



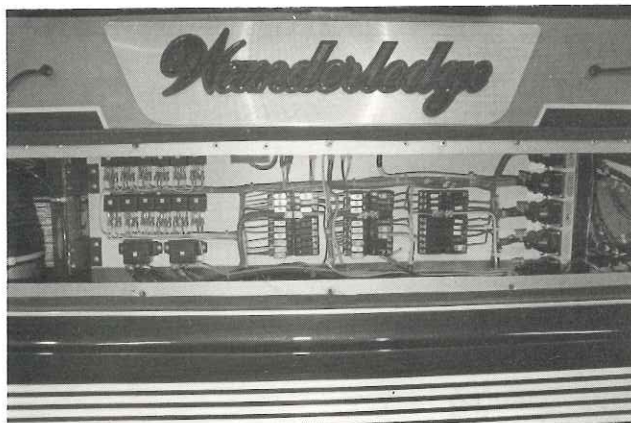
## Section IV Electrical Systems

There are actually two interrelated electrical systems used in your motorhome: the 12 volt dc supply system; and the 120 volt ac supply system. The 12 volt dc supply system is divided into several branches, or zones, each functioning from the common 12 volt battery source. One branch provides the 12 volts required for the automotive starting, ignition and lighting systems; remaining branches supply those motorhome circuits and appliances which require 12 volts dc for operation.

The 120 volt ac system includes those motorhome appliances which require 120 volts for their operation, supplied from either the internal generator, or from the external 120 volt ac (or a split 240 volt ac) supply, via the shoreline hookup. An optional inverter unit will supply 120 volt power from the coach batteries to selected circuits.

### 12 Volt DC Supply System

Wiring diagrams of the 12 volt supply and distribution system are included in Section X.



**Figure 4-1.** Typical Load Center

The 12 volts supplied to all motorhome appliances, outlets and accessories is routed from the batteries through a main 12 volt master switch and routed through busses to the individual branches, or zones, that are serviced from this supply. Circuit breakers are located behind the access panel at the top front left side of the coach, lower front load center (behind removable panel outside front of coach) and at each of the zones. The circuits supplied and fuse or circuit breaker protection at each zone are shown on diagrams included in Section X. A typical load center is shown in figure 4-1.

### Battery Heaters

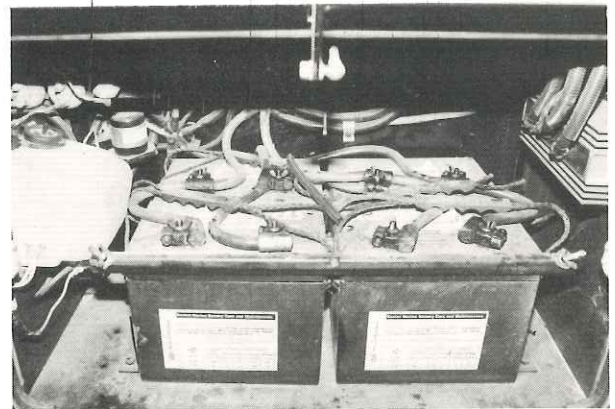
120 volt ac battery heater pads provide faster engine starts during cold weather conditions by increasing the available cold cranking power. Heaters operate only from the ac supply line via the **Battery Heater** switched by 120 volt breaker only.

### Note

**To avoid premature deterioration of the batteries, heaters should be used only when the temperature is below 32°F.**

### Battery Charger

The 12 volt coach battery supply, figure 4-2, and the engine battery supply are maintained fully-charged by either the engine alternator (when engine operates); or by battery charger. The coach and battery systems are separated by a diode isolator to prevent deterioration of voltage in the event of one or the other supplies becoming defective.



**Figure 4-2.** Battery Compartment

Batteries can become discharged because of coach 12 volt loads, while parked, without a 120 volt ac source. For overnight stops this presents no problem, with judicious use of 12v. service, because the engine alternator will recharge the batteries rapidly during the next day's travel. When operating from shoreline or generator power, the batteries obtain the major portion of the charge during "sleeping" time, while coach loads are low, so that the battery charger can "top off" the batteries.

If it is planned to leave the coach parked without exterior power for two days or longer turn off the **Electronic Master** switch in overhead cabinet adjacent to left front load center. This will ensure that there is no drain from the circuits which remain on





when the **Master** (under dash) switch is **Off** (clock, memory and LPG leak detector).

### DC Supply Monitors

The **ALT/CHGR METER**, located on the lower dash, indicates the total current flow from the charging source (engine alternator or battery chargers).

The **BATTERY CHARGE** ammeter, located on the co-pilot's overhead dash, shows the current flow to or from the coach batteries.

The **COACH LOAD** ammeter, also located on the co-pilot's overhead dash, shows the load drawn by coach circuits.

**ENG. VOLT METER**, located on lower dash, shows voltage at the batteries.

While in transit, this should reflect an alternator regulated setting of 14v. When parked, with 120v. source supplied, this should read between 12.5 and 14.0v. depending upon load. When parked, without 120v. source, do not permit voltage to drop below 11.5.

After a trip, **CHARGE** ammeter may show some discharge reading, even when 120v. source is supplied, if there is a load on the 12v. coach circuits. The **Float** type battery charger allows a voltage of 12.5-13 when there is a load.

### AC Supply System

Motorhome ac-operated appliances are supplied from either an external shoreline hookup or from the on-board generator. Selection of shoreline or generator power source is determined automatically by a remote change over switch located adjacent to the 120V breaker/distribution panel. The 120 volt AC circuits are normally supplied by the shore line power cable. Whenever the generator is started the changeover switch will detect the generator voltage and will switch to the generator in approximately 25 seconds.

### Power Line Monitors

A dual power line monitor is located on the co-pilot's overhead dash to monitor the voltage in both legs of the ac shoreline supply (or generator supply). The monitors have a polarity and ground detector circuit to indicate possible electrical hazards due to incorrect hookups.

A power line polarity monitor is located in the shoreline/utility box (figure 4-4).

### AC Circuit Breaker Panel and Distribution Panel

The main ac circuit breaker panel is located in the end table adjacent to the entrance door.

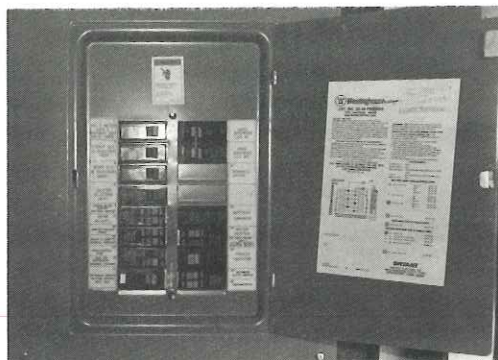


Figure 4-3. AC Circuit Breaker Panel

### Generator Operation

The generator plant is connected to the coach batteries so that it can be started independently of the engine 12 volt batteries.

The generator can be started and stopped from any of three locations within the coach: at the driver's instrument panel, at the systems Monitor Panel, or at the bedroom panel. In addition, the generator can also be operated from the controller box in the generator compartment.

To start the generator, push the **Generator** switch to the **Start** position and hold until the generator starts, as indicated by the generator **On** indicator light. **Do not hold switch on for longer than 5 seconds at a time!** If the generator does not start the first time, wait a minute and try again. Release the switch when the indicator light in the switch glows. The generator may be stopped at any time, by holding the switch to the **Stop** position until the generator stops (light in switch extinguishes).

In cold weather, it is necessary to activate the cylinder glow plugs before starting. Push **Start-Stop** switch to **Stop** position and hold for 15 to 20 seconds.

It is not advisable to start the generator under a heavy load, especially with the high current demands made by the air conditioners. This may cause hard starting and possible damage to the generator electrical system.

The generator is housed within an electrically operated extendable tray. To open, operate the **Out-In Gen. Tray** switch in the left front battery storage compartment.





## Caution

The generator tray is **heavy** and moves in and out with a great deal of force. **Keep Hands Off Tray When Operating Switch!**

### Shoreline Operation (Commercial Power)

## Caution

Your motorhome has been wired in accordance with the National Electrical Code. All 120 volt ac wiring is two-wire service with ground; all 240 volt wiring is three-wire service with ground. If the motorhome is connected to an external hookup which has only a two-wire circuit, ground the third wire on the adapter to the external supply metal junction box or conduit. For personal safety, check the polarity detector indicators on the power line monitors to be sure that lines are properly connected and grounded.

For purposes of safety, observe all precautions when making these connections. Connect the other end of the shoreline to the power source. Poor grounding or incorrectly-wired receptacles can cause personal harm as well as equipment damage or fire hazards. Check reverse polarity indicator in shoreline/utility compartment to verify correct polarity and grounding of hookup.



**Figure 4-4** Shoreline/Utility Compartment

In many instances, the shoreline hookups will not be rated to operate all electrical appliances in your coach. Check with facility personnel to determine the maximum current capability of the hookup. Sometimes, only one air conditioner may be operated. The current ratings for appliances de-

signed for standard or optional (identified by \*) usage in your coach are listed in table 4-1.

**Table 4-1.** Electrical Ratings for Motorhome Appliances

Item	Current Rating (Amperes)
Air Conditioners	
14,500 BTU	(Start) 19.0
Water Heater	10.0
Television Receivers	
Black-and-white	.5
Color	1.0
Battery Charger (depends on battery condition/load)	0 to 14.0
Engine Block Heater	10.0
Electric Heaters	
Interior Heater	12.5
Battery Heaters	1.2
Heat Tapes	3 watts/ft
Microwave Oven	15.0
Food Center	4.0
Refrigerator	2.7
*Ice-Maker	Start 15, Run 2.5
*Washing Machine/Dryer	14.0
Instant Hot Water	6.5

**\*Optional item**

### Shoreline Operation — Troubleshooting

Your coach is designed and tested to make sure the 120v. ac **Neutral** (white) wire and the **Ground** (bare copper or green) are not tied together (no continuity). This will prevent any danger of a "hot skin" if the source of power has reversed polarity (red LED lit).

#### Problem

— Probable Cause

— Corrective Action

#### Green LEDs lit - Normal (desired)

#### Red LEDs lit

— Reversed Polarity at power source.

— Convince park management to correct or change lot assignment.

#### Neither red or green LED lights

— No ground connection with park service

— Use jumper lead from ground pin on shore cord to service box.



Power source (park) circuit breaker trips.

- Reversed polarity in park and coach neutral and ground tied together.
- Use on-board generator until qualified electrician can correct coach problem. (Generator polarity is correct).

Green LED's lit plus Red LED's glow when additional load is turned on (Air Conditioner or Water Heater).

- Poor ground connection at park (floating ground).

### **Safeline Alarm**

Your coach is equipped with a shoreline disconnect alarm, which is located on the upper left auxiliary dash. This device will provide an audible or visual alarm whenever the shoreline is left connected to the coach at the same time that the ignition switch is turned **On**. This assures that the coach is not inadvertently driven away while still connected to the shoreline hookup.

### **Audio System Wiring**

Low-voltage audio system wiring is run throughout the coach between the stereo radio, speakers, head-

phone jacks, volume controls and amplifiers. These interconnections are shown on wiring diagrams provided in Section X.

### **Electronic Master Switch**

Most of the electronic circuits are de-energized when the main **A/T** switch is turned **Off** (relay action). Circuits that still receive power when the **A/T** switch is off serve the monitor panel, clocks, radio memory, and LPG leakage detector. If coach is to be stored for two days or more without external power, the **Electronic Master** switch in the front overhead kitchen cabinet on driver's side should be turned off.

### **Battery Storage in Freezing Weather**

Batteries that are not kept full-charged must be given protection against freezing. Partially-charged batteries will freeze at low temperatures, so batteries must either be left charged or removed from the vehicle and stored in a warm location.

The motorhome can be left connected to the shoreline ac supply and the coach battery chargers will keep all batteries charged. Note that even in a warm location it is advisable to keep the batteries charged to prevent deterioration. The four main coach batteries are sealed type batteries and should require no electrolyte service.