

# *Allegro Bus*

Built by  
Tiffin Motorhomes, Inc.

- 5) Remove battery cables. Clean terminals, top and sides of batteries and battery boxes. Reinstall cables, dress with a plastic ignition spray.
- 6) Drain holding tanks, toilet, and living area water systems. Turn off water pump and water heater master switches.
- 7) Turn off LP gas at tank valve.
- 8) Turn off refrigerator and furnace.
- 9) Turn all range and oven burner valves and pilot valves (if equipped) off.
- 10) Remove all perishables from refrigerator and galley cabinets. Block refrigerator open to reduce odor buildup. An open box or tray of baking soda in the refrigerator will help absorb odors.
- 11) Open closet doors, drawers, and cabinets so air can circulate through them.
- 12) Slightly open one window toward the front and one toward the back for ventilation.
- 13) Close all roof vents. Be sure vent fan and range hood fan switches are off.
- 14) Cover exterior vents (water heater, furnace, range hood, refrigerator) to prevent insects from getting in. Be sure to remove all covering material before using appliances or vents.
- 15) Cap or close holding tank drain, city water inlet and fresh water fill spout.
- 16) Turn off all radios, TVs, interior and exterior lights.
- 17) Close drapes and curtains.
- 18) Check motor home weekly. Start and run the engine for about 15 minutes weekly. Check engine oil, transmission fluid, coolant levels.

#### **LONG-TERM STORAGE ABOVE FREEZING**

- 1) Perform all the preceding, except run engine to normal operating temperature. Drain engine oil, replace filter, refill engine with fresh oil. Operate air conditioner to lubricate compressor seals.
- 2) Remove windshield wiper blades and store them inside the motor home.
- 3) Disconnect batteries and check charge (Specific Gravity) with a hydrometer every 30 days. Recharge if necessary. Note: Be sure to mark each wire so you can return it to its original location.
- 4) Rather than run the engine every week, run the engine every 30 days. Turn the vehicle air conditioner ON during this run. Check fluid levels as for Short-term Storage.
- 5) Shield tires from direct sunlight.
- 6) Check tire inflation pressure every 30 days. Maintain maximum rated cold inflation pressure.
- 7) Remove high grass and weed growth.

## **IMPORTANT NOTICE**

Certain of our forest product suppliers have advised that urea-formaldehyde is used in the production of particle board, hardwood plywood or paneling which they supply us and which we utilize in our finished product. These suppliers have requested that we communicate this to our customers.

For your information, we are reproducing samples of statements which have been provided to us by our suppliers.

**WARNING:** THIS PRODUCT IS MANUFACTURED WITH UREA-FORMALDEHYDE RESIN. FORMALDEHYDE VAPOR MAY IN SOME PEOPLE CAUSE HEADACHES, EYE, NOSE AND THROAT IRRITATION, AND AGGRAVATION OF ALLERGIES AND RESPIRATORY PROBLEMS, SUCH AS ASTHMA. PROPER VENTILATION SHOULD REDUCE THE RISK OF SUCH PROBLEMS  
—Champion International Corporation

**WARNING:** IRRITANT: THIS PRODUCT CONTAINS A UREA-FORMALDEHYDE RESIN AND MAY RELEASE FORMALDEHYDE VAPORS IN LOW CONCENTRATIONS. FORMALDEHYDE CAN BE IRRITATING TO THE EYES AND UPPER RESPIRATORY SYSTEM OF ESPECIALLY SUSCEPTIBLE PERSONS SUCH AS THOSE WITH ALLERGIES OR RESPIRATORY AILMENTS. USE WITH ADEQUATE VENTILATION, IF SYMPTOMS DEVELOP, CONSULT YOUR PHYSICIAN.  
—Georgia-Pacific Corporation

**WARNING:** THIS PRODUCT IS MANUFACTURED WITH A UREA-FORMALDEHYDE RESIN AND WILL RELEASE SMALL QUANTITIES OF FORMALDEHYDE. FORMALDEHYDE LEVELS IN THE INDOOR AIR CAN CAUSE TEMPORARY EYE AND RESPIRATORY IRRITATION, AND MAY AGGRAVATE RESPIRATORY CONDITIONS OR ALLERGIES. VENTILATION WILL REDUCE INDOOR FORMALDEHYDE LEVELS.  
—Weyerhaeuser Company

Ventilation is important in maintaining a comfortable environment and we direct your attention to the discussion of ventilation contained in your Owner's Manual.

## **SAFETY REGULATIONS REGARDING LP GAS SYSTEMS AND LP GAS APPLIANCES**

The manufacturer of this recreational vehicle is required to furnish the following consumer information as provided by the National Fire Prevention Association and the American National Standards Institute. The information and warnings found here may also be found in other sections of this Owner's Manual. Please see sections "Liquid Petroleum Gas System" and "Appliances" for other safety and operating information.

**WARNING:** LP GAS CONTAINERS SHALL NOT BE PLACED OR STORED INSIDE THE VEHICLE. LP GAS CONTAINERS ARE EQUIPPED WITH SAFETY DEVICES WHICH RELIEVE EXCESSIVE PRESSURE BY DISCHARGING GAS TO THE ATMOSPHERE.

**WARNING:** IT IS NOT SAFE TO USE COOKING APPLIANCES FOR COMFORT HEATING. COOKING APPLIANCES NEED FRESH AIR FOR SAFE OPERATION, BEFORE OPERATING:

1. OPEN OVERHEAD VENT OR TURN ON EXHAUST FAN, AND
2. OPEN WINDOW.

THIS WARNING LABEL HAS BEEN LOCATED IN THE COOKING AREA TO REMIND YOU TO PROVIDE AN ADEQUATE SUPPLY OF FRESH AIR FOR COMBUSTION. UNLIKE HOMES, THE AMOUNT OF OXYGEN SUPPLY IS LIMITED DUE TO THE SIZE OF THE RECREATIONAL VEHICLE. PROPER VENTILATION WHEN USING THE COOKING APPLIANCE(S) WILL AVOID DANGERS OF ASPHYXIATION. IT IS ESPECIALLY IMPORTANT THAT COOKING APPLIANCES NOT BE USED FOR COMFORT HEATING AS THE DANGER OF ASPHYXIATION IS GREATER WHEN THE APPLIANCE IS USED FOR LONG PERIODS OF TIME.

**WARNING:** PORTABLE FUEL-BURNING EQUIPMENT, INCLUDING WOOD AND CHARCOAL GRILLS AND STOVES, SHALL NOT BE USED INSIDE THIS RECREATIONAL VEHICLE. THE USE OF THIS EQUIPMENT INSIDE THE RECREATIONAL VEHICLE MAY CAUSE FIRES OR ASPHYXIATION.

**WARNING:** DO NOT BRING OR STORE LP GAS CONTAINERS, GASOLINE, OR OTHER FLAMMABLE LIQUIDS INSIDE THE VEHICLE BECAUSE A FIRE OR EXPLOSION MAY RESULT.

A warning label has been located near the LP gas container. This label reads: DO NOT FILL CONTAINER(S) TO MORE THAN 80 PERCENT OF CAPACITY.

Overfilling the LP gas container can result in uncontrolled gas flow which can cause fire or explosion. A properly filled container will contain approximately 80 percent of its volume as liquid LP gas.

The following label has been placed in the vehicle near the range area: IF YOU SMELL GAS:

1. Extinguish any open flames, pilot lights and all smoking materials.
2. Do not touch electrical switches.
3. Shut off the gas supply at the tank valve(s) or gas supply connection.
4. Open doors and other ventilating openings.
5. Leave the area until odor clears.
6. Have the gas system checked and leakage source corrected before using again.

LP gas regulators must always be installed with the diaphragm vent facing downward. Regulators that are not in compartments have been equipped with a protective cover. Make sure that regulator vent faces downward and the cover is kept in place to minimize vent blockage which could result in excessive gas pressure causing fire or explosion.

# FULL ONE-YEAR/12,000 MILE LIMITED WARRANTY

FOR MOTOR HOMES MANUFACTURED BY TIFFIN MOTOR HOMES, INC. SOLD IN THE UNITED STATES

## COVERAGE PROVIDED

Your new motor home, including the structure, plumbing, heating and electrical systems, and appliances and equipment installed by the manufacturer, is warranted under normal use to be free from manufacturing defects in material or workmanship.

The warranty extends to the first retail purchaser and begins on the date of original retail delivery or the date the motor home is first placed into service as a rental, commercial or demonstrator unit (whichever occurs first). The warranty extends for a period of one year from such date or until the unit has 12,000 total miles of use as determined by the mileage shown on the odometer (whichever occurs first). Written notice of defects must be given to the selling dealer or the manufacturer not later than ten (10) days after the expiration of the applicable warranty period.

## OWNER'S OBLIGATIONS

The owner is responsible for normal maintenance as described in the Owner's Manual; however, minor adjustments (such as adjustments to the interior of exterior doors LP regulator pressure, cabinet latches, TV antenna control, etc.) will be performed by the dealer during the first 90 days of warranty coverage. Thereafter, such adjustments are the responsibility of the owner as normal maintenance unless required as a direct result of repair or replacement of a defective pad under this warranty.

If a problem occurs which the owner believes is covered by this warranty, the owner shall contact the SELLING DEALER, or other authorized dealer, giving him sufficient information to resolve the matter. The owner shall deliver the motor home to the DEALER or manufacturing plant location for warranty service.

## DEALER'S OBLIGATIONS

By agreement with the manufacturer, the dealer is obligated to maintain the motor home prior to retail sale, to perform a detailed pre-delivery inspection and to repair or replace any parts necessary to correct defects in material or workmanship.

## WHEN THE DEALER DOES NOT RESOLVE THE PROBLEM

If the dealer is unable or unwilling to resolve a problem which the owner is convinced is covered by the warranty, he should contact the MANUFACTURING PLANT at the address listed below and provide the manufacturer with a description in writing of the problem and attempts made to resolve it.

## MANUFACTURING PLANT OBLIGATIONS

Upon receipt of notice of a claim, where the dealer is unable or unwilling to resolve the problem, the manufacturing plant will repair or replace any parts necessary to correct defects in material or workmanship, or will take other appropriate action as may be required.

## WHEN THE MANUFACTURING PLANT DOES NOT RESOLVE THE PROBLEM

If the representatives of the manufacturing plant are unable to resolve the problem and the owner is convinced that it is covered by the warranty, the owner should contact the plant.

## WHAT IS NOT COVERED BY THE EXPRESS WARRANTY

THIS WARRANTY DOES NOT COVER:

1. THE AUTOMOTIVE SYSTEM (INCLUDING THE CHASSIS AND DRIVE TRAIN), TIRES AND BATTERIES, WHICH ARE COVERED BY THE SEPARATE WARRANTIES OF THE RESPECTIVE MANUFACTURERS OF THESE COMPONENTS.
2. DEFECTS CAUSED BY OR RELATED TO:
  - A. ABUSE, MISUSE, NEGLIGENCE OR ACCIDENT;
  - B. FAILURE TO COMPLY WITH INSTRUCTIONS CONTAINED IN THE OWNER'S MANUAL;
  - C. ALTERATION OR MODIFICATION OF THE MOTOR HOME;
3. NORMAL DETERIORATION DUE TO WEAR OR EXPOSURE, SUCH AS FADING OF FABRICS OR DRAPES, CARPET WEAR, ETC.
4. NORMAL MAINTENANCE / SERVICE ITEMS, SUCH AS LIGHT BULBS, FUSES, WIPER BLADES, LUBRICANTS, ETC.
5. MOTOR HOMES ON WHICH THE ODOMETER READING HAS BEEN ALTERED.
6. TRANSPORTATION TO AND FROM DEALER OR MANUFACTURING PLANT LOCATION, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOSS OF USE, TOWING CHARGES, BUS FARES, CAR RENTAL, INCIDENTAL CHARGES SUCH AS TELEPHONE CALLS OR HOTEL BILLS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY UNDERTAKING, REPRESENTATION, OR WARRANTY MADE BY ANY DEALER OR OTHER PERSON BEYOND THOSE EXPRESSLY SET FORTH IN THIS WARRANTY.

Brand Name: \_\_\_\_\_ Model: \_\_\_\_\_ Serial No.: \_\_\_\_\_

**TIFFIN MOTOR HOMES, INC.**

P.O. Box 596 • 502 4th Street NW • Red Bay, AL 35582

1-256-356-8661

## INTERIOR CARE AND MAINTENANCE

### CLEANING UPHOLSTERY AND DRAPES

Professionally clean only. Frequent vacuuming or light brushing between cleanings will help prevent accumulation of dirt and grime. Use of a water-based or detergent based cleaners may cause shrinking or other fabric damage. Water stains may become permanent. **WARNING:** Do not use lacquer thinner, nail polish remover, carbon tetrachloride, spot remover, gasoline, or naphtha for any cleaning purpose. These products may cause damage to the material being cleaned, and may be highly flammable or poisonous.

### WALL AND CEILING MATERIAL

The paneling and the ceiling of your motor home may be any of several finishes and textures. Never use harsh detergents or abrasive cleaners on walls or ceilings. Most surfaces will clean with a soft cloth moistened with mild liquid detergent in warm water. Do not use large amounts of water which could saturate the material.

### CARPETING

Vacuum carpeting regularly, and clean it with a quality carpet cleaner.

## PREPARING THE MOTOR HOME FOR LONG-TERM STORAGE

### STORAGE CHECKLISTS

The following check lists will help you perform the steps necessary to prepare your motor home for storage. Storage conditions vary, and two check lists are provided: Short-term storage above freezing and long-term storage above freezing. Use the check list that applies to the storage conditions you anticipate. These check lists cannot include every detail required and you may want to expand them to suit your needs.

#### SHORT-TERM STORAGE (LESS THAN 60 DAYS) ABOVE FREEZING

- 1) Wash the motor home exterior and underside. Hose off accumulations of mud and road salts. Rinse the exterior weekly to remove accumulations of dust and debris.
- 2) Inflate tires to maximum rated cold pressure.
- 3) Park the motor home as level as possible front to rear and side to side. Block wheels front and rear, and leave the parking brake OFF.
- 4) Check the charge in both the vehicle and auxiliary batteries with a hydrometer. Hydrometer reading should be 1.255. Add colorless, odorless drinking water if necessary, and charge to a reading of 1.255.

Lubricate locksets, latches and hinges in entry doors and exterior storage compartments at least annually with powdered graphite. If the motor home is located at a beach or is exposed to salt air, more frequent lubrication may be required.

### SEALANT RENEWAL

The adhesives and sealants used in the construction of your motor home were developed to remain waterproof under sustained effects of weather and vibration. However, even the finest materials will eventually dry out and lose their effectiveness under the constant heat of the sun and attack by other elements. This section outlines the procedures that you must follow to maintain the weatherproof integrity of your motor home. Leak damage caused by neglect to follow these procedures may affect your warranty coverage.

Your dealer can perform the resealing inspection and work for you. He has current information on sealants used in your motor home, and can recommend the appropriated sealants for you if you prefer to do the work yourself. Always use recommended sealants.

### RUBBER ROOF SYSTEM

For normal cleaning, standard household detergents or cleaners may be used. Use any non-abrasive, common household detergent and plenty of water. Be sure to keep the sidewalls wet to reduce streaking.

Very stubborn stains may require solvents or non-water based cleaning agents.

The roof does not require annual coatings or additional sealants. Periodic washing with soap and water is all that is required.

The rubber roof material can be cut by sharp objects. Use caution when loading sharp articles on the roof. If you add accessories or new equipment on the roof, be sure the installer is qualified to work on the rubber roof material. This is required under the terms of the warranty.

### DOOR AND WINDOW RESEALING

Inspect the sealants around windows and doors at least every three months. If any of the following defects are evident during inspection, the affected areas must be resealed:

- 1) Excessive amount of sealant protruding from joints.
- 2) Sealant cracked or peeling.
- 3) Voids in sealant.

**NOTE: DO NOT SEAL THE BOTTOM FLANGES OF WINDOWS AND DOORS. TWO SEALANT VOIDS HAVE BEEN INTENTIONALLY LEFT IN THE BOTTOM FLANGE SEALANT TO PROVIDE EXTERIOR DRAINAGE IN THE EVENT OF LEAKAGE.**

## TIFFIN MOTORHOMES, INC. LIMITED WARRANTY\*

\*As defined by Magnuson-Moss Warranty Federal Trade Commission Improvement Act

_____
Owner's Name
_____
Street Address
_____
City and State (or Province in Canada)
_____
Owner's Telephone Number
_____
Chassis Identification Number
_____
Vehicle Identification Number
_____
Owner's Name Date of Delivery to First Purchaser
_____
Vehicle Mileage at Time of such Delivery

**IMPORTANT:** This folder should be kept with vehicle at all times and should remain with the vehicle at time of resale. Check to make sure engine coolant is minus 40°.

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grilling, allow the grill to cool off a few minutes before stowing in compartment. Be sure the gas is turned off at both the valve on the hose and the grill. Disconnect the hose from the grill.

The LP hose and grill are located in separate compartments so that the grill cannot be stowed away without disconnecting the LP hose.

## EXTERIOR CARE AND MAINTENANCE

### EXTERIOR FIBERGLASS

Some exterior parts of your motor home are made of fiberglass. The finish on these parts are durable, but not indestructible. Any material and finish will deteriorate in time. Exposure to sunlight, moisture, and airborne pollutants can chemically alter the composition of the base and finish material causing dulling and fading of the finish. Generally, changes in the finish due to weathering are cosmetic, they are on the surface part and do not affect its strength. Weathering can take several forms.

- 1) Chalking - The surface finish has broken down into a fine powder. It usually will wash off.
- 2) Fading - The color of the finish has changed. This can be caused by chemicals spilled on the surface, staining it, or by changes in the pigments used in the finish.

The best insurance against these effects is routine maintenance. If the finish is not washed thoroughly and waxed, the surface can deteriorate very rapidly. The following maintenance guidelines can help you reduce these weathering effects:

- 1) Wash the exterior of the motor home monthly, at least. Wash with a mild soap. Avoid strong alkaline cleaners and abrasives.
- 2) Wax the exterior fiberglass at least once a year - twice if possible - with a wax formulated for fiberglass. When waxing, always read and follow the instructions and precautions on the container. Some cleaners and waxes are recommended for use on only certain types of surfaces. Sometimes one part may weather more rapidly than others. In cases where this has happened, a light rubbing compound may be required. Always follow rubbing compound with a high-quality wax.

### WINDOWS, DOORS, VENTS, AND LOCKS

Keep moving parts of windows and latches adjusted and maintained. Lubricate the windows with a light oil or powdered graphite at least once a year. Check and tighten the screws holding the windows in place periodically. Check the weather sealant. Clean screens by gently wiping with a damp cloth or soft flat brush.

Inspect the sealants around doors and windows every three months.



- 1) Turn off the water heater.
- 2) Turn off incoming water supply.
- 3) Open a faucet in the motor home.
- 4) Pull the handle of the relief valve straight out and let water flow until it stops.
- 5) Release the relief valve handle and let the valve snap shut.
- 6) Turn on the water supply.
- 7) Close the faucet when water flows continuously without sputtering.
- 8) Turn on the water heater.

**WARNING: THE WATER HEATER AND FURNACE COMBUSTION AIR EXHAUST PORTS MAY BE EXTREMELY HOT DURING WATER HEATER AND FURNACE OPERATION. DO NOT TOUCH THESE OUTLETS OR ALLOW ANY MATERIAL TO COME IN CONTACT WITH OR COVER EITHER THE AIR INTAKE OR EXHAUST PORTS WHILE OPERATING THE WATER HEATER AND/OR FURNACE.**

#### **REFRIGERATOR**

The switchable refrigerator will run on 110 volt power if the generator is running or if the coach is connected to on-shore power. When 110 volt power is not available, the refrigerator will automatically switch to LP.

If you wish to shut off the refrigerator, turn the selector switch located on the front of the refrigerator to off, then close the refrigerator LP valve located behind the access panel on the outside of the coach. To return the refrigerator to service, turn the selector switch on and open the LP gas valve.

For more detailed operating instructions, consult the owner's information package.

#### **RANGE**

A three burner cook top is standard in the Allegro Bus. However, your RV may be equipped with an optional range. There is a shutoff valve in the line which isolates the range without effecting any other appliances, or, like all the LP appliances, it can also be shut off by closing the main LP valve on the storage tank.

**WARNING: DO NOT USE OPEN FLAMES TO WARM THE LIVING AREA. GAS COMBUSTION CONSUMES THE OXYGEN INSIDE THE MOTOR HOME.**

#### **GRILL**

If your motor home is equipped with an optional grill, it will be located in a storage box near the entrance door. The grill operates off LP gas. An LP gas hose, valve and quick disconnect is located in the storage box next to the grill. Slide the grill out of its box and pull the hose out of its box and connect it to the grill. When you are finished

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## GENERAL INFORMATION

Congratulations! You've just bought what we feel is the very best motor home available. Before you hit the road and start enjoying your new RV, we would like to give you a brief introduction to your new motor home.

Your new RV has been built with one goal in mind, to make it as dependable, convenient, and care-free as possible. But, there are things you need to know and do to keep your traveling as much fun and as worry-free as you'd like it to be.

This manual is a brief description of the general operation of your motor home. For more detailed information concerning chassis and appliances you should consult the manuals provided by the manufacturers of those products. These manuals are included in the information packet provided with your motor home.

## DRIVING

Your new RV is much larger than a car or many other vehicles. Therefore it maneuvers and handles quite differently than a car. Once you become familiar with the controls and their operation, take the RV for a short drive to become acquainted with the way it handles. Keep in mind the length and width of the RV when making turns at traffic lights and stop signs. Always turn wide enough to avoid curbs and signs into which the overhang of the RV may come in contact.

Always observe highway speed and safety regulations. The speed you drive the RV may need to be reduced in hazardous weather conditions.

In windy conditions an RV handles differently than a passenger car due to the wide surface area. When this problem occurs, slow the RV down until you are comfortable with the way it handles. Always remember that your RV weighs several thousand pounds more than a car and is more difficult to stop. Begin slowing down sooner before an anticipated stop than you would in a car. Also, due to the weight of your RV, you must allow much more distance when passing other vehicles on the highway than you would in a car.

When traveling in the mountains or hilly conditions, you should use your transmission to aid in climbing and descending hills. Lower gears while climbing hills will give you more power and less strain on the engine. Lower gears while descending hills, coupled with the use of brakes will keep the RV under control. Also, while traveling in the mountains your engine and transmission may become hot. If this occurs, turn the vehicle's dash air conditioner off.

Overhead clearance is an important factor when driving your motor home. Make sure you have enough room to go under overpasses and bridges. Watch for low hanging limbs and other obstructions which may damage the roof of your RV.

When parking the RV, always put the transmission in "Park" and set the park brake. Also, when parking on an incline, turn the wheels into curb.

**THIS TEST PROCEDURE SHOULD BE REPEATED EVERY WEEK OR EVERY TIME THE COACH IS TAKEN ON A TRIP, WHICHEVER OCCURS FIRST.**

## LIGHTING LP GAS APPLIANCES

Detailed operating information for the LP appliances can be found in your Owner's Information Package. Please read and follow these instructions.

Air trapped in the gas lines may delay the initial lighting of any appliance. It could take several seconds or minutes for the gas to reach the appliance. To purge some of the air from the gas system, first light a burner on the range. The other appliances will then light more quickly.

**ALWAYS FOLLOW THE APPLIANCE MANUFACTURER'S LIGHTING AND OPERATING INSTRUCTIONS.**

## FURNACE

The furnace in your Allegro Bus is sized to provide enough heat to maintain comfort in winter weather. Also, duct work is fed into the storage compartments housing the water and holding tanks to avoid freezing in cold weather.

There are two valves in the gas line to the furnace. The first is the main valve on the LP tank. The second is the valve underneath the coach near the rear wheels. When touring during warm weather, you can turn off and isolate the furnace from the LP storage tank by using this valve. This valve is only for the furnace and leaves the grill and range fully usable.

## WATER HEATER

The water heater is located in the bathroom. The standard water heater heats with propane. Some motor homes may be equipped with the optional gas/electric water heater. If your RV has the gas/electric heater, there will be a heating mode selector switch, an ignition on/off switch, and an auxiliary water pump switch located on the front of the vanity. On the electric water heater, there is an additional switch on the back of the water heater that must be turned on to operate the unit. **CAUTION: DO NOT LIGHT WATER HEATER UNTIL IT IS FILLED WITH WATER.**

The mode selector switch allows you to choose either LP or 110 volt current to heat the water. The ignition switch will be 'on' when you are using LP to heat the water and 'off' when you are using 110 to heat the water. Occasionally you may experience "weeping" of the pressure/temperature relief valve on the water heater. This is not a defect. It is caused by the normal expansion of water while it is being heated in the closed water system of your motor home. The water heater tank is designed internally with an air gap at the top of the tank to reduce this weeping phenomenon. In time, though, the heating and expansion of the water will absorb this air. To replace the air, and reduce relief valve weeping:

As an added precaution, do a visual check of all exposed piping and fittings after you have arrived at a destination and before you use the LPG system. Travel and road shocks may have caused damage to the system that you will need to repair before using the appliances.

**WARNING: NEVER CHECK FOR LEAKS WITH AN OPEN FLAME. DO NOT CHECK COPPER AND BRASS PLUMBING LINES AND FITTINGS FOR LEAKS USING AMMONIATED OR CHLORINATED HOUSEHOLD TYPE DETERGENTS. THESE CAN CAUSE CRACKS TO FORM ON THE LINE AND BRASS FITTINGS. IF THE LEAK CANNOT BE LOCATED, TAKE THE UNIT TO AN LP GAS SERVICE FACILITY.**

Keep the tank valve closed and turn off all appliances if the unit is not being used. **WARNING: DO NOT USE PLIERS OR A WRENCH TO TIGHTEN VALVES. IF A VALVE IS NOT LEAK-TIGHT WHEN CLOSED BY HAND, SEE AN LP GAS SERVICE FACILITY.**

### **LP GAS LEAK DETECTOR**

Your motor home is equipped with an LP gas leak detector. The leak detector is located on the base board of the bed.

### **HOW TO OPERATE THE LP LEAK DETECTOR**

Your motor home is equipped with a master 12 volt cutoff switch, the detector will be turned off when this switch is turned OFF. When the detector is powered by turning on the master 12 volt switch, the green indicator will light. After 60 seconds, the detector will begin monitoring the air in your coach for combustible vapors. The propane you use to cook, refrigerate, and heat is combustible. Should a leak occur, your alarm will produce a pulsating alert sound when the gas reaches the detector. This alert will continue to sound until the gas has dissipated or until the reset button is pressed. When the alert sounds, open all doors and major windows to air out the coach and turn the main gas valve off at the LP tank. Do not reenter the coach until the alert stops sounding. **IF THE ALERT SOUNDS A SECOND TIME AFTER THE GAS IS TURNED BACK ON, LEAVE THE GAS OFF AND HAVE A QUALIFIED LP GAS DEALER OR RV SERVICE CENTER MAKE THE NECESSARY REPAIRS.** The reset button only stops the alert from sounding for 60 seconds. This device is intended for the detection of LP gas only.

### **HOW TO TEST THE LP LEAK DETECTOR**

The detector must be operating for at least 60 seconds before it can be tested. Expose the detector to gas from a butane lighter, and observe that the alert sounder will begin to alarm. The alert will continue to sound until:

- A. The gas mixture at the detector returns to a safe level.
- B. The reset button is pressed. If the reset button is pressed, the detector cannot be tested for at least 60 seconds.

## **CHASSIS / MECHANICAL INFORMATION**

### **ENGINES**

We build motor homes with two engine options. The front mounted gasoline engine, and the rear mounted pusher diesel. Engine access is available for both engines to perform routine checks and maintenance.

These checks should be done before you start the engine to begin a trip and should be done each morning prior to traveling. It may be best to do the checks when the engine is cool. When the engine is cool, there is no chance of getting hot oil on your clothes or touch a hot engine part.

To check the oil level, pull out the dip stick ... wipe it off ... put it back in ... then pull it out again and check the oil level. If oil needs to be added, pour the proper weight oil into the engine by removing the oil fill cap. To check the level of coolant, locate the radiator reservoir. You'll see there are two lines on the side, one may say cold and the other hot. If the engine is cold, the level should be at the cold line. If the engine is hot, the level should be at the hot line. To add coolant to the radiator, simply remove the cap on the reservoir and pour in enough coolant to bring it up to the appropriate mark.

To check the level of fluid in the transmission, locate the transmission dip stick. Check it the same way you would the engine oil. If you need to add fluid, just pour it into the transmission dip stick tube.

To check the power steering fluid, locate the power steering reservoir. Check and fill to chassis manufacturer's specifications.

Your information pack has a special booklet from the Chassis manufacturer that will give you all the information you need regarding the type and weight of fluids your engine uses and service intervals for each one. You'll want to glance through the information the first chance you have so you can schedule maintenance when needed.

### **FUEL AND FUEL SYSTEMS**

Consult your chassis manual for fuel recommendations. In most cases the optional Onan generator operates with the same fuel supply as does the RV. Consult the Onan generator manual before selecting a fuel.

### **FUEL FILL**

The fuel filler cap is located on driver's side of the RV. To fill the tank, slowly remove the cap to allow for pressure which may build up in the fuel tank on a warm or hot day, to escape. **Warning: quick removal of the fuel cap can cause fuel to spray out of the fuel fill.** Extinguish all smoking material when adding fuel to the RV tank.

In order to protect you and to maintain a proper functioning fuel system, replace lost or broken fuel caps with the same design as the original.



### **ALTERNATIVE FUEL TYPES (GASOLINE ENGINES ONLY)**

Gasohol and Methanol are both acceptable fuel for gasoline engines. Never use blends that contain both Methanol and Ethanol and never use blends containing more than 5% Methanol or 10% Ethanol. If you find the use of alternative fuel blends affect the performance of your engine, discontinue use.

### **ENGINE COOLING SYSTEM**

Check the coolant level, appearance, and strength periodically. Drain and replace at the time recommended in your chassis manual. Check hoses regularly for signs of damage or deterioration, and tighten hose clamps if necessary.

Check hoses for cuts or abrasion damage. If hoses have become hard and brittle and show signs of cracking as a result of engine heat, replace them. Replace hoses if they are soft and spongy, or swollen as a result of exposure to oil and grease. Any flaking or deterioration of the inner lining of the hose is also a reason for replacement. Such particles can clog the cooling system, reducing its efficiency.

### **COOLANT LEVEL**

The coolant level should be at the "Full Cold" mark when the system is cool or at ambient temperature. After the vehicle has been driven sufficiently to obtain normal operating temperatures, the level should be above the "Full Hot" mark.

**WARNING: TO HELP AVOID THE DANGER OF BEING BURNED, DO NOT REMOVE THE RADIATOR CAP WHILE THE ENGINE AND RADIATOR ARE STILL HOT. SCALDING FLUID AND STEAM CAN BE BLOWN OUT UNDER PRESSURE IF THE CAP IS TAKEN OFF TOO SOON.**

Maintain coolant levels in the radiator to the top of the filler neck. Be sure the recovery bottle is at its appropriate mark when checking.

Regardless of whether freezing temperatures are expected or not, maintain cooling system protection to at least -34 degrees Fahrenheit to provide adequate corrosion protection and loss of coolant from boiling.

When adding solution due to loss of coolant for any reason or in areas where temperatures lower than -34 degrees Fahrenheit occur, use a sufficient amount of an ethylene glycol base antifreeze that meets the chassis manufacturer's specification.

A) Alcohol or methanol base antifreeze, or plain water, are not recommended for your engine at any time. They will not provide proper protection against corrosion.

B) Additives in addition to a good quality ethylene glycol base antifreeze meeting the chassis manufacturer's specification are not required or recommended. Many of the claims for additives are associated better heat transfer or cooling, but these claims are not supported by test data. In some instances, the ingredients may be incompatible with the recommended coolant. Also, when used alone with water as is sometimes sug-

vapor that gets trapped in the system or absorbed by the gas that freezes and causes the problem. This ice can build up and partially or totally block the gas supply.

There are a number of things you can do to prevent freeze up:

- 1) Be sure the gas tank is totally moisture-free before it is filled
- 2) Be sure the tank is not overfilled. This is also a safety consideration.
- 3) Keep the valve on an empty tank tightly closed.
- 4) Have the gas tank purged by the LP gas service station if freeze-up occurs.
- 5) Have the LP service station inject an approved antifreeze or deicer into the tank. Be sure you have the proper gas blend for your traveling area. If you have the proper gas blend, it is very unlikely that the gas is at fault.

If, despite precaution, you do experience freeze up, try melting the ice by warming the regulator using a small light bulb. DO NOT USE AN OPEN FLAME. Once flow is restored, make certain that the regulator cover is properly reinstalled to prevent water from entering the regulator which will cause it to freeze again. If the problem persists, ask your LP gas supplier to service the tank or regulator as required.

Aside from the possibilities of freezing during cold temperatures, your LP gas system performance is affected significantly as the temperature drops. The liquid in the tank is, of course, much colder than the air that normally surrounds the tank. The liquid in the tank vaporizes by absorbing heat from the surrounding air. But as the air temperature drops closer to the temperature of the liquid in the tank, the liquid doesn't vaporize as easily. Consequently, the BTU valve of the LP drops dramatically.

### **LP GAS SYSTEM LEAK CHECKS**

The smell of LP gas indicates a leak. Obvious leak sources are fittings, valves, and couplings.

For your safety, check for leaks in your gas system each time the tank is filled or before each trip. Always check the system any time you detect a garlic type odor.

To perform a leak check, swab a mixture of a non-ammoniated, non-chlorinated soap solution or an approved leak detection solution over each fitting, joint, and connection in the system. Open the tank service valve. Inspect each joint. If even the smallest bubbles appear at any joint, this joint must be remade. Refer repairs to an authorized LP gas service facility. Never attempt to repair gas piping without proper tools and know-how.

Potential trouble spots for leaks are areas where piping runs close to chassis and frame members. Look for chafes and cracks around pipe hangers. If you find defects in any LP gas system component, have it repaired or replaced before using the system.

14. If you do not have the special tools and training necessary, do not attempt to repair LP gas system components.

## LP GAS REGULATOR

The regulator is the heart of the LP gas system. It works continuously and requires more care and attention than any other part of the system.

Its main job is to reduce the high and varying pressure of the gas from the tank to a low, consistent pressure to serve the appliances in the motor home. Normal tank pressure can range from 250 PSI to 7 PSI depending on the outside temperature. The regulator smoothes out these wide variations and supplies your gas appliances with a steady 6.35 ounces, or 11 inches water column pressure.

It does this smoothing in two stages. The first stage reduces the high pressure to about 10-13 PSI. This allows the second stage to be much more efficient and accurate in controlling the pressure to the appliances. This two-stage reduction also helps reduce the likelihood of freeze-up or pilot outage.

Because the regulator is constantly "breathing" it is equipped with a vent. When the diaphragm inside the regulator moves up and down, it is drawn into or expelled from the chamber through this vent. If excess pressure builds up in the regulator, a relief mechanism allows it to escape through the vent. It is therefore very important that the vent is clean and free of obstruction. Clogging from corrosion, dirt, insects nests, or other debris is the most common cause of regulator malfunction. Even a small piece of material that finds its way into the inlet can result in improper pressures in the system and possible damage to or failure of components. The regulator is mounted so that the vent is facing downward and is protected from freezing road spray and other foreign matter by a water-resistant cover. Be sure the cover is on at all times. If the vent does become clogged, it can be cleaned with a toothbrush.

**WARNING: DO NOT ATTEMPT TO ADJUST THE REGULATOR. IT HAS BEEN PRESET BY THE REGULATOR MANUFACTURER. IF ANY ADJUSTMENT IS REQUIRED, IT MUST BE MADE BY A QUALIFIED LPG SERVICE TECHNICIAN USING SPECIAL EQUIPMENT.**

## USING LP GAS SYSTEM AT LOW TEMPERATURES

Your gas system will function at low temperatures, provided the system components are kept at a temperature above the vapor point of the LP gas. Butane vaporizes at about 32 degrees Fahrenheit and propane vaporizes at about 40 degrees. Choose a type of LP gas which has a boiling point approximately 40 degrees lower than any temperature you expect to encounter. Ask your LP gas supplier or your motor home dealer for information on product blends available in your area.

LP gas systems can and do freeze up in very cold weather. It is a common misconception that the regulator or the gas itself freezes. Actually, it is the moisture or water

gested, the additive may not provide the corrosion protection given by the recommended coolant solution.

## ENGINE ACCESS

All gasoline engines will be located in the front of the motor home. To gain access to the engine, the engine cover between the driver and passenger seat must be removed. Swivel both the driver and passenger seat so they face each other. Open all doors and windows. The fiberglass engine cover has a quick-disconnect latch at each corner of the cover. Disengage each latch and remove the cover.

All diesel engines will be located in rear of the motor home beneath the bed. To gain access to the engine, simply pull up on the frame of the bed and two gas shocks will hold it in place. You now have access to the engine cover. The engine cover door is fastened with two slide latches. Disengage the latches, and raise the access cover.

For basic operational checks, an access door is located on the outside rear of the motor home.

Here, fluid levels can be checked and basic maintenance performed.

**WARNING: WHEN OPERATING THE ENGINE, DON'T ALLOW FLOOR MATS AND OTHER OBSTRUCTIONS TO ENTER BETWEEN THE FLOOR AND THE ACCESS COVER. BE SURE DOORS AND WINDOWS ARE OPEN IF THE ENGINE IS WORKED ON WITH THE COVER OFF.**

## AUXILIARY START SWITCH

This feature is found on gasoline models only. Not available on Diesel models.

This switch is located on the dash, just to the left of the steering column. The switch permits using the auxiliary batteries to start the motor home engine if the vehicle battery has discharged. To use the auxiliary start, follow these steps:

- 1) Apply the park brake
- 2) Press the auxiliary start switch
- 3) Start the engine with the ignition switch
- 4) After the engine is started, release both the auxiliary switch and the engine switch.

This system can also be used to start the generator if the auxiliary batteries have discharged. Follow the same steps, except use the generator switch, instead of the engine switch.

## ENGINE JUMP STARTING:

**NOTE: DO NOT PUSH OR TOW THE VEHICLE TO START. THERE ARE NO PROVISIONS IN THE AUTOMATIC TRANSMISSION FOR ENGAGEMENT OF THE TRANSMISSION TO TURN OVER THE ENGINE. EFFORTS TO PUSH OR TOW THE VEHICLE TO START IT WILL HAVE NO EFFECT.**

Both booster and discharged battery should be treated carefully when using jumper cables. Follow the conditions and procedure outlined below, being careful not to cause sparks. Departure from these conditions or procedures could result in serious personal injury (particularly to eyes) or property damage caused by battery explosion, battery acid, or electrical burns; and/or damage to electronic components of either vehicle.

### CAUTION:

**A) BE SURE THE JUMPER CABLES AND CLAMPS TO BE USED FOR JUMP STARTING DO NOT HAVE LOW OR MISSING INSULATION. DO NOT PROCEED IF SUITABLE CABLES ARE NOT AVAILABLE.**

**B) IF EITHER BATTERY HAS FILLER CAPS, CHECK THE FLUID LEVEL. (DO NOT CHECK WITH AN OPEN FLAME.) IF LOW, FILL TO THE PROPER LEVEL WITH DISTILLED WATER. REPLACE ALL CAPS BEFORE JUMP STARTING.**

**C) DO NOT ROUTE THE CABLE (OR ATTACH THE CLAMP) ON OR NEAR PULLEYS, FANS, OR OTHER PARTS THAT WILL MOVE WHEN THE ENGINE IS STARTED.**

- 1) Set the parking brake firmly and place the automatic transmission in PARK. Turn off the ignition, turn off lights, and all other electrical loads.
- 2) Only 12 volt batteries can be used to start the engine. Do not use 24 volt charging equipment. Using such equipment can cause serious damage to the electrical system or electronic parts.
- 3) Attach the end of one jumper cable to the positive terminal of the booster battery and the other end of the same cable to the positive terminal of the discharged battery. Do not permit vehicles to touch each other as this could cause a ground connection and counteract the benefits of this procedure.
- 4) Attach one end of the remaining negative cable to the negative terminal of the booster battery, and the other end to a solid ground at least 18 inches from the battery of the vehicle being started. DO NOT CONNECT DIRECTLY TO THE NEGATIVE TERMINAL OF THE DEAD BATTERY.
- 5) Start the engine of the vehicle that is providing the jump start and turn off electrical accessories. Then start the engine in the vehicle with the discharged battery.
- 6) Reverse these directions exactly when removing the jumper cables. Disconnect the negative cable from the engine that was jump started first.

- Shut off the gas supply at the tank valve or gas supply connection.
  - Open all doors, windows, and vents.
  - Leave the area until the odor clears.
  - Have the gas system checked and the cause of the leak corrected before using system again.
2. Inspect the entire LP gas system for leaks or damaged parts before each trip.
  3. Always be careful when drilling holes or fastening objects to the motor home. The gas supply lines could be punctured by a nail or screw.
  4. Do not restrict access to LP tanks. In an emergency, the tank service valve must be easily accessible. The tank compartment door must always be unlocked.
  5. Do not carry or store filled or empty LP gas containers inside your motor home. LP gas containers are equipped with a safety device that relieves excessive pressure by discharging gas into the atmosphere. Leaks can occur at valves and fittings. Always store LP tanks with the valves closed.
  6. Do not use any LP gas tank other than the one furnished with your motor home without being sure that all connecting components are compatible.
  7. **WARNING: TURN OFF LP GAS MAIN VALVE AND INDIVIDUALLY TURN OFF ALL GAS APPLIANCES OR ELECTRICALLY DISCONNECT AUTOMATIC IGNITION APPLIANCES BEFORE ENTERING AN LP GAS BULK PLANT OR MOTOR FUEL SERVICE STATION**
  8. **WARNING: DO NOT FILL LP GAS CONTAINERS TO MORE THAN 80% CAPACITY. OVERFILLING CAN RESULT IN UNCONTROLLED GAS FLOW WHICH CAN CAUSE FIRE AND EXPLOSION. A PROPERLY FILLED CONTAINER HOLDS ABOUT 80% OF ITS VOLUME AS LIQUID.**
  9. Never check for leaks with an open flame. Use an approved leak detection solution or a nonammoniated, non-chlorinated soap solution only. If the leak cannot be located, take the unit to an LP gas service representative.
  10. LP gas regulators must always be installed with the diaphragm vent facing downward. Make sure that the regulator vent faces downward and that the cover is kept in place to minimize vent blockage which could result in excessive gas pressure causing fire or explosion.
  11. Do not use a wrench or pliers to close the service valve. This valve is designed to be closed leak-tight by hand. If a tool is required to stop a leak, the valve probably needs repair or replacement.
  12. Use proper tools to tighten fittings. Don't force, jam or cross-thread fittings. Always check fittings for leaks after tightening.
  13. Be sure the tank is securely fastened in its mounting rack before each trip.

## PROPANE (LPG)

Depending on the options you chose, the propane system might include:

- The LP storage tank
- The furnace
- The two way refrigerator
- The switchable water heater
- The range
- The grill
- The generator

### LP STORAGE TANK

The LP storage tank is basically self contained and doesn't require much in the way of maintenance. Before traveling, you should check the tank for damage from road debris and have any repairs made by an LP gas supplier.

#### FILLING LP TANK

To fill the chassis-mounted storage tank, drive the vehicle to an LP gas supplier or one of the service stations which sell LP gas.

**WARNING: TURN OFF LP GAS MAIN VALVE BEFORE FILLING LP GAS TANK OR ENTERING AN LP GAS BULK PLANT OR MOTOR FUEL SERVICE STATION. TURN OFF ALL PILOT LIGHTS AND APPLIANCES INDIVIDUALLY BEFORE REFUELING OF MOTOR FUEL TANKS. IF THEY ARE NOT INDIVIDUALLY TURNED OFF, AUTOMATIC IGNITION APPLIANCES MAY CONTINUE TO SPARK WHEN LP GAS IS TURNED OFF AT THE CONTAINER. DO NOT FILL LP GAS CONTAINERS TO MORE THAN 80% OF CAPACITY.**

### LP GAS SAFETY PRECAUTIONS

Historically, LP gas is a safe and reliable fuel. As with any other volatile and flammable material, common sense dictates that LP gas be handled and used with respect and caution. Because LP gas systems are so reliable, they are often taken for granted. Neglect can be a very dangerous habit. If the system is maintained regularly, you can expect almost trouble free operation.

**WARNING: LP GAS IS FLAMMABLE AND POTENTIALLY EXPLOSIVE. USE PROPER HANDLING, LIGHTING, AND VENTILATION PROCEDURES.**

1. The distinctive odor of LP gas indicates a leak. If you smell gas, or your 12volt LP leak detector has been activated you should take the following action:
  - Extinguish all open flames, pilot lights and all smoking materials.
  - Do not touch electrical switches.

## WINDSHIELD WIPER SYSTEM

**Diesel chassis:** You will find the washer/wiper control located on the dash to the left side of the steering column. The inner knob turns the system on. Turn the inner knob one notch clockwise, this will put the wiper system in the intermittent mode. The outer knob will control the speed at which you want the intermittent system to work. LO and HI setting are also controlled by the inner knob. Press the inner knob and this will activate the washer system.

**Ford chassis:** You will find the washer/wiper control located on the turn signal lever on the left side of the steering column. Grasp the end of signal lever and turn forward, the first seven notches are the adjustment for the intermittent control. The last two notches are the LO and HI setting. Press the end of the signal lever inward and this will activate the washer system.

**Chevrolet chassis:** You will find the washer/wiper control located on the turn signal lever on the left side of the steering column. Grasp the end of signal lever and turn backward, the first five notches are the adjustment for the intermittent control. The last two notches are the LO and HI setting. Turn the lever marked washer forward to activate the washer system.

### HEATER-A/C CONTROL

Both the heater and air conditioner controls are located within the same panel. This system will operate the dash unit only.

**Temperature control, heat/cool lever:** Push lever to left for cool air or right for hot air.

**Air Flow:** This can be directed out of 1) the dash vents only, 2) the floor vents only, 3) the dash and floor vents at the same time or 4) Defrost vent only. Four buttons on the control panel indicate the settings.

When the dash A/C or heat is in the off position, the fan will continue to operate at a low speed.

**Fan Speed:** Three fan speeds to utilize-low, medium and high.

#### ROUTINE HEAT AND A/C INSPECTION

The heater/air conditioning system consists of a heater core and evaporator housed in a case which, typically, includes an air inlay, blower motor assembly, air distribution ducts and doors to control the flow of air through the case.

1) Check outer surfaces of radiator and condenser cores to be sure they are not plugged with dirt, leaves or other foreign material. Be sure to check between the condenser and radiator as well as outer surfaces.

2) Check the metal tubing lines to be sure they are free of dents or kinks which can cause a loss of system capacity due to a line restriction.



3) Check the flexible hose lines for brittleness or deterioration which can be the source of a system leak.

4) Check for proper drive-belt tension.

The following checks may indicate if the amount of refrigerant in the system is low. The ambient temperature should be above 70 degrees Fahrenheit.

**NOTE: ENGAGEMENT OF THE COMPRESSOR CLUTCH IN BOTH OF THE TESTS BELOW INDICATES THAT THE CLUTCH ELECTRICAL CIRCUIT IS OK. IF THE CLUTCH DOES NOT ENGAGE, THEN CHECK FOR A BLOWN FUSE, LOOSE CONNECTIONS OR DAMAGED OR DETERIORATED WIRES. IF THESE CHECKS ARE OK, THEN THE PROBLEM MAY BE IN THE COMPRESSOR CLUTCH OR SWITCH. TAKE THE VEHICLE TO A QUALIFIED SHOP FOR FURTHER TESTING.**

#### **TROUBLESHOOTING THE SYSTEM**

Problems of too little or no heat, poor air circulation, or inadequate defrosting action are sometimes encountered with a heater system.

#### **ELECTRICAL CIRCUIT DIAGNOSIS**

The blower electrical circuit and motor is OK if the blower operates at all of the designated speeds. If the blower does not work at all, then check for a blown fuse, loose connection, and for damaged or deteriorated wires. If these checks are OK and/or the blower does not operate at all speeds, then the problem may be in the switch, relay or motor. Take the vehicle to a qualified shop for further testing.

#### **VACUUM SYSTEM DIAGNOSIS**

If the air is not flowing through the proper outlets (floors, dash, or defroster), then there may be a problem in the vacuum system, or with the diverter doors. Check the doors to see that they operate properly and do not bind.

Next check all vacuum hoses and connections between the vacuum source, A/C control and vacuum motors for leaks. If any hoses are damaged or deteriorated, replace them. If the hoses are OK, the problem may be in the control assembly or vacuum motor(s). Take the vehicle to a qualified shop for further testing.

**WARNING: BECAUSE OF THE NATURE OF REFRIGERANT 134A AND THE HIGH PRESSURES WHICH ARE PRESENT IN THE REFRIGERANT SECTION OF THE SYSTEM, PERSONAL INJURY CAN RESULT IF PROPER DIAGNOSTIC AND SERVICE PROCEDURES ARE NOT FOLLOWED. THEREFORE, REFER ALL SUCH WORK REQUIRED ON THE SYSTEM TO A QUALIFIED SHOP WITH THE NECESSARY TRAINED PERSONNEL AND EQUIPMENT.**

To winterize the system;

1. Open the valve between the water pump and water tank. This will drain the fresh water tank. Leave valve open.
2. Open the cold water faucet and run the water pump until all water is pumped out of the lines. Leave faucets open. Turn pump off.
3. Open the cold and hot water faucets and drain valves, located in the water utility compartment. Leave these valves open.
4. Open the outside door of the water heater. Near the bottom of the heater is the drain plug. Remove plug and drain the water heater. Open hot water faucets.
5. Flush the remaining water in the toilet. Open all cold water faucets.
6. After all the fresh water lines and tank have been drained, close the water line drain valves.
7. Drain both holding tanks.
8. Your motor home is equipped with a water heater by-pass. With this, you can by-pass the water heater when filling your lines with RV antifreeze. By-pass is located underneath the bottom shelf of the bathroom vanity. Lift out the shelf, and 3 water valves will be exposed. The valve on the left is the hot water valve. The valve on the right is the cold water valve. The valve in the middle is the by-pass. To by-pass the water heater, close the hot and cold valve and open the by-pass valve. You can now fill the water lines without filling the water heater tank.
9. Mix the recommended amount and strength of RV antifreeze and pour it into the fresh water storage tank. Then pump the solution into all fresh water lines, down drains, and into waste water drain lines. This will provide protection in all lines, fixtures, and drain line elbows and traps.

**WARNING: NEVER USE AUTOMOTIVE ANTIFREEZE OR ANY OTHER ANTIFREEZE THAT IS NOT FORMULATED FOR USE IN RVs. ANTIFREEZE MUST BE NON-TOXIC.**

**CAUTION: DRAINING THE WATER SYSTEM ALONE WILL NOT PROVIDE ADEQUATE COLD WEATHER PROTECTION. IF THE MOTOR HOME IS TO BE UNHEATED DURING FREEZING TEMPERATURES, CONSULT YOUR DEALER FOR THE BEST WINTERIZING PROCEDURE FOR YOUR CLIMATE. YOUR DEALER CAN WINTERIZE YOUR MOTOR HOME FOR YOU OR CAN SUPPLY YOU WITH ONE OF THE SPECIAL ANTIFREEZES WHICH ARE SAFE AND APPROVED FOR USE IN RV WATER SYSTEMS. FOLLOW THE INSTRUCTIONS FURNISHED WITH THE ANTIFREEZE.**

When preparing for a new touring season, flush all lines and the storage tank with clean water. Then refill the fresh water storage tank and make sure the drain plug in the water heater is tight.

Reverse the process on the water heater by-pass.

### **Pump Cycles On and Off When Faucets are Closed**

Check that all faucets are closed tightly. Next, check for leaks in the water lines. Otherwise, there may be an internal leak in the pump.

### **Pump Will Not Turn Off**

This problem can be caused by an empty or near empty water tank. If that is not the problem, check for low batteries. Otherwise, the internal switch in the pump could be stuck.

## **WATER SYSTEMS MONITOR PANEL**

The monitor panel allows you to instantaneously check the condition of the house batteries and the fluid levels of LPG, black, gray and fresh water. The monitor panel is located under the galley sink, behind the second cabinet door on a living room slideout. The monitor panel on a galley slideout is located in the overhead cabinet beside the refrigerator.

Press the button labeled "monitor." Lights will indicate the present level of fluid in each tank and the condition of your house batteries.

The "E" or empty indicator light will always be on when the monitor button is depressed. If the tank is full, all lights will be on. Lights are sequential, and indicate levels in approximate 1/3 tank increments. If the tank is approximately 2/3 full, for example, lights "E" 1/3 and 2/3 will be on.

To avoid false monitor readings, use biodegradable toilet paper and rinse out your holding tank often.

## **WINTERIZING WATER SYSTEMS FOR LONG TERM STORAGE**

There are a number of steps involved in putting your motor home into winter storage. Each of them is important, though none, perhaps, is as critical as winterizing the plumbing in your coach.

The plumbing system consists of;

- The fresh water storage tank
- The waste water holding tanks
- The water heater
- The kitchen and bathroom fixtures
- The water supply lines
- The drain lines
- The water pump

Each of these items is highly susceptible to damage caused by freezing water in the system.

## **BRAKE HOSE INSPECTION**

Inspect all brake lines regularly in accordance with the chassis manufacturer's Maintenance Schedule. Check for road hazard damage, cracks and chafing of the outer cover, and for leaks and blisters. A light and mirror may be needed for an adequate inspection. If any of the above conditions are observed on any brake hose, have it replaced.

## **DRIVE BELTS AND SPECIFICATIONS**

Proper care and maintenance of drive belts is an important part of good engine maintenance. Proper belt tension and the condition of the pulley grooves are of primary concern.

Since belts and pulleys wear with use, look to all frictional surface areas for signs of wear. Normal wear can be recognized as even wear, both on the belt and the grooves of the pulley. Even with normal wear, belts will eventually show evidence of cracking. Replace belts before or as soon as cracking becomes evident. Unusual signs of wear indicate some corrective action is necessary.

When checking, remember failed or partially failed belts may have been damaged by a bad pulley, a misaligned drive or by some faulty mechanical component.

Always check the condition of pulleys before replacing belts. Inspect the pulleys for chips, cracks, bent sidewalls, rust, corrosion, etc. Replace any defective pulleys.

## **WHEELS / TIRES / SUSPENSION**

Your motor home is equipped with heavy-duty truck tires. With the proper maintenance, you should receive many miles of trouble free service.

### **TIRES**

Proper inflation is crucial for long tire life and safety. Before and after every trip, you should check the tire pressure and add air as needed. Listed on the outside of the tire is the maximum PSI. Keep tires pressurized at that level.

**WARNING: PROPER INFLATION OF TIRES IS CRUCIAL. IF TIRES ARE NOT PROPERLY INFLATED, A BLOW-OUT OR FIRE MAY RESULT.**

### **REPLACING TIRES**

Always replace tires with exactly the same size and profile tire which originally came on the vehicle. Be sure the load range rating is the same as the original tires. If a different size tire is used, your speedometer will not register properly and the gross axle weight may not be adequate. If replacing only a single tire, it should be paired on the same axle with the least worn tire of the others.

**WARNING: DO NOT MIX DIFFERENT TYPES OF TIRES ON THE SAME VEHICLE SUCH AS RADIAL, BIAS, AND BIAS BELTED TIRES EXCEPT IN EMERGENCIES, BECAUSE VEHICLE HANDLING AND TIRE LIFE MAY BE SERIOUSLY AFFECTED AND MAY RESULT IN LOSS OF CONTROL OR TIRE FAILURE.**

### **WHEEL AND TIRE BALANCING**

From the standpoints of tire wear and vehicle ride and handling ease, maintain proper balance of wheel and tire assemblies.

### **CHANGING A FLAT TIRE**

First, refer to chassis operating manual.

When you have a flat tire, it is best to summon professional help through an auto club, travel service or truck service facility. However, there may be occasions when these services are not available to you. If you are not familiar with changing a truck tire, listed are several things you **MUST** be aware of:

- 1) The wheel and tire itself is very heavy. If you are not physically able to handle a wheel and tire that weighs in excess of 100 pounds, do not attempt to change the tire.
- 2) When tightening the lug nuts, refer to the chassis owner's manual. If you are not physically able to break loose the wheel nuts, do not attempt to change the flat tire yourself.
- 3) The motor home itself is very heavy, not to mention your belongings in the motor home. If the ground is soft and not level, do not attempt to change the tire. If it is absolutely necessary to change a flat tire on soft ground, you should support the jack with a strong wide timber or piece of steel.

### **DAMAGED TIRES**

To help avoid personal injury and property damage if a wheel must be changed, obtain expert tire service if you can.

Never add air to your tires unless an accurate pressure gauge is also used. Do not put air back in a tire that has been run flat, or is seriously low on air, without first having the tire taken off the wheel and the tire checked for damage. In choosing the right tire pressure, be careful not to go past the maximum pressure capability shown on the tire.

### **TOOLS NEEDED FOR CHANGING A FLAT TIRE**

- 1) 10 ton hydraulic jack.
- 2) Proper sized lug-wrench with a four-foot breaker bar handle.
- 3) Wheel blocks
- 4) Wheel chocks

Located in the water system compartment is the 12 volt water pump and it is activated by a switch located in the galley and bath for convenience.

### **SANITIZING THE FRESH WATER SYSTEM**

You should sanitize your water tank and lines annually. It is simple to do with water and bleach. Pour 1/2 cup of household bleach into the potable water tank fill and completely fill the tank with water. Next, drive the motor home forward and backward a couple of times to move mixture around inside the tank. Turn the water pump on and open all faucets to allow water into the lines. Let this sit for three hours. Drain water tank. Connect system to city water and flush the system for several minutes.

## **TROUBLESHOOTING THE WATER SYSTEM**

### **WATER SYSTEM LEAKS**

With "today's" water lines, leaks are no longer a major problem. However, they still sometimes can occur from the twisting and vibration from an RV. If you experience a leak in your water lines, you should take the RV to your local dealer, who will have proper crimping equipment required to repair leaking water lines.

### **WATER PRESSURE**

Excessive water pressure can cause damage to water lines and faucets. Therefore, water pressure should be regulated from 40 to 50 PSI before entering the city water inlet. This can be done by placing a small portable regulator on the outside faucet.

### **WATER PUMP TROUBLE SHOOTING**

If the water pump fails to operate, the first thing to check is the on/off switch located on the monitor panel. Check the condition of the house batteries. 12vDC must be present to operate the pump. Check the relay located on the electrical converter panel. If it needs replacing, do not replace with a fuse larger than 15 amps. Check wiring connected to the pump. In cold weather, if pump is frozen, thaw with a light bulb placed near the pump.

#### **Pump Motor Runs, Won't Pump Water**

Check water level in the water tank. Check filter, as it could be clogged, restricting flow of water. Check water lines coming in and out of the water pump making sure there are no kinked lines.

#### **Pump Runs, Water Sputters**

After filling the water tank, this will be normal due to air in the water lines. Sputtering can also be caused by a near empty water tank

## **DRAINING TANKS**

To drain waste water tanks, follow these procedures; open the black water drain valve by pulling the handle out. When the black water tank is empty, open the gray water tank drain valve by pulling its handle out. Finally, when the gray water tank is empty, close both valves by pushing the handles in.

**WARNING: HOLDING TANK MUST BE DUMPED ONLY AT APPROVED DUMP STATIONS. WHILE CAMPING AT FACILITIES WHERE EACH SITE HAS ITS OWN DUMP STATION, YOU SHOULD NOT LEAVE TERMINATION VALVE ON THE BLACK WATER TANK OPEN CONTINUALLY. ALLOW 3/4 OF A TANK TO BUILD UP AND THEN EMPTY THE TANK.**

When draining your tanks, always drain the black water tank first, then drain the gray water. That's because the gray water is from the kitchen and bath sinks and has a lot of soap and detergent in it, which will help clean the residue from the black water tank and hose. Also, be sure to close both drain valves after draining the tanks and leave them closed even if you're still hooked up to on-shore sewer.

## **FRESH WATER SUPPLY**

Attach the hose to the fill connection. Run the hose through the bottom of the compartment. Attach it to a pressure regulator (available at most RV parts stores) and then to the on-shore supply valve. Make sure the coach valve is in the 'city water' position and slowly open the supply valve.

Also, located in the sanitation compartment are the on-shore water supply hose and the water storage tank fill fitting. When filling the tank from an on-shore supply, it is important that you open the flexible fill tube. This will allow the tank to vent properly. Watch to see that the tank does not overflow.

First, make sure that the on-shore supply valve is open. Then move the two position valve handle to the 'fill' position. When you see that the tank is 7/8 full, turn the control handle back to the 'city water' position. Filling the tank only 7/8 full will avoid any possibility of damage.

When the coach is not on city water, and is using the on-board twelve volt water pump, the storage tank automatic overflow valve will keep a pressure or a vacuum from developing in the tank and will help the system to deliver full flow at all faucets. As a precaution, close the on-shore supply valve if you'll be away for any length of time. And turn off the 12 volt water pump. That way if anything fails in the coach while you're gone, you won't come back to find your motor home flooded.

There is also an option for filling the water tank. If you're not connected to an on-shore supply, you can simply insert a garden hose into the flexible filler to fill the fresh water storage tank.

## **DANGER: NEVER CRAWL UNDER MOTOR HOME WHEN THE VEHICLE IS SUPPORTED BY THE JACK.**

Consult the operator's manual for more information on changing flat tires.

### **CHANGING FRONT WHEEL**

- 1) Be sure the motor home is on a smooth, firm, level surface.
- 2) To provide clearance for the jack, carefully drive the flat tire up on a wheel chock.
- 3) Turn off the engine. Place the transmission selector in Park and set the park brake.
- 4) Block the front and back wheels on the opposite side of the flat tire so the vehicle cannot move.
- 5) On soft surfaces, use a board beneath the jack.
- 6) When jacking up your vehicle refer to your chassis owner's manual.
- 7) Operate the jack until the jack is firmly in position. Do not lift tire off the ground.
- 8) Loosen all the wheel nuts, but do not remove.
- 9) Operate the jack until the tire clears the ground.
- 10) Remove wheel nuts and wheel. Place your spare on Lugs.
- 11) Replace wheel nuts. Tighten wheel nuts snugly, not completely.
- 12) Lower the tire back to the ground, without allowing the full weight of the vehicle to rest on the tire.
- 13) Tighten the wheel nuts according to the chassis manufacturer's owner's manual.
- 14) Again, check the tightness of the wheel nuts every 20 miles until you can reach a professional. Have the professional check the torque and tire pressure before continuing.

### **CHANGING A REAR WHEEL**

(If only one of the dual tires goes flat, you may drive the RV to a tire service station if it is within 5 miles. Check the tire often and do not exceed 25 mph.)

- 1) Be sure the motor home is on a smooth, firm and level surface.
- 2) Turn off engine, place transmission selector in Park and set the park brake.
- 3) Chock the front and rear wheels on the opposite side of the flat tire so the vehicle cannot move.
- 4) On soft surfaces, use a board beneath the jack.



- 5) Position the jack according to the chassis owner's manual. Screw the extension out until it touches the torsion bar hanger. Never get under the vehicle while positioning the jack.
- 6) Raise the jack until it is firmly in position, but don't lift the tire off the ground.
- 7) Loosen, but don't remove the wheel nuts.
- 8) Raise the vehicle until the tire clears the ground.
- 9) Remove wheel nuts and wheel. Wheel nuts on both wheels could be loose, so be sure nuts are tight on both wheels after replacing the damaged tire.
- 10) When replacing the outside dual, see that dual wheels line up properly. An alignment stud and hole are machined in the wheel mounting flange. If they are aligned, the wheel is properly lined up.
- 11) Replace wheel nuts. Tighten the nuts snugly.
- 12) Apply the proper amount of torque. Dual wheel nuts must be completely tightened with both wheels off the ground.
- 13) Seek a tire professional to check the torque on the wheel and the tire pressure.

## FRONT SUSPENSION AND ALIGNMENT

The term "front alignment" refers to the angular relationships between the front wheels, the front suspension attaching parts and the ground.

Several factors can affect front alignment, including tire inflation pressures, wheel bearing condition, steering and suspension components. The following checks can indicate problems that should be corrected.

- 1) Check all tires for proper inflation pressures and approximately the same tread wear.
- 2) If the unit is equipped with air suspension components, be sure to inspect them according to the literature included in the Owner's Information Package. Be sure to keep them inflated to the recommended pressures.
- 3) Check front wheel bearings for looseness.
- 4) Check for looseness of ball joints, tie rod ends and steering relay rods and damper.
- 5) Check for excessive run-out of wheels and tires.
- 6) Check for a difference in the ride height between right and left sides of the vehicle.

- When the LED is blinking slowly, (1 time per second), a battery shutdown has occurred. The voltage is either below 10.0 volts DC or above 15.5 volts DC.
- When the LED is blinking rapidly (5 times per second), a potential problem in the DC system has been detected. Check your batteries, battery cables and DC loads.

### Overtemp/Overload – Red LED:

- When the LED is Off operation is normal.
- When the LED is red, there is an over temp or overload condition. Check for excessive loads or short circuit on the output of the inverter. Correct the condition and restart by pushing the INVERT switch.
- When the LED is blinking slowly, (1 time per second), an over current condition or a short circuit has occurred. The system has shut OFF and will not automatically restart. Correct the fault condition and manually restart the system.

### Low Battery & Overtemp/Overload – Red LEDs:

- When both LEDs are blinking, an AC backfeed has been detected. A backfeed occurs when AC power from an external source is connected to the output of the inverter. Inspect wiring for possible input/output wiring error. This condition will damage the unit and must be corrected before further operation.

### TSC (Temperature Sensitive Charging):

This provides for the connection of a sensor to measure battery temperature for compensated charging. If no sensor is connected the charge voltage levels are set to defaults based on battery type.

The remote control for the inverter is located under the galley sink behind the second cabinet door in a living room slideout. In a galley slideout, the remote control for the inverter is located in the overhead compartment beside the refrigerator.

For additional information, please refer to the inverter owner's manual. Any further questions should be referred to the Hart Interface Corporation.

## PLUMBING

### SEWER

Behind the waste water drain compartment are located the black and gray water holding tank drain valves and drain hose connections. After you park at the campground, take the cap off the drain fitting. Connect the sewer hose to the drain fitting and then pull the sewer hose from its storage tray and connect it to the on-shore sewer system.

After holding the INVERT switch for 5 seconds, press the CHARGE switch to select the battery type. One of the four LEDs will rapidly blink indicating the present battery type setting. Press the CHARGE switch again to change the battery type. Continue to press until the desired battery type is selected. If the CHARGE switch is not pressed for 5 seconds, the unit will return to normal operation and the battery type selection will have been made.

When the 12-volt input to the unit is disconnected, the battery type setting is stored in non-volatile memory. When the unit is reconnected, the battery type selection conveniently returns to the setting.

#### STATUS LEDs:

Each Status LED performs two functions, providing battery type selection and operation status.

#### Battery Type Selection

After holding the INVERT button down for 5 seconds, use the CHARGE button to select battery type.

#### Operation Status

##### Invert – Green LED:

- When the LED is solid green, the unit is in invert mode. This occurs by pressing the INVERT switch.
- When the LED is blinking slowly (1 time per second), the inverter is in standby with AC power applied and the transfer switch engaged.
- When the LED is OFF, the inverter is OFF.

##### Charge – Green LED:

- When the LED is solid green, the unit is in the charge mode and external AC power is being supplied.
- When the LED is blinking slowly, (1 time per second) the charger is ready, but external AC power is not available.
- When the LED is OFF, the charger has been manually turned OFF. This can only be accomplished while AC power is being supplied.

Note: When AC power is available, the default setting for the charger is ON. If the unit was manually turned OFF and AC power is interrupted and becomes available again, the charger will return to ON.

##### Low Battery – Red LED:

- When the LED is OFF the battery voltage is normal, between 10.5 and 15.0 volts DC.
- When the LED is solid red, it indicates a battery warning condition, the battery voltage is below 10.5 volts DC or above 15.0 volts DC.

**NOTE: EXCESSIVE OR UNEVENLY DISTRIBUTED LOADS ALSO AFFECT RIDE HEIGHT AND ALIGNMENT. THIS SHOULD BE TAKEN INTO CONSIDERATION WHEN MAKING THE CHECK. ALSO, IF THE MOTOR HOME IS EQUIPPED WITH AIR BAG CYLINDERS, IT IS IMPORTANT THAT THE CYLINDERS BE INFLATED TO THE PROPER PRESSURE FOR THE LOAD BEING CARRIED IN ORDER TO MAINTAIN ADEQUATE RIDE HEIGHT.**

- 7) Check for steering gear looseness at frame.
- 8) Check for improperly operating shock absorbers. There may be evidence of a leak.
- 9) Check for loose control arms.
- 10) Check for loose or missing stabilizer bar attachments.

## WEIGHT SPECIFICATIONS AND TOWING

### VEHICLE WEIGHT DISTRIBUTION

The vehicle weight distribution is the distribution of weight throughout the motorcoach from front to back. All chassis manufacturers rate their front and rear axles. All furniture, appliances, generators, fresh water tanks, holding tanks, etc. are strategically designed and positioned throughout the motorcoach to prevent overloading the axle ratings. This also assures proper handling of the vehicle.

### WEIGHING THE MOTORCOACH

Your motorcoach can be weighed in one of two ways. The first method is by going to a certified scale and weighing the entire motorcoach at one time. Certified scales can usually be found at large truck stops, etc. The second method for weighing the motorcoach is by placing portable automotive scales under the front wheels and recording the weight and then placing the scales under the rear wheels and recording the weight. A total of these two weights will give you the total weight of your motorcoach. (Important note: to ensure an accurate weight using the second method, the motorcoach must be level, otherwise the total weight calculated will be higher than the actual weight.)

### WEIGHT SPECIFICATION DEFINITIONS

- GVWR – Gross Vehicle Weight Rating
- UVW – Unloaded Vehicle Weight
- CCC – Cargo Carrying Capacity
- GCWR – Gross Combination Weight Rating
- SCWR – Sleeping Capacity Weight Rating
- GAWR – Gross Axle Weight Rating

**MOTORHOME  
WEIGHT INFORMATION  
SAMPLE LABEL**

VIN or Serial Number \_\_\_\_\_

GVWR (Gross Vehicle Weight Rating)  
is the maximum permissible weight of this fully loaded motorhome.

UVW (Unloaded Vehicle Weight)  
is the weight of this motorhome as manufactured at the factory with full fuel, engine oil and coolants.

SCWR (Sleeping Capacity Weight Rating)  
is the manufacturer's designated number of sleeping positions multiplied by 154 pounds (70 kilograms).

CCC (Cargo Carrying Capacity)  
is equal to GVWR minus each of the following: UVW, full fresh (potable) water weight (including water heater), full LP-Gas weight and SCWR.

**CARGO CARRYING CAPACITY (CCC) COMPUTATION**

	pounds (kilograms)
GVWR.....	14050 (6386)
minus UVW .....	9250 (4204)
minus fresh water weight of 106 gallons @ 8.3 lb/gal.....	880 (403)
minus LP-Gas weight of 80 gallons @ 4.5 lb/gal.....	360 (160)
minus SCWR of 6 persons @ 154 lb/person .....	924 (420)
CCC for this motorhome*	2636 (1199)

\*Dealer installed equipment and towed vehicle tongue weight will reduce CCC

**CONSULT OWNER MANUAL(S) FOR SPECIFIC WEIGHING INSTRUCTIONS AND TOWING GUIDELINES.**

ST990238

3/11/00

**TOWING THE MOTORHOME**

**WARNING: NEVER LIFT THE MOTOR HOME BY THE FRONT BUMPER. DAMAGE TO THE FIBERGLASS CAP IS POSSIBLE.**

**NOTE: SEE CHASSIS MANUAL FOR CORRECT TOWING INFORMATION.**

If flat towing is necessary, place the transmission in neutral and do not exceed speeds of 35 mph and a distance of 50 miles. If you must exceed this speed and dis-

**INVERTER (OPTIONAL)**

The Freedom Inverter/Charger provides 120-volt AC power from auxiliary DC batteries, automatic battery charging and automatic AC transfer switching between an external AC source and inverter mode.

**EXTERNAL AC POWER:**

When external AC power is available, the 3-stage battery charger, transfer switching, and Power Sharing automatically function.

When external AC power is not available and the INVERT switch is ON (either through the auxiliary switch on the INVER button on the remote), the inverter will automatically turn ON. If the INVERT switch is OFF (the INVERT LED will not be illuminated), the inverter will be OFF.

If installed with the Remote Control Panel or Link Instrumentation, the unit will be set up and controlled from the remote. Refer to the remote manual for more information.

**FRONT PANEL CONTROLS AND INDICATORS**

**INVERT MODE:**

The INVERT push-button switch is located on the front of the unit and has two functions:

- Turn the inverter ON/OFF and reset after a fault condition. Pressing the INVERT switch turns the inverter ON. The green INVERT LED will be ON when the inverter is inverting. When the inverter is ON, pressing the INVERT switch turns the inverter OFF.
- Battery type setup. To enter the battery type select mode, press and hold the INVERT switch for five seconds. The status LEDs will change from indicating status information to indicating battery type. The selection of the battery type. The selection of the battery type is made with the Charge switch.

Turning the INVERT OFF will reduce battery power consumption to a very low level. This is recommended if the unit will not be used for an extended period of time.

**CHARGE MODE:**

The CHARGE push-button switch has two functions:

- Turn the charger ON and OFF

If external AC is present, pressing the CHARGE switch will turn the charger ON. The green CHARGE LED will be ON when the charger is charging. When the charger is ON, pressing this switch will turn the charger off.

- Select the battery type

## DC POWER

The coach lights and a number of appliances operate on DC power. The DC power is provided by the dual batteries or the 12 volt converter. The 12 volt circuits are fused on the right side of the distribution panel. If you experience a problem with an individual DC circuit, check these fuses.

**WARNING: ALWAYS REPLACE 12 VOLT FUSES AND BREAKERS WITH THE SAME SIZE AS THE ORIGINAL FUSES OR BREAKERS.**

## RELAYS

One of the storage compartments contains the relay box consisting of five relays. These relays are in-line fuses and protect; the coach lights, the monitor panel, the refrigerator, the DC converter, and the house batteries.

The relay is a secondary protection device and is the first place you should look if you can't solve an electrical problem at the distribution panel. There is a reset button on the side of the relay. If you find a tripped relay, it is easy to reset by simply pushing a button.

## HOUSE BATTERIES

The house batteries will be located either in a storage compartment or in the front end. The batteries are charged by the alternator when the engine is running and by the converter when the coach is connected to AC power. Your house batteries require maintenance. Check them every three months for proper amount of water and keep their terminals free of corrosion.

## BATTERIES & DISCONNECT SWITCH

The batteries can provide only a limited amount of service when not being charged by one of these systems. There is a main battery disconnect switch located in the coach stairwell. It will completely isolate the batteries from the coach. If you're depending on battery power, or if the unit will be out of use, turning this switch off will assure the batteries will not be inadvertently drained. And, if your coach lights don't work, check this switch first.

## POWER CONVERTER

Typically, AC is going to be your main power source and the converter will use this power to produce 12 volt DC power for the coach. The converter may be warm to the touch and still be functioning normally. There are two fuses on the front to the unit. If either or both are blown there will be no DC power.

tance, you must disconnect the drive shaft. Never tow in excess of 50 mph with the driveshaft disconnected.

**WARNING: DO NOT ALLOW ANY PERSON TO RIDE IN THE TOWED VEHICLE.**

## HITCHES AND TOWING WITH THE MOTORHOME

Your RV is designed to tow a small to mid-sized automobile. However, large industrial trailers and the like should not be towed.

If your RV is equipped with a gasoline chassis you may tow up to 3500 lbs. with a tongue weight of 400 lbs.

If your RV is equipped with a diesel chassis you may tow up to 5000 lbs. with a tongue weight of 600 lbs.

Keep in mind that towing a vehicle will add extra gross weight to your RV and that you must anticipate stopping sooner.

**WARNING: EXCEEDING THESE RECOMMENDED TOWING WEIGHTS CAN BE DANGEROUS, CAUSING CONTROL PROBLEMS OF YOUR RV AND DAMAGE TO YOUR TRANSMISSION.**

## WEIGHT AND EXTERIOR STORAGE

Exterior compartments are located all around the motor home for storage of items you do not wish to keep inside the RV. Many of these compartments are large enough to carry an excessive amount of cargo. It is very important not to over load the compartments with heavy items. Also, distribute the cargo equally, as best you can, throughout the RV.

Your exterior storage compartments are not designed to be 100% watertight. Therefore, items which must not become damp should be stored inside the RV.

**WARNING: DO NOT STORE FLAMMABLE OR COMBUSTIBLE LIQUIDS IN THE STORAGE COMPARTMENTS OF THE RV.**

## WEIGHT AND INTERIOR STORAGE

Overhead cabinets, closets and drawers are all designed for interior storage. Drawers in the RV are notched to prevent accidental opening while traveling. To open, lift up and pull.

When loading the interior of your motor home, distribute weight equally throughout the RV.



## FURNITURE AND INTERIOR ACCESSORIES

### DRIVER'S/PASSENGER'S SEATS

The driver and passenger seats are designed to swivel, recline and slide forward and backward.

**WARNING: DO NOT ADJUST THE SEATS WHILE THE VEHICLE IS IN MOTION.**

**Forward/Back:** the forward/back lever is located on the right hand side of the seat portion of the chair. Depress the rear lever seat will slide forward or backward.

**Swivel:** This lever is located just in front of the Forward/Backward lever. Depress lever and the seat will swivel left and right.

**Recline:** The recline lever is located on the left side of the seat on the back rest. Depress lever to recline and when released, the seat back will lock into place at the chosen position.

### SEAT BELTS

When your RV is in motion, it is necessary for all passengers to use a seat supplied with safety belts. For your protection, always use these belts.

**WARNING: SEATS THAT ARE NOT EQUIPPED WITH SAFETY BELTS ARE NEVER TO BE USED WHILE VEHICLE IS IN MOTION. NEVER OCCUPY BEDS OR BUNKS WHILE VEHICLE IS IN MOTION.**

Driver and passenger seats are equipped with automatic roll-up lap and shoulder belts. The length of the belt automatically adjusts when the belt is pulled out of holder.

Sofa and dinettes are equipped with regular, manual adjusting safety belts.

### CHILD RESTRAINTS

State laws require that infants and small children be restrained in carriers designed for that purpose. For every one riding in this vehicle it is imperative that they wear a restraining device. Children cannot be restrained by an adult holding them while traveling. An unrestrained child can be injured in an RV even if an accident does not occur, such as when the RV makes a sudden turn or shift. Therefore, please restrain children at all times when the vehicle is in motion.

### DINETTE CONVERSION

To convert the dinette into a bed:

- 1) Remove all cushions.
- 2) Remove the two wood sticks located at the edge of the seat (Be careful with the

For a 39ft Allegro Bus, the electrical distribution panel is located in the outside storage compartment on the driver's side.

### AC POWER

All of the 110v receptacles as well as several appliances operate on AC power only. The AC system consists of the power cable, the change over box, the AC circuit breakers, located in the distribution panel.

### POWER CABLE

The main power cable in your coach is rated at 50 amp service. The prong configuration on this cable assures that you will not be able to connect to receptacles supplying less amperage. Special adapters are available to reduce your cable to 30 amp service. If you use an adapter to plug the cord into shore power, be sure the ground is in tact.

**WARNING: NEVER OPERATE THE 120VAC ELECTRICAL SYSTEM WITHOUT PROPER GROUND.**

The power cable is connected to a change over box that automatically switches between generator power and shore power. You can hear a slight clunk as it makes the transfer. If the generator is running, the box will route generated AC to the coach. If not, the box will route on-shore power. AC is fed to the distribution panel by the change over box and then is routed through breakers to its destination.

### GROUND FAULT INTERRUPTER

A ground fault interrupter is provided in the bathroom and outside wall of your motor home. The purpose of this device is to protect you from the hazards of line to ground electric faults and electrical leakage when using appliances. If the GFI is tripped, the entire circuit will not work. A reset button in the center of the receptacle must be pushed in order to restore power to the circuit.

The GFI does not prevent electric shock, nor does it protect you from coming into contact with both the "hot" and neutral sides of the circuit. The GFI must be tested once a month.

To test: Press the test button. The reset button should pop out, indicating the protected circuit has been disconnected. If the reset button does not pop out, do not use the circuit until it can be checked by a certified electrician. Press the reset button to restore power.

**NOTE: IF THE PATIO OUTLET, BATHROOM OUTLET OR REGULAR RECEPTACLES IN THE HALLWAY FAIL TO WORK, PUSH THE RESET BUTTON ON THE GFI. IF THE GFI CONTINUES TO TRIP, HAVE IT CHECKED BY A QUALIFIED ELECTRICIAN.**

## **TROUBLESHOOTING**

1. Check in-line electrical fuse located in storage box beneath slid-out.
2. Determine if slideout motor is receiving electrical current. This may be done by using a volt meter to test current at input leads on slide out motor. If a volt meter or other test device is not readily available, automotive type "jumper cables" from auxiliary battery may be attached directly to slideout motor leads to determine if slideout motor will run. Changing positive jumper cable from one lead to the other lead on slideout motor will cause motor to reverse. If motor does not run, then motor is defective or gear is stripped in gearbox.

## **EMERGENCY OPERATION**

1. Using 1/2" wrench, loosen U-bolt which secures slideout motor to frame assembly.
2. Using 7/16" wrench, remove bolt at end of motor and gear head unit.
3. Pull motor and gear-head unit away from in-line gearbox.
4. Position hand crank on exposed shaft on in-line gearbox.
5. Turn hand crank counterclockwise until slideout room is fully retracted to its innermost position. Five revolutions of the hand crank will move slideout room approximately 1".
6. Secure locking levers inside motor home before motor home is moved.

## **ELECTRICAL**

There are two types of circuits providing power to your coach. One is AC, the other is DC. AC power is transferred to the coach by either shore power through the main 110v electrical cord, or by an optional generator. DC power is supplied from the house batteries, the chassis batteries, or a power converter which converts AC power to DC power.

## **ELECTRICAL SYSTEMS WIRING**

Included in your information package is a comprehensive wiring diagram of the Allegro Bus. It includes all the 110vAC and 12 volt wiring found in the coach portion of your motor home.

## **DISTRIBUTION PANEL**

Located just beneath the refrigerator is the electrical distribution panel. The left portion of the panel houses the 110 volt circuit breakers. The right side houses the 12 volt circuit breakers. If you are experiencing difficulties with an 110 AC or 12 volt DC problem, this is the first place you should check.

two sticks because they have two dowels each that could break with extreme force)

- 3) Depress button located on table leg.
- 4) Fold table leg beneath table and lock.
- 5) Slide table from wall track.
- 6) Lower table top to the dinette frame to create the bed base.
- 7) Replace all cushions in the dinette to form a bed.

## **SOFA CONVERSION**

To convert the sofa into a bed:

- 1) Remove cushions.
- 2) Lift the seat portion of sofa up until the release mechanism is engaged.
- 3) Slowly lower the seat portion back down. The sofa should now convert into a bed.
- 4) Repeat the same steps to convert back into a sofa.

## **HIDE-A-BED SOFA CONVERSION**

To convert Hide-A-Bed into a sofa:

- 1) Remove bottom cushions.
- 2) Pull front portion of frame up.
- 3) Pull back portion of frame toward you.
- 4) Repeat step in reverse to convert back into Hide-A-Bed.

## **INTERIOR LIGHTING**

All of the lighting inside the RV consists of 12vDC fixtures. 110vAC bulbs will not operate in these fixtures.

## **OVERHEAD VENTS**

Roof vents are located throughout your RV. These vents allow passage of hot, stuffy air out of the motor home and allow fresh air to enter.

**NOTE: WHEN TRAVELING BE SURE VENTS ARE COMPLETELY CLOSED. LUBRICATE VENT MECHANISM YEARLY.**

## HEATING AND COOLING

Both the heating and cooling functions of the ventilation system are controlled with a single wall mounted thermostat. Some thermostats control whole coach single zone heating and air conditioning. Some thermostats control heating and air conditioning in two separate zones. The thermostat found in your coach will depend on the size and layout of your ventilation system.

Use the mode button to select heating or cooling. Use the arrow buttons to raise and lower the set point. You can also set the fan to run continuously or automatically only when needed.

Consult your A/C owner's manual for detailed instruction on thermostat operation.

## SAFETY

### CARBON MONOXIDE SAFETY PRECAUTIONS

Carbon monoxide is an odorless, colorless, tasteless gas. Carbon monoxide is a by-product of engine combustion. It is produced by fuels that are not completely used up in combustion or burning. Carbon monoxide takes the life of thousands of people annually. Please pay careful attention to the following:

**WARNING: CARBON MONOXIDE IS EXTREMELY TOXIC AND VERY DEADLY. NEVER BLOCK OR COVER THE EXHAUST SYSTEM OF YOUR RV OR GENERATOR. NEVER ALTER THE DESIGN OF EITHER EXHAUST SYSTEM UNDER ANY CIRCUMSTANCE. DON'T ALLOW THE GENERATOR TO RUN WHILE PARKED NEXT TO OTHER RVS OR NEXT TO A BUILDING. THE DEFLECTION OF EXHAUST FUMES COULD RE-ENTER YOUR RV. NEVER OPERATE ANY ENGINE ON YOUR RV WHILE SLEEPING, INCLUDING THE GENERATOR.**

If you experience the following, exit the RV and seek medical attention: intense headache, dizziness, sleepiness, throbbing in temples and muscular twitching. Whenever possible, inspect your exhaust system for damage. If damage is found, have it repaired at once. Damaged exhaust systems can leak lethal amounts of carbon monoxide into your RV.

### CARBON MONOXIDE LEAK DETECTOR

Your motor home is equipped with a 12 volt carbon monoxide leak detector. The leak detector will not work when the 12 volt disconnect switch is turned off. The leak detector is located underneath the cabinet behind either the passenger or driver's seat.

**WARNING: CARBON MONOXIDE CANNOT BE SEEN OR SMELLED AND CAN KILL YOU. IF ALARM SOUNDS: TURN OFF APPLIANCES, VEHICLE OR OTHER SOURCE OF COMBUSTION AT ONCE (FURNACE, WATER HEATER, STOVE, RV, ETC.) GET FRESH AIR INTO VEHICLE. HAVE THE PROBLEM CORRECTED BEFORE RESTARTING APPLIANCES OR VEHICLE.**

'on', the antenna provides the signal for the TV. When it is 'off', the cable signal is routed to the coach.

At the best atmospheric and geographical conditions, your antenna has a range of approximately 50 miles. After this distance reception will dramatically fall off.

### HYDRAULIC LEVELING JACKS

The hydraulic coach leveling jack option comes in either a manual or an automatic configuration. The manual system allows you to operate the four leveling jacks independently from a control box next to the driver's seat. The automatic system performs the leveling task at the touch of a single button. Consult your HWH manual for detailed operations.

**WARNING: NEVER USE YOUR LEVELING JACKS TO CHANGE A FLAT TIRE OR TO DO MAINTENANCE BENEATH YOUR MOTOR HOME. ALWAYS HAVE YOUR PARK BRAKE FULLY ENGAGED BEFORE OPERATING JACKS.**

### SLIDEOUT ROOM(S)

To operate, first be sure the motor home is level and secure with the park brake engaged. Remove the locking pins on either side of the room and unfold the arms. Next, locate the slideout control switch located in the small overhead compartment just above and behind the passenger seat. Press and hold the button to automatically and fully extend the room. When the room has gone all the way out it will automatically stop. When you wish to retract the room, simply press and hold the button again and the room will fully retract.

**NOTE: IF YOUR MOTOR HOME IS EQUIPPED WITH LEVELING JACKS, EXTEND THEM BEFORE OPERATING SLIDE-OUT ROOM.**

It is a good idea not to store anything in the compartment that houses the slideout control switch to avoid accidental activation of the switch

### SLIDEOUT ROOM TROUBLESHOOTING AND EMERGENCY OPERATION

If the slideout room fails to operate, perform the troubleshooting operations listed below. If the problem cannot be resolved and the slideout room is parked in any position other than its fully retracted position, then emergency operations as outlined below must be performed to retract room to its innermost position.

**WARNING: DO NOT UNDER ANY CIRCUMSTANCES OPERATE THE GENERATOR WHILE SLEEPING. YOU WOULD NOT BE ABLE TO MONITOR OUTSIDE CONDITIONS TO ASSURE THAT GENERATOR EXHAUST DOES NOT ENTER THE INTERIOR, AND YOU WOULD NOT BE ALERT TO EXHAUST ODORS OR SYMPTOMS OF CARBON MONOXIDE POISONING.**

Check the generator exhaust system after every 8 hours of operation and whenever the system may have been damaged, and repair any leaks or obstructions before further operation.

**WARNING: DO NOT OPERATE THE GENERATOR WHEN PARKED IN OR NEAR HIGH GRASS OR BRUSH, EXHAUST HEAT MAY IGNITE A FIRE.**

Do not modify the generator installation or exhaust system in any way without first consulting both the generator and RV manufacturers.

Disconnect the generator starting battery before performing any maintenance on the generator.

Do not use the generator as an emergency power source to a general residential or industrial utility line.

## EXTERIOR ACCESSORIES

### ELECTRIC STEP

Your RV has an electrically operated step that will extend when the door is opened and retract when the door is closed. But, if you park for a lengthy period of time, you can disable the step in the extended position by turning off the step switch. Always be sure to retract the step before you start the engine and leave the area. When the engine is started, the step will automatically retract, even if the step switch has been turned off. However, it is always a good idea to listen for the sound of the step motor to be sure the step did indeed retract.

The Allegro Bus is also equipped with a manual stairwell cover. The stairwell cover is located in the cabinet beside the front passenger seat. The stairwell should be covered while the RV is in motion.

### TV ANTENNA

Your TV is equipped with a TV antenna mounted on the roof. This antenna is designed for the reception of VHF and UHF TV signals.

Operating instructions are included in your owner's information package. Never travel with the antenna in the up position. Before leaving, always be sure the antenna has been lowered.

Located in the compartment above the windshield, are the antenna/cable selector switch and optional video distribution control box. When the antenna/cable switch is

### OPERATING THE CARBON MONOXIDE LEAK DETECTOR

Once power is supplied, the detector will run through a warm-up and self-check cycle for ten minutes before beginning to monitor for Carbon Monoxide gas. Perform the following test procedure at least once a week when using your motor home:

- 1) Be sure that the detector has been powered for a minimum of 10 minutes before testing.
- 2) Press and hold test button for approximately 10 seconds.
- 3) Without releasing the test button, aim the nozzle of a butane lighter towards the gas sensor area.
- 4) Press the gas release quickly (not more than 1 second) Do not rotate flint wheel.
- 5) Release the test button.
- 6) The alarm should sound. If it does not, repeat this test then see the troubleshooting section in the alarm manual.
- 7) Wait 1 minute.
- 8) Press and release the test button to silence the alarm. If the alarm continues to sound, wait 30 seconds and press and release the test button again. NOTE: The alarm will reset within 5 minutes without pressing the test button.

### FIRE SAFETY

If you are cooking, never leave the stove or oven unattended. Make sure you know where the fire extinguisher is located and how to use it.

If you experience a fire while traveling, carefully stop the RV and exit as quickly as possible.

### SMOKE DETECTOR

A battery-powered smoke detector complying with ANSI A119.2/NFPA 501C is mounted on the ceiling in the living/cooking area of your motor home. Please read the smoke detectors Owner's Manual for details on testing and caring for this important safety device.

Test the smoke detector after the motor home has been in storage, before each trip, and at least once a week during use. Depress and hold the test button on the cover for up to 20 seconds. The horn should sound a loud alarm. This indicates that the detector is functioning properly. If the horn does not sound, check that the battery is inserted properly and is fresh. If the battery is dead, replace it promptly and re-test the detector.



## EMERGENCY EXIT

The rear window (when equipped) and bedroom passenger side window are the emergency exits. You will notice two red handles located at the bottom of the window. Turn the red handles completely, and push outwardly on the base of the window. The entire window will open. This exit is to be used when all doors are blocked in an emergency situation.

## GENERATORS

The optional generator: You'll depend on your generator a lot to provide power while camping, if on-shore hook-ups are not available.

When you have a need for AC power, you can start the generator by using the switch on the generator itself, or by using the dash mounted remote switch. Press the start switch, and hold it down until the generator engine is running.

The generator requires the same type of periodic maintenance as does the coach engine. Keep a check on oil level and service the generator as often as the generator manual suggests.

Also, the optional diesel generator is water cooled and requires the proper amount of coolant to be maintained.

Some generators have an 'engine hour meter' mounted on them. Some units have the counter mounted on the dashboard. The counter shows how many actual hours the generator has run. Again, your information packet has instructions from the Onan Company on what service is to be done and when. So keep an eye on this counter and schedule service when it is time.

The 120 volt output of the generator is connected directly to an automatic change-over switch. With the generator power plant operating, power is available at all of the 120 volt power outlets in the motor home, just as if the cord were connected to an external source. Gasoline or diesel fuel for the generator is taken from the main fuel tank through a special feeder tube. This arrangement prevents the generator from running the motor home fuel tank dry.

Generators powered by LP gas will receive its fuel supply from the LP tank.

Heavy power loads should not be started until the generator has been running for at least 3 minutes. (roof a/c, microwave, coffee makers etc.)

To start the generator, hold the switch in the START position until the unit starts, then release the switch. If the unit is slow to start, do not hold the switch in the START position for more than 10 seconds. Release the switch, wait 15 seconds, then repeat. This will help avoid overheating and damaging the generator starter. If the system fails to start the generator, manual starting instructions are discussed in the generator

power plant manufacturer's instructions. To stop the unit, hold switch to the STOP position until the engine stops. Be sure to hold it until the engine stops. If you release the switch too soon, the engine will continue to run.

## GENERATOR OPERATING SAFETY PRECAUTIONS

Read and understand the generator operating, maintenance and safety instructions furnished in your Owner's Information Package. Do not smoke or use an open flame near the generator unit or fuel tank.

**WARNING: DO NOT BLOCK THE GENERATOR VENTILATING AIR INLETS OR OUTLETS. THE AIR-COOLED ENGINE REQUIRES A CONSTANT SUPPLY OF COOLING AIR. RESTRICTED VENTILATING AIR INLETS OR OUTLETS CAN CAUSE ENGINE FAILURE OR FIRE FROM ENGINE OVERHEATING.**

Do not use generator ventilating air for heating any interior living space. Ventilating air can contain high concentrations of lethal gases.

**WARNING: DO NOT PLACE FLAMMABLE MATERIAL OR STORE ANY OTHER MATERIALS IN THE GENERATOR COMPARTMENT.**

Check engine fuel lines often. Fuel leakage in or around the compartment is an extreme fire hazard. Do not use the generator until fuel leaks are repaired.

**WARNING: EXHAUST GASES ARE DEADLY. INSPECT THE GENERATOR EXHAUST SYSTEM THOROUGHLY BEFORE STARTING THE GENERATOR ENGINE. DO NOT BLOCK THE TAIL PIPE OR SITUATE THE MOTOR HOME IN A PLACE WHERE THE EXHAUST GASES HAVE ANY POSSIBILITY OF ACCUMULATING EITHER OUTSIDE, UNDERNEATH, OR INSIDE YOUR VEHICLE OR ANY NEARBY VEHICLES. OUTSIDE AIR MOVEMENTS CAN CARRY EXHAUST GASES INSIDE THE VEHICLES THROUGH WINDOWS OR OTHER OPENINGS REMOTE FROM THE GENERATOR EXHAUST. OPERATE THE GENERATOR ONLY WHEN SAFE DISPERSION OF EXHAUST GASES CAN BE ASSURED, AND MONITOR OUTSIDE CONDITIONS TO BE SURE THAT EXHAUST GASES CONTINUE TO BE DISPERSED SAFELY.**

Be aware of exhaust gas (carbon monoxide) poisoning symptoms:

- 1) Inability to think coherently
- 2) Dizziness
- 3) Vomiting
- 4) Intense headache
- 5) Muscular twitching
- 6) Weakness and sleepiness
- 7) Throbbing in temples

If symptoms indicate the possibility of carbon monoxide poisoning, turn off the generator immediately, get out into fresh air at once, and summon medical assistance.