Figure 1

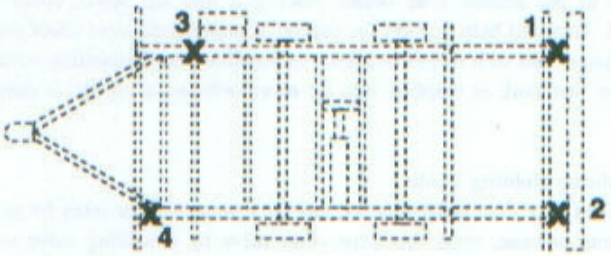


Figure 2

The Master Switch (**Figure 2, right side**) is designed to control 12-volt power in your trailer. When the switch is in top "on" position (power to all lights & 12-volt appliances) there will be no power to the Lift Motor. When switch is in middle "off" position there will be no power to the lights & 12-volt appliances (Except 12-volt Refrigerator). When switch is in lower "on" position there will be no power to lights & 12-volt appliances (Except Refrigerator and Lift Motor). LP Gas Detector will be off.

NOTE*** The Master Switch is designed as a safety device. The furnace or water heater will be shut off when the Master Switch is in the lower on position.

4. PARKING & SETUP

4.1 Selecting Campsite

Many commercial parks and campsites are available for the modern traveler and camper. It is recommended for reasons of convenience and security that you take advantage of these facilities when parking. However, in the case no facilities are available, school, church, motel or other parking lots are sometimes used with consent of the caretakers. In such an event, it is wise to notify local police of your location.

4.2 Leveling Trailer

Once the site is selected, several factors need to be considered as the site is approached. Location of utility outlets if any and the levelness of the parking area will determine your position. If it is a pull through site, it is best to approach from the 'high' end and stop to a point where electric, water and sewer connections can be made. Once this position is reached, level your wheels from side to side. Small pieces of the planking and boards may be carried for this purpose. Once leveled from side to side, block wheels to stop trailer from rolling, then adjust leveling jack on your trailer hitch to level front to back. Having parked with hitch on low end allows you to easily disconnect tow vehicle or leave attached as you so desire. It is especially important that your trailer be level for most efficient operation of your refrigerator. **See Figure 1** for location of leveling jacks.

4.3 Raising Your Hi-Lo

With your Hi-Lo positioned on your campsite and leveled, you are ready to raise it from the low traveling profile to the normal living position.

1. Open the top door and fasten it to the door holder.
2. Hold bottom door at an angle of 90 degrees, so it will NOT interfere with top door when raising.
3. **Refer to figure 2.** Lift the telescoping switch (**left**) and hold in this position until the trailer's top section has reached its full height at which time you should hear a 'squeal' and the safety lock engages automatically. To make sure safety bar is locked, depress switch to down position. If the top section does not lower, this indicates that the safety bar is in locked position. Once you have ascertained that the safety bar is locked, lift telescoping switch to pressurize hydraulic cylinder. If the safety bar does not lock, refer to (**section 7.9.3**).

Your trailer now is ready for entry and connecting up your utilities, electric, water and sewer when available. Turn on LP gas valve at tank. Before lighting water heater, be sure water system and water heater tank are filled with water. Also light oven pilot if so equipped (**See section 10.2**). The refrigerator may be switched to 110-volt electric or LP gas. Note: Instruction booklets are enclosed for further details on hot water heater, refrigerator, furnace and other components included in your trailer. To get the most from your trailer, it is best to read and study each manual.

4.4 Outside Utility Hook Ups

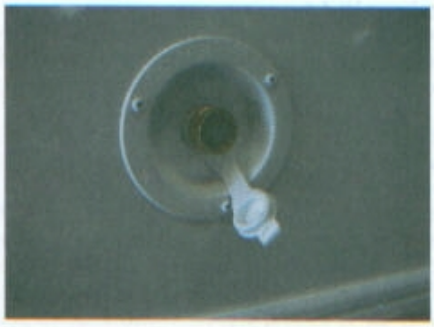
1. Electric Supply - The 110-volt supply cord is located in a compartment on the lower roadside of the trailer. Your trailer is equipped with a 25' heavy-duty power cord designed to carry 110-125-volts AC, 60Hz, 30 Amp electric service. Pull out cord and take one complete wrap around electric supply post, then up to receptacle. Be sure power source is 110-125-volt with standard 3 wire connector, positive, neutral and ground. (See section 6.13).

2. Sewer Hook up - Remove sewer hose from capped bumper storage tube. Place container under capped drain outlet located under left side of trailer to catch any water in the drain, then remove protective cap by turning counter clockwise. Connect sewer hose to terminal fitting. Place opposite end of the sewer hose into a ground sewer or dump station inlet.

The use of a tapered collar or adapter, available from your dealer or trailer supply stores to put around hose before placing it into the sewer outlet is recommended. This will help prevent the escape of unpleasant odors about your campsite. Arrange hose so it slopes as evenly as possible from terminal to outlet. Always ensure that tank is emptied into an acceptable sewer outlet or dump station.

3. Draining Holding Tanks.

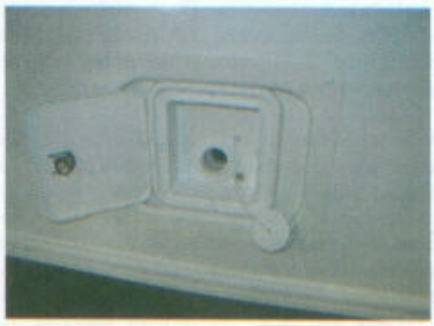
All Hi-Lo trailers have dual holding tanks, one for sewage and the other for gray water. To dump sewage, open the large slide valve by unlocking valve and sliding valve open with a quick steady pull. After completely drained, rinse and flush tank. When tank is empty, close and re-lock valve. If trailer is equipped with gray water holding tank, repeat same procedure using the smaller of the two slide valves. If staying at campsite, keep hose connected and both slide valves closed, draining and flushing periodically if needed. **Towing your trailer with the holding tanks full is not recommended.**



4. Fresh Water Connection

Caution - Check supply pressures before connecting - your system is tested at 100 psi. Pressures above this should be controlled by an in line regulator.

Connection for city water supply is located on lower left front portion of the trailer and marked "city water connection." Water hose should make connection directly from the supply hydrant to the trailer connection. Note: It is important to use the proper type of hose for this purpose, as some will give an offensive taste and odor to your water supply. Flush hose before connecting to trailer. Once connection is made, the water pressure may be turned on and different spigots within trailer opened slightly to release trapped air.



The on board water tank is protected from city water pressure by a check valve in the line. To fill this tank, unlock the water fill door marked "potable water." The water storage tank then may be filled with a container or with an approved water supply hose. Water is pumped from the tank by a 12-volt demand pump. A switch for this pump will be found within the trailer. **Caution** - this switch should be off when the tank is empty or when traveling.

Never put contaminated water into your system. Procedures for sanitizing your system may be found under the plumbing section (8.4). Sanitizing is recommended even for a new trailer.

This completes your outside utility hook ups. It is ready for normal use providing all interior connections are in order.

4.5 Awning and Windows

Awnings may be extended if trailer is equipped, being sure they are securely fastened in case of wind or storms. Pockets for collecting water should be avoided. Upon leaving trailer for long periods, awnings and roof vents should be returned to normal position. When trailer is in use, windows or the roof vent should be opened at least a small amount for ventilation and as an aid to prevent condensation.

4.6 Preparing To Leave Camp and Lowering Your Hi-Lo

1. Drain and flush holding tanks. Close slide valves.
2. Fill water tank if supply desired for travel.
3. Remove, flush and replace sewer hose into storage.
4. Remove water line and electric cord and store.
5. Replace caps on sewer and water lines on trailer and site.
6. Shut off LP gas at tank and turn oven pilot to "oven off" position (if equipped).
7. Shut off the water pump switch.
8. Change refrigerator to 12-volt while trailer is in transit (**see section 10.1**).
9. Close all windows, awnings, vents, access doors, exterior utility doors, front sunshade, ExpandA-Room and cover.
10. Secure all loose items in trailer.
11. Be sure there is nothing on the counters and other areas that will interfere with the trailers telescoping operation.
12. Place swing away bunk into stored position and close all cabinet doors.
13. Turn off all heating appliances.
14. Set entrance doors in operational position for raising and lowering (**see section 4.3**).
15. Check for obstructions both inside and out. Make sure no one is inside or near the trailer before lowering.
16. Release safety bar by pulling the release cable (**see Figure 2 on Page 9**) located near the telescoping switch. If the safety bar will not release, raise the top section enough to accomplish this, then depress telescoping switch to the down position.
17. Depress telescoping switch until the top section lowers to the travel position.
18. Remove and store leveling lacks.
19. Close and lock doors securely.
20. Put the step in "stow away" position.
21. Remove any wheel-blocking materials.
22. Trailer is now ready to hitch to tow vehicle (**see section 2.1**).
23. Never tow your Hi-Lo in a raised position.

5. LP-GAS SYSTEM

5.1 General Information

As with other systems in your Hi-Lo all components have been nationally recognized testing laboratory. When properly handled, LP gas will provide you with trouble-free operation of your heat producing appliances.

LP-gas (liquid petroleum) is a material composed of various hydrocarbons such as propane, propylene, butanes, butylenes, or a mixture of them. In its gaseous form (vaporized), it is colorless and carries an added garlic-like odor for detection. Besides being flammable, it is potentially lethal to inhale. LP-gas is compressed into liquid form for storage and transportation. It is also known as bottle gas. Propane gas will vaporize during extreme cold (above -44' F), while butane will not vaporize below 30' F. Most LP-gas fueling stations sell only propane for recreational vehicle use.

The LP-gas tank mounted on your vehicle contains LP-fuel in liquid form under high pressure. As fuel is used, vapor (LP-gas) passes from the top of the tank through a regulator, which reduces the pressure to about 6 1/2 ounces per square inch. Vapor at the low pressure is then transferred through the gas distribution line for appliance use.

5.2 Checking For Leaks

Upon delivery and periodically thereafter, check your gas system for possible leaks. Although the entire distribution system and its attached appliances have undergone extensive factory testing for leaks, with normal use being subject to road vibration, connections and fittings can develop leaks. Usually you can detect these leaks by the strong odor of garlic or unions. If you encounter this odor, turn off all open flames immediately and commence a systematic search for leaks throughout the gas system. Use a bubble solution of non-ammoniated soapy water -**NEVER A MATCH** - on connections and fittings. Bubbles will appear at the leaky points, when tightening connections, use two wrenches with opposing torque to prevent twisting of copper tubing. If the leak doesn't show up in the manifold or copper tubing distribution system, then check the appliances.

5.3 LP-Gas Regulator Setting

Never attempt to reset the gas regulator yourself. Have an authorized service agency make any regulator adjustments. Even a little amount of pressure over the recommended 6 1/2 ounce per square inch can cause damage to appliance regulators.

5.4 Using The Automatic Changeover Regulator (optional)

Your Hi-Lo may incorporate an automatic changeover regulator. This apparatus allows both gas bottles to be turned on simultaneously. The arrow on the regulator handle indicates which bottle is in service. When the indicated bottle in service becomes empty, changeover is automatically accomplished to commence draining fuel from the other bottle. At this point, the plastic window will display a red signal or flag to indicate the condition, whereupon first notice you should then flip the lever over to indicate service on the other bottle. The first bottle, which was depleted, can then be **turned off,** uncoupled and taken to be refilled without disturbing the LP-gas supply. After Refilling, it can be remounted and again to the "on" position. When the other bottle is depleted, the LP-gas supply will again be automatically changed over.

5.5 Gas Containers - Using Alcohol

When gas containers are not in use for some time, or are empty, it is advisable to keep the service outlet valve closed to minimize entry of moisture inside containers or the regulator. Moisture can cause freeze-up damage to regulators. To minimize chance of freeze-up, have your dealer add a half-cup of dry methyl alcohol into each container.

5.6 Filling Propane Containers

Warning - your vehicle has exterior combustion air inlets. Appliance pilot lights should be turned off during gasoline or Propane refueling on the unit. (Required by law in some states.)

Propane is available throughout the country. When one bottle is depleted, it is best to have it filled without delay. Most campground directories have listings of propane stations. Many travel parks have propane available.

Local regulations sometimes require that I.C.C. removable cylinders be removed from the RV for filling. Caution the supplier not to overfill your tank. A 20% or 10% relief valve is incorporated on some tanks for safety. This valve is normally opened during filling and will indicate when the tank is filled to the proper limit by appearance of liquid replacing vapor. At all times, the overfill valve should be tightly closed by hand only.

The main valve on propane containers should be tightened by hand only using caution not to over tighten. The valve is designed to satisfactorily close with only a reasonable amount of tightening. Continual over-tightening will eventually damage the valve and will require its replacement. If a valve is replaced, always replace it with the RV type that incorporates a check valve as some local regulations prohibit filling tanks that don't have one.

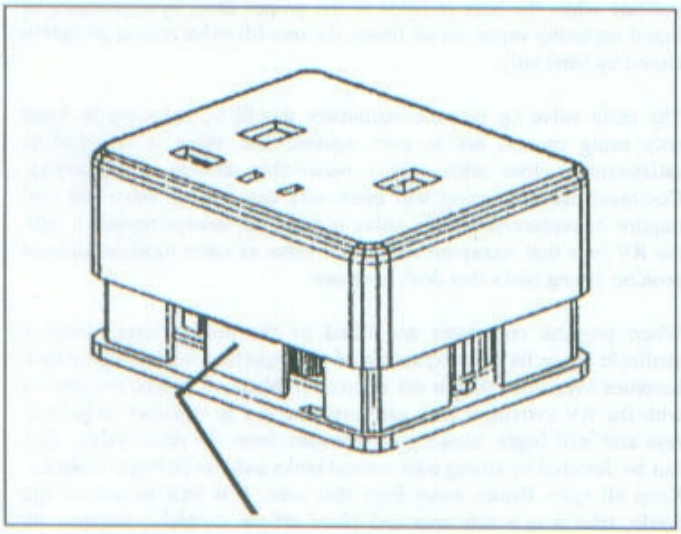
When propane containers are filled to the proper level, there is available space for safe expansion of the vaporized liquid. If your tank becomes over-filled and is not allowed to bleed off before installation with the RV system, it may gain pressure due to exposure to hot sun rays and will begin 'blowing off' pressure from the relief valve. This can be detected by strong odor around tanks and can be heard close up. Keep all open flames away from this area. It is best to remove the bottle, take it to a safe area and bleed off the excessive pressure by opening the valve and closing it when discharge has been sufficient.

Warning Handle your propane tanks with care.

5.7 Propane Consumption

Most gas appliances are only intermittently operated. Unless there is a heavy use of hot water, water heater consumption is not too great. Operating under winter conditions, requiring heavy use of the furnace, or doing a lot of oven baking for hours at a time is what really consumes the gas rapidly. During freezing weather and high wind conditions, furnace consumption can be extremely heavy.

Propane consumption depends upon individual use of appliances and the length of time operated. Each gallon of LP-gas produces about 91,500 BTU's of heat energy. A typical seven-gallon container will provide about 640,500 BTU's of heat energy.



If difficulty in encountered in removing the front panel, use a flat blade screwdriver or similar object to depress the tab that holds the panel to the base. The tab is located on the left side in the base.

5.8 Safety in Using Propane

You should check for leaks at the connections on the propane system soon after purchase and initial filling of propane tanks. Continued periodic checks of the system are recommended. Even though the manufacturer and dealer have already made tests for leakage, this check is advisable because of the vibration encountered during travel. Your vehicle was manufactured to provide you with full access to the gas line connections. Leaks can be found easily with a soapy water solution applied to the outside of the gas piping connections. Usually tightening of connections will close leaks. If not, ask your authorized dealer service to make the necessary repairs.

Propane is heavier than air. Leaking gas tends to flow to low places much as will water. It will sometimes pocket in a low area. Propane can usually be detected by an identifiable odor similar to onions or garlic. **Warning NEVER LIGHT A MATCH OR ALLOW ANY OPEN FLAME IN THE PRESENCE OF LEAKING GAS.**

Be sure to shut off main propane supply valve when the vehicle is not in use. This rule should also apply while the vehicle is moving to prevent any accidental ignition of gasoline fumes while refueling by the pilot lights in the water heater, furnace, or refrigerator.

Never allow gas containers to be filled above the liquid capacity indicated on container. If a container is overfilled, liquid gas may flow through the regulator causing it to freeze and/or introduce a dangerous excessive gas pressure into lines. In addition, an over filled container placed in hot sunlight may expel excess gas through the relief valve and be susceptible to ignition by a nearby open flame.

Propane Detection

Whenever the measured concentration of propane exceeds 2,000 ppm the detector will provide a visual and audible alarm by sounding the buzzer and flashing the red LED two times per second. When alarming the buzzer may be temporarily silenced by pressing the test button. However, until the measured concentration is reduced to a safe level the alarm will sound again within 4 minutes.

Detector Test

Press the test button for 5 to 6 seconds until the alarm sounds then release the test button. The LED should flash red and sound alarm for approximately four minutes. This causes the microprocessor to carry out an extensive check of the overall circuit to verify that the system is working properly. This test must be carried out not less than once a week to assure proper operation of the detector. To interrupt the test, press the test button until the alarm is silent and the LED is green.

Clean Air

As long as the detector does not measure a concentration of LP gas greater than 2000 ppm or a very high concentration of solvents or similar fumes there will be no visual or audible indication and the unit will show that it is working properly by displaying a green LED.

5.8 Safety in Using LP-Gas (continued)

Fume Detection
The Microprocessor system of the detector is capable of distinguishing between propane and fumes of those solvents often found in the living environment. The unit will not alarm when exposed to these fumes but will indicate their presence by flashing the green LED 1 red every 8 seconds. If the concentration increases, the green LED will flash red 2 times every 8 seconds. Extremely high concentration may result in an alarm. If this condition is indicated, fumes pollute the environment and you will want to ventilate the premises by opening a door or window until the visual indication stops.

Trouble shooting
Any failure in the detector will result in a clear indication of malfunction.

Power Failure
If no power is applied to the unit there is a failure of the power circuit, there will be no light from the LED, but the audible alarm sounds when the test button is pressed, then the LED is defective.

Low Voltage
If the supply voltage falls below 10 VDC the detector will continue to operate, but will blink alternately green and orange. Below 8 VDC the unit will behave erratically and eventually will shut off. To ensure reliable operation do not operate the unit below 10 VDC.

Component Failure
The failure of my circuit component will cause the detector to display a continuous orange light on the LED and a short beep indicating failure. A failure of the microprocessor device will result in obvious indications such as a continuous red LED display, a continuous buzzer sound or both. If the unit indicates a failure mode please contact your Atwood Service Center immediately.

Warning

TEST DETECTOR OPERATION AFTER VEHICLE HAS BEEN IN STORAGE, BEFORE EACH TRIP, AND AT LEAST ONCE PER WEEK DURING USE.

IMPORTANT

THIS DETECTOR WILL ONLY INDICATE THE PRESENCE OF LP GAS AT THE SENSOR. LP GAS MAY BE PRESENT IN OTHER AREAS.

IMPORTANT

NOT SUITABLE AS A SMOKE AND FIRE DETECTOR. NOT SUITABLE FOR INSTALLATION IN HAZARDOUS AS DEFINED IN THE NATIONAL ELECTRICAL CODE.

Protechtor
LP & CO DETECTORS

We would like to address some concerns that have been expressed about the Atwood Protechtor LP & CO detector.

Our detectors operate at peak performance when the battery or filtered side of the converter is between 10 VDC and 12 VDC. This minimum voltage range must be met for our detector to provide its fullest level of protection to the consumer.

Anything less than these voltage ranges causes the detector to go into various warning or alarm states. These alarm states and their corrective actions have been often misunderstood.

Below you will find a diagnostic chart that displays symptoms and corrections under various low voltage ranges.

VOLTS	ALARM	LED	SENSING CAPABILITY	CORRECTIVE ACTION
10V - 12V	Sonic	Flashing Red	Yes	Dangerous levels of gas. Take corrective action. See User's Manual for complete instructions.
10V - 12V	None	Green	Yes	None
8V - 10V	None	Blinking green/yellow	Yes	Increase supply power to 10 VDC minimum.
6V - 8V	Chirp every 90 seconds	Solid yellow	No	Must shut off power to detector, i.e. battery disconnected. Re-establish voltage above 10 VDC.
Below 6V	May alarm full time or chirp	Will show solid yellow or red	No	Must shut off power to detector, i.e. battery disconnected. Re-establish voltage above 10 VDC.

Note: Anytime the power to the detector falls below 8V the user must shut off power to the detector ie. battery disconnected and re-establish voltage above 10 VDC.

Gases other than carbon monoxide or LP can occasionally cause our detectors to alarm even though they exceed UL standards for resisting interfering gases by five-fold. However, in extreme cases ... (new coaches sealed tight and stored in the sun or exposure to heavy concentrations of alcohol based cleaning fluids) ... our detector can alarm.

IMPORTANT PREVENTATIVE ACTIONS

- Leave the "sensor activation strip" in place as long as possible. Wait until pre-delivery inspection to remove it.
- Ventilate a newly manufactured RV before putting detector into service.
- Keep the RV well ventilated when using cleaning solvents.

This connection is for
110-125-Volt AC, 60 Hz
30-ampere service.
Do not connect
to higher voltage.

#1-30A.MAIN #4-20A.BATH/KIT
#2-20A.A/C #5-15A.REFRIG.
#3-20A.OVEN #6-15A.OPT.WATER HTR

6. ELECTRICAL SYSTEM

6.1 General Information

Your Hi-Lo trailer is equipped with a combination 110/125-volt AC and 12-volt DC electrical system. This is provided so you may use outside 110-volt service where available or when this is not the case, you may be self-contained and operate off your car and trailer batteries for limited periods. This versatility is a big advantage when traveling as situations may arise where utilities are not available. Many state and federal parks, primitive camps, overflow areas, etc., provide only the campsite itself with few or no facilities. You are prepared for most any eventuality.

6.2 110-125 Volt AC

Commonly referred to as the 110-volt AC system with 30-amp capacity at 60hz cycles. It is recommended that you always check outside power sources to make certain they are within the compatible voltage rating of your trailer. As a reminder of this circuit capacity, an instruction plate similar to Figure 2 is attached to your trailer near your 110-volt entrance.

Your Hi-Lo is equipped with a heavy duty 30-amp power cord stored in the electric power cord compartment located on the lower left front side of your trailer. The cord's weatherproof construction permits it to be extended to the power source. The cable assembly should not be cut or altered in any manner so as to safeguard its water tightness.

Duplex receptacles are located and wired within the trailer to furnish convenient outlets for AC power. Circuit breakers have been installed to protect electrical circuits from overloading. Do not make unauthorized changes to circuits from overloading. Do not make any unauthorized changes to circuitry or add on fixed appliances. Should you wish to make such changes, consult your dealer who will assist you in obtaining a safe installation.

Circuit Breakers

The circuit breaker box is located in the lower left inside cabinets of your trailer as pictured. Location will vary slightly with trailer models. If a circuit breaker trips, locate and remove the cause of the overload before resetting the circuit breaker.

6.3 Ground Fault Interrupter

The bathroom, kitchen, and outside outlets are protected by a ground fault interrupter (G.F.I.). This device is provided in compliance with ANSI A119.2/NFPA 501C requirements, and is intended to protect you against electrical shock possible when using electrical appliances in the bathroom or damp areas. Should an appliance develop a shock hazard or if your trailer grounding is faulty, the G.F.I. device will disconnect the outlet, protecting you from serious shock.

Your owner's information kit contains instructional material about the G.F.I. These should be read and the test procedures carefully followed.

6.4 12-Volt DC

Your Hi-Lo is equipped with a 12-Volt DC electrical system. This system supplies voltage to operate the 12-Volt hydraulic lift motor, interior lights, fans, radio, water pump, furnace, monitor system, and other 12-Volt appliances. The 12-Volt battery is charged through the tow vehicle alternating system (drawing 6.15). The battery is located in A-frame tongue section on the front of your trailer. (12-volt wire location, PG 18a,)

Figure 1

12-Volt Distribution Panel

CKT	1	Monitor	5	AMP
CKT	2	Radio	15	AMP
CKT	3	Interior Lights	15	AMP
CKT	4	Interior Lights	15	AMP
CKT	5	Interior Lights/Hood	15	AMP
CKT	6	Furnace	15	AMP
CKT	7	Water Pump	15	AMP
CKT	8	LP Gas Detector	15	AMP
CKT	9	Automatic Water Heater	15	AMP

6.5 110-Volt to 12-Volt DC Converter

The converter will supply 12-volt requirements when your trailer is connected to a 110-volt supply source. This not only saves the power in on-board battery, but the converter will automatically sense the condition of the RV battery. If it is below full charge, the charger section of the converter will start charging the battery. The battery will automatically be charged at a high or low amperage rate, depending on the need. The rate of charge will decline, as the battery reaches 'full charge' and the charger will drop back to 'maintenance' level. Anytime a storage battery cannot be charged as described, it is possible the battery is defective.

Battery usage without 110-volt supply should be very limited, for furnaces, motors, refrigerators on DC can run down a battery in a matter of a few hours. Careful usage of lights and limited use of appliances can extend the time between charges.

6.6 DC Distribution Panel (12-Volt Fuses)

A DC distribution panel is located with the 110-volt breaker panel. This panel contains circuits with replaceable fuses for protection of RV 12-volt light and motor lines. Do not put in larger fuse than indicated. Clearance lights, turn signals, stoplights and electronic brakes are controlled and fused by the tow vehicle.

Warning Disconnect the 110-volt cord and the positive battery terminal before working on either electrical system.

6.7 12-Volt to Electric/Hydraulic Power Lifting Unit

A heavy-duty battery cable that runs directly from the battery to the motor supplies the power for your lift unit motor.

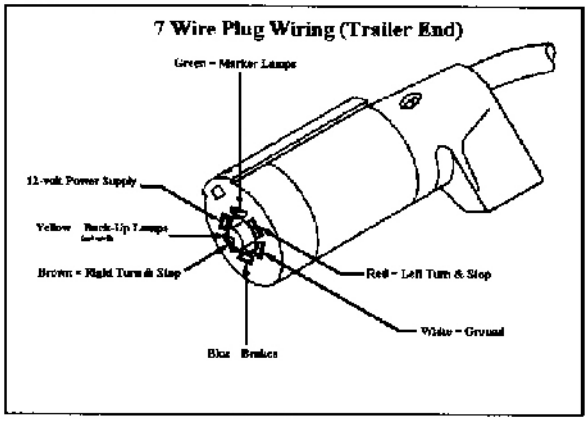
Instruction pamphlets covering the converter, ground fault interrupter, and other components of your trailer are enclosed with your manual or available at your Hi-Lo dealer.

6.8 Electric Brakes

Electric brakes require little or no special care or Service other than keeping connections and wiring free of dirt and other foreign matter. Brake adjustment, relining and repair are similar to those of your car and can be serviced by any qualified service station.

6.9 Break Away Switch

Your trailer is equipped with an emergency break away switch. In the event you would come unhitched on the road, the break away pin will be pulled, setting your trailer brakes. This device should be checked periodically by pulling pin and attempting to pull forward. If the brakes 'lock up', the system is in good order. Never leave pin out or attempt to use for parking brake, as this will run the battery down. Loss of emergency braking is usually due to defective wiring, defective breakaway switch, or low battery.



6.10 7 Wire Plug

A chart of the 7-wire plug is shown in Figure 6.11. This will assist you in matching up the tow vehicle wiring to that of the trailer. It is very important to keep plug terminals clean and free from corrosion at all times.

6.11 Schematics of Electrical Systems

Schematic for the 12-volt lower section is shown on Page 20 (Hi-Lo Manual). Also the 12-volt schematic car trailer connection showing various hook ups on the tow vehicle and trailer.

6.12 Understand the use of power cord (including air conditioner circuit cord).

The long cord with the three prongs is used to supply 110-volts to your trailer from the campsite power supply outlet.

Inside trailer the short cord with female outlet is used to supply power to topside outlet to run your air conditioner if so equipped.