other appliances. See chart on page 32. The best way to know what amperage is available is to call ahead to the campground. There are special adaptors available through your local Keystone dealer to make these connections to campgrounds with lower service ratings.

Adapters

These devices connect to the end of a 50 amp shore cord to allow it to plug into a 30 amp outlet or the end of a 30 amp shore cord to allow it to plug into a 15 amp outlet. When using adapters, your available electrical power for the entire unit is reduced to the rating of the adapter. For Example, if using a 30 to 15 amp adapter, the entire unit only has 15 amps available for power. This is not adequate to properly run an Air Conditioner or certain other appliances. See chart on page 32.

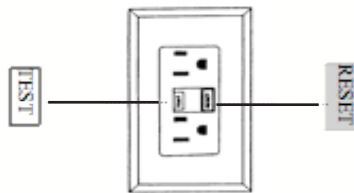
Extension Cords

It may be necessary to use an extension cord to extend your recreational vehicle shore cord to the available campground electrical outlet. It is critical; the correct size cord is utilized ie. 30 amp service- 30 amp extension cord.

If using an extension cord rated less than the RV's shore cord, it reduces the available electrical power for the entire unit to the rating of the extension cord. The length of the extension cord can also affect the available power. Do not use ANY adapters with an extension cord and do not plug multiple extension cords together at one time. Your local Keystone dealer can assist you in obtaining the proper extension cord for your needs.

Converter

The main purpose of the converter in your RV is to provide 12 Volt power to the unit while plugged into an AC outlet, such as at a campground. The converter will, as its name indicates, convert the incoming alternating current to direct current, so as to operate the appliances and fixtures requiring 12 Volt DC power. In essence, utilization of the converter will reduce the usage of the RV battery.



The converter installed helps by trickle charging the RV battery when the trailer is plugged into AC power. When connected to the tow vehicle the RV battery will also be charged. When using AC power and having the RV battery hooked up, check the electrolyte level more often if staying connected to AC for a lengthy period of time.

If remaining plugged into AC power for extended periods, check the electrolyte level often in the RV battery.

WARNING

Exceeding the amperage rating of an adapter can cause low voltage which may cause damage to the appliances or other components. It may also cause the adapter or the shore cord to melt leading to fire which could cause property damage, personal injury or death!

WARNING

Exceeding the amperage rating of an extension cord can cause low voltage which may damage appliances or other components. It may also cause the extension cord to melt leading to fire which could cause property damage, personal injury or death!



GFCI - (Ground Fault Circuit Interrupter)

Bathroom and exterior receptacles are protected by a highly sensitive device, known as a “Ground Fault Circuit Interrupter”, which is designed to sense the slightest electrical “short” at those receptacles and instantly disconnect the current before a person can be injured.

Testing

The GFCI receptacle should be tested at least once a month or prior to every trip. To test the GFCI, push the TEST button. The RESET button will pop out. Power is now off at all outlets protected by the GFCI receptacle. Push in the RESET button in to restore power. The test is complete when the reset button remains pushed in. If the RESET button does not pop out when testing, the GFCI is malfunctioning and no outlets should be used on this circuit, as protection is lost. Call your dealer if the GFCI malfunctions.

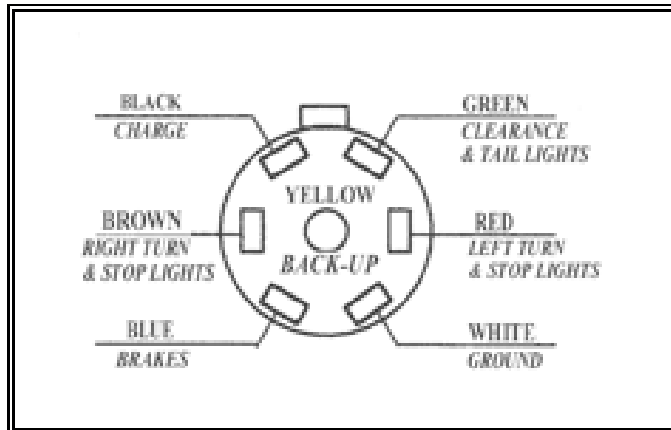
Maintenance

This item requires no maintenance other than periodic testing as described above. If for any reason, this switch malfunctions, do not attempt to repair yourself. Contact an authorized repair facility.

Bargman 7-Way Plug

A 7-pin plug supplies the electrical connection between the tow vehicle and the recreational vehicle. This plug connects into a receptacle on the tow unit to allow operation of the recreational vehicle’s marker lights, taillights, brake lights and electric brakes. A charge line from the tow unit’s alternator is also run to this receptacle, which allows charging to the RV battery.

No.	Color	Item	Wire Gauge*
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1	White	Common Ground	8
2	Blue	Electric Brake	12
3	Green	Tail Lights and License	14
4	Black	Battery Charge	8
5	Red	Left Stop and Turn	14

6	Brown	Right Stop and Turn	14
7	Yellow	Center Auxiliary	14

Care and Maintenance

Maintaining the Bargman Plug requires little effort. Store safely when not in use and clean the prongs as needed. Please see your dealer if repair work is necessary.

Typically, the wires within the Bargman 7-Way Plug are color-coded as identified in the graphics on this page.

Brakes, Electric

Included in the unit packet is an extensive manual by the manufacturer of the brakes, axles, hubs and drums. Please refer to this manual for information of any of these systems.

Breakaway Switch

The breakaway switch is designed to work in the event separation occurs between the tow vehicle and the RV while on the road. As separation occurs, the pin is pulled from the switch. A circuit from the trailer battery to the RV brakes becomes closed, and activation of the trailer brakes results.

Care and Maintenance

Do not let the lanyard, which is connected to the pin drag upon the ground. Inspect the condition of the lanyard prior to travel. As well, since the breakaway safety feature operates on the trailer battery, insure the battery is fully charged and the terminals are clean. Testing the switch prior to traveling is recommended (See below). If a problem is noted, or if the switch fails during testing, please call your dealer.

How to Test the Breakaway Switch

1. Disconnect the power cord from the RV to the tow vehicle
2. Pull the lanyard pin out to the first stage
3. Brakes should audibly engage
4. Double check by moving the tow vehicle forward slightly to be sure the RV brakes have locked and are operating correctly

! WARNING

The breakaway switch is for emergency use only.

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