RBD Recreation By Design

www.recreationbydesign.com

OWNER INFORMATION

RECREATIONAL VEHICLE INFORMATION

BRAND NAME_____ LENGTH _____

MODEL _____ MODEL YEAR_____

VEHICLE IDENTIFICATION # 5CZ _____

APPLIANCE INFORMATION:_____

AIR CONDITIONER #1: TYPE: _____SERIAL #: _____

AIR CONDITIONER #2: TYPE: _____SERIAL #: _____

WATER HEATER: TYPE: _____SERIAL #: _____

FURNACE: TYPE:_____SERIAL #: _____

RANGE: TYPE: _____SERIAL #: _____

DISHWASHER: TYPE:_____ SERIAL #:_____

REFRIGERATOR: TYPE: _____SERIAL #: _____

MICROWAVE: TYPE: _____SERIAL #: _____

WASHER: TYPE: _____ SERIAL #: _____

DRYER: TYPE: _____SERIAL #: _____

CONVERTER: TYPE: _____SERIAL #: _____

NOTES:

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FOREWORD

Thank you for selecting a recreational vehicle built by Recreation By Design. We would like to welcome you to the unique lifestyle that camping or traveling in an RV offers. Freedom is the word that comes to mind when contemplating a trip or vacation in an RV. You will never be turned away from a full motel or hotel again. Even a campground with no open lots is not a problem when traveling by way of a self-contained recreational vehicle. You have the freedom of pulling over at any roadside area and still enjoy all the comforts of home in a self sufficient manner.

Your recreational vehicle was constructed to comply with the requirements set forth by the Recreational Vehicle Industry Association, as well as other state and federal governing agencies.

As with any major purchase, house, boat or automobile, if maintained in a responsible manner, your recreational vehicle will provide you with many years of enjoyment. This manual was written with that goal in mind. Please read it carefully to familiarize yourself with your new recreational vehicle. Please keep in mind some features mentioned in this manual may not apply to your specific recreational vehicle.

Your sales representative should offer a walk-thru demonstration, be sure to ask any questions you might have at that time. Also, please review all component manufacturer's owners manuals and
activate any individual warranties by completing and mailing the warranty cards as required.

NOTICE: COMPLETE RBD'S WARRANTY REGISTRATION CARD FOUND ON THE BACK COVER OF THIS MANUAL AND RETURN IT TO US WITHIN 30 DAYS FROM THE DATE OF PURCHASE.

For your convenience keep this manual in your RV and refer to it often, observing all notes and warnings associated with its use. An educated and informed owner is the best insurance against accidents and malfunctions.

Every effort was made to assure the most current, accurate and up-to-date information was included in this manual at the time of its printing, however, due to continuous product improvement, specifications are subject to change without notice.

Some of the optional equipment shown and discussed in this manual may not be included with your RV. Any additions or modifications made at the request of the customer, whether made at the factory or by the dealer are not covered in this manual.

This recreational vehicle has had several inline inspections on its trip down the production line as well as a final inspection before delivery. However, to insure your satisfaction, it is your responsibility to fully inspect the various components, appliances and basic operation of your RV. This will help familiarize yourself with the recreational vehicle as well as providing you with the assurance of everything being in proper working order.

Your recreational vehicle has been designed for short term camping and recreational use. It was not engineered to be used as a permanent dwelling. If you intend to use your RV full-time, and experience accelerated wear and deterioration that would be considered abnormal and abusive, it could reduce your warranty coverage.

Should a problem develop under normal use please contact the Recreation By Design factory service department at:

Recreation By Design, LLC
57420 County Road 3
Elkhart, IN 46517

Phone (574) 294-2117
Fax (574) 293-5698

Call our factory and obtain authorization for repairs BEFORE attempting the repair yourself or contracting a service center. By notifying us, you will know what is covered under the terms of your warranty, as well as making us aware of your problem. If the problem is with an appliance, check the specific manufacturer's manual supplied with the recreational vehicle for information regarding warranty work
and /or location of the authorized service center nearest you. Any parts that need replacing and are covered under the terms of the warranty should be retained and returned to us along with the invoice. Following this procedure will enable us to discover the reason for the malfunction, correct the problem and properly reimburse you for your expenditures.

REPAIRS MADE WITHOUT FACTORY AUTHORIZATION MAY BE SUBJECT TO DENIAL OR PARTIAL REIMBURSEMENT. MODIFICATIONS MADE TO THIS RV WITHOUT PROPER AUTHORIZATION COULD RESULT IN REDUCTION OR LOSS OF WARRANTY COVERAGE. AGAIN, PLEASE BE SURE TO CONTACT THE FACTORY'S SERVICE DEPARTMENT PRIOR TO MAKING ANY SUCH MODIFICATIONS.

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LIMITED WARRANTY

SUMMARY

RECREATION BY DESIGN, LLC. 57420 COUNTY ROAD 3, ELKHART, INDIANA 46517 ("warrantor) warrants to the **original consumer purchaser** for a period of **twelve** (12) months from the date of purchase by the original purchaser that this recreational vehicle shall be free of defects in materials and workmanship attributable to warrantor in **body structure only.** This warranty only covers material, manufactured and assembled by Recreation by Design, LLC.

MATERIALS AND EQUIPMENT EXCLUDED FROM WARRANTY

Warrantor is not responsible for claims relating, but not limited to the following:

1. Defacing: Scratches, dents, chips and defacing on any surface or fabric of this recreational vehicle, not caused by warrantor.
2. Routine maintenance: Including re-caulking the body of the recreational vehicle, tightening the screws and adjusting doors & drawers.
3. The chassis and running gear of this recreational vehicle: Including any parts of the brake system, wheel balance, tubes and batteries.
4. All appliances: Including air conditioners, microwaves, water heaters, ovens, ranges, refrigerators and furnaces.
5. TV's, VCR's, radios, cassette decks, compact discs and speakers.

WARRANTORS OBLIGATIONS - HOW TO OBTAIN WARRANTY SERVICE

Warrantor will remedy defects in materials and workmanship caused by warrantor in the **body structure** only of this recreational vehicle. Warranty performance can only be obtained at warrantor's facility unless otherwise specifically permitted by warrantor. All costs incurred from transportation and temporary housing in regards to warranty services for this recreational vehicle shall be borne by the purchaser. Warrantor shall remedy the defects within a reasonable time, not to exceed sixty (60) days after delivery by purchaser. All warrantors' expenses in remedying the defect shall be borne by the warrantor.

PURCHASERS OBLIGATIONS

The purchaser shall give written notice to the warrantor at the above address of any defect within fifteen (15) days after it is, or should have been discovered and any action to enforce it shall be commenced more than six (6) months thereafter or after expiration of the warranty period.

EVENTS DISCHARGING WARRANTOR FROM ANY OBLIGATION UNDER THIS WARRANTY

Misuse or neglect, including accident, unauthorized alteration, failure to provide reasonable and necessary maintenance including six (6) month inspections of the recreational vehicle body. Use of the recreational vehicle for rental or commercial or any other use other than as a recreational vehicle for personal use, shall discharge the warrantor from any obligation under this warranty.

LEGAL REMEDIES OF PURCHASER

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

No action to enforce this warranty shall be commenced later than six (6) months after discovery of any defect or after expiration of the warranty period.

REGISTRATION CARD

The purchaser of such recreational vehicle should complete and return to warrantor the attached registration card, but this is not necessary in order to obtain warranty performance. A purchase receipt or other proof of date of original consumer purchase will be required before warranty performance is rendered. Warrantor or any of its authorized dealers on request will provide additional registration cards free of charge. Federal law requires that warrantor maintain records of names and addresses of the owners of the recreational vehicles and the respective identification numbers of such recreational vehicles. Warrantor's possession of the information contained in such cards will assist warrantor in the prompt servicing of such, and will assist warrantor in the prompt servicing of such recreational vehicle.

GENERAL ADVICE FOR GETTING SERVICE ON YOUR NEW PRODUCT

Dear Customer:

To assist you with any problems that may occur with your new RV in the future, please find on the following page some guidelines as to the most efficient ways to get service on your new product. You are advised not to contact Recreation By Design for service on appliances. The appliance manufacturer is set up to provide you with the service you need.

Appliances:

1. **Before** requesting service on any appliance, please ensure that you are operating the appliance correctly. Literature is to be found in each RV detailing the use, care & general maintenance responsibilities of the owner.
2. The most effective way to get service on an appliance that is installed in your unit is to call the **appliance manufacturer direct.** Please use the phone numbers supplied to you in your warranty packet.
3. Prior to calling, you must have specific information regarding the appliance, i.e.: Serial #, Model #, Date of purchase and the RV's VIN #.
4. Be warned that most appliance manufacturer service centers **will charge a service charge** if the RV is not taken to their facility for the appliance to be serviced. It is **your responsibility** to pay any service charges.
5. **Do not use** an unauthorized repair service as this could invalidate your appliance warranty and render you liable for the full service charge. **Get authorization** from the appliance manufacturer first.

Common Problems:

1. Thermostat not set correctly, check manual for correct operation.
2. Ensure propane tank is full, shutoff valve is open and gas is getting to appliance.
3. If you have 12-volt problems, check that all fuses n converter are **OK** including 110-volt fuse inside converter.
4. Problems with 110-volt could be caused by a poor supply to the RV. Check with a licensed electrician for correct voltage.

IDENTIFICATION & SAFETY

Recreational Vehicle ID #, Decals and Data Plates.

The recreational vehicle ID # label is mounted on the front lower roadside corner of a travel trailer, fifth wheel or Park Model.

IMPORTANT: Always give model, year, and V.I.N. number information when ordering parts. Also, we recommend that you keep a copy of this information separate from the recreational vehicle in the event theft or vandalism requires you to supply a copy to the authorities.

Decals and data plates used throughout the recreational vehicle aid in its safe and efficient operation; others give service instructions. Read all decals, data and instruction plates before operating your recreational vehicle.

MANUFACTURED BY:			DATE:	
INC. VEH. MFG. BY:			DATE:	
GVWR	KG (LB)			
GAWR	TIRES	RIMS	COLD INFLATION PRESSURE	
FRONT (KG)			KPA	SINGLE ☐ DUAL ☐
(LB)			(PSI)	
INTERM (KG)			KPA	SINGLE ☐ DUAL ☐
(LB)			(PSI)	
REAR (KG)			KPA	SINGLE ☐ DUAL ☐
(LB)			(PSI)	
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT IN:				
V.I.N.	TYPE			FD-222

Safety Regulations for LP Gas Systems and Appliances

This caution/ warning symbol will be used in this manual to call attention to important information on avoiding vehicle damage or possible personal injury.

The following warnings are posted throughout your recreational vehicle to provide information on LP gas safety. They have been installed not only because of the requirement to do so, but also as a constant reminder to occupants of the recreational vehicle to exercise proper caution when using or being around LP gas appliances and equipment. We are listing them here so that you may study them and make sure that you and your family understand and follow them.

1. **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.

2. **WARNING**: It is not safe to use cooking appliances for comfort heating

COOKING APPLIANCES NEED FRESH AIR FOR SAFE OPERATION. BEFORE OPERATION:

1. Open overhead vent or turn on exhaust fan.
2. Open Window

The 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, and 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.**

3. WARNING: Do not store LP gas containers, gasoline, or other flammable liquids inside the vehicle because a fire or explosion may result.

4. 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. An 80 percent automatic shut-off has been installed on the LP gas tank which will automatically prevent further filling when the gas volume has reached 80 percent of tank capacity.

5. The following label has been placed in the vehicle near the range area:

IF YOU SMELL GAS

- Extinguish any open flames, pilot lights, and all smoking materials.
- **DO NOT** touch electrical switches.
- Shut off the gas supply at tank valve (s) or gas supply connection.
- Open doors and other ventilating openings.
- **DO NOT USE THE RANGE HOOD**
- Leave the area until odor clears.
- Have the system checked and leakage source corrected before using again.

6. 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.

7. **WARNING:** Portable fuel burning equipment including wood or charcoal burning grills and stoves shall not be used inside the vehicle because they may cause fire or asphyxiation.

Fire Safety

Fire safety is an important part of owning a recreational vehicle. The following basic rules of fire prevention can help eliminate the possibility of a fire.

Make sure that everyone in your recreational vehicle is familiar with the location of exits, including emergency exit windows should an emergency arise.

1. Never store flammable liquids in the recreational vehicle.
2. Never leave cooking food unattended.
3. Never smoke in bed, and always use an ashtray.
4. Never allow children to play with LP gas or electrical equipment.
5. Never use an open flame as a flashlight.
6. Always repair faulty or damaged wiring and electrical components.
7. Never overload electrical circuits.
8. Locate and repair LP leaks immediately.
9. Keep cooking surfaces clean.
10. Don't allow accumulation of trash.
11. Never clean with a flammable liquid.
12. Spray fabrics annually with a flame retardant.

IF A FIRE DOES START, MAKE SURE TO FOLLOW BASIC RULES OF SAFETY:

1. Have everyone evacuate the recreational vehicle as quickly as possible.
2. After everyone is clear, check the fire to see if you can attempt to put it out. If it is large, or the fire is fuel-fed, get clear of the recreational vehicle and have the fire department handle the emergency.
3. **DO NOT** attempt to use water to put out the fire. Water can spread some types of fire, and electrocution is possible with an electrical fire.

If you determine that you can attempt to control the fire using the fire extinguisher, make sure you know how to use it. Read the label on the fire extinguisher, and study the information in this manual to become familiar with the safe operation and maintenance of the extinguisher.

Fire Extinguisher

Underwriter Laboratories classify fires into three types:

Class A - Fires in wood, paper, fabric, rubber, and certain plastics.
Class B - Flammable liquids such as grease, cooking oils, gasoline, or kerosene.
Class C - Electrical fires started from live electrical wires, from short-circuited motors or switches.

The fire extinguisher provided with the recreational vehicle is a chemical type suitable for extinguishing small fires of the class B or C type. Extinguishers are designed to put out a fire in the initial stage, not when it is blazing out of control. If a fire cannot be approached within 10 feet, it is too late to do any good.

To fight a fire with an extinguisher, first remove the tamper tape, which covers the discharge push button. The extinguisher does not need shaking. Hold it upright and stand six to ten feet from the fire with a clear path to an exit. Press the button down all the way, aimed at the base of the fire and spray with quick motions from side to side.

Avoid inhaling the dry chemicals. Although non-toxic, they could cause temporary irritation and vomiting. When the fire is out, clean up the area as soon as possible. The dry chemicals are non-corrosive, but some residue may cause surface damage if left too long.

In the case of an electrical fire, disconnect the battery and throw off the main circuit in the unit. It is important that everyone knows where to find the main circuit and how it operates. If the shoreline power cord is connected, disconnect it.

To keep a fire extinguisher in operating condition:

1. **Check pressure —** Monthly or more often. Check the nozzle for obstruction. Press the green pin below the nozzle. If it returns and sticks out from the extinguisher, it is operable. If the pin does not come back, discard extinguisher. Refillable models have a pressure gauge to check.
2. **Tamper Tape —** Check the tape to make sure it is intact. **DO NOT** test the extinguisher. Even a partial discharge may cause leakage, and make it useless when needed.
3. **Inspection Tag —** When checking the extinguisher for pressure, enter the date checked on the inspection tag furnished with the recreational vehicle. Regular inspections will help insure the condition.

• Smoke Detector

An ionization detector offers a broad range of fire sensing capabilities. However, they do possess limitations. Fire could start in a location that would prevent smoke from reaching the detector. They are also better at detecting fast flaming fires than the slow smoldering variety. They are also not a cure for poor fire safety habits. Smoke detectors need occasional maintenance for reliable service. A smoke detector is designed to be relatively maintenance free, but there are three things you can do to keep a detector in reliable working order:

1. **Test it —** at least once a week by firmly pressing the button located near the center of the cover. The alarm should sound briefly. If it does not work, replace the battery and test again.

2. **Clean —** the detector if grease or dust accumulates. The following procedure should be followed once a year.

   a. Remove the cover and the battery.
   b. Clean dust from sensing chamber openings with a vacuum and soft brush attachment.
   c. Replace the battery and depress the test switch. The alarm should sound briefly. If it does not work, try a new battery.

3. **Service —** the detector if it does not work by sending it to the manufacturer or their repair center.

   DO NOT attempt to make the repairs yourself (other than battery replacement).

NOTE: When the battery is low, the detector will "chirp" for seven days to remind you to change it.

OPERATIONS AND PROCEDURES

Proper Loading and Weight Distribution

Your recreational vehicle has been designed to carry loads within specified limits. Exceeding these limits will greatly affect the handling of the recreational vehicle. These limitations are defined in two ways:

1. **Gross Vehicle Weight Rating (GVWR) —** This is the total designed weight rating of the recreational vehicle.
2. **Gross Axle Weight Rating (GAWR) —** This is the designed weight rating of either axle. Adding the GAWR of the axles and the hitch weight will be approximately equal to the GVWR of the recreational vehicle.

Check weight ratings of your recreational vehicle on the serial number identification tag on the recreational vehicle.

Additional terms used when discussing weight and distribution include:

1. **Gross Vehicle Weight (GVW) —** The total loaded weight of the recreational vehicle. It includes everything that combines to give the recreational vehicle its total weight when traveling. Included are the weight of the recreational vehicle, all furnishings, appliances, and conveniences, fuel, water, personal belongings stored both inside and outside, and all passengers.
2. **Gross Axle Weight (GAW) —** The total loaded axle weight under any given load condition.
3. **Curb Weight (Shipping) —** The weight of the vehicle with standard equipment and maximum capacities.
4. **Unloaded Vehicle Weight (UVW) —** The weight of the vehicle with maximum fluid capacity required to operate vehicle.*
5. **Cargo Carrying Capacity (CCC) —** The weight difference between the GVWR and the UVW. Includes **LP** gas and fresh water.
6. **Tongue Weight** (Tow-able recreational vehicles) — This is the weight of the tongue as it bears down on the hitch of the towing vehicle. Tongue weight should be determined with the travel trailer as it would be fully loaded for travel.

*Per CFR 49, 571.3 definition.

NOTE: When establishing the cargo capacity, weigh with all water tanks as empty as possible and do not allow anyone to be in the vehicle.

DO NOT assume that you can fill all tanks and all storage areas and be within the GVWR. Weights of stored items will vary greatly and will affect total weight of your recreational vehicle.

Always weigh the recreational vehicle at a certified weigh station equipped with platform scales. Check the telephone directory or with local authorities for the location of weigh stations in your area. If you find that you have exceeded the GVWR of the recreational vehicle, you will have to remove items until you are within the specified limits. If you find that either of the GAWR's has been exceeded, you will need to redistribute the load within the recreational vehicle to meet the specified limits.

Always give careful consideration when loading your recreational vehicle so that items will be evenly distributed. Not only will the recreational vehicle handle and ride better, but you will have reduced tire wear and increased fuel economy. When weighing the recreational vehicle, weigh both right and left hand sides also. This will ensure that you have not overloaded one side or the other, affecting recreational vehicle handling. **DO NOT** store heavy items near the front or rear ends of the recreational vehicle. It is a good idea to empty the holding tanks before leaving on a trip, and as often as possible when traveling, to help keep weight reduced. Try to carry only as much water as you will use when traveling. Sometimes, the water tanks can be used to balance the weight in the recreational vehicle (a gallon of water weighs 8.3 pounds). It is also important to keep in mind when traveling, that all items stored inside and outside the recreational vehicle are secure, and all doors and drawers are secure. **DO NOT** add any type of rack or frame to any recreational vehicle frame or chassis part. The alteration to length and/or weight distribution may result in unstable handling, be a safety hazard, or could damage the recreational vehicle components. In any case, the recreational vehicle warranty may be affected.

Computing Your Load and Load Distribution

NOTE: Gross axle weight is determined with all tires on the scale, but side to side weight

to be determined distribution has by weighing each side separately.

(Tow-able Recreational Vehicles)

To weigh your trailer properly, use the following procedure:

1. Level the trailer and make sure that it remains level throughout the weighing procedure.

a. <u>For gross vehicle weight,</u> pull the trailer onto the scales and weigh with both the axles and front jack resting on the scale. The difference between the weight of the trailer fully loaded and empty is the rated personal cargo weight. If for example the GVWR of your trailer is listed at 7040 lbs. and it weighs empty at 4755 lbs., your personal cargo weight cannot exceed 2285 lbs. The GVW must not exceed the GVWR found on the certification decal.

b. <u>For tongue weight,</u> rest only the hitch on the scale and weigh with the trailer fully loaded for travel. Check the weight against the proper tongue weight as listed on the certification decal.

c. <u>For gross axle weight,</u> pull forward so that only the trailer axle (s) are setting on the scale. If the weight exceeds the GAWR on the weight distribution information sticker, remove or redistribute the weight in the trailer to meet the proper specification. The difference between gross vehicle weight and gross axle weight is the tongue weight.

1. Gross Vehicle Weight

2. Tongue Weight

3. Gross Axle Weight

If additional items must be added to the unit after it has been weighed and the loading analysis completed, weigh each additional item using a bathroom scale before placing them in the travel trailer. The total of these items are then added to the GVW originally determined. Remember that by adding additional weight, you may be affecting the tongue weight of the trailer. The tongue weight is increased by moving cargo forward, and decreased by moving cargo toward the rear. However, too much weight in the rear can cause trailer sway or handling instability.

Once you become familiar with loading your trailer and know how to distribute the weight and which items you normally carry, make a list and diagram you can use for future reference. Plan your loading and storage so that emergency items are easily accessed. Place heavier or breakable items on the travel trailer floor for greater load stability. Make sure these items are well packed and secured to prevent movement. Take extra care not to overload the front and rear ends of the trailer.

Make sure to use packing material around breakable items such as plates and glasses in cupboards if you will be towing over rough roads or terrain. It is a good idea to use non-skid materials under heavier items to help prevent shifting.

Most new trailer owners tend to carry more supplies than they really need. It is important to remember that each item added brings with it the extra weight to tow and distribute.

WARNING:

DO NOT store LP gas containers, gasoline, or other flammable liquids inside the trailer as it may result in a fire or explosion.

Towing Vehicle Requirements

When considering a towing vehicle, keep in mind certain requirements for safe and easy use:

1. **Transmission —** The transmission can be manual or automatic, but for most people an automatic transmission will control engine loads better.
2. **Power —** The sum of the trailer GVW and the tow vehicle GVW must not exceed the Gross Combines Weight Rating (GCWR) capability of the tow vehicle**. Discuss the towing capabilities of your vehicle** with both your recreational vehicle dealer and tow vehicle dealer.
3. **Tires & Suspension -** It is important to make sure that your tow vehicle tires and suspension have sufficient rating to handle the additional capacity needed to tow a trailer. Check with your tow vehicle dealer and owner's manual for what type of tires and tire pressures are required. If your tow vehicle is equipped with vehicles air shocks, do not use the air shocks as a load leveling device to level the tow vehicle/travel trailer combination once it is hitched up.

WARNING:

Some motorized vehicles are not good tow vehicles because they cannot adequately control sway in the tow vehicle

4. **Hitch —** Make sure that your towing vehicle is equipped with a weight distributing hitch (see below) that has a rating at least equal to the travel trailer GVWR. For bumper pull hitches, verify that the trailer tongue weight does no exceed the specified tongue weight capability of the tow vehicle. Make sure that it is installed control per the hitch manufacturer's instructions, and that it meets the tow vehicle's requirements for fit and performance.
5. **Sway Control —** Make sure to install a sway control system that is compatible with both your hitch and tow vehicle. Have it installed and properly adjusted per the manufacturer's instructions.
6. **Safety Equipment —** Make sure to install proper safety equipment such as towing mirrors. In most states they are required by law. Most styles available are not permanent and can be easily installed and removed. Check with your dealer for correct types and methods of installation. Also
7. **Brake Control -** Make sure to install proper hitch wiring to supply 12-volt power to the travel trailer for turn signal and brake light operations and to control the electrical brakes on the trailer.

Travel Trailer Hitch

To safely tow your new travel trailer, you will need to install a weight distributing hitch with a 2-5/16" ball. It is very important to choose a hitch designed for attachment to your particular tow vehicle, and have it properly installed. Choosing the correct hitch for use with your trailer that will enhance the stability and maneuverability of your travel trailer and tow vehicle combination.

WARNING:

Make sure to choose a hitch that does not have a tongue weight rating that exceeds that which is recommended. Doing so may result in damage to your trailer frame.

A weight distributing hitch is one in which leverage is used to distribute the tongue weight of the trailer between the trailer and the tow vehicle. It consists of the hitch receiver which attaches to the tow vehicle, and spring bars that provide the necessary leverage for load distribution. A hitch of this type, properly installed and matched to your tow vehicle, will provide a level ride that can improve braking and steering control, as well as reduce towing strain.

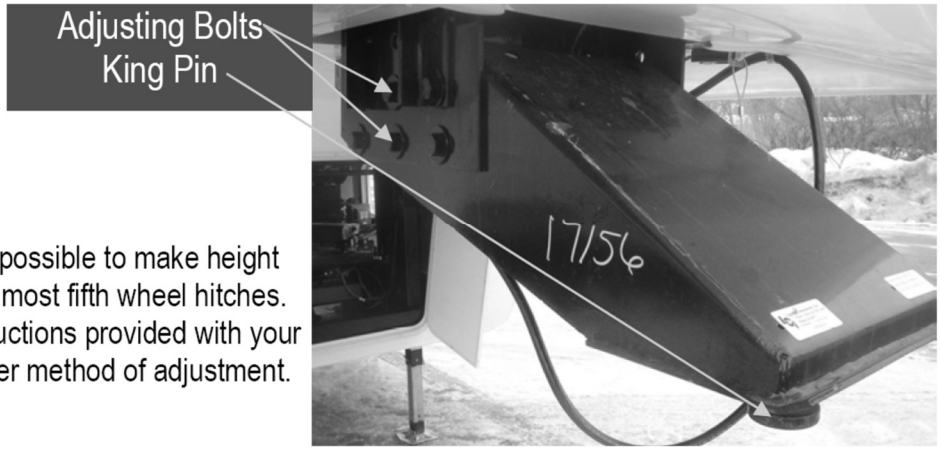
Pay particular attention to the relationship between the tongue load limits of your tow vehicle and the hitch that you purchase. Another consideration when choosing a hitch is the addition of a sway control system. Friction and cam-action are the two main types of sway control systems available.

Fifth Wheel Hitching Procedures

Height Adjustment

Since not all trucks and fifth wheel hitches are exactly the same size, it may be necessary to adjust the height of your fifth wheel pin box to achieve a level position. If the fifth wheel is hitched up with the front too high, too much weight will be transferred to the rear of the unit, which can cause trailer sway. If it is hitched up too low, additional weight will bear down on the tow vehicle, exceeding the proper hitch weight.

The pin box can be adjusted by removing the bolts on each side that hold the two sections together, repositioning the pin box to a new height, and reinstalling the bolts. Because of the weight and critical nature of the pin box, consult with your dealer before attempting to alter the position of the pin box.

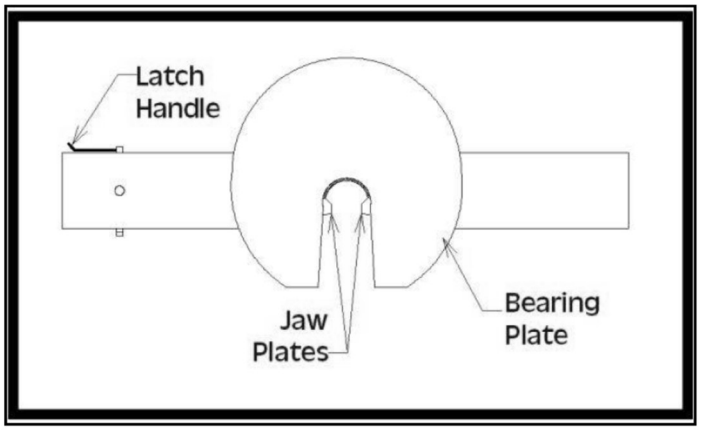


It is also possible to make height adjustments with most fifth wheel hitches. Refer to the instructions provided with your hitch for the proper method of adjustment.

Hitching Up

Make sure all hardware is reinstalled and tightened correctly.
The instructions given here are general instructions applicable for most fifth wheel hitches. It is very important that you read and follow the specific instructions provided with your particular fifth wheel hitch. It is a good idea to discuss hitching procedures with your dealer or manufacturer. They can answer your questions, and offer helpful tips to make the procedure an easy one for the first time fifth wheel owners.
Make sure to also talk with your tow vehicle dealer before selecting a hitch for your truck, being sure that it meets the specifications required.

Typical Fifth Wheel Hitch Components



When attaching the fifth wheel to the tow vehicle hitch, use the following steps:


WARNING:

Follow all additional instructions outlined by the hitch manufacturer, tow vehicle dealer, and your recreational vehicle salesman


WARNING:

DO NOT **raise the fifth wheel jacks until you are sure the kingpin is fully engaged and locked in place in the fifth wheel**

1. Lower the tailgate of your tow vehicle.
2. Remove the latch pin from the hitch latch handle. Make sure that the hitch is in the unlatched position by pulling the hitch latch handle to the open position (check hitch manufacturer's specific instructions).
3. Place wheel chocks under both the front and back of the trailer's wheels (both sides).
4. Using the fifth wheel jacks, adjust the height of the kingpin plate until it is level with bearing plate on the tow vehicle hitch.
5. Slowly back the tow vehicle up until the kingpin is inserted past the jaw plates (or latch plate) of the hitch. Have someone assist you in this with the use of predetermined hand signals. Make sure this person is in view at all times and proceed slowly and cautiously.
6. Make sure the kingpin is completely inserted and locked in the hitch.
7. Close the coupler latching lever, making sure that it is fully locked in place. Insert the lock pin in the latching lever.
8. Raise the fifth wheel jacks to their fully retracted position.
9. Raise and secure the tow vehicle tailgate.

Unhitching

To unhitch the fifth wheel from the tow vehicle hitch, proceed as follows:

1. Park the fifth wheel on a level spot, and place wheel chocks in front and behind the wheels on both sides.
2. Lower the fifth wheel jacks until the weight of the fifth wheel is no longer on the tow vehicle. If the ground is soft, make sure to place supports under the jack pads to keep the fifth wheel stationary.
3. Disconnect the breakaway switch cable and the electrical pigtail.
4. Remove the latch pin from the hitch latch handle. Pull the hitch latch handle to the open position (check hitch manufacturer's specific instructions).
5. Move the tow vehicle slowly away from the fifth wheel.

Tow Vehicle Wiring

NOTE: If your tow vehicle has a separate amber turn signal, it will require a special adapter to allow your trailer lights to function properly.

Along with your hitch, it is also necessary to install proper electrical connection from the tow vehicle to your travel trailer. A car end pigtail is supplied with leads of adequate length to allow connection to your tow vehicle wiring system. Make sure that you use wiring of the correct gauge with sufficient slack between the travel trailer and tow vehicle to allow for turning without dragging on the ground. Have your tow vehicle dealer, and/or hitch installer assist you with the installation.

The wiring color code for connection of the trailer to the tow vehicle is as follows:

White - Ground
Green - Trail, running, and license plate lights.
Red - Left turn and stop
Brown - Right turn and stop
Blue - Electric Brakes.
Yellow - Back up light.
Black - Battery Charge

Although your travel trailer has been checked at the factory, we recommend that you visually check to see that all lights are functioning properly before leaving your dealer. Always make sure your lights are working properly before each trip.

Electrical Hook-Up

Plug the trailer electrical pigtail into the socket located on the tow vehicle. Be sure there is enough slack to prevent disconnection during a full 90 degree turn. Check all lights for proper operation before pulling away, including brake lights and turn signals.

Safety Chains


WARNING:

Do not attach the safety chains to the vehicle bumper.

NOTE: **Safety regulations require the safety chain to be crossed under the tongue and hitch to prevent the tongue from dropping to the ground in the event of a hitch or coupling failure.**

After you have the travel trailer coupler properly attached to the hitch ball, the safety chains must be attached.

To do so proceed as follows:

1. Cross the safety chains under the tongue and hitch.
2. Attach the hooks to the chain attachment loops provided on the towbar portion of the hitch or to the vehicle frame.
3. Make sure that the chain slack length is equal on both sides and that it is sufficient to allow the tow vehicle and trailer to turn at their minimum radius without the chains dragging on the pavement.

DO NOT attempt to repair a damaged chain. If the safety chain has been damaged, it must be replaced.

Breakaway Switch


WARNING:

The breakaway switch is intended for emergency use only. Do not use the switch as an emergency brake for the fifth wheel when parked.

The breakaway switch is a safety feature designed to automatically engage the trailer brakes if the trailer should somehow come unhitched from the tow vehicle. A steel cable connects the switch to the tow vehicle. If separation occurs, the switch is activated by the action of the cable pulling out the switch actuating pin.
Make sure the cable is attached to the tow vehicle with sufficient slack to allow a full 90 degree turn without activating the trailer brakes.
The breakaway switch requires 12-volt current to operate. This current is normally supplied by the tow vehicle electrical system. If complete separation occurs, the trailer battery supplies the power needed for brake activation.

Test the breakaway switch before each trip by pulling out the switch actuating pin, and checking to make sure the trailer brakes have been activated. If the switch and brakes do not operate properly, have the problem repaired before towing the trailer. Keep the trailer battery charged at all times to insure the safe operation.

Brakes

Your electric trailer brakes are basically the same as the brakes in your tow vehicle. Hydraulic pressure is used to expand the brake shoes in your tow vehicle, while an electric circuit is used to perform the same function on your trailer. This electric circuit uses a combination of electromagnets and the rotation of the brake drum to accomplish the movement of brake shoes against the drum.

Your electric brakes are wired to the towing vehicle through the electrical pigtail. When attached, they distribute even braking power to both the towing vehicle and the trailer.

Talk to your dealer about the types of brake controllers available, and proper installation of the controller on your towing vehicle. Have him explain electric brake operation, and their proper use, as well as the importance of the load resistor and safety breakaway switch.

Make sure to test the brakes and adjust them as necessary, per the instructions of the brake controller manufacturer. Proper adjustment of the brakes can help to avoid dangerous swaying or jack-knifing on slippery pavement, or during an emergency stop.
It is very important to achieve the proper balance between the brake action of both the trailer and tow vehicle. Both sets of brakes were designed to stop only the vehicle on which they were installed. If one set of brakes is asked to absorb the load of the other excess heat is created, which increases brake lining wear and brake fading. If the tow vehicle's brakes are used alone, the weight of the trailer pushing on the back of the tow vehicle can cause jack-knifing. The correct method of brake synchronization has the trailer brakes being applied with a slight lead over the tow vehicle's brakes. Make sure this proper balance is achieved when the controller is installed and adjusted.
Before taking your trailer on a trip, check for proper brake action on a short road test. Apply the brakes several times at different speeds and pressure. If wheel lock-up occurs, the brake shoe adjustment is too tight. If no trailer brake action is occurring, brake shoe adjustment is too loose. Do not exceed a speed of 30 mph during this road test. Refer to the Brake/Axle Owner's Manual for adjustment procedures and troubleshooting guide.

Wheels

Make sure to check the wheels lug nut tightness periodically as well as after the first trip after changing a tire. Improper torque on the lug nuts may cause wheel/axle damage or cause a wheel failure.

Torque amounts can be found in the Periodic Maintenance Chart at the back of this manual.

Manual Fifth Wheel Jacks

The manual fifth wheel jacks utilize a hand crank on the side of the unit to raise or lower the fifth wheel from the front. The jacks are used to raise or lower the fifth wheel off or onto the tow vehicle hitch, and also for leveling the unit from front to back.

WARNING:

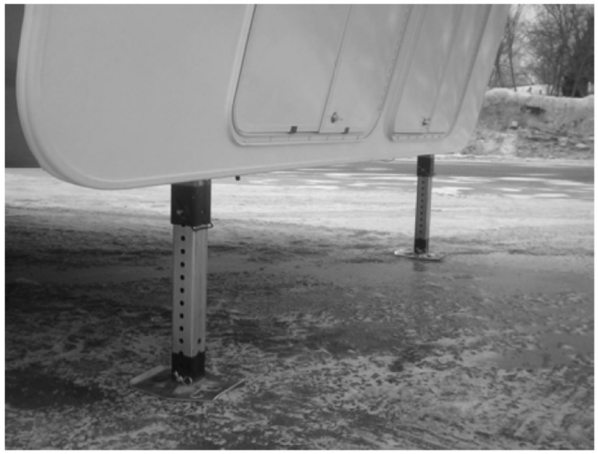
Before using the jacks, make sure to chock the wheels on both sides of the fifth wheel. Place chocks both in front and behind the wheels. Always retract the jacks fully before towing the fifth wheel.

To operate the jacks, proceed as follows:

1. To lift the fifth wheel for hitching or unhitching, drop the pad tube by removing the lock pin. Re-pin in the hole that places the pad closest to the ground. This will compensate for variations in terrain between the two jacks. If parked on a level surface, keep both sides pinned in the same position.
2. Open the cover on the side of the unit and insert the hand crank into the alignment tube until the end engages the crankshaft.
3. Turn the crank handle counterclockwise to raise the fifth wheel and clockwise to lower.
4. When retracting the jacks, raise them as far as possible with crank handle.
5. Remove the lock pin and raise the pad tube, re-pinning in the highest possible position.
6. Remove and store the jack crank handle. Close and secure the access door.

WARNING:

When hitching the fifth wheel to the tow vehicle, DO NOT raise the jacks until you are sure that the fifth wheel is securely latched into position in the tow vehicle hitch.



Make sure that the lock pin spring lock is positioned around the jack and secured over the end of the pin on the opposite side of the jack tube. This prevents the pin from coming out while traveling.
Before towing, check for maximum clearance between the ground and the bottom of the jacks.

Electric Power Fifth Wheel Jacks

The power fifth wheel jacks provide a 12 volt electrically driven motor to take the place of the manually operated jack crank handle for raising and lowering the fifth wheel.
To operate, hold the switch in the position you wish to move the jacks; either UP or DOWN. When released, the switch will automatically return to its centered, OFF position.
Make sure to observe all other instructions and cautions outlined in the previous operating instructions for the manual fifth wheel jacks.
The jacks may also be operated by use of a manual hand crank if the electric drive motor is inoperative.

Power & Crank down Stabilizer Jacks

Your trailer may be equipped with one or more pairs of stabilizing jacks. Before use make sure to pick as level a site as possible to park your trailer. If a level site is unavailable, it may be necessary to use wheel ramps or planking under the tires on the low side of the trailer.

To use stabilizer jacks, proceed as follows:

1. Obtain as level a position as conditions at your campsite allow before unhitching. It may be necessary to use ramps or planking under the tires to achieve side-to-side balance.
2. Always use wheel chocks when parking.
3. Unhitch the trailer from your tow vehicle and level from front to rear with front jacks.
4. Lower the stabilizer jack on the lowest side of the trailer first, checking for and "fine-tuning" level conditions with the jack.
5. Once side-to-side balance is obtained, lower jacks on opposite side to secure level position.
6. **DO NOT** over extend the stabilizer jacks in the front and rear as this may cause your trailers doors to rub at top and bottom.
7. Stabilizer jacks are to be used to stabilize the unit, **NOT to raise it up off of the ground.**

It is a good idea to use stick-on levels where they may be observed during the leveling procedure.

Electric Power Tongue Jack

The power tongue jack takes the place of the manually operated jack for raising and lowering the travel trailer from front to back. To operate, hold the switch in the position you wish to move the jack; either UP or DOWN. When released, the switch will automatically return to its centered OFF position.

Electric Slide-Out Room

The slide-out room is operated by a switch located inside the recreational vehicle on the sink base or a nearby wall partition. Before extending the room(s) check the exterior for proper clearances.

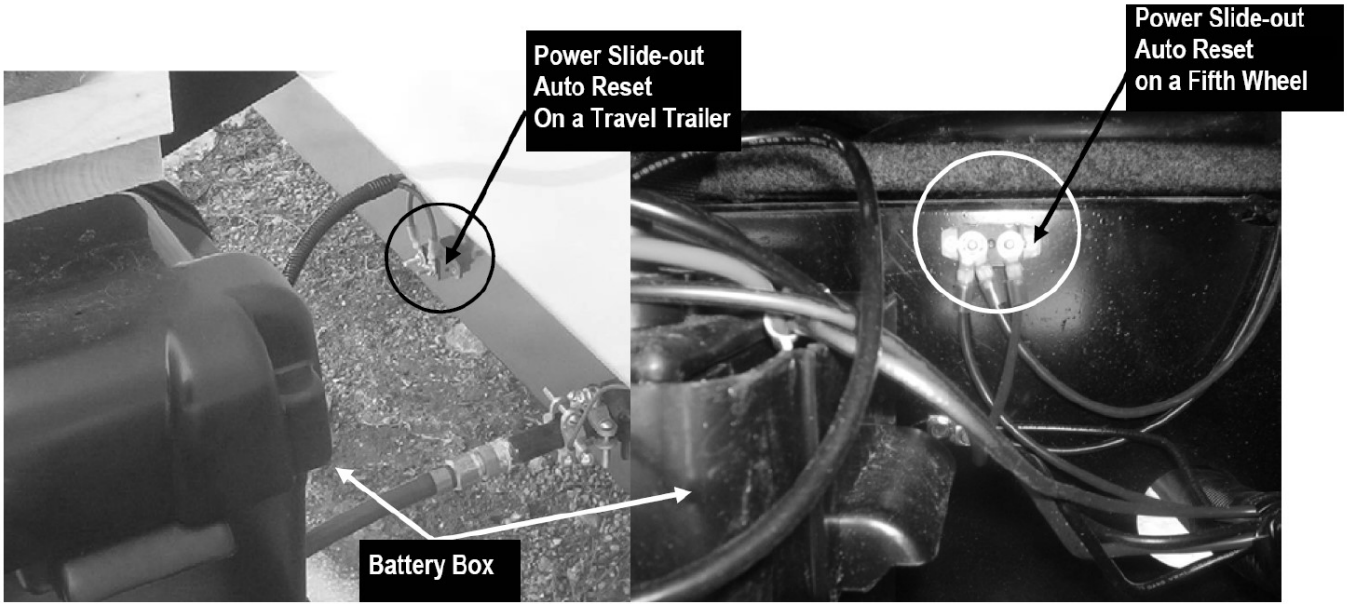
The recreational vehicle must be level and the stabilizer jacks securely in place. It may also be necessary for the recreational vehicle to be slightly off level, side to side, during heavy periods of rain to allow rain to run off the roof away from the recreational vehicle. This will prevent the water from "backing up" and running inside the living area of the trailer. To extend the slide-out, hold the switch in the "out" position.
A moaning or grinding sound at the initial start of the operation is normal. Hold the switch in the out position until the room has stopped its travel or until the headers are square to the side of the recreational vehicle. On the super slide-outs it is normal for the headers to reach the sidewall at one corner before completely squaring up.

To bring the slide-out room in, reverse the above procedure.

Jumper Cable Connection

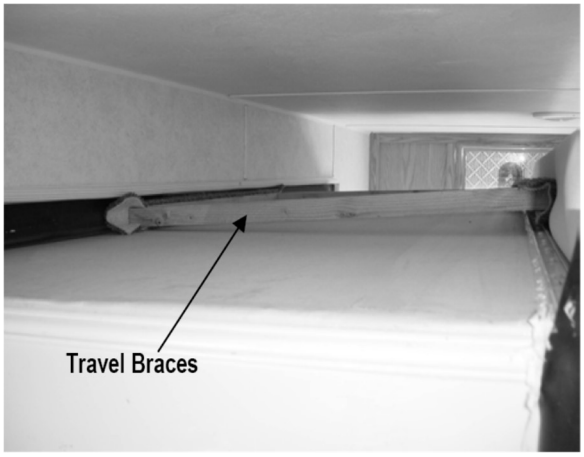
If nothing happens when the switch is pushed check the electrical connections. A blown 12 volt fuse or a tripped auto reset breaker could also be the reason for an inoperable slide-out room.
Most of the time when the room fails to move it is due to a low or dead battery, even though you may feel that your battery is sufficiently charged. If the room doesn't move, a direct jumper cable connection from a fully charged battery may be needed.

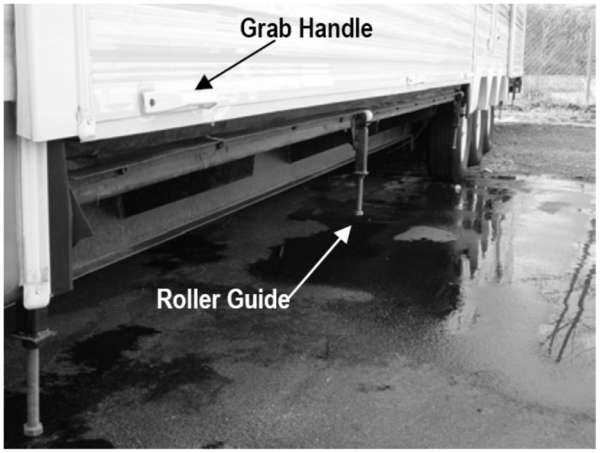
1. Connect the jumper cable hot lead to the connection point (terminal) on the starter solenoid opposite the copper strip.
2. Connect the jumper cable ground lead to a ground point such as one of the hose fittings that are mounted in the valve outlet ports, or any convenient point on the valve body or middle section of the power unit.



Manual Slide-Out Room

1. Opening a manual slide-out room is best accomplished with two people, although one person is capable of opening a smaller (up to 8') room.
2. The travel braces used to keep the slide-out room tightly closed and sealed while in travel, they must first be removed from the top of the closed room.
3. Next, the room may either be pushed out from the inside or pulled from the outside using the grab handles installed for that purpose.
4. Once the room is extended to its furthest point, and using a 3/4" wrench or ratchet and socket, lower the roller guide down until the slide-out floor is flush with the trailer's main floor.
5. Closing the slide-out room is accomplished by reversing steps 1 through 4.





Emergency Stopping and Towing

If an emergency ever requires you to be stopped, be sure to follow these guidelines:

1. Pull off the road as far as possible.
2. Turn on your hazard warning flashers.
3. If traveling at night, use three red warning indicators such as flares, reflectors, or lanterns as required by the Uniform Vehicle Code and Model Traffic Ordinance as follows:
   A. Place the first at traffic side of the vehicle, directed at the nearest approaching traffic.
   B. Place the second 100 feet behind the recreational vehicle in the center of the lane and toward approaching traffic.
   C. Place the third 100 feet in front of the recreational vehicle in the center of the lane and away from the traffic approaching from behind.
4. Always stand off the road.

NOTE: Curves and/or hills may affect the safe placement of warning indicators.

Interior Controls and Operations

The following instructions are for items inside the recreational vehicle which are general in nature. Instructions for the operation of appliances and conveniences not found here can be found in other sections dealing directly with appliances and systems. Check the index for the location of specific information.


WARNING:

To avoid exhaust gas entry into your RV, keep windows closed when a generator engine is running.

Windows

The default windows that open in the recreational vehicle are basic slider windows. If your model contains frameless windows then they are operated by jalousie mechanisms, to operate these, simply rotate the crank handle to open or close the window.

Egress (Emergency) Windows

In the event you must exit the recreational vehicle due to an emergency and cannot reach the entry door, lift the red handles on the egress window and push the glass out, leaving an opening to exit through. Operate the egress window only in an emergency as it is difficult to replace and the seal may be compromised.

Doors, Drawers, and Storage Compartments

Cabinet and closet doors in the recreational vehicle have catches which prevent them from accidentally opening during travel. Drawers throughout the recreational vehicle have travel stops which keep them from sliding out when in motion (under normal driving conditions).
To open drawers, lift up first, then slide out. When closing drawers, make sure they drop slightly into the travel position.
Make sure before operating your recreational vehicle that all cabinet doors and drawers are closed, and cabinet contents are secure. Retract and secure sliding doors in the bath area, as well as the bath door, to prevent noise and/or damage while traveling.

Under the Bed Storage


WARNING:

Use caution when lowering the bed to keep hands and fingers from being pinched

There may be a large storage compartment located under the bed. You may access this storage.
either by grasping the cut out corner at the foot of the bed and lifting or by the cabinet doors or drawers located in the side of the bed base. Make sure before lifting, that there is nothing on the bed that will restrict its movement, or add extra weight.
Optional pneumatic lift props on both sides of the storage compartment aid both in lifting, and holding the bed in the upright position. When storing items under the bed, be sure to leave
space in the storage compartment for the props when the bed is closed.
When lowering the bed, there will be some resistance felt at first, because of the lift props. Be sure to keep both hands on the end ledge all the way down to the closed position to avoid having the bed suddenly drop shut.
Store items in the areas designated for storage. **DO NOT** store anything in the area reserved for the converter and electrical panels.

Seating, Tables and Additional Beds

Depending on which model and options you have in your recreational vehicle, seating will include some combination of the following:

Jack Knife Sofa — The sofa will comfortably seat three adults. It also converts to a bed by lifting the front section and pulling toward you. The sofa back follows and pivots down into a prone position. To reconvert back to a sofa, lift the front and push back and down into place. The sofa back will follow and pivot up into its upright position automatically.

Hide-A-Bed Sofa — The sofa will comfortably seat three adults. The sofa contains a pull out bed that is accessed by removing the seat cushions. To open the bed, use the handle provided in the center, pulling up and out to its fully extended position. To store, simply reverse the procedure, lifting and folding it back to its original position. Replace the cushions on the sofa to complete the procedure. Make sure not to force operation of the sofa if there is resistance. Look for obstructions that may be interfering with the folding mechanism.

Built-In Sofa — The built-in sofa will comfortably seat three adults. It also converts to a bed by lifting the front section and pulling toward you. The sofa back follows and pivots down into a prone position. To reconvert back to a sofa, lift the front and push back and down into place. The sofa back will follow and pivot up into its upright position automatically. This sofa offers additional storage as it is set on a base cabinet.

Dinette — Most dinettes will seat four people. The dinette can also be converted into an additional bed if required. To convert, lift the table top off of the two support posts. Remove the support posts from the floor and lay them down between the seats. Insert the table top between the seats on the ledges provided. Use the seat cushions to form the bed. Reverse this process when reconverting to the dinette configuration. Storage and/or various systems components can be accessed from above by removing the seat cushions and lifting the seat supports or from the convenient cabinet door on the ends of the seat.

Wall Table — This table is stored in a folded position. To raise for use, pull out on the bottom to release it from its securing catch, and swing up. When raised, reach under the table and swing the supporting leg down until it locks into position.

Dining Table - This is a solid wood round table with drop-down leaves which gives you the option of placing it flat against a wall thereby saving valuable floor space.

Swivel Rocker - This chair has a swivel base as well as a rocking action.

Recliner - The reclining chair has a lever on the side of the seat to bring the foot-rest up, then just grasp the arms of the chair and push back to recline. Make sure the chair has the proper clearance behind it to avoid damage to the wall or other furniture.

Wall-away Recliner - This chair operates in the same manner as the recliner, the difference is that the interior mechanism requires very little clearance behind the chair.

Glider Recliner - Instead of a rocking motion this chair glides back and forth as well as reclining. Make sure the chair has the proper clearance behind it to avoid damage to the wall or other furniture.

Condensation and Ventilation

Moisture condensing on windows is a visible sign that there is too much moisture inside the RV. This can be caused either by cooking, bathing or using the washer & dryer. This excessively high humidity can cause mildew, staining and rotting of woodwork and paneling.
Humidity should be controlled to the point where little or no condensation appears on the inside surface of the windows. Several steps can be taken to correct this problem.

1. Bring fresh outside air inside through ventilation, using exhaust and roof vents
2. Air out the trailer by opening doors, windows and roof vents several times a day.
3. Do not pack hanging clothes too tightly as this prevents proper circulation in the closet.
4. Purchase a de-humidifier to effectively reduce excess moisture in your RV.

Roof Vents

Depending on which model and options you have in your recreational vehicle, you may have one or more of the following ventilators.

Manual Roof Vent — Simply crank the dome open so inside air can escape through the screened opening.
12 Volt Power Roof Vent — Crank the dome open and depress the switch to operate the fan, which pulls inside air out through the screened opening.
120 Volt Power Roof Vent — Crank the dome open and depress the switch to operate the fan, which pulls inside air out through the screened opening.
Auto Power Vent — This power vent can be operated either with "Auto Mode" on or off.
When "Auto Mode" is on (switch will be illuminated) vent is controlled by the Thermostat and Rain Sensor. In this Mode the "Dome up/down" switch is disabled, the "Airflow in/out" switch controls fan rotation direction only.
When the thermostat calls for cooling via a contact closure, the dome powers open and the fan is energized. The fan will spin at the speed and direction that has been preset on the Fan Speed Control and Airflow in/out switch. If the Fan on/off switch is set to off, the dome will open but the fan will not run. When the dome opening circuit senses a fully closed dome, the dome lift motor will be de-energized.
When the thermostat is satisfied, the contacts open and the dome will power close. When the dome closing circuit senses a fully closed dome, the dome lift motor and the fan motor will be de-energized.
In the event that the Rain Sensor becomes wet, the dome will close. When the dome closing circuit senses a fully closed dome, the dome lift motor and the fan motor will be de-energized. The fan will remain de-energized until the Rain Sensor dries out or the Auto/ Manual Switch is switched to the manual position.
When "Auto Mode" is off (Manual Mode) Fan on/off is controlled by the thermostat, the Rain Sensor is disabled, and the Dome up/down switch is enabled and controls the dome position (the dome must be open in order to energize the fan).The Airflow in/out switch operates independently of the other controls. It controls fan rotation direction only.
With the dome open and the Thermostat calling for cooling via a contact closure, the fan will be energized and spin at the speed and direction that has been preset on the Fan Speed Control potentiometer and Airflow in/out switch. If the fan is set to off, the fan will not run. When the thermostat is satisfied the contacts open and the fan is de-energized. The dome will remain open for static ventilation.

Exterior Operations

The following instructions are for items on the outside of the recreational vehicle. Instructions for the operation of appliances and conveniences not found here can be found in other sections dealing directly with appliances and systems. Check the index for the location of specific information.

NOTE:
Make sure storage compartment doors are closed, latched, and contents secure before moving the recreational vehicle.

Entry Door - The entry door consists of both an exterior door and a screen door used for ventilation when the recreational vehicle is parked. **DO NOT** attempt to pull the recreational vehicle with the doors open. **DO NOT** drive or pull the recreational vehicle with the outer door open and the screen door closed. The doors may be damaged, and it is a safety hazard. When driving, it is a good idea to keep the door locked to prevent uninvited entrance from the outside when stopped. Two types of locks may be provided with the outer door. The handle lock for normal security, and a dead bolt lock for additional security.
The screen door can be attached to the outer door. A sliding panel on the screen door permits access to the handle on the outer door to prevent unnecessary handling of both doors. Separate keys are provided for both types of door locks. It is a good idea to keep a record of the key numbers in a safe place, should it become necessary to have duplicate keys made.

Step - A manual operating step is provided as standard equipment on most recreational vehicles. To extend the step, lift up on the step and pull forward. The step is held in place by a detent on each side. To retract the step, lift the step out of the detent, and push back to the original stored position. Make sure that the step is secure in the retracted position before moving the recreational vehicle. Make sure to keep your fingers away from the sliding mechanism when extending or retracting the step. Use extra caution if exiting or entering the recreational vehicle without the use of the step.

Storage - Your recreational vehicle is likely to be equipped with outside storage compartments. Each door can be locked for security. **DO NOT** overload outside storage compartments with heavy densely packed items. Remember that any weight added to the recreational vehicle
effects the overall vehicle weight. Also remember to check side to side weights, since Putting an extremely heavy item on one side or the other will effect proper load distribution. Check the index for additional information regarding weighing and loading of the recreational vehicle. Keep any emergency items stored in outside storage compartments easily available, where they can be reached without unloading the entire contents of the compartment.


WARNING:
When closing the storage compartment doors, make sure that hands and fingers are clear of hinges and openings.

Ladder and Rooftop Storage - The optional ladder located on the rear of the recreational vehicle is used to climb to the roof to either perform maintenance on roof mounted items, or to store items on the roof. Make sure before climbing the ladder, that your shoes are not slippery and that there is no ice or other slippery substance on the ladder. When storing items on the roof, **MAKE SURE** that they are placed within the area of the roof mounted storage rack, and **SECURELY** fastened to prevent them from loosening or falling off during travel. Remember if storing items on the roof, to keep vehicle weights and weight distribution in mind. Do not store items on the roof that could damage the roof.

LP GAS SYSTEM

General Information

WARNING:

Do NOT bring or stroe LP Gas cylinders, gasoline or other flammable liquids inside the RV because a fire or explosion can result

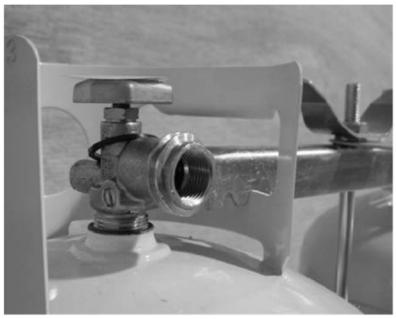
The liquid petroleum (LP) gas system in your recreational vehicle furnishes the fuel for cooking, heating, and hot water. LP gas can also be used as an alternate energy source for refrigeration. LP gas is a clean, efficient, safe form of energy when proper handling and safety precautions are observed. It enables you to enjoy a comfortable lifestyle where other forms of energy are not easily utilized.

The gas is stored under extreme pressure in the tank, with space in the tank to allow for expansion into vapor. This vapor is reduced in pressure by passing through a regulator. This reduction in pressure is a two-step process which assures consistent pressure for use, regardless of outside temperatures, weather, or altitude.

Your LP system is designed to accept either propane or butane. However, since butane vaporizes at 32 degrees F, it can only be used in areas where you can be sure of higher temperatures. Propane vaporizes at approximately —40 degrees F. There are blends of propane and butane available, which will vary in the temperature at which it vaporizes. When filling your tank, select an LP gas that has a boiling point about 40 degrees lower than temperatures you expect to
travel in. Talk to your dealer, or local LP gas supplier about what you should be using.

WARNING:

Make sure the tank service valve is accessible at all times. In an emergency, it may be necessary to shut off the valve quickly.



WARNING:

A warning label has been located near the LP gas container. This label reads as follow:

DO NOT FILL LP GAS CONTAINER(S) TO MORE THAN 80% OF CAPACITY. FAILURE TO COMPLY COULD RESULT IN A FIRE OR PERSONAL INJURY.

Filling the LP Gas Tank

1. Before entering the LP gas bulk plant or service station, make sure all pilot lights are extinguished. Shut off gas to all appliances by closing the LP gas main shut off valve.
2. Extinguish open flames and smoking materials.
3. Always remember to close the supply valve, and open the 20% liquid level valve.
4. Never use a wrench to close the service valve or 20% gauge. If when closing by hand, leaking occurs, have the valve repaired or replaced.
5. Drive at least one mile from the LP supplier before relighting pilot lights or appliances. This will allow any minimal leakage which occurred while filling the tank to dissipate. DO NOT light pilot lights if you continue to smell LP gas. Allow the recreational vehicle to ventilate for 30 minutes. If you still detect LP gas odor, have the source of the leak located and repaired.

Never use any other tank than the one furnished with your recreational vehicle. If the tank must be replaced, check with your dealer for correct tank specifications and replacement procedure.

LP Gas Regulator

The regulator reduces the pressure of the LP gas vapor from the pressure in the tank, to the pressure required for use at the appliances. This reduction in pressure is performed by a two-stage regulator. Two regulators are used in the same body to reduce the pressure of the LP gas in the tank for use by the appliances in the recreational vehicle. The regulator seldom requires service, but it should always be protected from the elements and extremes of hot and cold.
The high pressure regulator (first stage) is used to reduce the pressure to approximately 10 to 13 PSI before sending it along to the low pressure regulator (second stage). This second stage regulator reduces the pressure further to 11 inches water column, or 6.35 ounces per square inch.
The two stage regulator does not have to work as hard since the second stage receives consistent pressure rather than inlet pressure which varies. The result is an efficient safer system that helps to eliminate problems such as freeze up and pilot outages.


WARNING:
LP gas regulators must always be installed with the regulator vent facing downward. Regulators that are not in compartments have been equipped with a protective cover. Make sure that the regulator vent faces downward and that the cover is kept in place to minimize vent blockage that could result in excessive gas pressure causing fire or explosion. DO NOT rely upon being able to smell LP gas leaks, as the odor may or may not be sufficiently strong enough.

The regulator has been reset by the manufacturer of the regulator, and adjustment should not be necessary. If adjustment should be required however, **DO NOT** attempt to adjust it yourself. Adjustment must be made with special equipment by a qualified **LP** gas service technician. Have the regulator checked annually, or whenever you suspect a problem. The correct line pressure should be 6-1/4 oz or 11 inches of water column.
Because air is required for proper operation of the regulator, it is very important that the regulator vent is kept clean and free of dirt and debris. This is why it is necessary to keep the vent facing downward and the regulator covered to protect it from contamination, A toothbrush can be used to clean the vent if it becomes clogged by foreign matter.
During cold weather, it is important to keep ice from forming in the regulator, which will shut off the flow of **LP** gas to your appliances. Have the supplier add anhydrous methanol when filling your tank for use during cold weather. Regulator freeze up can occur in any weather if there is moisture in the tank, or if the tank has been overfilled. Always use moisture-free **LP** gas, and make sure the tank has not been filled beyond 80% of capacity. If moisture has entered the tank, have the tank LP purged, or have anhydrous methanol added by an authorized **LP** supplier. If you believe a regulator has been damaged or otherwise is not functioning, have it replaced by a competent serviceman.

Optional Automatic Changeover Regulator

The two-stage automatic regulator on your Recreational Vehicle offers the convenience of instant, automatic changeover from the empty to the full gas tank. It also affords the additional safety and efficiency of two stage pressure regulation. The top portion of the automatic changeover is a dual high pressure regulator, which reduces tank pressure to approximately 10 to 13 lbs and sends it along to the second stage low pressure regulator, which completes the regulation process by reducing the 13 lb inlet pressure to 11 inch water column or 6.35 ounces of outlet pressure.
To operate, open both tank supply valves. The cylinder to which the arrow on the changeover knob points is the "service" tank. As long as there is LP gas in the "service" tank, the full-empty indicator on top of the regulator will show white. When the "service" tank is empty, the automatic regulator will begin using fuel from the "reserve" tank. When this happens, the full-empty indicator will change from white to red.

At this point, the valve of the "service" tank should be shut off and the indicator knob manually turned so that the arrow points to the opposite tank. This tank then becomes the "service" tank, and the full-empty indicator will again show white.
The empty tank may now be disconnected for refilling. When it has been filled, reconnected, and the valve opened, it then becomes the "reserve" cylinder. Remember to manually turn the indicator knob each time the automatic switchover takes place.

Regulator Freeze-Up

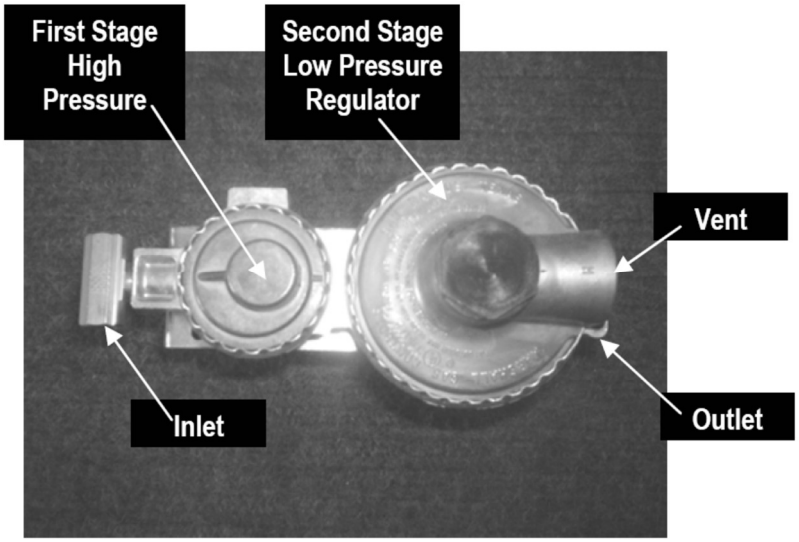
The term "regulator freeze-up" is a misleading one. Regulators and LP gas do not freeze. However, the moisture that can be contained in the gas will freeze as the gas expands and cools passing through the regulator. This freezing of the moisture in the gas can build up and partially or totally block the passage of the gas through the regulator. Freezing can also occur when outside temperatures are low enough to contribute to the freezing of the moisture in the gas. The source of the moisture is varied. It can occur at the refinery or gas bulk plant, in the cars used to transport the gas, or even within your own LP tanks. Moisture in an LP tank can occur when a tank service valve is left open, allowing moist air to enter and become trapped.
A two-stage regulator helps to reduce the possibility of freeze-up because of its larger orifice size, and the fact that heat is transferred through the walls of two regulators instead of just one.

There are several steps that can be taken to inhibit or prevent this from happening:

Make sure that your LP tank is free of moisture before refilling.
DO NOT overfill the LP tank. Make sure to keep the service valve on an empty tank closed.

If freezing has occurred, have your LP dealer purge the LP tank before refilling. Add anhydrous methanol or other approved LP antifreeze or deicing agent to the LP tank. Keep the regulator covered at all times.

NOTE: If freeze-up does occur, shut off the LP gas at the tank. A frozen regulator may permit LP gas to flow at high pressure, resulting in leaks at appliances or in the lines. If freeze-up should occur, **NEVER** attempt to thaw with an open flame. A small light bulb can sometimes be useful to provide heat and aid the thawing process. Once thawed, be sure to take the proper steps to prevent a reoccurrence. Have the system checked by your LP supplier if freeze-up continues.



Other Cold Weather Factors:

Remember that as outside temperatures drop, the Btu value of the LP gas is lessened, since the colder liquid LP in the tanks requires the heat from the surrounding air to vaporize. This lowering of Btu value can significantly affect the performance of the system. You can help insure proper performance by keeping your LP tanks as full as possible in cold weather, and reviewing the Btu/hr rating plates on LP appliances for proper LP management.

Hoses, Pipes, Tubes and Fittings

The hoses, pipes, tubes, and fittings used in your LP system are designed to withstand pressures far exceeding those of the LP system. However, because environment and time can both contribute to the deterioration of these components, they must be inspected for wear at regular intervals. Be sure to inspect the hose before each season, and when having the tank refilled. Look for signs of deterioration such as cracks or loss of flexibility. When replacing the hose or other LP components, make sure to always replace them with components of the same type and rating (check with your dealer).

Fittings are used to connect the various system components to each other. The P.O.L. fitting at the end of the LP supply hose is made of brass so that pipe sealants are not necessary to prevent leaking. It also has a left-handed thread, which means that it is turned clockwise to remove, and counter-clockwise to tighten. The P.O.L. fitting has been designed to help restrict the flow of LP gas in the event of a regulator failure, or hose malfunction.

Checking the LP Gas System for Leaks

WARNING:

The following label has been placed in the vehicle near the range area:

DANGER

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 CONTAINER VALVE(S) OR GAS SUPPLY CONNECTION.**
4. **OPEN DOOR AND OTHER VENTILATING OPENINGS.**
5. **LEAVE THE AREA UNTIL ODOR CLEARS.**
6. **HAVE THE GAS SYSTEM CHECKED AND LEAKAGE SOURCE CORRECTED BEFORE USING AGAIN.**

FAILURE TO COMPLY COULD RESULT IN EXPLOSION RESULTING IN DEATH OR SERIOUS INJURY.

Road vibration can loosen LP gas fittings. It is important to check your LP system for leaks at least every 5000 miles, and whenever the tank is filled. It is also a good idea to have your entire LP gas system checked annually by a qualified LP gas service representative.

Use the following steps when checking the system for leaks:

WARNING:

Never check for leaks with an open flame.

Open all windows and vents.

Open the gas tank service valve.

Use non-ammoniated, non-chlorinated soap solution, or an approved leak detection solution on all line connections (ammoniated soap solutions can cause cracking on copper or brass lines and fittings).

If a leak is detected, tighten the connection with two open end wrenches until the bubbling stops. **DO NOT** over tighten, or use excessive force. If the leak continues, contact your recreational vehicle dealer, or a qualified LP gas service representative.

Recreational Vehicle Propane Gas Alarm

The propane gas alarm system senses leaks in the LP gas system of the recreational vehicle. In the event the sensor detects a leak, an alarm will sound and the red light will illuminate. The leak detector is powered by the recreational vehicle 12-volt system. The gas alarm will operate to detect propane gas. The detector can only be reset when there is power present. The gas cannot be turned on unless the detector is powered, and the air is free of combustible vapor.

The Alarm displays the following three colors:

Green	On
Red	Alarm
Yellow	Replace

WARNING

1. Test the alarm weekly during use and after each storage period.
2. This alarm is not suitable as a smoke or fire detector or for installation in hazardous locations as defined in the National Electrical Code.
3. Keep the ventilation openings dust free. **DO NOT SPRAY CLEANERS OR CHEMICALS DIRECTLY INTO THE CASE.**

For further instruction please read the operation instructions in the owners manual.

In the Event of an Alarm:

If detector senses presence of LP gas, the red light in the ON/OFF switch will illuminate, accompanied by an audible alarm. The alert will continue to sound until detector is turned off.

 **WARNING:** If the alarm sounds:

- Immediately have all occupants exit the recreational vehicle.
- Extinguish any open flames, pilot lights, and all smoking materials.
- **DO NOT** touch any electrical switches.
- Shut off the gas supply at the tank or gas supply connection.
- Open doors and windows for ventilation. **DO NOT USE THE RANGE HOOD OR OTHER POWER VENTILATORS.**
- If gas is still present when the detector is reset, the alarm will again

IT IS IMPORTANT TO ALWAYS ASSUME THAT AN ALARM WOULD NOT HAVE OCCURRED UNLESS A PROBLEM EXISTS. Have the system carefully checked for the cause of the alarm by a qualified LP gas dealer, or RV service center. Check all fuel lines and other potential sources of gas leaks. Have the problem corrected before using the recreational vehicle again.
It is possible for the alarm to be activated by the presence of other substances such as strong cleaners or by aerosol sprays. Sometimes a foreign substance can be spilled on the sensor, causing it to malfunction or fail to work at all. For this reason, it is important that the system be checked with regularity, and care taken to prevent contamination of the sensor.

If while cleaning, the alarm is accidentally tripped by odors from a strong cleaner, complete your cleaning and air out the recreational vehicle before resetting. Always check that all pilot lights are shut off before resetting. **DO NOT DISCONNECT** the alarm just because you may find false alarms to be annoying.

Detector Testing Procedure:

Using a butane lighter, hold it up to the sensor and depress the lever allowing butane gas to escape **(DO NOT USE AN OPEN FLAME).** Point the gas exit jet on the lighter into the sensing hole on the detector panel. Within a few seconds the alert will sound, and the **GAS ON** light on the sensing panel will go out, indicating that the flow of gas has been shut off. To reset, turn the detector off, fan the gas sensing hole to clear the gas vapors, and then reset. Remember to check pilot lights. If the sensor fails to respond to the presence of the butane gas, replace the sensor as soon as possible. Maintenance to the system consists of periodic visual inspection for rough treatment, oil or grease deposits, or damage to wiring. Test system occasionally to insure proper operation.

LP Gas Safety Precautions

IF YOU SMELL GAS:

- Extinguish any open flames, pilot lights and all smoking materials.
- **DO NOT** touch any electrical switches.
- Shut off the gas supply at the tank valve (s) or gas supply connection.
- Open all doors and other ventilating openings. **(DO NOT USE THE RANGE HOOD).**
- Leave the area until the odor clears.
- Have the system checked and leakage source corrected before using again.

WARNING:

LP-Gas cylinders shall not be placed or stored inside the vehicle. LP-Gas cylinders are equipped with safety devices that relieve excessive pressure by discharging gas to the atmosphere.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

Be careful when doing any work or maintenance in the recreational vehicle, that you do not puncture a gas line with a nail, screw, or drill bit.
A complete listing of the LP gas warning labels and decals used throughout the recreational vehicle can be found in the Introduction section of this manual. They are located in the recreational vehicle in locations where the potential for a dangerous situation is present. They have been installed not only because of the requirement to do so, but also a constant reminder to occupants of the recreational vehicle to exercise proper caution when using or being around LP gas appliances and equipment. Make sure that you and your family understand and follow all of them. Never remove these warning labels and decals. If one should be lost, it should be replaced as soon as possible.

ELECTRICAL SYSTEM

General Information

WARNING:

Connecting a power cord to a non-grounded or improperly grounded power source can result in a dangerous and possibly fatal electric shock.

Because of the potential danger in failing to heed this warning, RBD cannot be held responsible should damage, injury, or death result from failure to connect the power cord to a properly grounded power source.

The electrical power supply provided for the recreational vehicle is a dual system, operating with 110-volt AC and/or 12-Volt DC.
The 110 volt power may be provided by connecting the recreational vehicle to an outside power source when parked. When the 110-volt system is operational, power also passes through a system converter, allowing the full use of all 12-volt functions in the recreational vehicle.
110 volt functions in the recreational vehicle include the refrigerator, ice maker, roof mounted air conditioner (s), TV and VCR, microwave oven, converter, outlets for 110 volt operated conveniences and some lights. The refrigerator also has the option of running on **LP** gas when 110-volt power is not available. All other electrical functions in the unit are supplied with 12-volt power.
When it is not possible to access 110-volt power, the 12-volt system functions can be supplied by the battery. The battery is recharged by the power converter when the recreational vehicle is attached to an outside 110-volt power source.

Connecting to an Outside Power Source

A shoreline power cord is provided to attach the recreational vehicle to a grounded power source. The electric utility service connection is located on the driver's side of the recreational vehicle near the rear, in various locations depending on the model that you have. The power cord is stored inside the electric utility service compartment. The electric utility service door has a slot with a cover that can be
moved to the side, allowing the power cord to be used and the door to be closed and locked for security.
Never use a two wire extension cord, a cheater adapter with the ground pin removed, or put a lower amperage plug on your power cord in place of the molded plug. Some models may be equipped with a 50-amp service instead of a 30-amp service.

Batteries

In a towable recreational vehicle the batteries will be located in a separate compartment or in a battery box located on the "A" Frame of a travel trailer. It is important to make sure that batteries are kept charged. Take time to turn off all lights or other 12-volt conveniences when not in use. Connect the recreational vehicle to a 110-volt power supply when possible, instead of draining the batteries. The charge condition of the batteries can be checked with the monitor panel. To check, press and hold monitor test switch while reading the charge level on the battery gauge. Charge levels indicated are divided into sections from weak through fully charged.

ELECTRICAL SYSTEM

Battery Maintenance

Battery maintenance is important. Checking the condition of a battery at regular intervals will help insure its proper operation. Here are some recommendations for checking and servicing batteries.

- When removing a battery, disconnect the ground battery clamp first.
- When installing a battery, always connect the grounded battery clamp last.
- When re-installing your battery, thoroughly dry all cables and terminals, reinstall, and use a plastic ignition spray to protect the terminals.
- Check the outside condition of the battery. Look for cracks in the case or vent plugs. If the case is cracked, the battery must be replaced.
- Watch for overcharging. Three ways to spot overcharging are:
- Active material on the vent cap (heavy deposit of black lead-like material on the underside of the vent cap).
- By testing voltage regulator output.
- When a battery needs to be replaced, make sure to replace it with a battery of the same characteristics as the original equipment. Consult your dealer for advice on battery replacement.

Battery Safety

WARNING: ALWAYS SHIELD YOUR EYES WHEN WORKING NEAR BATTERIES!

WARNING: BATTERIES CAN EXPLODE! Do not smoke or expose any battery to electric sparks or flame. Batteries, when charging or discharging generate hydrogen. Hydrogen and air is a very explosive mixture.

WARNING: Do not short across the battery terminals. THE SPARK COULD IGNITE THE GASSES. Do not wear metal jewelry or a watch when working on a battery.

WARNING: Before doing **ANY** work on electrical system, disconnect battery cable and the 110-volt power cord. Do not reconnect the cables until all work has been completed. This will avoid the possibility of shorting or causing damage to electrical components or shock to the servicing person.

WARNING: Battery electrolyte is a corrosive, poisonous sulfuric acid. Avoid contact with skin, eyes, clothing or any painted surface.

Power Converter

The converter is used to switch 110-volt electricity from an external supply to 12-volt electricity to power some interior lights and 12-volt accessories. The converter requires no maintenance under normal circumstances. If the converter does not have a 110-volt supply to convert to 12-volt, it automatically switches the battery into the electrical circuit to power 12-volt functions. When reconnected to a 110-volt supply, it will again operate from this power source. It is normal for the converter to run warm. If, however, it gets too hot, it will turn itself off. After it cools down, it will come back on. In most cases, when this happens it is because something has been put around or too near the converter preventing it from receiving adequate ventilation.

Make sure not to put anything near the converter that could obstruct ventilation.
A slight hum during operation is also normal for the converter. If you have no 12 volt power and no hum, check to see if 110 volt power to the converter has been interrupted.

Battery Charging

The converter also operates as a battery charger when it is connected to a 110-volt power source. If the battery is below its full charge, the converter/charger will begin operation at a rate that reflects the level of discharge. When the battery is again fully charged, the converter charger drops its charging level back to a maintenance level to keep the battery fully charged.
If for any reason you charge a battery with a source outside the recreational vehicle, make sure to follow the rules of battery maintenance and safety outlined in this section. Also observe these additional safety precautions related to battery charging:

1. Disconnect the battery from the recreational vehicle.
2. Make sure to use care when connecting and disconnecting the cables from chargers. A poor connection can cause an electrical arc, which can result in an explosion.
3. Check literature supplied by battery manufacturer, and follow warnings or cautions outlined.

NOTE: When operating 12-volt equipment from battery, reduce equipment in use to conserve battery. Gradual dimming of lights, and slowing of motors indicates low battery voltage.

NOTE: Older batteries do not store charge levels as long as new batteries.

Ground Fault Circuit Interrupter

WARNING:

Even with GFCI protection persons with severe heart or other health problems may still be seriously affected by an electrical shock. The GFCI outlet is not a substitute for good electrical safety. It **DOES NOT** protect against contact of the hot and neutral wire at the same time.

The 110-volt outlet in the bath is equipped with a protective circuit interrupter. The ground fault circuit interrupter (GFCI), is designed to break the flow of current to the protected outlet when an imbalance of current is detected. Imbalances include electrical leakage in an appliance such as a shaver or hair dryer that have developed a weak spot in electrical insulation. The possibility of electrocution exists when using a faulty appliance, while at the same time being in contact with an electrical ground such as water, plumbing, or the earth.
If an imbalance is detected, the GFCI will trip and shut off power to the outlet. Even with GFCI protection, the electrical shock will still be felt, but to a lesser degree.
It also does not protect against short circuits or system overloads. Circuit breakers in the main panel which supply power to the circuit, will trip if either of these conditions exist.
The GFCI receptacle should be tested initially when the recreational vehicle is purchased, and at least monthly thereafter.

NOTE: The GFCI does not protect any circuit other than the one which it is connected.

To test the circuit, use the following procedure:

1. Make sure power is on to the circuit.
2. Push the test button.
3. The red reset button should pop out. All power should be interrupted to outlets protected by the GFCI.

Verify by plugging in a light at these outlets, and pushing in the reset button. If red reset button does not pop out after pushing the test button, or GFCI circuit continues to trip, immediately turn off power at the circuit breaker panel and have a qualified electrician check it out.

NOTE: Some electrical appliances may have their own circuit breakers. If there is an interruption in electrical service of an appliance, consult the manual for that appliance to determine what action to take.

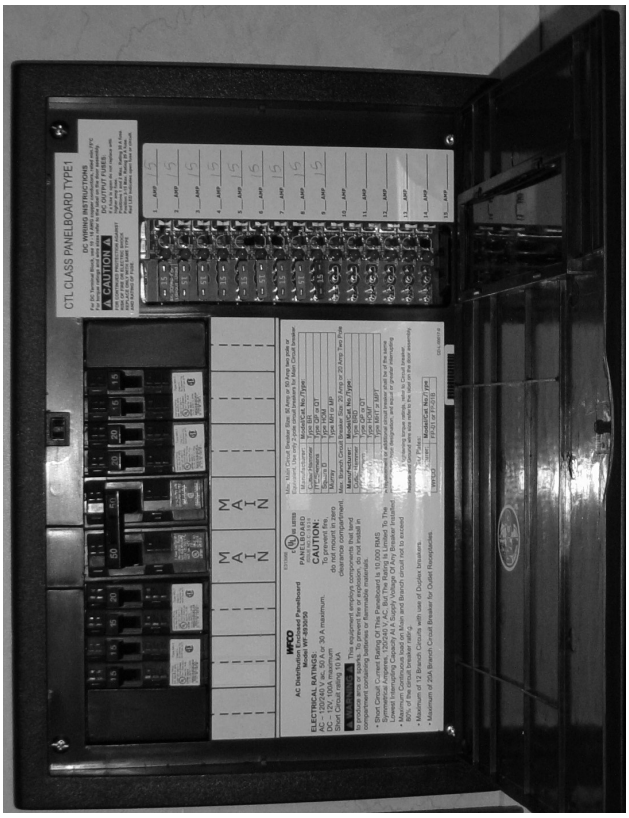
Circuit Breakers

The 110-volt system is protected by circuit breakers which automatically shut the circuit off if the circuit load is too heavy, or a short circuit occurs. If a circuit breaker has been tripped, do not reset the breaker until the cause is identified and corrected.

12 Volt Fuses

A 12-volt DC distribution panel is located next to the 110-volt circuit breakers.
The panel contains circuits with replaceable fuses for protection of recreational vehicle 12-volt lines. If any line is loaded beyond the capacity of its fuse, the fuse will "blow". A portion of the 12- volt load on the line must be turned off to reduce the total load on the line to a level below the capacity of the fuse. Replace the fuse with the same size fuse. DO NOT replace with a larger fuse than indicated. If this reduction of load on the line does not stop the "blowing" of the replaceable fuses, there may be a "short" somewhere along the 12-volt line, or at a non-fused 12-volt component on the line. Check the 12-volt line and any components along the line. Locate the "short" and take necessary steps to repair it. If you cannot locate the problem, have a qualified electrician check it out. It is a good idea to keep additional fuses on hand in the recreational vehicle. Replacement fuses are available at filling stations, hardware stores, or automotive supply stores. Remember that the replacement fuse must be the same amperage rating as the original.

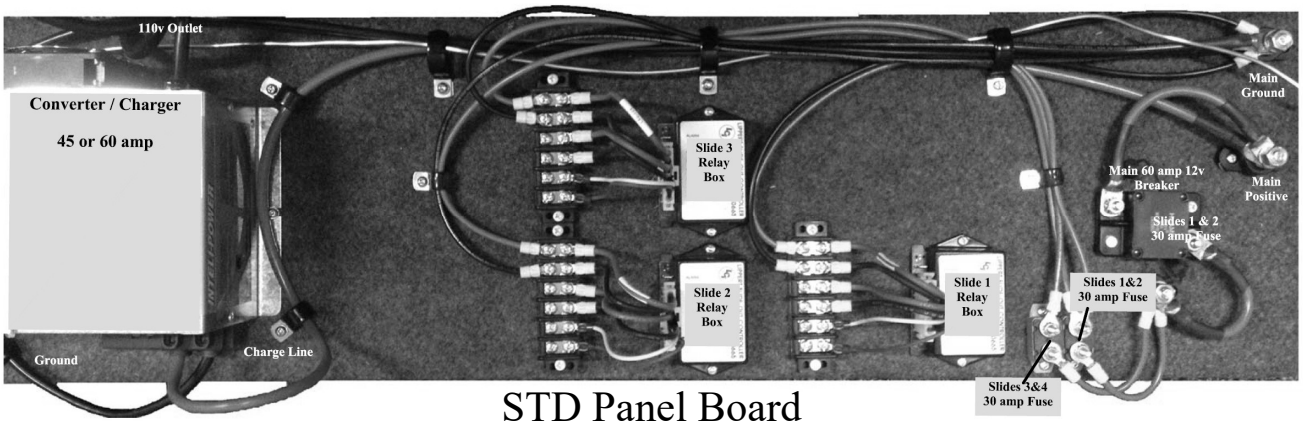
Panel Box



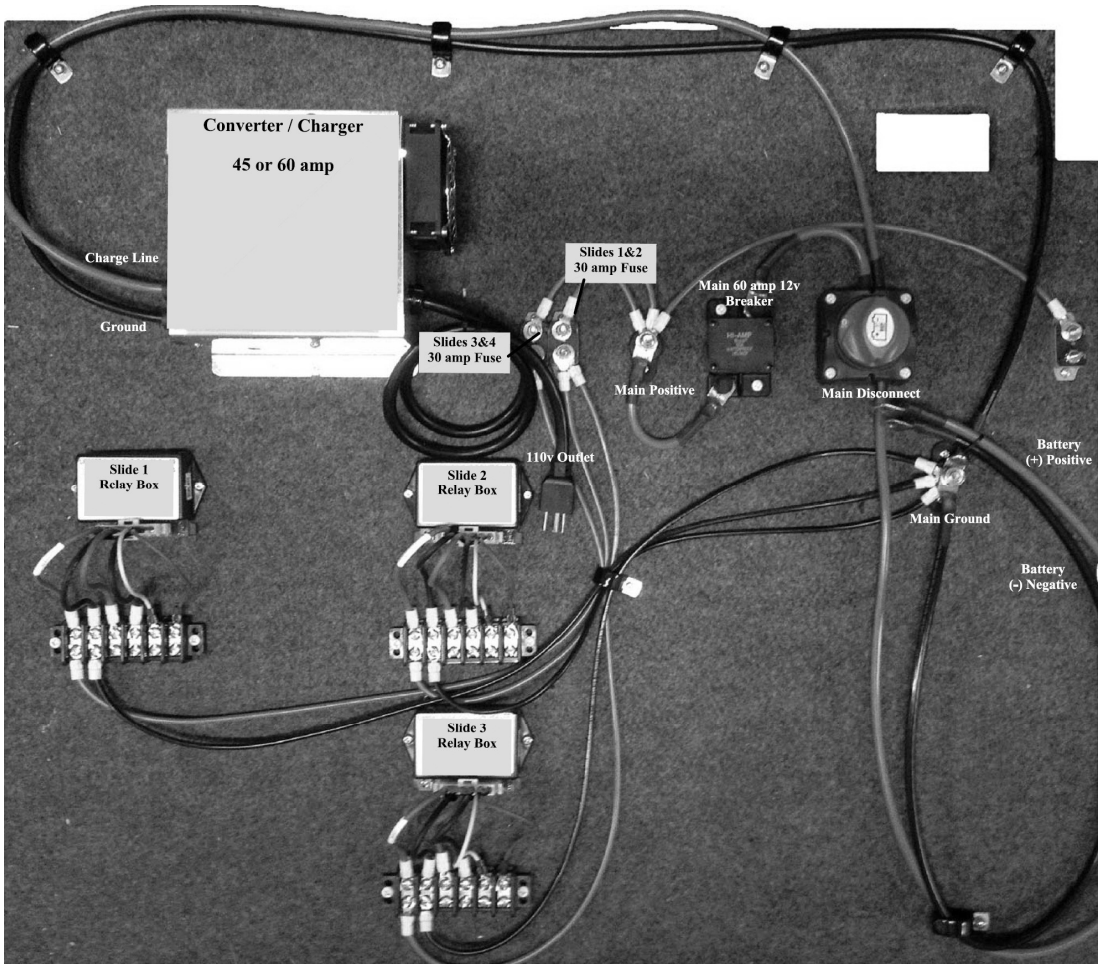
Relay Board

The relay board is located in the front bay of Fifth Wheel units and in the rear closet of other units underneath the panel box. It lays out the electrical connections for the 12v electrical system in the unit as well as the slides. It includes a Converter / Charger to power the 12v electrical system and charge the battery.

Attached to the board are several slide relay boxes that control the slide-out movement as well as the fuses for the slideouts.



STD Panel Board



Fifth Wheel Panel Board

WATER AND DRAINAGE

General Information

Your new recreational vehicle plumbing system may have the dual ability to be self contained with onboard storage (SC units only), or use facilities provided by an external pressurized source. In either case, the components of the system operate like those in your home. Components of the plumbing system consist of strong, lightweight, corrosion resistant materials that provide long life, and easy cleaning. By following the instructions outlined here, you can expect efficient operation with a minimum of maintenance.

Recreational vehicle plumbing can be divided into two separate systems. The fresh water system consists of those items which are used to deliver water for your use, while the waste water system is made up of the drains and tanks which store and remove water that has been used.

Fresh Water System

Fresh water is provided from an external pressurized source, or from the fresh water storage tank.

External Hookup

Water provided from outside the recreational vehicle is pressurized by the system from which it is delivered. When you connect your recreational vehicle to an outside source, the fresh water tank and the water pump are kept separate from the remainder of the system by in-line check valves.

To attach the recreational vehicle to an outside source of water:

1. Remove the cap from the fresh water inlet on the side of the recreational vehicle.
2. Attach one end of the fresh water hose to the outside source of water.
3. Connect the other end of the hose to the recreational vehicle city water inlet.
4. Turn the outside source of water on. Open the various faucets in the recreational vehicle gradually to clear the air from the lines. Close the faucets when the water flows freely.

NOTE: Do not turn the water pump on when using water from an external supply.

To disconnect from the outside source of supply:

1. Shut off the outside source of supply.
2. Disconnect the hose from the supply valve and the recreational vehicle inlet.
3. Re-reel the hose and store.
4. Reinstall the cap on the recreational vehicle inlet.

NOTE: Always fill the tank with clean drinkable water from a known safe source. Make sure to close the fill spout when the tank is filled. Also, always fill the system with a hose or bucket that you know is clean, and is used only for this purpose.

Fresh Water Tank

When an outside source of water is unavailable, water can be drawn from the fresh water storage tank for use in the recreational vehicle. The tank is filled through a gravity controlled water fill spout on the side of the recreational vehicle.

To fill the fresh water tank, proceed as follows:

1. Remove the water fill spout cap and the vent plug.
2. Water can now be added directly to the tank through the fill spout by use of a known clean hose or bucket, used only for this purpose.
3. When the tank is filled, replace the water fill spout cap and vent plug.

NOTE: When trying to drain entire onboard fresh water system, make sure to open faucets, water heater drain, and system low point drains to remove all fresh water from the system.

When traveling, you may want to drain the tank, or keep the quantity of water in it to a minimum. This reduces the total weight of the recreational vehicle for travel. Make sure when draining the tank, that the water pump has been turned off. The fresh water tank drain valve is located below and near the fresh water fill spout. Water in the tank can be drained by turning the drain cock perpendicular to the recreational vehicle body. To close the valve, turn the lever parallel to the recreational vehicle body.

Water Pump

NOTE: When filling the system, you may want to add additional water to the tank to replace the water used when filling the hot water tank and water lines.

When using water from the fresh water tank, the system must be pressurized. A self-priming 12-volt DC pump is provided to handle this function. If you have a monitor panel then a pump on-off switch is located on the monitor panel, otherwise there will be a pump on-off switch on the wall in the bathroom or kitchen.

When initially starting up the self contained water system, follow this procedure:

NOTE: The self contained water system is a demand system. This means that the water pump will run whenever there is a need for water.

1. Make sure the tank is filled with water.
2. Open all the faucets in the recreational vehicle, both hot and cold.
3. Place the pump control switch in the ON position.
4. **Allow time for the hot water tank to fill**. Shut off each faucet as the flow becomes steady and free of air. When the last faucet is shut off, the pump should also shut off.
5. The system is now ready for use.

Sanitizing the Fresh Water System

Sanitize the system before initial use, after extended periods of non-use, at least once a year during continuous use, and whenever there is a suspicion that the system has been contaminated.

To sanitize the system, use the following procedure:

1. Prepare a chlorine solution using a gallon of water and 1/4 cup of liquid household bleach per 15 gal capacity of the water tank (5% sodium hypo chlorinate solution).
2. Use one gallon of solution for each 10 gallons of tank capacity.
3. With tank empty, and all faucets and drains closed, pour the solution into fresh water tank.
4. Complete filling the tank with fresh water.
5. Switch on the water pump. Open all faucets at a time until all air is purged, and the water flows freely.
6. Again add fresh water to the tank until the water level reaches the fill spout.
7. Allow the system to stand undisturbed for a few hours (at least three).
8. Drain the system by opening all faucets, and the fresh water tank drain valve, while flushing the system with water of drinking quality.
9. Continue flushing the system, allowing the water to flow for several minutes.
10. Close the tank drain valve and faucets. Refill the system with water of known drinking quality.

Optional Monitor Panel

NOTE: Other monitor panel functions such as checking the battery charge level are discussed elsewhere in this manual (see index)

The monitor panel allows you to quickly check the levels in the fresh water and waste water tanks. Electrical sensors at various points on the tanks send signals to the monitor panel. To check fluid levels, press and hold the test switch designated for the tanks, and read the level indicators on the panel. The indicator is proportioned in quarters with each light being lit up to the level that the tank contains.
Sometimes, residue on the sides of a tank, or water with a low mineral content will give a false reading. Check the levels occasionally when you are sure of a tank's contents to double check the accuracy of the monitor panel.

Waste Water System

The waste water system in your recreational vehicle can be described as two separate systems. A gray water system that consists of the drain lines and holding tank for waste water from the sinks, tub, dishwasher and washing machine, and a black water system which includes the holding tank and drain for toilet wastes. Each system is self-contained, and allows disposal of waste water at designated dump stations at your convenience.
Components of the gray water system have drain traps, and both tanks are vented to equalize air pressure and disperse odors caused by drain water and wastes outside. Sometimes, the rocking movement of the recreational vehicle while driving may empty the drain traps of their water, and allow the odors of the gray water tank to come into the coach. Residue in the drain water lines can also produce odors. To combat gray water holding tank odors, an approved deodorizing agent should be used. An agent that dissolves grease and fats and contains a detergent will help keep tank and drain lines clean and free-flowing.

Holding Tanks

Both holding tanks are approximately located beneath the bathroom area. Drain valves and drain hose storage are located on the driver's side. The tanks are made of strong, light polyethylene to minimize both weight and maintenance. Some models may have two gray water tanks and one black water tank.

Each tank has a separate drain line and dump valve, which permits dumping tanks individually or together. Each tank should be emptied often at a dump station designated for this purpose. Most national, state, and private campgrounds have dumping facilities. Many have hookups on the campsite, while some have portable dump collectors. Many service stations, particularly along interstate highways, also have these facilities. Many campground directories list dumping station locations across the nation.

If possible, dump holding tanks before a trip, to reduce the gross vehicle weight. Dumping tanks prior to travel also helps reduce the stress and wear on the plumbing that can occur from water and waste shifting.

Enough water should be kept in the black water tank to cover the bottom, to prevent hardening of any residue that may remain.

Never dump black water tank until it is at least half full. This practice makes sure that enough water is in tank to flush all wastes into sewer line. If necessary, fill tank to at least half full with additional water before draining.

Never put anything in the holding tanks other than normal drain water, wastes, and biodegradable products. Paper wrappers, gum, cigarettes, etc., no matter how small they may be, should never be placed into either the gray or black tanks.

Warning:
Damage occurring from traveling with over filled tanks may affect the units warranty.

NOTE: It is important to note that harmful and toxic materials can accumulate if the holding tanks are not regularly drained and thoroughly rinsed. It is also important to use holding tank deodorizing and cleaning agents in the waste water tanks to reduce odors and keep the lines open and free-flowing.

To Empty the Holding Tanks:

1. Remove the sewer drain hose from its storage compartment on the side of the coach.
2. Remove the cap from the recreational vehicle sewage drain, and connect the drain hose to it.
3. Attach the other end of the flexible drain line to the dump station inlet. Make sure both ends of the flexible drain line are securely attached.
4. Drain the black water tank first, by pulling the termination valve handle toward you. Make sure to allow sufficient time for the tank to completely drain, then rinse the tank with several gallons of water by depressing the stool pedal. Close the valve on the stool and let it fill before releasing to the tank. This creates additional force to flush the tank more completely.
5. Drain the gray water tank by pulling the termination valve handle toward you. Draining the gray water tank last, with its soapy water helps to further rinse the drain and flexible hose.
6. When tanks are emptied, close termination valves by pushing handles back to closed positions.
7. Remove flexible drain hose and wash it thoroughly with clean water. Remove the other end from the dump station inlet, and replace it in its storage compartment. Secure the sewer hose storage cover, and replace the caps on both the recreational vehicle outlet and dump station inlet.

The Following guidelines will help to ensure trouble free operation:

1. Never put anything in black water tank other than toilet paper especially for RV systems.
2. Do not put automotive antifreeze, household toilet cleaners or drain cleaners, or any solid material into your drains.

3. Always use chemicals in the black water system that are made especially for this purpose.
4. When cleaning components of waste water system, use cleaners made for RV systems.
5. Always keep the drain cap in place, and termination valves closed.
6. After every third time the holding tanks are emptied, fill and flush both tanks with clean fresh water a couple of times to keep them clear and clean.

NOTE: If connecting to a campsite sewer inlet, **DO NOT** open termination valves until tanks are % full. **DO NOT** keep black water valve open while parked. Wastes are **NOT** flushed directly into sewer system. Only liquid waste is drained, therefore, water must accumulate, and chemicals in tank need time to break down solids before they can be released. If draining gray water tank directly into sewer inlet while parked, make sure to close termination valve for a period of time before leaving, allowing some water to accumulate in tank to use for flushing drain line and flexible hose.

Faucets

The faucets in your recreational vehicle have been designed to be economically practical faucets that can be both beautiful and durable. The one-piece plated faucet shield is put through extensive treatments to produce a surface finish which will maintain its lustrous beauty throughout many years of use.
The patented design eliminates washer wear — the common cause of leaking. Should your faucet develop a leak it is most likely caused by debris in the water line causing improper seating of the stem tip; or as a result of the handle stop being misaligned.
Refer to the faucet owner's manual supplied with your recreational vehicle for specific maintenance and service instructions.

Toilet (Marine)

The marine style toilet installed in your recreational vehicle is connected to the pressurized fresh water system. A single lever arrangement controls flow of water into the bowl and flushing.

1. To add water to the toilet before using, lift the flush lever until the desired water level is reached. As a general rule, more water is required only when flushing solids.
2. To flush the toilet, push the lever all the way down until sewage leaves the toilet.
3. Release the flush lever. A small amount of water should remain in the bowl.

NOTE: Always remember to clean up the dumpsite before leaving. **NEVER** empty your holding tanks directly on the ground, a roadway, river, or stream. **DO NOT POLLUTE!**

Unnecessary frequent flushing of the stool will quickly deplete your fresh water supply and fill your holding tank. If the black water tank becomes full, you will no longer be able to flush the stool until the tank can be drained. Follow the toilet manufacturer's recommendations supplied with the toilet for cleaning and maintenance. If you have a toilet that differs from the description given here, make sure to follow the manufacturer's advice for operation.

Make sure to hold the flush lever down long enough to release the contents of the bowl, but not longer than necessary, since it will result in excessive water usage.
Unnecessary frequent flushing of the stool will quickly deplete your fresh water supply and fill your holding tank. If the black water tank becomes full, you will no longer be able to flush the stool until the tank can be drained. Make sure that all your guests understand the operation of your recreational vehicle toilet. Always use deodorizing agents specifically designed for use in holding tank systems and a good biodegradable tissue.

These products are available directly from your dealer. Never use chlorine or caustic chemicals such as drain openers or laundry bleach in your system. They will damage your toilet seals. Never allow foreign objects (non-dissolving items) to be flushed through the toilet. Don't allow a small problem to go unsolved. As soon as you detect a problem, take the necessary steps to correct it. It is also a good idea to carry a few spare parts that will correct a small problem that might develop, without unduly interrupting your trip. Follow the toilet manufacturer's recommendations supplied with the toilet for cleaning and maintenance. If you have a toilet that differs from the description given here, make sure to follow the manufacturer's advice for operation.

Water System Winterization

If you intend to store your recreational vehicle through periods of sub-freezing weather in an unheated environment, it will be necessary to winterize the water system. Damage to water system components will result if the proper winterization steps are not taken.

1. Level the unit for good system drainage.
2. Drain the waste water tanks as previously outlined.
3. Turn the water pump switch off.
4. Open all faucets, and the water heater drain.
5. Open low point drains on the water lines.
6. Drain the fresh water tank.
7. When all lines are drained, close water tank valve, water heater drain, and low point drains on water lines.
8. Fill the fresh water tank with a non-toxic antifreeze solution per the product directions.
9. Turn on the water pump, and allow the winterizing solution to circulate and fill the system.
10. Close each faucet as solution flows freely from it. This also includes the water line to toilet.
11. Turn off the water pump.

Before using the system again in warmer weather, completely flush the system with water, flush the toilet, and sanitize the entire fresh water system. When using the recreational vehicle during cold weather, and water in a tank or drain line should happen to freeze, you should take immediate steps to thaw it before damage to the system occurs. **DO NOT** continue to use water system components if such a condition exists. If damage has occurred, make sure to have it repaired before using again.

Water System Maintenance and Troubleshooting

As with any mechanical system, your plumbing is subject to the development of problems. Most of these problems can be greatly reduced if not altogether eliminated by following a schedule of planned inspections and maintenance. Neglect of proper maintenance procedures is the usual cause of most water system problems.

Road vibrations and shocks, as well as excessive pressure from some city water sources are the main physical causes of water system damage. It is important to inspect all plumbing joints and fittings often for cracks and leaks. Water leaking from a plumbing joint can cause considerable damage if left unchecked.

A leak somewhere in the fresh water system should be suspected whenever the pump is running and all faucets and valves are closed. When the leaking fitting has been identified, attempt to stop the leak by tightening. DO NOT over-tighten. Plastic fittings rarely need to be tightened with a wrench. If these fittings leak after tightening by hand, disconnect the fitting and check for dirt, scale, or other foreign substances which may be causing the leak. Clean the fitting thoroughly and reinstall. If leaking persists, shut off the water supply until the fitting can be properly replaced. Check with your dealer for correct method of replacement, and replacement parts.

Proper winterization procedures of plumbing systems will normally be all that is necessary to prevent the damage caused by freezing. Freezing damage can harm any component of the system, including the water tanks, toilet, pump, and all piping. Be sure to follow the winterization procedures outlined in this manual. Also be sure to discuss any additional precautions that should be taken to winterize your trailer's plumbing system with your dealer. Local climates vary; and winter maintenance needs may be effected.

Be sure to read the literature supplied with plumbing components, such as the pump, for trouble-shooting tips. Also remember that it is possible for an electrical problem to cause water system problems. Lack of power to the pump can be caused by a variety of reasons. If you are unsure of how to locate and/or repair a plumbing problem, it is best to have your dealer or a qualified plumber handle the job.

APPLIANCES

General Information

WARNING: Portable fuel- burning equipment, including wood and charcoal grills and stoves, shall not be used inside the recreational vehicle. The use of this equipment inside the recreational vehicle can cause fires or asphyxiation.

The following instructions are general in nature and may vary from the appliances in your recreational vehicle. Each appliance should have an individual owner's manual and operating instructions supplied with the recreational vehicle. Please refer to these manuals for more detailed instructions and information on the operation of your particular appliance.

The various appliances in your recreational vehicle will provide home-like convenience while traveling. They have been designed and tested by their manufacturers for maximum service in a recreational vehicle application.
Each appliance in your recreational vehicle is warranted by their respective manufacturer. Be aware that constant improvement in design of the recreational vehicle may mean that an appliance in your recreational vehicle may not be covered in this manual. It is extremely important that you review all the literature provided in the manufacturer's information package provided with your recreational vehicle. Fill out and mail any warranty registration cards required by the appliance manufacturer at this time. Be sure to have your dealer go over the operation of the appliances with you, and report any shortages of literature you may have at that time.

NOTE: It is important to make sure that refrigerator is level before attempting to start. Once started, the movement encountered during driving should not affect operation. However, when the recreational vehicle is parked, the sensitivity of the refrigerator to be level should be remembered.

It is important that you carefully read all the manufacturer's information provided regarding both operation and maintenance of the appliances. Pay close attention to all safety precautions given, and make sure to follow them. If the instructions for operation of any appliance differ from the instructions outlined in this manual, make sure to use the information provided with the appliance. Be sure to keep all literature, including this manual with the recreational vehicle for easy reference. If service on any appliance is required, contact your dealer, or an authorized service representative of the appliance manufacturer. Most appliance manufacturers have a toll free service telephone number for your convenience.

Refrigerator

NOTE: Never fill your refrigerator with large amounts of warm food or liquid. This will raise the temperature and will take a long period of time for the refrigerator to recover.

MAKE SURE to read the owner's manual furnished with the refrigerator for complete instructions regarding the operation and maintenance of your refrigerator.
The refrigerator may be powered by either 110-volt electric, or LP gas. A 12-volt supply is also needed for the electronic control functions. Controls for operation are located on the upper right, above the freezer compartment. Controls include a mode selector switch to choose gas or electric operation, or shut the unit off, and a thermostat to set the temperature from a cold to coldest setting. Indicators on the control panel confirm the mode in which the refrigerator is operating, as well as letting you know if the flame has been lost during LP gas operation.
The thermostat should be set on the coldest setting during start up and initial operation. After the unit has run for awhile allowing the refrigerator to cool, the thermostat should be lowered to the desired temperature range, which is usually approximately mid-setting. The freezer compartment is not designed for the quick freezing of food, but to retain frozen food in that state. Foods purchased for storage in the freezer compartment should be frozen when purchased to reduce the load on the refrigerator system. Ice will be made more rapidly if the thermostat is set at its highest position.

Water Heater

The water heater is automatically filled from the fresh water system, or when the recreational vehicle is connected to an outside water system. Make sure the water heater has been filled before attempting to light it or heat it by electricity. Read all the literature provided with your water heater before using it. Pay particular attention to any cautions or warnings associated with its use. When operating, it will provide hot water to the kitchen and bath. There are various styles of water heaters available, including electronic ignition models, and models that can also operate on 110-volt power when available. Refer to the water heater manufacturer's owner manual for specific operating instructions.

Range

MAKE SURE to read the owner's manual provided by the range manufacturer carefully **BEFORE** using the range, and follow all precautions outlined. Never leave the range unattended when lit.

Lighting the Range Burners

The range in your recreational vehicle may be a four burner style equipped with a piezo spark ignition system (some models). There may be no pilot light under the range top that must be lit before the top burners can be operated. It is necessary however to make sure that the main LP gas valve on the LP tank is turned on.

Range Hood

The range hood exhausts the air and cooking odors from the kitchen area, as well as provides light for cooking and countertop activities. Exhaust fan control is provided by a switch on the front side that must be pulled out to open vent door and actuate exhaust fan. Make sure to push switch all the way back in to lock vent door for travel. The exhaust vent on the outside of the recreational vehicle opens automatically when exhaust fan control is activated. When exhaust fan control is pushed in to OFF position, the vent door closes automatically. It is important to push the control switch in quickly to snap the vent door in the fully closed position. This action eliminates the need to go outside and manually open or close vent. The exhaust filter screen and fan should be cleaned occasionally to remove accumulated dirt and grease. Clean the filter screen in a hot detergent solution. Some models may not be equipped with an exterior venting range hood, in this case the exhaust is filtered through the filter screen and vented into the interior.

The following warning label has been located in the cooking area to remind the user to provide a supply of fresh air for combustion:

WARNING:
IT IS NOT SAFE TO USE COOKING APPLIANCES FOR COMFORT HEATING.

Cooking appliances need fresh air for safe operation.

Before operation:

1. Open overhead vent or turn on exhaust fan.
2. Open window.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

WARNING:
Never turn exhaust fan on with filter screen removed. The exposed fan blades pose an injury threat, and dirt and grease deposits which are normally trapped by filter are free to build up in range hood exhaust duct, creating a fire hazard.

Ice Maker

The optional icemaker has been designed to provide a continuous and automatic supply of ice cubes when provided with a fresh water supply and 110 volt power. To turn on your icemaker, remove the front grill and place the switch in the upper right hand corner in the ON position. Replace the grill. Be careful not to block the air circulation through the grill when the icemaker is operating. The water supply valve to the icemaker must be turned on before operation can begin. It is a good idea to throw away all the ice cubes made during the first 2 to 3 hours of operation so that any dirt and scale will be flushed from the water line. If the ice in the icemaker is not used after a few days, empty it to insure fresh cubes.

When the icemaker is full of ice, it will shut itself off, but the refrigeration system will continue to cycle to maintain the ice in the unit. "Ruffle" the cubes periodically to avoid having them freeze together. Never use an ice pick, knife or other sharp instrument to separate the ice cubes if they stick together, because it may damage the interior of the icemaker.

Both the temperature and the flow of water into the icemaker can be controlled with adjusting screws at the rear of the cabinet. Consult the literature provided with the icemaker in the manufacturer's information package for the correct method of adjustment. Also consult this literature for troubleshooting and service information if you should experience any problems with your icemaker.

When the recreational vehicle is being stored, remove the front grill and turn the power switch off. Remove all the ice, clean the interior, and prop the door open at least two inches to keep the interior dry and prevent mold, odor, and corrosion of the interior micro switches. When winterizing the coach, shut off the flow of water to the icemaker with the valve at the back of the icemaker. After shutting off the water, allow the icemaker to run for about an hour so that all the water in the icemaker is drained through the system. The antifreeze used when winterizing the water system may cause some discoloring of the interior of the icemaker upon reuse in the spring. This will not effect operation, but the ice made for the first few hours should be discarded.

Microwave Oven

The microwave oven is an optional appliance that can be used for the convenient and fast defrosting, cooking, or simmering of foods. The oven is controlled by an auto-touch panel which allows it to be programmed for all of its various functions. Make sure to read the literature provided with the microwave oven for detailed information regarding its operation. Be especially sure to follow all precautions outlined in the manufacturer's literature. Make sure that the oven turntable (when applicable) is in place before operating, and that the movement of the turntable is not restricted. It is important that you select the proper power level for the various foods and operations you will be using. Refer to the operating instructions and the cookbook provided with the microwave for the settings best suited for the food category you are cooking.

The oven should not be adjusted or repaired by anyone except properly qualified service personnel. **DO NOT** operate the oven if it has been damaged.

Roof Air Conditioner

The recreational vehicle can be equipped with an optional roof mounted air conditioner. It operates on 110 volt power, and is located in the living/dining area of the recreational vehicle and also in the bedroom area of some models. The recreational vehicle may come factory equipped with the wiring and necessary bracing for the insertion of an air conditioner, even if it is purchased without the air conditioner installed at the factory.

NOTE: Always turn off air conditioner (and all electrical appliances) before disconnecting the RV from its 110-volt power source.

Refer to the manufacturer's owner's manual for complete operating and service instruction Efficiency when using the air conditioning can be increased by closing all windows and curtains, and parking the recreational vehicle in the shade. Air conditioning consumes a large portion of the electric power available in the recreational vehicle, so efficient operation can be an important consideration. Even though your recreational vehicle is equipped with 30 amp capabilities, be aware that some campgrounds may offer less than 30 amp service. Check what amperage is available before utilizing excessive power that may create a fire hazard or trip breakers in either the recreational vehicle, or the outside power source.

NOTE: If you cover the outside portion of your air conditioner during periods of storage, make sure to remove protective cover before reusing.

Furnace

Your recreational vehicle may be equipped with a central heating system that is made up of a furnace, thermostat, and ducting to carry the heat throughout the recreational vehicle. The furnace may be a self-igniting (electronic ignition) model that does not require the manual lighting of a pilot light for operation.

The furnace is vented to the outside for both intake and exhaust functions. Never store anything in the furnace compartment of the recreational vehicle, or block the exhaust vents on the outside of the recreational vehicle. Take care to keep heat duct registers open and free of obstruction.

Have the entire heating system inspected annually by a qualified service agency to ensure safe and efficient operation. If you suspect a problem at any time with the system, have it taken care of immediately. Refer to the furnace manufacturer's owner's manual for specific operating information.

WARNING: Never operate the furnace if you smell gas.

NOTE: Make sure to read all information supplied by the furnace manufacturer, paying particular attention to any warnings or cautions associated with its use.

Audio and Video

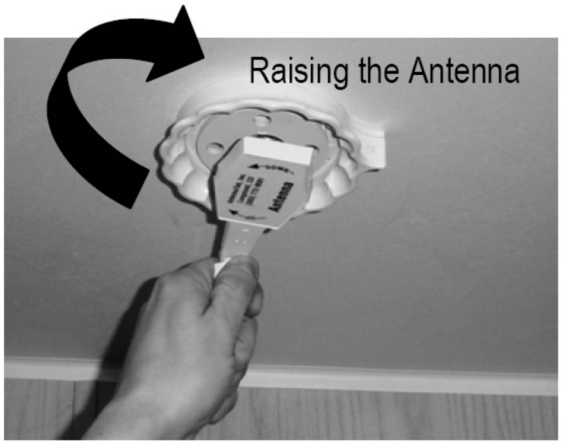
The optional Radio/Cassette/CD player is a complex system that requires instruction found in the owners manual for that component. Make sure to read all the information provided, and follow all instructions and precautions outlined by the manufacturer. Also, make sure to validate any manufacturer's warranty as may be required.

NOTE: It is a good idea to visually check the position of the antenna after raising or lowering. Make sure when lowered, that the antenna lines up to parallel to the side of the recreational vehicle.

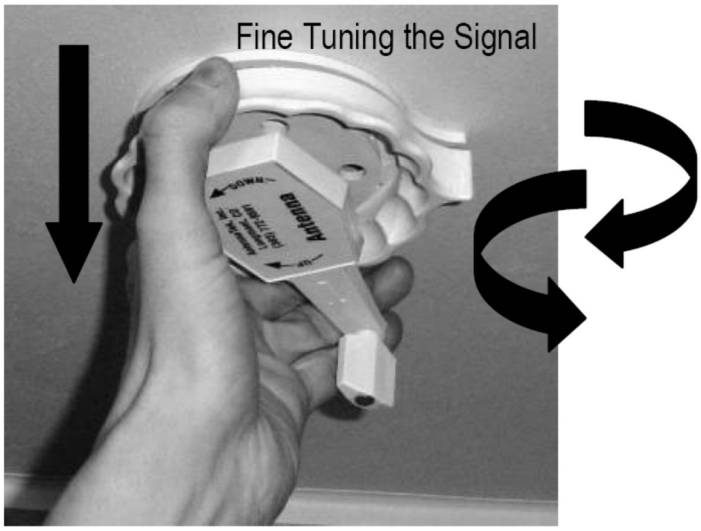
TV Antenna

The optional roof mounted antenna control is located in the ceiling. The antenna can only be used when the recreational vehicle is parked.

To raise the antenna, crank the handle in the up direction as indicated by
knob, pulling it slightly down, and turning it until the clearest picture and sound are available.
To lower the antenna, rotate it with the large control knob until the pointer on the control knob lines up with the pointer on the ceiling plate. The antenna can now be lowered by cranking the handle in the down direction. Continue to rotate the handle until you feel resistance (about 13 turns).
To make sure the antenna is working properly, tune the TV receiver to the nearest station and rotate the antenna for the best picture and sound. Next turn off the switch on the optional power booster.
Make sure to turn off the power booster when not in use. The booster can drain the battery if allowed to remain continuously activated. There is a read indicator light on the power booster that is illuminated when it is on.



WARNING: Do not connect any high current devices to antenna power boost circuit. The maximum current rating of circuit is 8 amps at 12-volt DC.



WARNING: Always lower the antenna before moving the recreational vehicle. Wind and low obstacles can severely damage or destroy the antenna if it is raised while

CARE AND MAINTENANCE

General Information

Periodic maintenance and cleaning of your recreational vehicle is necessary to retain the dependability, safety, and appearance that will provide you with many miles of trouble free operation, as well as protecting your investment.
Make sure to read and follow all the maintenance tips and schedules that appear not only in this manual, but also in the manuals provided by the various component manufacturers. Keep good records of maintenance functions performed, and make sure to perform all owner obligations as may be required by the chassis manufacturer to keep your warranty in force.
It is also important to note that operating conditions will effect service timetables. Driving in extreme conditions such as heavy dust, continuous short trips, or start and stop heavy traffic means that service duration's will be shortened. Discuss service timetables with dealer. Preventative maintenance will pay for itself many times over by catching or preventing problems before they occur. Many repairs costs are greatly increased due to the fact a small problem can begin to effect other parts and systems of the unit if left unattended. If a situation arises involving a maintenance or cleaning activity for which you are not sure of the proper procedure, do not hesitate to contact your dealer, or chassis service representative for information.

Care and Maintenance

Fiberglass Siding

The care of fiberglass siding is essentially the same as any automotive finish. Wash your recreational vehicle at least once a month. Use warm water and a mild detergent to clean any finish.
Take care to avoid spraying water directly into refrigerator or furnace vents when washing the recreational vehicle. Remove bird and tree sap droppings, insects, and tar as soon as possible to avoid staining of the finish.

NOTE: DO NOT use rubbing compound or any abrasive cleaner or cloth on the recreational vehicle. If using a tar and insect remover, make sure it is safe for use on painted

It is important to note that any finish will deteriorate with time. Dulling and fading can be increased by exposure to extreme sunlight, air pollutants, and excessive moisture. Surface weathering of fiberglass does not change the strength of the fiberglass. Regular washing and waxing of exterior surfaces is the best insurance against surface deterioration such as fading, yellowing, or chalking.
If surface deterioration has occurred, check with your dealer for the steps required to restore the finish. Buffing or even painting may be necessary in extreme cases. Small cracks appearing in the fiberglass can be repaired by using a fiberglass filler. Allow the filler to harden, sand, and then repaint. (check with your dealer for further instructions and product information).

Wax fiberglass surfaces at least once a year with a standard liquid or paste wax. Make sure to follow the directions for use as outlined by the product manufacturer. Make sure to wash and wax your unit out of the hot sun when exterior surfaces are cool.
Storage of the recreational vehicle out of direct sun is also a primary way to help preserve fiberglass finishes.
Physical damage to fiberglass should be taken care of immediately to avoid moisture from entering through breaks and causing problems with interior walls and components. Cover breaks in the fiberglass with plastic, sealing the edges with tape until proper repairs can be made.

WARNING:
Failure to maintain seals through regular maintenance can lead to damage of RV components, and may be considered abusive treatment under terms of your recreational vehicle warranty.

Seals and Adhesives

It is important to maintain the seals and adhesives of your recreational vehicle to prevent moisture from entering and destroying recreational vehicle components. When washing your recreational vehicle, inspect the seals for signs of drying out and wear. Be aware that weather, sun, and road vibration will have an effect on seals, causing them to dry, crack, or separate. If you are unsure what to look for, have your dealer instruct you, and also show you the correct method for renewing the seals. If you prefer, he will be able to perform seal maintenance for you also.

Check the condition of the frame regularly. Keep it clean, and repaint as necessary to help avoid rust. It is especially important to keep underbody components clean, when towing the recreational vehicle in the winter in areas where road salts are used.

Tires

In areas where hot sun constantly beats down on the recreational vehicle, shading the tires by covering can reduce tire sidewall cracks from forming.

Roof

Inspection of roof components at least twice a year is very important to make sure seams and seals are not cracked or worn. Proper maintenance of seals is necessary to keep moisture from entering and causing severe damage such as rot, mold, or mildew. If you encounter drying, cracked, or weathered seals, make sure to reseal as necessary. Check with your dealer for the type of caulking required for rubber roofs and correct methods of resealing. Silicones and synthetic sealers cannot be used on the rubber roofs. Special sealers are also required for the skylights.

NOTE: If your roof should somehow be punctured, cover the puncture to seal out moisture, and have it repaired as soon as possible (check with your dealer)

It is especially important to check the seals before and after periods of extended storage or non-use. Fall and spring inspections are recommended. A mild household soap solution can be used to clean a rubber roof. Stubborn stains may require use of a scouring powder type cleanser.

Extrusions and Aluminum Surfaces

Clean and wax all extrusions when waxing recreational vehicle sidewalls, to help avoid surface pitting. Special aluminum cleaners are available to restore the original luster to aluminum surfaces. Make sure to follow the instructions for use as outlined on the product package. Chrome surfaces can be restored with special chrome polish if regular cleaning methods are not successful. Again, make sure to follow product instructions for use.

Windows and Doors

Check the seals around the windows at regular intervals. Follow previous instructions for checking the condition of seals and repairing as necessary. Make sure that windows remain operative by adjusting and lubricating latches and moving parts annually. Also check the condition and operation of the door locks, adjusting and lubricating as necessary. Use powdered graphite or light oil to lubricate moving parts on doors and windows. Vinyl seals around windows and doors should be cleaned regularly, and kept supple by use of a silicone spray (make sure to follow the directions on the product). Keep screens and window slides clean and free of debris, to maintain proper operation, and avoid component damage. Test the operation of all windows occasionally to make sure they are working properly, including closing flush and locks holding tight. Check with your dealer if you are unsure about the correct methods of lubrication and adjustment.

NOTE: Be aware that moisture can accumulate in locks and hinges of windows and doors, causing damage or faulty operation. Do not force the operation of these components in subfreezing weather.

LP Gas System

The **LP** gas system should be checked regularly for leaks and road damage. Follow the lines, looking for kinks or flattened spots that could have occurred during travel or maintenance on the recreational vehicle. The entire system, including regulator pressure, should be checked annually, or whenever you suspect a problem, by a qualified **LP** gas service technician using proper equipment. The method of checking the system for leaks, and **LP** gas safety precautions can be found elsewhere in this manual.

NOTE: Line pressure for LP gas appliances should be checked at least every six months. Most LP gas suppliers have equipment to make the test for you. The correct line pressure for all of the LP gas appliances is 11" of water column pressure.

Drainage System

The drainage system, including the tanks and associated drain piping should be periodically inspected for road damage. Any deterioration of the sealant around joints and fittings should be repaired immediately. Check the operation of the termination valves. If they pull or close with effort, lubricate the shaft and slide valve with spray silicone. Termination valves that leak should be repaired or replaced as soon as possible. Sometimes, a buildup of paper or other material in the inside groove of the termination valve can obstruct the valve and cause it to seat improperly. If you suspect that this is occurring, the valve can be removed from the drainage line by removing the four screws that hold it in place and sliding it out. The valve groove may then be cleaned out with a screwdriver or similar tool. Replace the valve in the line and reinstall the screws to secure it in place.

Exterior Lights

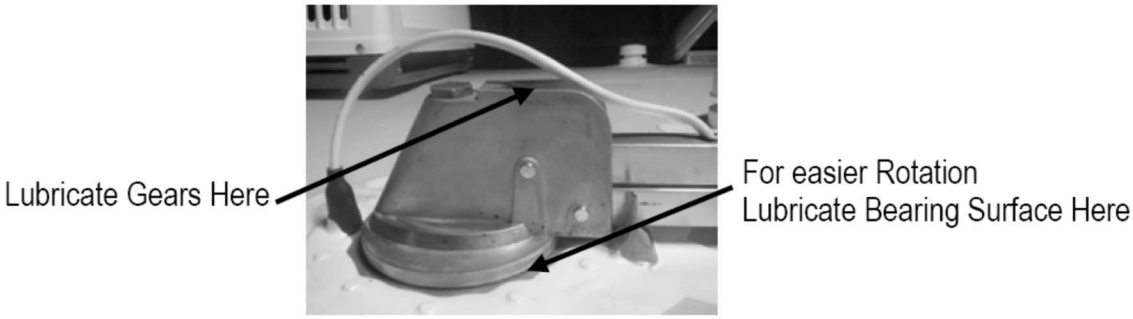
Make sure to check the operation of all exterior lights often. Check identification, clearance, turn signal, brake, and backup lights to make sure they are working correctly. Replace burnt out bulbs as soon as possible.

TV Antenna

To lubricate the elevating gear, apply a liberal amount of silicone spray lubricant to the elevating gear with the lift in the down position. Run the lift up and down a few times to distribute the lubricant over the gears.

If rotating the antenna becomes difficult, normal operation can be restored by lubricating the bearing surface between the rotating gear housing and the base plate. Any spray type silicone lubricant may be used.

Elevate the antenna and remove the set screw from the rotating gear housing (see illustration). Spray lubricant into hole and around the edges of the gear housing. Rotate the gear housing until the lubricant coats the bearing surfaces and the antenna rotates freely.



Appliances, Sinks, and Countertops

Clean with hot soapy water or a good liquid cleaner. Avoid using abrasive cleaners. Never use steel wool on stainless steel, since the steel particles left in the sink can rust and become unsightly. Also, when cleaning stainless steel with a mild cleanser, rub gently with the grain, and rinse well. Rinse after each use and wipe dry.

Be sure to remove all food and ice from the refrigerator at the end of each trip. Prop the door open slightly to keep the interior dry, and free of mold, mildew, and odors.

Make sure to read all literature provided with each of the appliances, and follow the maintenance instructions included. Pay particular attention to any cautions or warnings included. Also read the rest of this manual, following the instructions for the care and use of appliances.

Do not place hot pans directly on countertops, because they can loosen or scorch surface.

Pre-finished Panels and Wood Surfaces

Treat cabinetry and wood surfaces as you would any fine furniture product in your home. Proper care and maintenance of wood products will keep them looking like new for many seasons of use.

Clean pre-finished panels with a spray-type furniture polish. Avoid getting wood surfaces wet. Wipe off and dry immediately if you do get wet. Do not use abrasive cleansers around wood finishes. Clean regularly with a soft cloth and cleaner designed for wood products such as lemon oil or any oil based wood cleaning product. Avoid constant exposure to direct sunlight which can cause fading and drying of wood surfaces.

Water System

Check all hoses, fittings, and connections regularly for leaks and signs of wear. Make sure to keep the system sanitized, and take care to winterize during cold weather (see instructions elsewhere in this manual). Do not allow water to remain in system for extended periods or after a trip.

Electrical System

The electrical system requires minimal maintenance under normal circumstances. Most electrical maintenance in the recreational vehicle involves the battery. Keeping the batteries properly maintained will help to eliminate many frustrating electrical problems. Make sure to refer to the index for the location of electrical and battery maintenance elsewhere in this manual.
If you experience electrical problems with your recreational vehicle, make sure to have it checked by a qualified electrician.

Roof Vents

Check roof vents regularly for debris that may block air flow or jam the cranking mechanism. Lubricate the cranking mechanism with light oil.

ABS Plastic

Many components of the recreational vehicle are constructed of strong, lightweight ABS plastic. Sometimes, it may be necessary to remove stains, or generally clean. A mild solution of soap and water will clean many stains, and should be used initially. Tougher stains may require stronger cleaners, but be sure to read the label to determine if the product is recommended for use on plastics.
Avoid abrasive cleansers (even the liquid and cream types), alcohol based products, and solvents such as acetone and MEK. Gasoline and kerosene should not be used because of the damaging effect they have on the plastic surface, as well as the fire hazard they present. Often the damage caused by solvents, alcohol, and oil based products may not be immediately noticeable, but the plastic is made weaker, and prone to stress cracking.

Winter Precautions

Special Tips for Winter Use

Water Systems — if the fresh water storage tank is located inside the coach, the normal heating of the coach during cold weather should be enough to insure its not freezing. In severe cold however, it is wise to monitor the water temperature in the tank, and take appropriate steps to drain and winterize if necessary. In severe cold it may be necessary to open lower cabinet doors at night in both the bath and kitchen areas to keep warmer air circulating around water fixtures.

If you are going to have to leave the coach unheated for any length of time in severe cold conditions, it is best not to keep water in the fresh water tanks. It may work best to carry cooking and drinking water with you in plastic jugs instead.

If you will be using your recreational vehicle when conditions fall below the freezing level, it will be necessary to protect the drainage system components from damage by the addition of an approved antifreeze solution as outlined on the product directions. Drain lines which are exposed outside the recreational vehicle are especially susceptible to freezing, and steps should be taken to protect them from damage.

NOTE: It is important To remember that heating With LP consumes gas rapidly, so refill tank immediately when low, to avoid running out completely.

Food Storage - Make sure to use an LP gas that will vaporize properly in the colder temperatures. Check with your LP gas representative for the proper fuel, and reread the information on LP gas selection in the LP Gas section of this manual (check the index for the location).

Heating — Use **ONLY** the furnace to heat the recreational vehicle. Ensure it is properly vented to the outside. **NEVER USE THE RANGE FOR HEATING — ASPHYXIATION COULD RESULT.**

Condensation — Cooking produces large amounts of moisture. Not just as steam from pots and pans, but also as a product of combustion. Make sure to use the exhaust vents and open a window slightly to control the humidity. At night, leave a roof vent and/or a window slightly open. Check the interior of the recreational vehicle periodically to make sure leaks have not developed, or condensation has formed that can cause damage to interior components. Condensation can most readily be observed as moisture accumulation on windows and mirrors. To eliminate condensation, improve circulation by taking one of the following steps.

- Bring in fresh outside air inside through ventilation, using exhaust and roof vents
- Air out the trailer by opening doors, windows and roof vents several times a day.
- Do not pack hanging clothes too tightly as this prevents proper circulation in the closet.
- Purchase a de-humidifier to effectively reduce excess moisture in your RV periodically.

Storage Preparation

When storing the recreational vehicle for the winter (or other extreme conditions), certain precautions need to be made to protect it until you open it again for use. Make sure to talk with your local dealer concerning any special requirements for storage in your particular geographic area. The following steps are general, can help you choose those that are most appropriate for your needs.

1. Make sure to park the recreational vehicle on a level surface.
2. Clean the recreational vehicle thoroughly, both inside and out, as previously outlined, including the refrigerator.
3. Make sure all electrical switches and appliances are turned off.
4. Close all drapes and curtains, and protect the curtains from sun fading by placing foil, or paper between the windows and the screens.
5. Make sure all windows, doors, and vents are closed securely. Cover exterior vents on appliances to prevent moisture and insects from entering during storage.

6. Be sure that the battery has the proper electrolyte level and that it is fully charged (specific gravity of 1.260). A discharged battery will freeze and crack the case, ruining the battery. In storage, a battery will lose charge gradually over a 30 to 45 day period, even when disconnected by use of the battery disconnect switch. We recommend that at least monthly the batteries be checked for charge. If the charge is 80% (specific gravity of 1.235) or less, it must be recharged. You may wish to remove the batteries from the recreational vehicle and store them in a heated area. However, even when warm, the battery charge level must still be maintained. A warm battery accepts charge much more readily however, than a cold one. Make sure to follow all precautions associated with battery care and maintenance outlined in the electrical section of this manual.
7. Make sure the tires are inflated to correct pressures.
8. If snow accumulates on the recreational vehicle, try to remove it as often as you can.
9. A primary concern when winterizing the recreational vehicle is to make sure the water systems are protected against damage caused by freezing. Follow the water system winterizing procedure outlined in the Water and Drainage section of this manual (check the index for location).

Be sure to read the rest of this manual, and follow any additional information on storage, cleaning, and winterizing procedures.

PERIODIC MAINTENANCE CHART

ITEM	EACH TRIP	EACH MO.	3 MO.	6 MO.	EACH YEAR	AS REQ'D	PROCEDURE
Fiberglass Exterior		x					Wash with warm water and mild detergent.
				x			Wax with liquid or paste wax.
Metal Exterior		x					Wash with warm water and mild detergent.
Roof & Roof Components				x			Inspect and re-seal as needed.
					x		Lubricate roof vent mechanism w/light oil and clean completely.
Windows and Doors		x					Check vinyl seals when washing exterior.
			X				Check seals for damage and repair as needed.
			x				Lubricate door hinges & step components with WD40.
					x		Adjust & lubricate window latches w/powdered graphite or light oil.
					x		Lube door locks & strike pocket, including storage and access doors.
Seals and Adhesives		x					Inspect and re-seal as needed.
LP Gas System						x	Check for leaks and road damage.
					x		Have qualified serviceman check pressures & complete system.
Water and Drainage		x					Check hoses, fittings and connections for leaks and signs of wear.
	X						Check drainage system for leaks and road damage.
						X	Sanitize system.
					x		Winterize system depending on local seasonal conditions.
Electrical System	x						Check GFCI circuits.
						x	Perform maintenance on generator (If installed)
						X	Check and service batteries.
Appliances	x						Remove food and ice from refrigerator after each trip.
		X					Clean fan blades and wash filter on range exhaust hood.
		x					Check for obstructions and dirt on exterior appliance vents.
Safety Equipment					x		Clean smoke and LP detector components.
	x						Test smoke and LP detector operation.
		X					Check fire extinguisher pressure and condition.
Carpeting	x						Vacuum after each trip.
						X	Clean.
Wood Surfaces		x					Clean pre-finished panels and wood.
Weight and Distribution	x						Be sure unit is within specified load limits and weight distribution.
Axles				x			Mounting bolts should be torqued to 145 - 155 foot pounds.
Wheel Bearings					x	x	Repack wheel bearings annually.
Brakes				x		x	Check operation and check for uneven wear.
Wheels – Torque Lugs		X				X	90lbs for mobile home axles, 110lbs for general axles

Your satisfaction and goodwill are important to your RV dealer and to Recreation By Design, LLC. If you experience a problem with repairs made to your recreational vehicle, review the matter with the RV dealership's service manager. In most cases these complaints are resolved in this manner.

If not, contact the owner or general manager of the dealership. If your problem cannot be resolved by the RV dealership, contact Recreation By Design customer service representative at 574-294-2117.

When calling, please have the following information ready:

1. Your Recreation By Design Vehicle Identification Number (VIN)
2. Name and location of the dealer you purchased your RV from
3. The date of your purchase
4. An itemized list of all problems to discuss

Or Write to:

Recreation By Design, LLC. Customer Service Department
57420 CR 3 Elkhart, IN 46517

Recreation By Design, LLC can provide factory service in Elkhart, Indiana. This option is available only for major service work that may be required. Service work is generally done on an appointment basis only. It is best to schedule an appointment well in advance with the service department. Drop-in customers will be worked in only if there is time available, however, if there are no openings in the service department's schedule, it will be necessary to schedule a future appointment. If you would like to schedule an appointment for service, please contact the Recreation By Design Customer Service department at 574-294-2117.

Recreation By Design – 57420 County Road 3 Elkart, IN 46517 – Phone 574-294-2117

Manufacturer of Recreational Vehicles

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