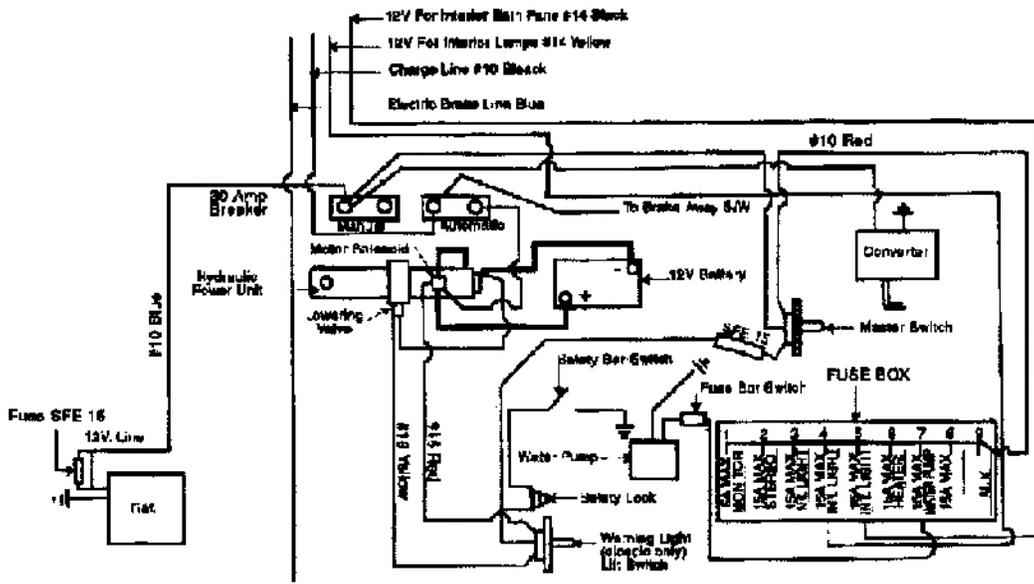
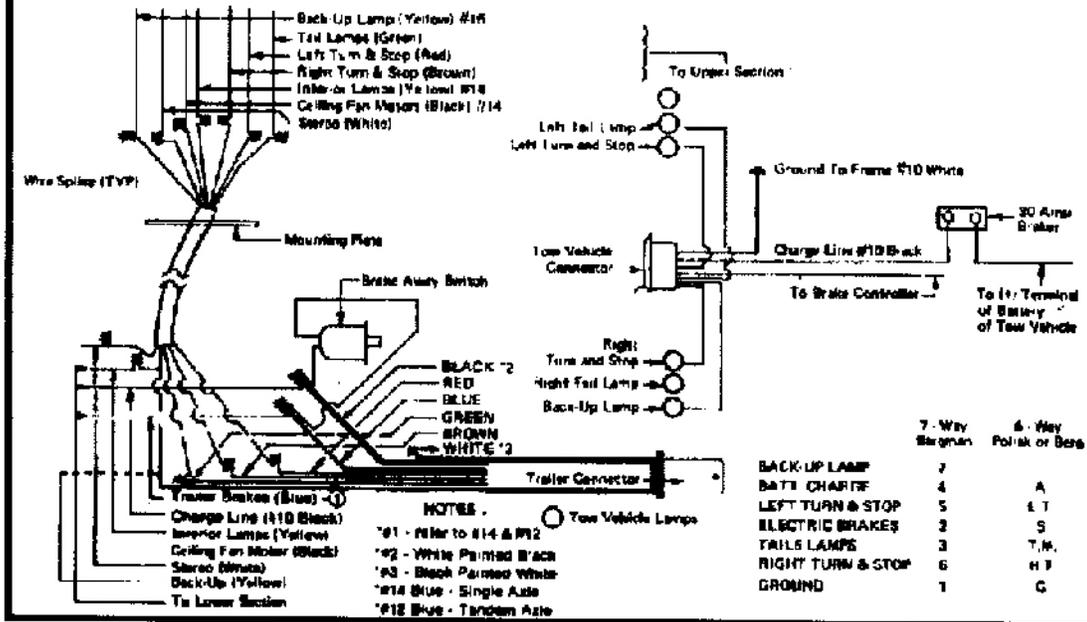
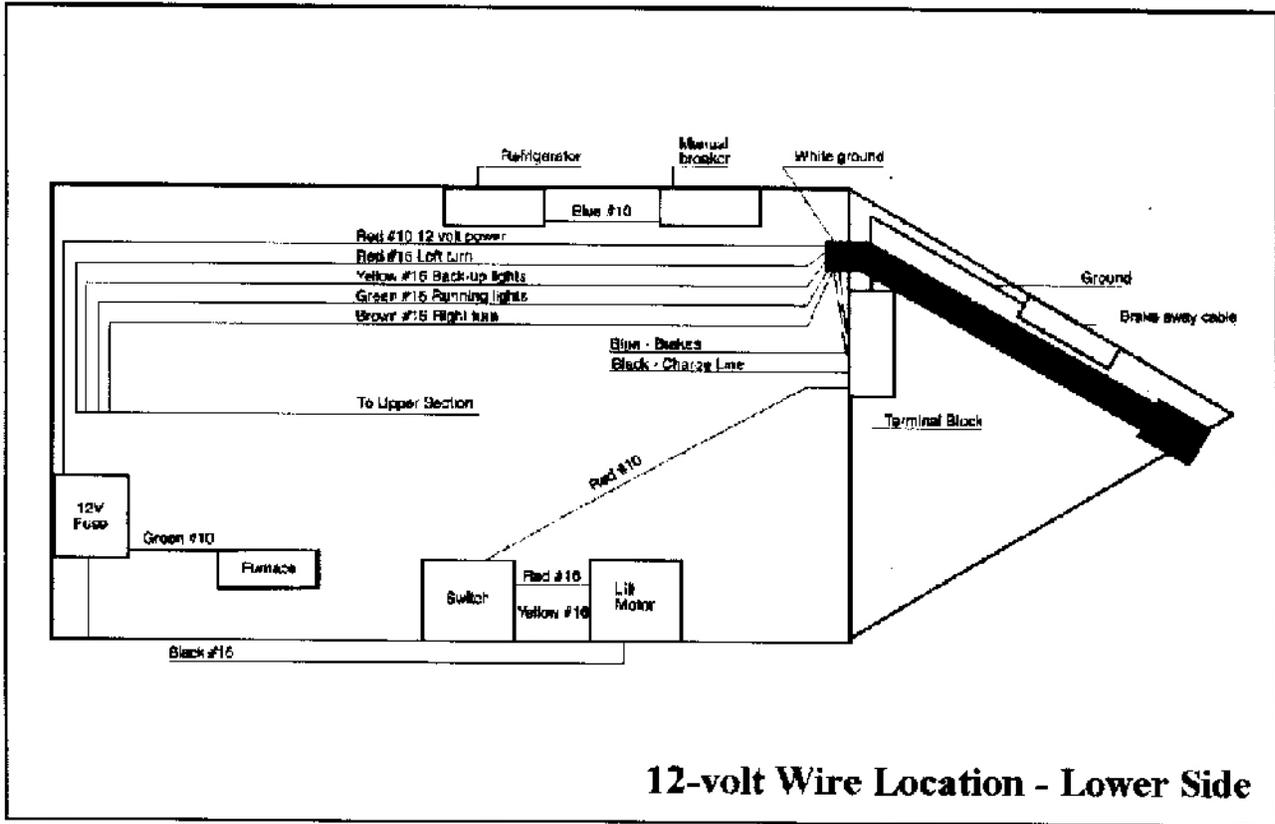
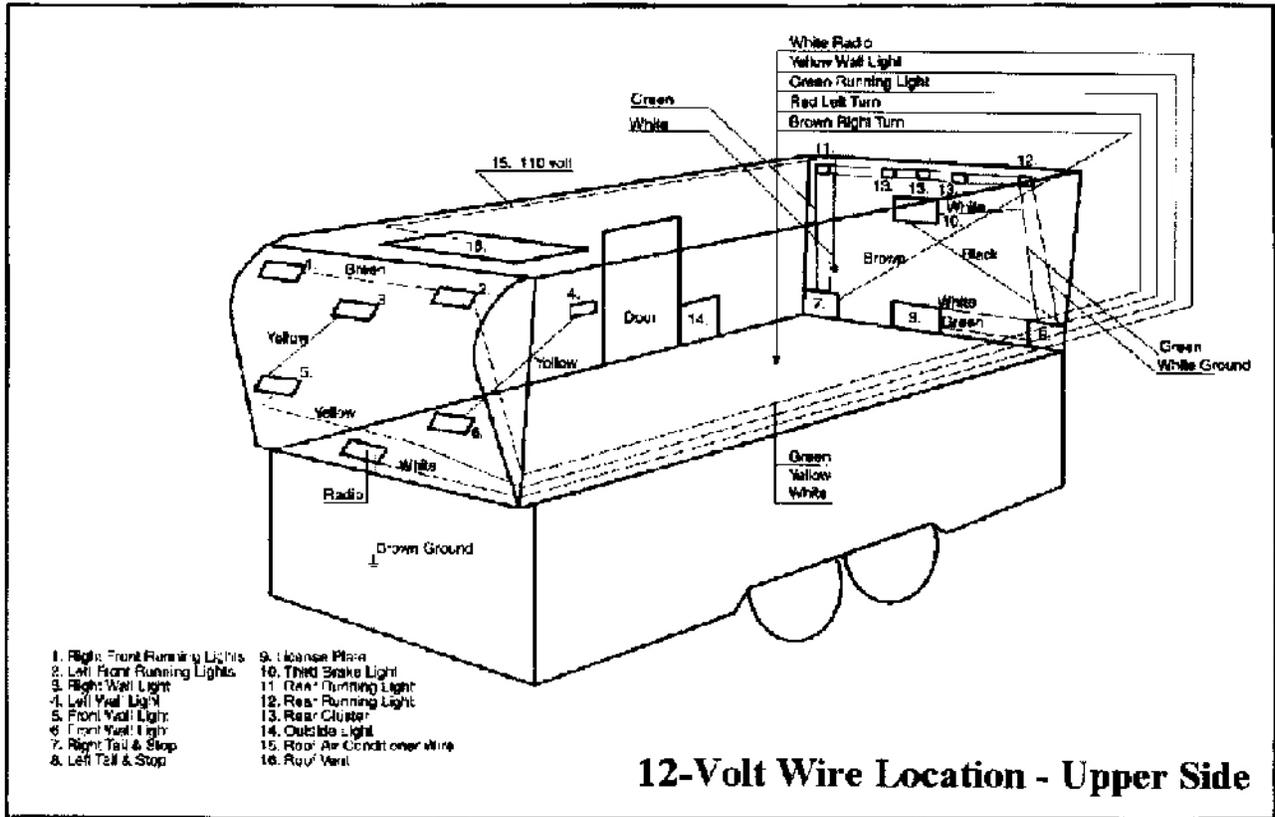


Drawing A 12-VOLT SCHEMATIC LOWER SECTION



Drawing B 12-VOLT SCHEMATIC CAR - TRAILER CONNECTION





7. HYDRAULIC LIFTING SYSTEM



Figure 1

7.1 Electric/Hydraulic Power lifting Unit

This unit is located in the A-frame compartment. It consists of the following elements: 1. Electric Motor, 2. Solenoid start switch, 3. Filler breather port, 4. Reservoir, 5. Relief valve, 6. Manual release knob, 7. 3/8 NPTF pressure port, 8. Electric release valve. This complete unit is factory adjusted and preset for smooth and efficient operation. It should require no further adjustment. However, for your information, here are some facts about the unit, which may prove useful in the future.

7.2 Electric Motor

A standard DC Prestolite starter motor operates the hydraulic pump. While it should seldom need servicing or replacement, an automotive supply house can supply a replacement in an emergency.

7.3 Raising Solenoid

Engaged by raising control switch, the solenoid completes the circuit to supply power to the pump.

7.4 Hydraulic Pump

The hydraulic pump is close-coupled to the electric motor. It is capable of producing up to 3,000 PSI; however, the raising mechanism of your Hi-Lo trailer requires much less for efficient operation. This unit includes a by-pass valve that operates when the hydraulic lifting cylinder has reached its maximum thrust. The by-pass is a built-in safety device to prevent damage- A harmless "squeal" will be detected when it is activated to indicate the top section is fully raised into position.

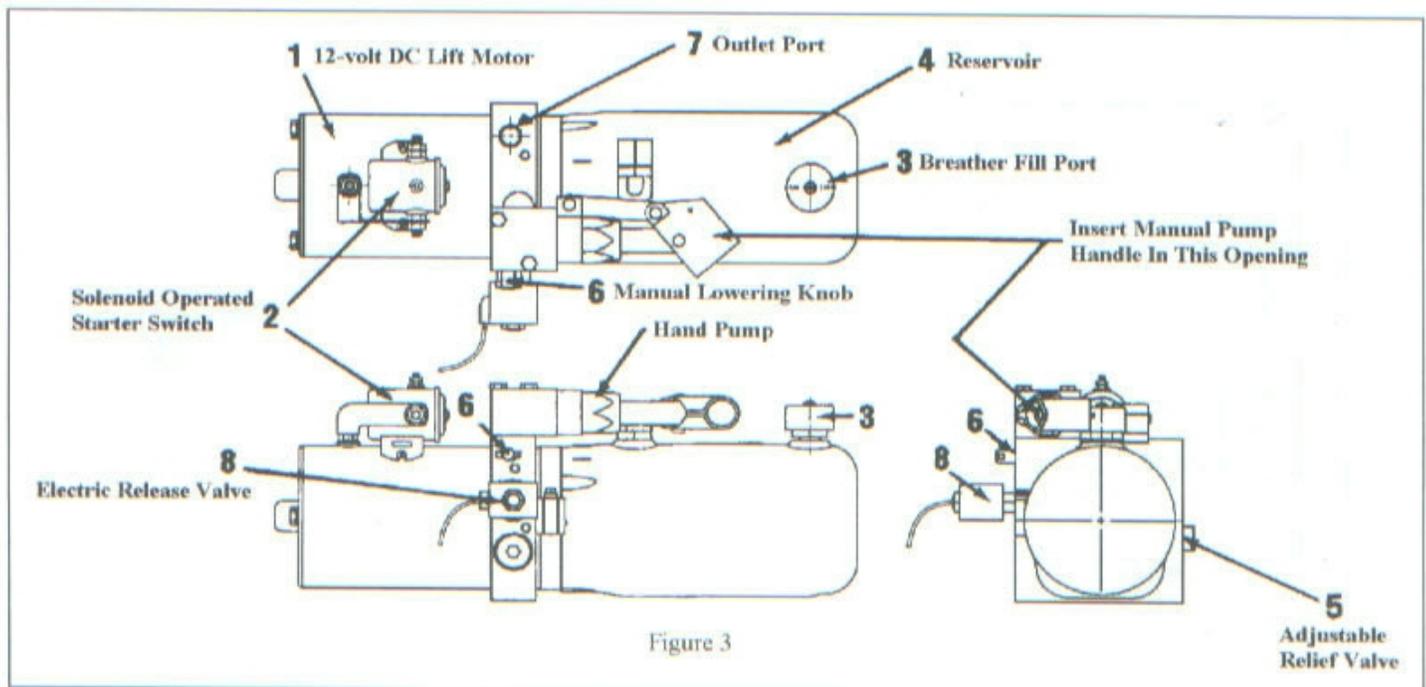


Figure 3



Figure 1

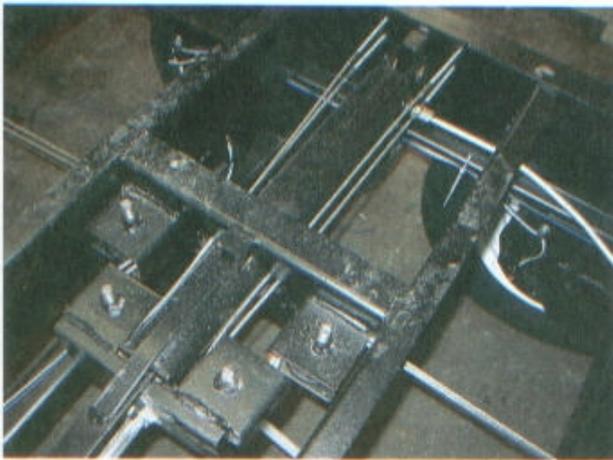


Figure 2



Figure 3

7.5 Lowering Solenoid Valve

The valve is engaged by depressing the up/down lift control switch at the entrance door or by turning manual lowering knob counter clockwise on the lowering valve (see figure 3). This valve has been preset at the factory for a lowering time of 12 seconds.

7.6 Safety Bar

When raising the top section to the raised position, make sure safety bar engages. This can be accomplished by moving the telescoping switch to the down position. If the top section does not lower, then the safety bar is latched. Lift telescoping switch to pressurize hydraulic cylinder.

7.7 Hydraulic Cylinder

The cylinder that raises your Hi-Lo is located in a transverse position and mounted in the center of the frame assembly. The unit is readily accessible from the trailer underside. As with the pump and other elements of the lifting system, it is rated well- beyond maximum requirements to insure dependable performance.

7.8 Cable Lifting Assembly

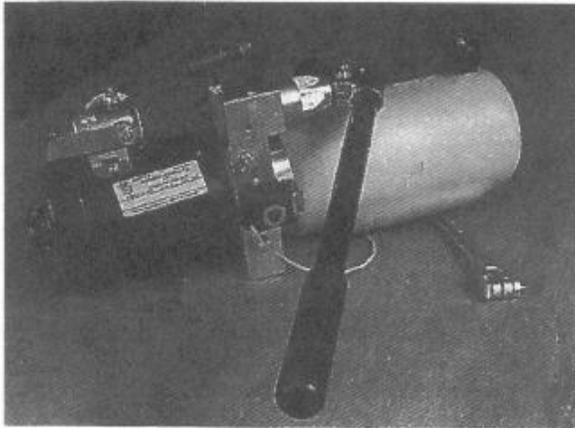
Aircraft-type cables operate from the hydraulic cylinder and perform the actual raising of the upper section.

The upper section of your Hi-Lo is also equipped with nylon guide assemblies and the bottom section with matching trunnion guides to keep the upper and lower sections in proper alignment at all times.

7.9 Trouble Shooting Hi-Lo Lift Mechanism

I. Top Will Not Raise - Lift Motor Will Not Run

- A. **Low or Dead Battery** - Attach jumper cable from a charged battery to the trailer battery. (Positive post to positive post - Negative post to chassis ground). If the motor now runs, check to be sure you are getting ample charge from the connector system and to the tow vehicle charge line.
- B. **Blown Fuse** - Replace blown fuse located in the circuit panel of the converter system. Check for short in wire between fuse and motor solenoid.
- C. **Loose Wire Connection** - Tighten all connections at the battery and motor terminals. Check to be sure that the wire and the terminal connection is crimped properly.
- D. **Defective Toggle Switch** - Remove the panel housing of the toggle switch, lift the toggle switch to the raising position and with a 12 volt test lamp test for 12 volt current supply between the yellow wire and the ground. If the light does not light and you have voltage at the black wire, replace the toggle switch.
- E. **Defective Motor Solenoid** - Using a jumper wire, jump between the battery terminal of the solenoid and the switch control terminal. The solenoid should click indicating a response from the magnet. If it does not click be sure that the solenoid is properly grounded to the motor chassis. Next, with a heavier jumper wire, jump between the two larger terminals of the solenoid. If the motor runs, the solenoid is defective, replace it.
- F. **Worn Motor Brushes** - Remove end cap from motor and inspect the brush assemblies. Clean and lubricate brushes and if *necessary* replace brushes.



MANUAL LIFT SYSTEM – BACK UP

The back-up system is designed as a manual way of raising your trailer in case of a dead battery. It will take approximately 140 strokes of the pump at a force of 40 foot-pounds. **Caution should be taken that you do not over exert, especially if you have poor health.**

2. Top Will Not Raise - Lift Motor Runs

- A. **Low On ATF Fluid** - Check to be sure fluid level is within one inch from the top of the reservoir with the trailer in the lowered position.
- B. **Lowering Valve Stuck In Open Position Or Needs Adjusting** (see 7.5) Check to be sure that the manual lowering valve knob is turned clockwise and is not on a partially open position. Lift the toggle switch to run the motor and simultaneously turning manual lowering knob counter clockwise in an attempt to raise and lower the trailer at the same time. This will force the fluid through the lowering valve at high pressure and clean out any debris that may have lodged in the valve.
- C. **Air In Pump Chamber** - Air in the pump chamber will result when running the pump when the fluid level is not at its filled position as the trailer is lowered. This will result in a gravelly sound when the pump is running. Lower the trailer and keep the switch in the lowering position for 60 seconds so that the air can bubble out of the pump into the reservoir, then acid fluid to the proper level.
- D. **Pressure Relief Settings Too Low** - To adjust pressure, a pressure gauge with a reading of up to 3000 lbs. should be used. Remove 1/4" pipe plug from tee on top of pump and install gauge. Proper settings should be approx. 15000 lbs. maximum. To adjust pressure, loosen lock nut on lower rear of pump. To increase pressure turn Alan screw 1/4 turn clockwise for each 200 lbs.

3. Safety Bar Will Not Release

- A. **Locked in Safety Position** - To remove pressure off of safety bar, lift toggle switch to raise the top section. Pull on safety release cable and depress lift switch. If trailer top does not rise to release safety bar, then follow steps under trouble-shooting "Top Will Not Raise."
- B. **Dirt on Top of Safety Bar** - From the underside of the trailer, inspect the safety release bar, which lies on top of the cylinder rod assembly. Remove any dirt, which may have been lodged on top of the safety bar.
- C. **Broken Release Cable** - A replacement cable will have to be strung through the safety bar housing and attached to the safety release bar.

4. Lowering Valve Inoperative

- A. **Low or Dead Battery** - Follow instructions for item 1.A.
- B. **Blown Fuse** - Follow instruction for item 1.B.
- C. **Loose Wire Connection** - Follow instruction for item 1.C.
- D. **Defective Toggle Switch** - Follow instructions for item 1.D except test the red wire to ground.
- E. **Dirt in Lowering Valve** - Follow instructions for item 2.B.

7.10 Servicing Hydraulic Lifting System

The hydraulic lifting system had been tested by Hi-Lo and proven in over 35 years of actual use. Here are a few helpful hints in the unlikely event you encounter a problem with your Hi-Lo trailer:

1. If top section will not raise, first check the steps in raising procedure.
2. If the pump motor will not run, check the battery connections for tightness. (Be sure there is a good ground to motor mechanism.) Turn on trailer lights to see if you have power. If the lights go out when you operate the toggle for the switch for the motor, the battery is low and is in need of a charge, also check to be sure the raising solenoid is operating properly.

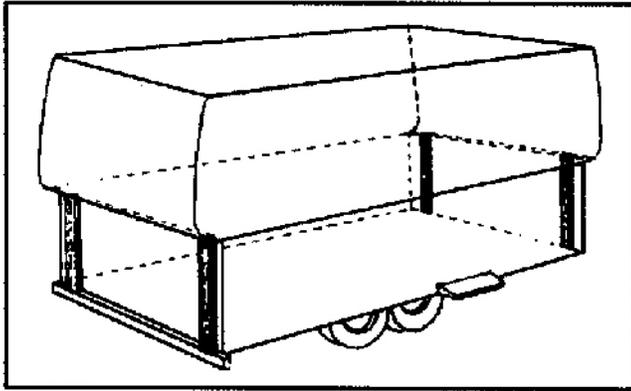
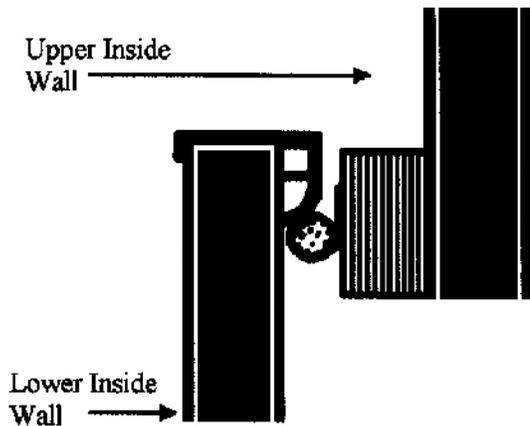
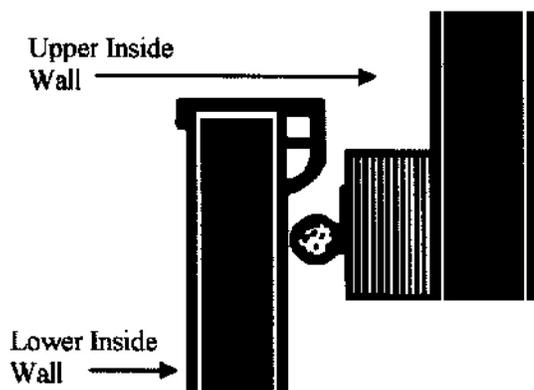


Figure 4

Proper Seal
Side Wall



Improper Seal
Side Wall



3. If motor runs, but pump does not raise trailer, check the fluid level in the pump reservoir. Fluid level should be approximately 1 inch from the top when trailer is in the "down" position. If low, add necessary amount. Use only type A or DEXRON 11 automatic transmission fluid. Be sure it is clean and avoid over filling. If fluid level is extremely low, check for leaks around the pump, at lifting cylinder, and the connecting hose.
4. If top section appears to be out of level when raised, check by measuring from the bottom edge of the trailer body. Distance should be the same on all four corners. If it is uneven, it is probably due to normal stretch of the cables and should be corrected as follows:

Check the leveling adjustment points for simple front and back realignment, adjust the proper adjusting nut located on the underside of the trailer. All front to back adjustments should be made with the trailer upper section supported so that tension is removed from the cables - accomplished by lowering the upper section onto four 2"x4" boards of the same length to brace between the section and frame member.

For example, if the front section is lower than the rear, you will correct this condition as follows:

- A. Lower the top section onto 2"x4" boards. Refer to Fig. 4
- B. Loosen the locking nut.
- C. Turn the front adjusting nut until all slack in cable is taken up.
- D. Tighten the locking nut.
- E. Raise trailer; remove 2X4 boards and check for proper alignment.

If one corner of the trailer is low, it may be corrected as follows:

- A. Lower the top section onto the 2"x4" boards.
- B. Loosen the locking nut on the appropriate cable.
- C. Adjust nut to take up slack in cable,
- D. Tighten locking nut on cable.
- E. Raise trailer; remove 2"x4" boards, and check for proper alignment.

5. If the upper section will not lower, release safety bar. (Follow lowering procedure). If safety bar does not release and lift motor runs and makes a squeal, the unit may be low on hydraulic fluid.

6. If the safety bar does not release and lift motor runs and does not make a squeal, the lowering valve is blocked in open position.

A. Dirt in Valve: Run lift motor for 10 sec. (At 1 min. intervals), 4 times to dislodge any dirt that maybe in the lowering valve

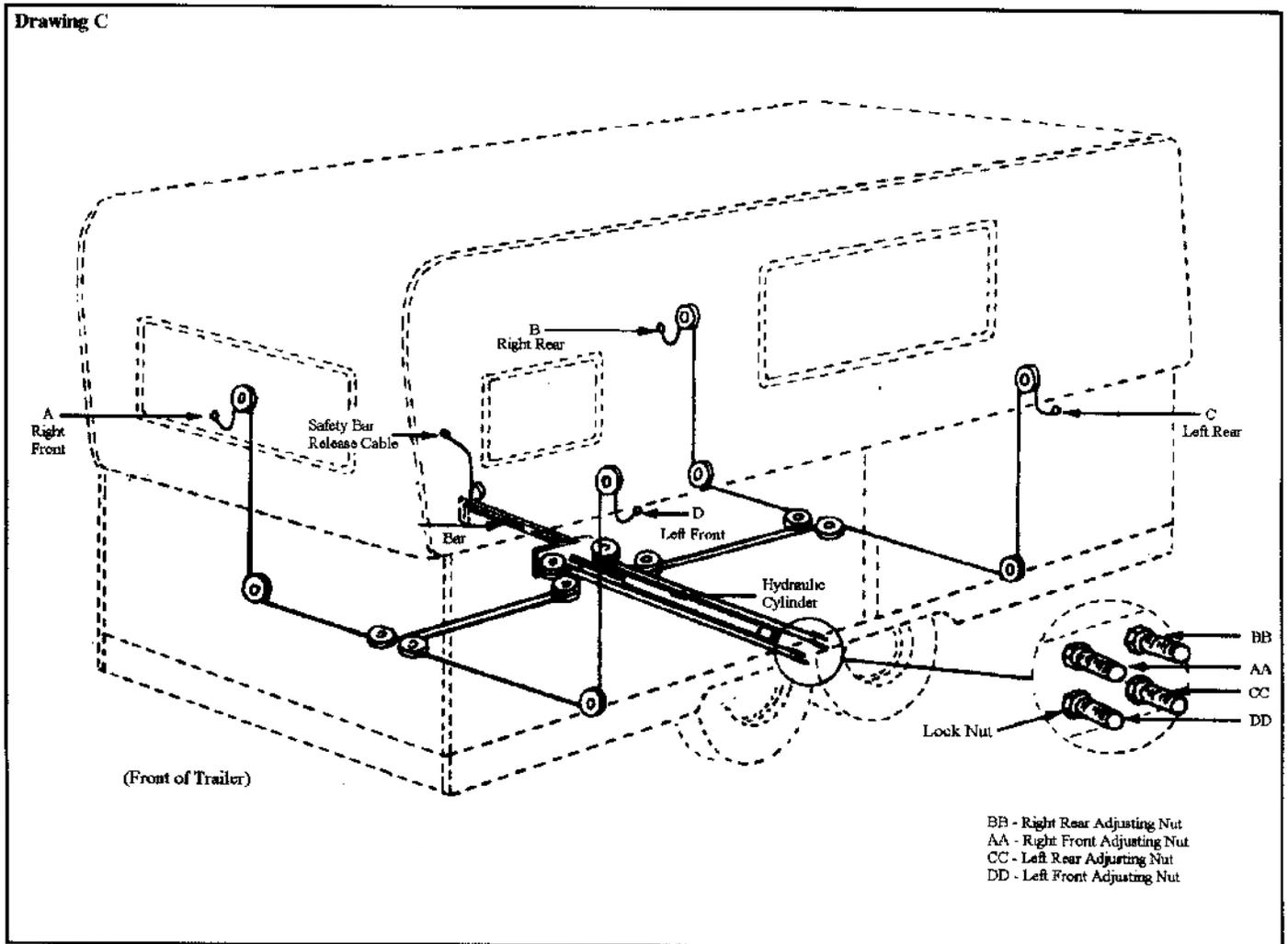
B. Manual Release Valve Open; Be sure manual release knob is clockwise and not in partially open position.

C. Check Toggle Switch: With switch in center (off) position or in raising (up) position there should be no 12-volt supplied to the terminal to which the yellow wire is attached. Twelve volt should be supplied to this terminal only when switch is in lowering (down) position. (Drawing "A" 12-volt schematic lower section 6.12). If toggle switch does not follow this pattern - replace switch. For temporary operation: To raise trailer off of safety release, use a screwdriver to short between black and white wire. To lower, short between black and yellow wire.

7. If safety bar releases and trailer will not lower:

- A. Check all cables to be sure that the cable is in pulley grooves.
- B. Lower trailer with manual valve. Turn manual lowering knob counter clockwise until trailer lowers. Then release knob to original position. Then raise trailer half way and try toggle switch. This releases high pressure that may have generated in lowering valve.
- C. Check ground wire from lowering valve to motor bracket. Be sure terminals are tight.
- D. With 12-volt test light, check center terminal (Black wire) of toggle switch to ground. If no light, check fuse 3 or check for broken wire between toggle switch and fuse block.
- E. Using screwdriver, short between black and yellow wire of toggle switch. If valve operates - replace toggle switch.
- F. Check connection at black lead wire of lowering valve to red wire of toggle switch for broken wire or loose terminal.
- G. Replace lowering valve.

Drawing C



8. PLUMBING



Figure A City Water Hookup



Figure B Fresh Water Fill

Note: If your trailer is equipped with an outside shower, care must be taken to be sure it is turned off and stowed properly when not in use, or it may leak and may cause damage to your trailer.

8.1 Fresh Water Tank

Fresh water is provided from one of two sources:

1. City water, provided under pressure when trailer is hooked up to a park or city water supply.
2. Water stored in an on-board water tank supplied by a pump operating automatically from your 12-volt electrical system.

A tank for your water supply is standard equipment. This tank is located at the front end and is filled through your city water connection.

8.2 External Water Supply

When camped in a park or near a city water supply, connect your trailer as follows

1. Turn water pump off.
2. Remove protective cap over city water inlet (Figure A)
3. Connect water hose to your trailer inlet and to the city water supply line (Figure A).
4. Turn external water supply source valve on.
5. Let the water run few minutes with your supply line attached to clean the lines.

Note: Both the on-board pump and on-board fresh water tank are now isolated from the water pressure in the system. Do not turn pump on until line is disconnected to avoid damaging the water pump.

Use the following procedure to disconnect the city water supply:

1. Turn external water supply source valve off.
2. Disconnect the water supply hose from your trailer inlet connection and replace inlet protective cap. If the on-board tank is to be filled, go to step (3). If not, store the supply hose.
3. Fill the fresh water on-board tank from the city water source then remove and store the hose.

8.3 Filling Fresh Water Supply

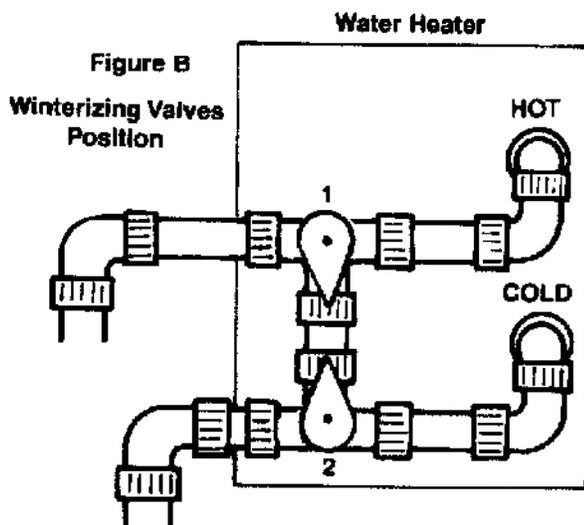
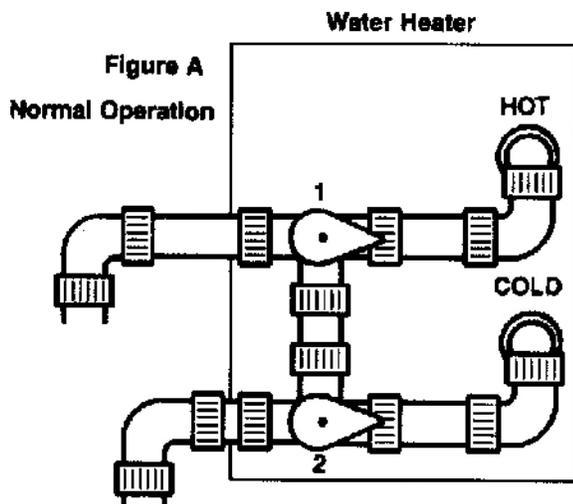
The on-board fresh water supply in your trailer provides fresh water automatically to all systems whenever a faucet is opened. A 12-volt automatic self-priming water pump provides water. This pump functions any time battery power is available and the pump switch is on. Fill the water tank by placing your water supply hose in the city water fill inlet (Figure B). Once the water tank is filled, turn the water pump on to pressurize the water system.

Avoid leaving water in tank when it is not in use. Turn the water pump off before draining water tank. For prolonged storage and during the winter months, this tank should be drained completely by opening valves at tank.

Note: The water system should be sanitized, flushed and drained before using.

8.4 Sanitizing Potable Water System

To assure complete sanitation of your potable water system it is recommended that the following procedures be followed on a new system, one that has not been used for a period of time, or one that may have become contaminated:



Note: Valve 1 in figures A and B has been reversed in the drawing for your clarity. Your valve A will be facing the water heater.

1. Prepare a chlorine solution using one gallon of water and $\frac{1}{4}$ cup of Clorox or Purex household bleach (5% sodium hypo chlorite solution). Pour one gallon of solution into tank for each 15 gallons of tank capacity.
2. Complete filling of tank with fresh water. Open each faucet and drain cock until all air has been released from the pipes and entire system is filled.
3. Allow the solution to stand for three hours.
4. Drain and Flush with potable fresh water.
5. To remove any excess chlorine taste or odor, which may remain, prepare a solution of one-quart vinegar to five gallons water and allow this solution to agitate in tank for several days by vehicle motion.
6. Drain the tank and again flush it with potable water.

8.5 Winterizing Water System

1. Open all interim valves, sink, shower, etc.
2. Drain supply tank by opening valve at front of tank.
3. Lower front of trailer by cranking down with jack.
4. Your Hi-Lo is equipped with a manual by-pass system shown at left.
5. See figure A for normal operation. Valves 1 and 2 open.
6. See figure B for winterizing. Valve 1 and 2 closed.
7. To winterize be sure valves are in the Figure B position. Pour about two gallons of RV antifreeze in the fresh water tank. Using your 12-volt pump, draw the antifreeze through the entire water system, opening each outlet until antifreeze (red solution) appears.
8. To winterize the hot water tank, open drain valve and pressure relief valve at front of tank. This is located back of cover at front of trailer under pilot light. Open drain plug in on the outside portion of the water heater and allow it to drain before re-inserting the plug.

8.6 Waste Water System

Your Hi-Lo trailer has a self-contained drainage system in which waste water and sewage go directly to separate holding and sewage tanks. All of the plumbing fixtures in the trailer are usable even when the drain is capped.

Wastewater and sewage enter the holding tanks to be retained until the tanks can be emptied into a disposal area.

8.7 Toilet

Your Hi-Lo is equipped with a mechanical seal type toilet. The instruction booklet accompanying these units should be reviewed carefully before use.

8.8 Waste Water Draining

If your campsite is equipped with drain facilities or dumping station, drain your body waste holding tank and wastewater tank as follows:

1. Pull the flexible hose from its storage compartment.
2. Remove the termination cap.
3. Install the drain hose on the termination fitting and place the other end well into dumping station fitting,
4. Pull out the large slide valve lever.
5. Allow body waste tank sufficient time to completely drain.
6. Pull out the small slide valve lever.
7. Allow wastewater tank sufficient time to completely drain, also this will help rinse sewage that might collect to flexible



hose when the body waste tank was drained.

8. Flush both tanks with clean water and allow them to drain.
 9. Push in both large and small slide valve levers to the closed position.
 10. Remove flexible hose from termination fitting and rinse out hose with fresh water, then remove hose from dumping station.
 11. Replace termination cap to trailer and dumping station cover.
 12. Stow sewer flexible hose to rear bumper storage.
- Note: All drain caps must be in place while in transit.
Note: Do not pull either slide valve levers open when the termination cap is in the secured position.

8.9 Deodorizing Waste Tank

Keep your holding tanks clean using any cleaner approved for recreational vehicle sanitation systems.

Add a special deodorizer or chemical additive approved for recreational vehicle systems to sanitize and improve the tank action.

8.10 Winterizing Waste Water System

Toilet - Drain, and depress pedal until antifreeze appears in bowl.

Holding Tanks - Drain and rinse. Close valves.

Slide Valves - Examine the shaft of the slide valve and apply metal lubricant if needed.

8.11 Shower

For your protection the shower faucet is equipped with a vacuum breaker (back flow preventer) to prevent contamination of your potable water supply. The water in the hand held shower hose will drain through this vacuum breaker when the faucet is turned off. **THIS IS NOT A LEAK.** This drainage is inherent in the design of the vacuum breaker, and is evidence that it is functioning properly.

9. APPLIANCE OPERATION AND CARE

9.1 3-Way/Electric Refrigerator

Your Hi-Lo is equipped with a 3-way refrigerator and there is an instruction booklet inside trailer. We recommend you read and follow the instructions for most efficient operation of this unit.

Before starting a trip, plug in the utility cord at your home about six hours before leaving. Switch the refrigerator to 110V. This will insure that the refrigerator is cold before you start your journey. Be sure the trailer is in the raised position. **Do not operate refrigerator over one hour while trailer is in lowered position unless the vehicle is in motion.** Once on the highway, switch to 12-volt operation until you get to your destination. When you arrive, switch to L.P. Gas or 110-volt operation.

Note: If the refrigerator voltage selector is accidentally left on 12-volt, it will result in a discharged battery.

9.2 Microwave/Range Combination

If your Hi-Lo includes a microwave/range unit, you will find an operating guidebook in your owner's kit. Be sure to read it carefully and follow directions step by step.

9.3 Range Exhaust Hood

If your Hi-Lo is equipped with a range exhaust hood, a simple on and off switch operates it. The hood has a grease filter screen protecting the fan, which will require periodic cleaning. To clean, remove the screen and wash in soapy water. Rinse with water and let the screen drain dry. Replace the clean filter in the exhaust hood. To operate exhaust fan you must first unlatch exterior vent cover.

9.4 Automatic Gas Hot Water Heater

Units equipped with a propane fueled water heater will include an instruction manual in the owner's kit. This unit should be turned off while in transit or whenever the trailer is in the lowered position.

Note: An additional plate concerning the Hi-Lo unit's gas piping is located on the front of the trailer adjacent to the mounting for the gas bottles.

9.5 Furnace

Your Hi-Lo is equipped with forced air furnace, which operates on propane. It is equipped with a sealed combustion chamber and has an automatic ignition system that is designed for safety and efficiency. You will find an operating manual in your owner's kit. Be sure to read it carefully and follow its instructions. Also be sure the gas is shut off during transit. The furnace requires 12-volt DC current to operate blower and automatic ignition. If the furnace is operating in absence of 115-volt power source, it will discharge 12-volt storage battery.

Note: To operate furnace, the on/off switch under the thermostat should be on. Switch should be in the off position when not in use.