

## Propane Detector

### **⚠ DANGER**

If the detector senses the presence of propane, the light will turn from green to red, accompanied by an audible alarm. If the alarm sounds:

1. Immediately evacuate all occupants from the recreational vehicle.
2. Extinguish any open flames, pilot lights and all smoking material.
3. DO NOT touch any electrical switches.
4. Shut off the propane supply at the tank.
5. Open doors and windows to ventilate.
6. DO NOT USE THE RANGE HOOD OR OTHER POWER VENTS.
7. The alarm will continue to sound as long as propane is detected or until turned off.

### NOTE:

The alarm may sound at times when no propane is present due to household product use, such as aerosol hair-spray, certain cleaners, adhesives, alcohol, etc.

## Electrical System Control

### **⚠ DANGER**

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

### NOTE:

The electrical power supply provided for the recreational vehicle is a dual system, operating with 120VAC and/or 12VDC.

The 120VAC power may be provided by either connecting the recreational vehicle to an outside power source when parked, or by use of a recreational vehicle generator. When the 120VAC system is operational, power also passes through a system converter, allowing the full use of all 12VDC functions in the RV. Some 120VAC functions in the RV may include:

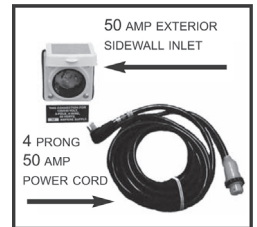
- Refrigerator
- Ice maker
- Roof-mounted air conditioner/s
- TV
- Microwave
- Converter
- Electrical outlets
- Some lights
- DVD

Some refrigerators also have the option of running on propane when 120VAC power is not available. When not connected to 120VAC power, the 12VDC system functions can be supplied by the batteries. Batteries are recharged by the power converter when the RV is attached to an outside 120VAC power source, or by the generator. (Be sure you turn the power switch ON; the generator will not charge the batteries or otherwise operate when the power switch is in the OFF position.)

For more information please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## Connecting to an Outside Power Source

A 50 amp power cord is provided to connect the RV to a grounded power source. The electric utility service connection is located on the driver's side near the rear of the coach.



The power cord is stored inside the electric utility service compartment. (Depending upon the type of RV you have, the power cord could be either permanently mounted or detachable.)

## **⚠️ WARNING**

### Available Power

The power available at campgrounds and the quality of connection can vary widely. In order to protect your investment, we recommend using a quality surge protector.

Many campgrounds have limited electric service that may not be adequate to power your RV. The best way to know what electric service is available is to call your campground ahead of time.

### Adapters/Reducers

Many aftermarket devices are available that connect to the shore cord on your RV, allowing it to be plugged into a lesser power supply. Using an adapter or reducer to connect your RV to a lesser power source than the RV was designed to use requires you to shut off some appliances in the RV in order to keep the demand lower than the power available. **PLUGGING YOUR RV INTO A POWER SOURCE LESS THAN IT WAS DESIGNED FOR SIGNIFICANTLY INCREASES THE RISK OF FIRE.**

Because of the increased risk of fire or electrical damage, we recommend that you do not use an adapter or reducer to plug your RV into a lesser power source than it was designed for. If you choose to use an adapter or reducer, be aware that many if not all these products are not certified by Underwriters Laboratories™ or any other safety testing firm. It is therefore up to you to ensure that any adapter or reducer you use is properly sized for the electric load and adequately constructed to protect you and your family from the risk of fire or electric shock.

### Extension Cords

Forest River recommends that you do not use extension cords to power your RV. If you choose to use an extension cord, be sure it is properly rated for the electric load and is in good condition before each use. Damage to an extension cord is often not visible and can only be detected through the use of special equipment and expertise that most consumers do not have. Never use an extension cord longer than 50 feet, when the cord has gotten wet, or a cord that has been pinched or shows any signs of damage.

**FOREST RIVER SPECIFICALLY DISCLAIMS ANY AND ALL LIABILITY OF WHATEVER SORT FOR ANY DAMAGE, PERSONAL INJURY, OR DEATH ASSOCIATED WITH THE USE OF AN ELECTRICAL ADAPTER OR REDUCER OR EXTENSION CORD.**

## **AGS (Automatic Generator Start System)**

Some coaches are manufactured with an Automatic Generator Start System. The AGS is designed to automatically start your coach generator, based on the inside temperature of the coach or a low battery condition. These features allow you to leave pets and important items in your coach while you enjoy a day away and be confident your coach will stay cool and comfortable. The AGS includes settings for 'Quiet Time' so you can comply with park and rally rules. The AGS does not interfere with your air conditioner controls or the manual generator start/stop switches in your coach.

## **Batteries**

The batteries are located in a separate compartment on the exterior of the coach. Some motorhomes have a battery compartment located under the entry step. Be sure you know the location of your batteries before leaving the dealership. It is important to keep the batteries fully charged at all times. Take time to turn off all lights or other 12VDC conveniences when not in use. To prevent draining the batteries, connect the motorhome to a 120VAC power source whenever possible.

The charge condition of the batteries is displayed on the monitor panel, generally located in the Control Center, mounted on the wall. To check, press and hold the monitor TEST switch while reading the charge level on the battery gauge. Charge levels indicated are divided into sections from weak to fully charged.

## **Battery Maintenance**

While Forest River may not have installed your battery, we want to provide you with the following information. Battery maintenance is important. Checking the condition of a battery at regular intervals will help ensure its proper operation. Here are some recommendations for checking and servicing the batteries.

### **NOTE:**

Some batteries are not serviceable; consult the manufacturer's information on the battery you own.

1. Keep the battery mounted securely. Excessive vibration can cause early battery failure.
2. Check the electrolyte level of the auxiliary batteries at regular intervals. Keep each cell filled with distilled water to just above the plates. Once the plates have dried out, they cannot be reactivated, and the capacity of the battery is reduced in direct proportion to the area of plate surface that has become dry. This kind of damage can occur quickly.

3. Keep the battery clean. Corroded terminals make poor contact. Battery sulfating occurs when the battery has been standing in a discharged condition over a long period of time or when the battery has been operated continually in a state of partial discharge.
4. 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. If the vent plugs are cracked, they must be replaced.
5. Watch for over-charging. Three ways to spot over-charging are:
  - a. Active material on the vent cap (heavy deposit of black lead-like material on the underside of the vent cap).
  - b. Excessive use of water.
  - c. By testing voltage regulator output.
6. Make sure the battery hold downs and carrier are kept clean and free of corrosion.

#### NOTE:

When removing a battery, disconnect the ground battery clamp first. When installing a battery, always connect the grounded battery clamp last. 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.



The battery disconnect switch is used to disconnect the house battery during storage. If your battery disconnect switch is a toggle switch, it must be in the 'USE' position. If your switch is a rotary switch, it must be in the 'ON' position. If the switch is not in use or on, you will not have power to your battery.

If your chassis battery is dead, you can start the chassis engine by using the battery boost switch (located on the dash, if equipped). Hold the switch down while starting the engine then release it when the engine engages.



## Battery Safety

### ⚠ WARNING

Always shield your eyes when working near batteries. Batteries can explode. Do not smoke or expose battery to electric spark or flame. When charging or discharging, batteries generate hydrogen. Hydrogen and air is a very explosive mixture.

### ⚠ WARNING

Do not short across the battery terminals. The spark could ignite the gases. Do not wear metal jewelry or a watch when working on a battery.

### ⚠ DANGER

Disconnect the battery cable and the 120 volt power cord before working on electrical system. Do not reconnect the cables until all work has been completed.

### ⚠ DANGER

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

## Battery Charging

The converter also operates as a battery charger when it is connected to a 120 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. Battery charging is fully automated. When charging a battery remotely (outside the RV), follow these safety precautions:

## **⚠ DANGER**

1. Disconnect the battery from the recreational vehicle.
2. Check electrolyte status before charging. Be sure each cell is properly filled with distilled water.
3. Use care when connecting and disconnecting the cables from chargers. A poor connection can cause an electrical arc, which can result in an explosion.
4. Remove the battery vent caps before charging and be sure that the electrolyte solution does not splash out as a result of charging too quickly. NEVER attempt to open a maintenance free battery.
5. Read the literature supplied by the battery manufacturer and follow all their warnings or precautions as stated in their manual.
6. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## **Power Converter/Inverter**

The converter is used to switch 120VAC electricity from an external supply or from the generator to 12VDC electricity. Under normal conditions, the converter requires no maintenance. If the converter does not have a 120VAC supply to convert to 12VDC, it automatically switches the batteries into the electrical circuit to power 12VDC functions. When reconnected to a 120VAC power source, it will again operate from that source.

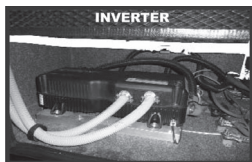
### **NOTE:**

The converter will run warm, which is normal. If, however, it gets too hot, it will turn itself off. After it cools, it will come back on. In most cases, shut down occurs due to poor ventilation.

### **NOTE:**

A slight hum during operation is also normal for the converter. If you have no 12VDC power and no hum, check to see if 120VAC power to the converter has been interrupted.

If you have an inverter, the inverter will take over when 120VAC power is not available. The inverter control panel is located above or near the entrance door.



## **⚠ CAUTION**

Keep converter/inverter area clear of obstacles and clutter. They must have adequate ventilation to avoid overheating.

## **Fuses and Circuit Breakers**

### **Ground Fault Circuit Interrupter**

The 120VAC outlet in some possible wet locations are 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 has 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 exists. The GFCI receptacle should be tested initially when the recreational vehicle is purchased and a least monthly thereafter.

## **⚠ DANGER**

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 GFCI does not protect any circuit other than the one to which it is connected.)

To test the circuit, use the following procedure:

1. Make sure power to the circuit is ON.
2. Push the test button.
3. The reset button should pop out.
4. All power should be interrupted to outlets protected by the GFCI.
5. Verify by plugging in a light at these outlets and pushing in the red reset button. If the 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 service it.

## **Circuit Breakers**

The 120VAC system is protected by circuit breakers. These breakers automatically trip 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 of the problem is identified and corrected.

- The generator may have one (4.0 KW) or two (5.5 KW & larger) breakers and a DC fuse on the generator control panel. If an interruption in generator operation occurs, check to see if any of these have been tripped; consult the manuals provided with the generator before attempting maintenance on the generator. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## **12 Volt Fuses**

The 12VDC distribution panel is located next to the 120 volt circuit breakers. The panel contains circuits with replaceable fuses for protection of recreational vehicle 12VDC lines. If any line is loaded beyond the capacity of its fuse, the fuse will blow. A portion of the 12VDC 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 fuses, there may be a short somewhere along the 12VDC line or at a not-fused 12VDC component on the line. Check the 12VDC line and any components along the line. Locate the short and take necessary steps to repair it. If you cannot locate the problem, call a qualified RV technician.

### **NOTE:**

Keep additional fuses on hand in the recreational vehicle; replacement fuses are available at gas stations, hardware stores, or automotive supply stores. Remember that the replacement fuse must be the same amperage rating as the original fuse.

### **NOTE:**

Your RV may also be equipped with an inverter which is used to generate 120VAC power from a 12VDC battery. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).



# PLUMBING

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A recreational vehicle plumbing system has the dual ability to be self-contained with onboard storage or use facilities provided by an external pressurized source. 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. 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.

## Fresh Water

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Potable (fresh) water is supplied by either the fresh water tank aboard the RV or from an outside source, connected through the city water connection. When using the fresh water tank, the water is pumped through the water lines by means of the water pump. When utilizing an exterior source, such as a campsite water supply, the pump is not needed as the water is already pressurized and will flow through the water supply lines within the trailer.

## Water Center Panel

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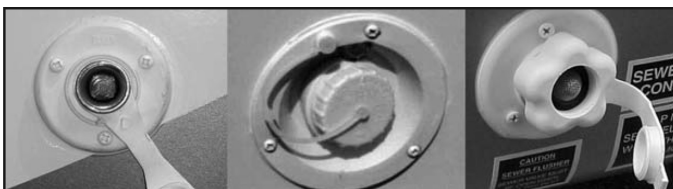
### External Hook-Up

Water provided from outside the recreational vehicle is pressurized by the system from which it is delivered. When connecting your motorhome 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.

#### NOTE:

DO NOT turn the pump on if the fresh water tank is empty. Doing so could cause damage to the pump or a blown circuit may occur.

### Attaching 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 RV city water inlet.

4. Turn on the outside source of water. Gradually open the hot and cold water at the sinks and tub to clear air from the lines. Close the faucets when the water is flowing freely. Water heater bypass valves should be set to Normal mode.

#### NOTE:

Do not turn on the water pump when using water from an external source. Only use the water pump when obtaining water stored in your fresh water tank.

### To Disconnect from the Outside Water Source

1. Turn off the outside source of water.
2. Disconnect the hose from the supply valve and the recreational vehicle inlet.
3. Remove the hose and store.

#### NOTE:

Do not leave water on when leaving RV for an extended period longer than a few hours.

4. Reinstall the cap on the recreational vehicle inlet.

When an outside source of water is unavailable, water can be drawn from the fresh water storage tank in the RV.

### Filling the Fresh Water Tank:

1. Remove the water fill cap.

#### NOTE:

Do not leave unattended while filling.

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 full, replace the water fill cap. The Fill Cap is for filling the tank. The City Water Fill connects to campsite water.

#### NOTE:

Water from the fresh water tank is obtained by use of the water pump when filling the hot water tank and water lines. Remember, traveling with full water tanks will add weight to your coach, cause additional wear, and decrease gas mileage. Travel with the water tanks, both fresh water tank and waste tank, as empty as possible while still maintaining your desired level of comfort.

## Traveling with Water

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When traveling, you may want to drain the tank or keep the quantity of water to a minimum. This will reduce the total weight of the RV for travel. The location of the fresh water and the waste water tank drain valve will vary from RV to RV, but is generally located beneath the motorhome near each respective tank. They may also be located inside, designated by a Low Points Drain label. Water in the tank can be drained by turning the drain valve handle perpendicular (vertically) to the coach body. To close the valve, turn the lever parallel (horizontally) to the coach body.

**NOTE:**

A gallon of water weighs approximately 8 lbs. If you add 30 gallons of water to your fresh water tank, multiplying 30 gallons by 8 lbs. will result in at least 240 pounds of extra weight.

## ***Monitor Panel/Command Center***

### **Checking Water Tank Levels**

While there are several different styles of monitor panels, they all serve the same purpose. They measure and display information, regarding levels for water, batteries, and LP.

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 and read the level indicators on the panel. The indicator is proportioned in quarters (or in some cases, thirds) with each light displaying the level contained within the tank.

**NOTE:**

Residue on the sides of a tank or water with a low mineral content can result in a false reading. Help prevent this from occurring by keeping your tanks clean.

Check the levels when you are sure of a tank's contents, and compare it to the reading on the monitor panel. If you are concerned about the accuracy of the monitor panel, have it checked at your local service center.



## ***Water Pump***

### **Plumbing System**

The motorhome plumbing system has basically two water systems: the fresh water system and the waste water system. Potable (fresh) water is supplied by either the fresh water tank you have onboard your coach or by connecting to the city water fill at the campground.

**NOTE:**

When connecting to city water, (water from the faucet at the campground), use only a water hose which was manufactured and labeled for potable (drinkable) water. This will ensure the hose will not alter the taste of the water and that the hose has been sanitized for that purpose. To be sure you maintain sanitary drinking and cooking water, never use the hose for any other purpose. You can purchase this type of hose at almost any camping store.

**NOTE:**

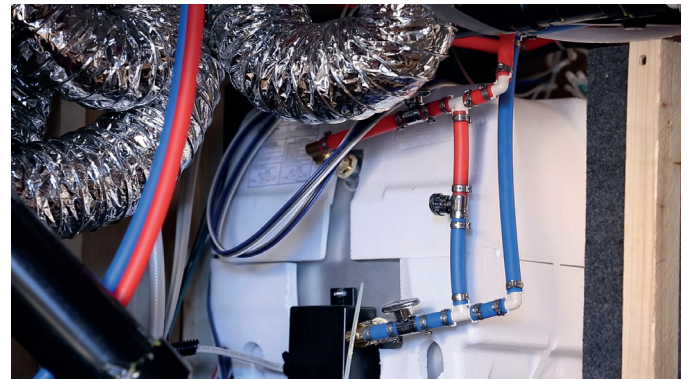
When connected to city water, be sure your water pump switch is in the OFF position. The pump is not needed when connected to city water, since that fresh water source is already pressurized. Use the pump only when obtaining water from your onboard fresh water tank and you are disconnected from any exterior water source. When using your onboard water, be sure your water pump switch is in the ON position.

### **Water Pump**

The RV water pump operates on 12 volt power and is totally automatic, when the pump switch is in the ON position. Operation begins when a faucet is turned ON, provided you are not connected to a city water fill.



When a faucet is turned ON, the pump automatically draws water from the onboard fresh water tank. The pump supplies the pressure needed to move the water through the water lines. The water pump switch is located on the monitor panel.



Before turning the water pump ON:

- Ensure there is adequate water in the fresh water tank.
- Be sure the water heater BYPASS valves are set to NORMAL MODE, allowing water to enter.
- Open all faucets, both HOT and COLD, including any tub and/or shower faucets.

Turn the pump switch ON, and allow the pump to fill the water lines and hot water tank. After water is running in a steady stream from all faucets, turn the faucets OFF. The water pump should stop operation automatically when all faucets are closed. The pump should now run 'ON DEMAND' when a faucet is opened and stop when the faucets are closed.

**CAUTION**

**Never operate the water pump if the fresh water tank is empty. Damage to the pump may occur.**

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## Sanitization

Sanitize the system before initial use, after extended periods of no-use, at least once a year during continuous use, and if there is suspicion that the system has been contaminated.

To sanitize the system: For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

- Prepare a chlorine solution using a gallon of water and ¼ cup of liquid household bleach (5% sodium hypochlorinate solution). Use one gallon of solution for each 15 gallons of tank capacity.
- With an empty tank and all faucets and drains closed, pump into the tank, via the potable tank fill, either with a manual or electric water pump. Or pour 1/2 cup of bleach (1/4 cup per 15 gallons of capacity) into the hose before connecting it to the water source. The water source pressure will push the chlorine and water into the tank, making the correct solution when the fresh water tank is full.
- Completely fill the tank with fresh water.
- Switch on the water pump. Open all faucets one at a time until all air is purged and the water flows freely.
- Again, add fresh water to the tank until the water level reaches the fill spout.
- Allow the solution to stand in the tank, undisturbed, for at least three (3) hours.
- Drain the system by opening all faucets and the fresh water tank drain valve while flushing the system with fresh water of drinking quality.
- Continue flushing the system, allowing the water to flow for several minutes.

Close the tank drain valve and all faucets. Refill the system with water of known drinking quality.

## Waste Water/Holding Tanks

The waste water system in your motorhome can be described as two separate systems. A gray water system, which consists of the drain lines and holding tank for waste water from the sinks and tub, 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 (black tank for toilet waste and gray tank for sinks and showers) are vented to equalize air pressure and disperse odors to the outside, caused by drain water and waste. At times, the rocking movement of the coach while driving may empty the drain traps of their water and allow odors from the gray water tank to enter the motorhome.

Residue in the drain water lines can also produce odors. To combat gray water holding tank odors, an RV

approved deodorizing agent should be used. An agent that dissolves grease and fats and contains a detergent will help keep the tanks and lines clean and free flowing. You can obtain the deodorizer at most campgrounds and at stores that carry camping supplies.

### If Connecting To A Campsite Sewer Inlet:

- DO NOT open termination valves until tanks are 3/4 full.
- DO NOT keep black water valve open while parked.

### NOTE:

Solid waste is not flushed directly into the sewer system. Only liquid waste is drained; therefore, you must allow water to accumulate in the tank and give the chemicals time to break down the solids before emptying the tank.

### NOTE:

Always keep enough water in the waste tank to cover the bottom. Doing so will help prevent waste from solidifying, which will prevent the waste from being flushed from the system. If draining the gray water tank directly into the sewer inlet while parked, be sure to close the termination valve for a period of time before leaving, allowing water to accumulate in the tank for use in flushing the drain line and flexible hose.

Each tank has a separate drain line and dump valve, which permits dumping tanks individually or together. Each tank should be emptied often and ONLY at dump stations designated for this purpose. Dump stations can be found at most campgrounds and are well marked, and at most truck stops. Many service stations, particularly along interstate highways, also have these facilities. Campground directories list dumping station locations across the nation.

If possible, dump holding tanks before a trip to reduce the gross vehicle weight. It is very important that you keep enough water in the black water tank to cover the bottom to prevent hardening of any waste residue that may remain. Never dump black water tank until it is 3/4 full. (Check the tank level on your monitor panel.) This practice ensures that enough water is in the tank to flush all wastes into sewer line. If necessary, fill the tank to the 3/4 mark with additional water before draining.

Never put anything in the holding tanks other than normal drain water, body waste, and biodegradable products. Paper wrappers, gum, cigarettes, etc., no matter how small, should NEVER be placed into either the gray or black tanks as doing so could cause damage to your plumbing system and/or tanks.

### NOTE:

You can find biodegradable paper products at most stores that sell camping supplies and at campgrounds that have a store on the premises. You can also find chemical substitutes for deposit into the waste tanks if you prefer.



## 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 RV drain and connect the drain hose.
3. Attach the other end of the flexible drain line to the dump station inlet. Be sure both ends of the flexible drain line are securely attached.
4. Drain the black water tank first by pulling the valve handle away from the valve body. Be 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, hand flush handle, or use the tank flush water valve if equipped. 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 tank last uses the soapy water in the tank to 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 motorhome outlet and the dump station inlet.

Follow these guidelines to help ensure trouble-free operation:

- Never put anything in black water tank other than biodegradable RV toilet paper.
- Do not put automotive antifreeze, household toilet cleaners, household drain cleaners, or any solid material into the waste water system.
- Always use chemicals in the black water system made especially for this purpose.
- When cleaning components of the waste water system, use **ONLY** cleaners made for RV systems.
- Always keep the drain cap in place and termination valves closed.
- 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:

Keeping the black water tank clean allows the monitor panel to accurately assess the status of the tank. Always clean up the dump site before leaving. Never empty your holding tanks directly on the ground, a roadway, river, or stream. Do not pollute!

## Toilet

The toilet installed in your recreational vehicle is connected to the pressurized fresh water system. A single lever, located on the side or a foot pedal, controls flushing and the flow of water into the bowl.



- To add water to the toilet before using, push the flush lever until the desired water level is reached. (As a general rule, more water is required only when flushing solids.)
- To flush the toilet, push the lever all the way down and hold until the sewage leaves the toilet.
- Release the flush lever. A small amount of water should remain in the bowl. To add more water to the bowl, hold the lever **HALFWAY** down until the bowl has the desired amount of water.
- Be sure to hold the flush lever down long enough to release the contents of the bowl, but only as long as necessary, as this 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 is drained. Be sure all occupants and guests understand this operation.
- Always use deodorizing agents, specifically designed for use in holding tank systems, and a good biodegradable tissue paper. These products are available directly from your dealer or any store that sells camp supplies.

**NEVER** use chlorine or caustic chemicals, such as drain openers or laundry bleach, in your toilet.

**NEVER** allow foreign objects (non-dissolving items) to be flushed through the toilet.

Don't allow a problem to go unsolved. If you should detect a problem, take steps to correct it immediately. It's also a good idea to carry a few spare parts which could correct a small problem if one should develop. These parts can be obtained from your dealer or larger campground stores.

Refer to the toilet manufacturer's information in your Owner's packet to determine which part you may need, its correct name, and part number. (If you have a toilet

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different than the one described or pictured, follow the toilet manufacturer's recommendations for cleaning and maintenance.)

## Winterization and De-winterization

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

### NOTE:

Before using the compressed air method, you will need a special adapter known as a blowout plug. This plug allows compressed air to be delivered through the city water fill. This small, inexpensive adapter is available at most RV supply stores.

### **⚠WARNING**

**Never use automotive antifreeze in your fresh water system. Automotive antifreeze is toxic and not for use in potable (drinkable) water systems.**

### Winterizing With Compressed Air

1. Purchase 2 gallons of RV non-toxic antifreeze.
2. Drain the fresh water tank and empty the waste water holding tanks.
3. Turn the water heater bypass valve to the bypass position. (This valve is located near the water heater incoming lines at the rear of the water heater. The water heater is usually located in a base cabinet in the kitchen, and it may be necessary to remove an access panel to reach the bypass valve.)
4. Drain the water heater.
5. If you have a water filter system installed, remove the filter from the assembly and discard. (You will need to purchase a new one and install it when de-winterizing your RV.)
6. Open all faucets, including shower head sprayer (if applicable), toilet flushing device and any other water lines that are closed.
7. Turn on the water pump for at least 30 seconds to clear any water from the lines.
8. Connect an air hose with an adapter (blowout plug) to the city water fill connection.
9. Set the pressure to no greater than 30 lbs. and blow out the water lines until no water can be seen coming out of the fixtures and lines.
10. Pour RV antifreeze into drains, p-traps, toilet and tanks.

### NOTE:

Do not attempt to start the water heater or use the plumbing system after the system has been winterized. Dewinterize. Flush and sanitize the water system prior to use.

### Winterizing With Antifreeze Only

1. Purchase 4-6 gallons of RV approved, non-toxic antifreeze.
2. Drain all tanks (fresh water and sewage tanks).
3. Turn water heater bypass valve to bypass position.
4. Drain water heater.
5. If you have a water filter system installed, remove the filter from the assembly and discard. (You will need to purchase a new one and install it when de-winterizing your RV.)
6. Fill the tank above minimum water pump operation level with the RV antifreeze. (Use of a long funnel may be helpful.)
7. Turn the pump switch 'ON' and open the cold water side of all faucet fixtures. Leave the faucets open until the antifreeze (generally pink in color) flows out of the faucets. Repeat for the hot water side.
8. Flush toilet until antifreeze is visible inside the bowl and pour one gallon of antifreeze down the toilet to winterize the black holding tank.
9. Pour antifreeze down each shower/tub, lavatory sink and kitchen sink to fill p-traps.
10. To winterize gray tank(s), pour one gallon down each related sink drain.

### Dewinterizing Your RV

#### NOTE:

Do not attempt to turn on the water heater or use the plumbing system once the system has been winterized. Dewinterize the water system, flush and sanitize prior to use.

1. Drain all holding tanks (fresh water and sewage).
2. Attach garden hose to fresh water fill and fill tank.
3. Turn 'ON' pump switch and open cold water side of all faucet/shower fixtures. Leave open until the water runs clear (no pink residue). Repeat for the hot water side.
4. Flush toilet until clear water runs into bowl.
5. Dump tanks again.
6. Sanitize the water system. (Refer to that section in this manual.)
7. IF a water filter has been installed, drain the lines, remove the assembly, clean and reinstall using a new filter.

When ready to use the water heater, turn bypass valve to open position to allow water to enter and fill the water heater tank.

## **Fresh Water Holding Tanks**

Due to the vast array of floor plans and the necessary rearranging of plumbing systems, locations will alter, but in general, the holding tanks are located approximately beneath the bathroom area. Drain valves and drain hose storage are usually located on the driver's side.

The storage tanks are constructed of strong, lightweight polyethylene, which minimizes 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 dump stations designated for this purpose. These dump stations are found at most campgrounds and are well marked. Many service stations, particularly along interstate highways, also have these facilities. Campground directories list dumping station locations across the nations.

If possible, dump holding tanks before a trip to reduce the gross vehicle weight. 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 3/4 full. This practice ensures that enough water is in the tank to flush all wastes into sewer line. If necessary, fill the tank to the ¾ mark 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, should NEVER be placed into either the gray or black tanks.

### **NOTE:**

You can find biodegradable paper products at most stores that sell camping supplies and at campgrounds that have a store on the premises. You can also find chemical substitutes to deposit into the waste tanks if you prefer.

### **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.

## **Empty the Holding Tanks**

1. Remove the sewer drain hose from its storage compartment on the side of the recreational vehicle.
2. Remove the cap from the RV drain and connect the drain hose to it.
3. Attach the other end of the flexible drain line to the dump station inlet. Be 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. Be sure to allow sufficient time for the tank to completely drain, and then rinse the tank with several gallons of water by depressing the stool pedal or hand flush handle. 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 tank last uses the soapy water in the tank to 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 the dump station inlet.

### **NOTE:**

Follow these guidelines to help ensure trouble-free operation:

- Never put anything in the black water tank other than biodegradable RV toilet paper.
- Do not put automotive antifreeze, household toilet cleaner or drain cleaners, or any solid material into the waste water system.
- Always use chemicals in the black water system that are made especially for this purpose.
- When cleaning components of the waste water system, use cleaners made for RV systems.
- Always keep the drain cap in place and termination valves close.
- 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.

Keeping the black water tank clean allows the monitor panel to accurately assess the status of the tank. Always remember to clean up the dump site before leaving. Never empty your holding tanks directly on the ground or into a river or stream. Do not pollute!

# PLUMBING

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## ***Water System Maintenance And Troubleshooting***

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As with any mechanical system, your plumbing is subject to the development of problems. Most of these problems can be greatly reduced, if not 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. If left unchecked, water leaking from a plumbing joint can cause considerable damage.

A leak in the fresh water system should be suspected if 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 the fitting. **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 the 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 with your dealer or repair center any additional precautions that should be taken to winterize your RV's plumbing system. Local climates vary and winter maintenance needs may be affected.

Be sure to read the literature supplied with plumbing components, such as the water pump, for troubleshooting 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 who is familiar with the RV water system to inspect the system and perform any repairs needed.



Due to the variety of floor plans available at Forest River and the various shapes and sizes of recreational vehicles, we use many different brands of appliances, designed to fit into the designated space in each recreational vehicle. Therefore, all appliances used cannot be listed in this section. While we will attempt to touch on the major ones, please keep in mind your best resource is the specific appliance's manual that came with your Owner's packet. It will detail the product used in the manufacture of YOUR recreational vehicle. (If, by chance, you don't have the manual you need, many times you can find it on-line, where you will have the option of reading it or printing it for your future use. Be sure you have the model and serial number of your specific appliance handy so you get the most accurate information.)

Each appliance in your RV is warranted by its manufacturer. It is very important that you review ALL the literature provided in the Forest River Owner's packet that came with your recreational vehicle. Fill out and mail any warranty registration cards required by the appliance manufacturers. If you have any questions regarding the operation of the appliances in your RV, contact your selling dealer. Also, please notify your dealer of any shortage of literature you may have.

It is important that you read all the manufacturer's information provided, regarding both operation and maintenance of the appliance. Pay close attention to all safety precautions given, and follow them closely. 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. For your convenience, most appliance manufacturers have toll-free service telephone numbers.

## Kitchen

### Range/Oven

#### **⚠WARNING**

##### To Prevent Fire Or Smoke Damage

1. **Keep area around appliance clear and free from combustible materials, gasoline, and other flammable vapors and materials.**
2. **If appliance is installed near a window, take proper precautions to prevent curtains from blowing over burners.**
3. **Never leave any items unattended on the cooktop. The hot air from the vent may ignite flammable items and may increase pressure in closed containers, which may cause them to burst.**
4. **Avoid use or storage of aerosol cans near an appliance. Many are explosive when exposed to heat and may be highly flammable.**
5. **Do not leave plastic items on the cooktop as they may melt or soften. If this occurs, discard the container and contents as the food could be contaminated.**

Below is an excerpt from the appliance manufacturer's user manual regarding important safety instructions. Refer to the oven/range manufacturer's user manual for more complete instructions. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

Read all instructions before using this appliance. The following instructions are based on safety considerations and must be strictly followed to eliminate the potential risks of fire, electric shock or personal injury. Have your appliance installed and properly grounded by a qualified installer and according to the installation instructions. Have the installer show you the location of the gas shut off valve and how to shut it off in an emergency. To ensure proper operation and avoid possible injury or damage to the RV, do not attempt to adjust, repair, service, or replace any part of your appliance. All other servicing should be referred to a qualified installer or service center. Always disconnect power to appliance before servicing.

#### **⚠WARNING**

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

# APPLIANCES

## **⚠ DANGER**

It is not safe to use cooking appliances for comfort heating.

## **⚠ WARNING**

The propane oven and burners are operated using propane. Cooking appliances need fresh air for safe operation. Before operating this appliance:

- Open an overhead vent or turn on an exhaust fan, and
- Open a window.

## **⚠ DANGER**

Unlike homes, the amount of oxygen supplied is limited due to the size of the recreational vehicle, and proper ventilation when using the cooking appliance(s) will avoid dangers of carbon monoxide poisoning or asphyxiation.

### Lighting Surface Burners

The most common type of RV range is a three or four burner built-in range with a glass oven door. It may light manually or by using piezo ignition, which means there is no pilot light for the range. Be sure the main propane valve on the propane tank is in the 'On' position. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## **⚠ DANGER**

If the burner does not light within about 4 seconds or if the flame should go out during cooking, turn the burner off. If propane has accumulated and a strong propane odor is detected, open a window and wait 5 minutes for the propane odor to dissipate before relighting the burner.

### NOTE:

If the appliance has not been operated for a period of time, the surface burners may be difficult to light due to air in the propane line.

## **⚠ DANGER**

Do not turn the control knob 'ON' and allow propane to escape before lighting the match.

### To Bleed Air From Line

- Turn the surface burner control knob to the LITE position.
- When the burner lights, turn the knob back to the OFF position.

- Depending upon your model, follow the procedure for either 'Match lit' ignition or 'Piezo' ignition.

### Match Lit Ignition

1. Place a pan on the burner grate.
2. Hold a lighted match next to the desired surface burner head.
3. Push in and turn the surface burner control knob to the LITE position.
4. When the burner lights, adjust the knob between HI and LOW to select the desired flame size.
5. After cooking, turn the surface burner knob to the OFF position.

### Piezo Ignition

1. Place a pan on the burner grate.
2. Push in and turn the surface burner control knob to the LITE position. (IMPORTANT: Only light one surface burner at a time.)
3. Immediately, rotate the TOP BURNER IGNITOR knob to the right (clockwise) several clicks until the burner lights. The burner should light within 6 clicks or one full rotation of the knob.
4. When the burner lights, adjust the surface burner control knob between HI and LOW to select the desired flame size.
5. After cooking, turn the surface burner control knob to the OFF position.

### If the piezo igniter is not functioning:

- Be sure all controls are in the OFF position.
- Hold a lighted match to the desired surface burner head (DO NOT turn the control knob ON and allow propane to escape before lighting the match).
- Push in and turn the surface burner control knob to the LITE position.
- When the burner lights, adjust the knob between HI and LOW to select the desired flame size.
- After cooking, turn the knob to the OFF position.

## **⚠ WARNING**

When the recreational vehicle is not in use or while traveling, turn all knobs to the off position and turn off the main propane supply. When using the oven, do not cover bottom or entire rack with aluminum foil.

The oven features pilot ignition. Be sure all control knobs are in the OFF position before supplying propane to the appliance. Be sure propane supply to the appliance is on before lighting pilot or oven burner. If the appliance has not been operated for a period of time, the oven pilot may be difficult to light due to air in the propane line.

## To Light Oven Pilot

1. Be sure all controls are in the OFF position.
2. Push in and turn the OVEN knob to the PILOT ON position.
3. Open the oven door and locate the oven pilot (beneath the oven bottom on the left side of the burner). While pushing in the knob, hold a match next to the oven pilot for 10-15 seconds or until a small flame is visible without needing to continue to depress the knob.
4. Once the pilot is lit, leave the OVEN knob in the PILOT ON position if you wish to use the oven. The standing pilot will remain lit if the OVEN knob is left in the PILOT ON position. If the OVEN knob is turned to the OFF position, propane supply to the pilot will be turned off and the standing pilot flame will extinguish. Since each oven has its own personal baking characteristics, do not assume your new oven will perform exactly like your previous one. You may find that the cooking times, oven temperatures and cooking results differ somewhat from your previous range. Allow a period of adjustment.

### NOTE:

A delay in the time it takes to light the pilot may signal a need to bleed air from the line.

## Oven Knob

### NOTE:

The OVEN knob is used to select and maintain the oven temperature. Push in and turn this knob just to the desired temperature. DO NOT set it at a higher temperature then turn it back. Setting it at the desired temperature will provide more accurate oven temperature. Turn this knob to the PILOT ON position if you wish to use the oven. The oven standby pilot will remain lit. Turn the knob to the OFF position if the oven will not be used or when traveling.

## Shutdown Instructions

When the recreational vehicle is not in use or while traveling, turn the OVEN knob to the OFF position and turn off the main propane supply. This will turn off the oven pilot.

### NOTE:

The maximum recommended pan size is a 13 x 9 x 2" cake pan, 14 x 10 x 2" cookie sheet, or 10" skillet. Do not use canners or oversized cookware. The pan should not be more than one inch larger than the burner grate.

For more information please, consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## Microwave Oven

### General Use

For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

- Do not attempt to defeat or tamper with safety interlocks.
- Do not place any object between the oven front frame and the door.
- Do not allow residue to build up on sealed surfaces.
- Do not subject the oven door to strain or weight.
- Do not operate the oven if door seals are damaged, if the door is bent, or if door hinges are loose or broken.
- Do not operate the oven empty.
- Do not attempt to dry clothing, newspapers or other material in the oven.
- Do not use recycled paper products as they may contain impurities which may cause sparks or fires.
- Do not hit or strike the control panel with hard objects.

### General Operation

For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

- The oven light in the microwave oven is on only during operation or if the door is open.
- The oven automatically cooks on full power unless set to a lower power level.
- When the STOP/CLEAR pad is touched during the oven operation, the oven stops cooking and all information is retained. To erase all information (except the present time), touch the STOP/CLEAR pad once more. If the oven door is opened during operation, all information is retained.
- If the START pad is touched and the oven does not operate, check the area between the door and door seal for obstructions and be sure the door is closed securely. (The oven will not start cooking until the door is completely closed or the program has been reset.)

There may be a child safety lock on your oven. (Check the manufacturer's user guide.) To set, press the STOP/CLEAR pad for 3 seconds and the LOCK indicator appears with a beep sound. To cancel, press the STOP/CLEAR pad for 3 seconds and the LOCK indicator disappears with a beep.

### Food

For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

- Do not use your microwave oven for home canning.
- Do not use the maximum recipe cooking time unless you have previously done so.
- Do not heat eggs in the shell.
- Do not cook potatoes, apples, egg yolks, or sausages without first piercing the surface.

# APPLIANCES

- Do not attempt to deep fry with fat in your microwave oven.

## Refrigerator

### NOTE:

If your RV contains a conventional refrigerator, the refrigerator will only operate when 120 VAC is available.

Most RV refrigerators operate on the absorption system. In an absorption refrigeration system, ammonia is liquefied in the finned condenser coil at the top rear of the refrigerator. The liquid ammonia then flows into the evaporator (inside the freezer section) and is exposed to a circulation flow of hydrogen gas, which causes the ammonia to evaporate, creating a cold condition in the freezer. When starting the refrigerator for the first time, the cooling cycle may require up to four hours of running time before the cooling unit is fully operational.

### Leveling

Leveling is one of the requirements for proper operation with absorption refrigerators. Any time the vehicle is parked for several hours with the refrigerator operating, the vehicle should be comfortably leveled to prevent loss of cooling. If the refrigerator is operated when it is not level and the vehicle is not moving, liquid ammonia will accumulate in sections of the evaporator tubing. This will slow the circulation or in severe cases completely block it, resulting in a loss of cooling. When the vehicle is moving, the rolling and pitching movement of the vehicle will help to keep the liquid ammonia from accumulating.

### Automatic Energy Selector System

The refrigerator may be equipped with an automatic energy selector system, either a 2 way or 3 way system. This system can be set, by the user, to be fully automatic (when AUTO mode is selected) or to operate on propane only (AUTO mode is OFF) or DC (battery). If the user turns the refrigerator on AUTO mode, the AES system will automatically select the most suitable energy source available, either 120 volt, propane, or DC.

### Auto Mode

When on AUTO mode, the control system will automatically select between 120 volt (AC) and propane or, on a 3 way system, DC current. AC (electricity) has priority over propane, and DC current has priority over both. (If the CHECK indicator lamp is on, the lamp will not turn off until the ON/OFF button is pressed OFF and then ON again.)

### Propane Mode

This mode provides propane only. The control system activates the ignition system and attempts to light the burner for a period of approximately 45 seconds, at 2 minute intervals. If unsuccessful, the CHECK indicator lamp will illuminate.

If the CHECK indicator lamp is illuminated on the control panel, the controls have failed to ignite the burner. To restart an ignition attempt when the CHECK lamp is illuminated (or to turn off the CHECK lamp), press the ON/OFF button to OFF and back to ON again. The control system activates the ignition system and makes three attempts to light the burner. If, after the three attempts, it fails to ignite, restart the ignition sequence by again pressing the ON/OFF button to OFF and then back to ON.

### DC Mode

When DC mode is chosen, the refrigerator will operate by pulling power from the battery/s. In most cases, the refrigerator controls will continue to operate when the battery is down to 9.6V DC, causing a drain on the battery. WHEN IN AUTO MODE, IF THE REFRIGERATOR FAILS TO OPERATE, REFER TO THE MANUFACTURER'S USER MANUAL PROVIDED WITH THE FOREST RIVER OWNER'S PACKET. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

### Purging Air From The Lines

If the refrigerator has not been used for a long period of time or if the propane tanks have just been refilled, air may be trapped in the supply lines. Purge the air from the lines by pressing the ON/OFF button to OFF and then back to ON 3-4 times. If repeated attempts fail to start the propane operation, check to make sure the propane tanks are not empty and that all manual shutoff valves in the lines are open.

### NOTE:

Do not continue to reset propane operation if the CHECK indicator lamp continues to be illuminated after several tries. If the problem persists, please contact a service center for assistance.

### **⚠ WARNING**

When refueling or parked near gasoline pumps, shut off all propane appliances. Failure to heed this warning could cause a fire or explosion, resulting in death or severe personal injury as well as damage to the camper and/or surrounding area.

## Heating/Cooling

### Furnace

### **⚠ WARNING**

Before operating the furnace, check the location of the furnace vent to be sure it will not be blocked by the opening of any door on the truck camper (or by exterior items such as a bush or a tree).



## Tips to ensure continued safe operation of the furnace

1. Inspect furnace venting. Venting must be free of obstruction and soot.
2. Periodically observe the main burner flame to ensure it is burning with a hard blue flame. If the flame appears yellow or lazy, shut the furnace down. The burner may need to be cleaned or replaced.
3. Keep the furnace area clear of any combustible materials, gasoline or other flammable vapor and liquids.

### NOTE:

To properly observe burner operation, the furnace must be removed. This should only be done by your dealer or qualified service center.

### ⚠ WARNING

Do not install screens over the vent for any reason. Doing so can cause unsafe furnace operation.

### ⚠ WARNING

Should overheating occur or the propane supply fails to shut off, shut off the manual propane valve to the appliance before shutting off the electrical supply.

### ⚠ DANGER

Be sure the furnace and all ignition systems are off during refueling and while the vehicle is in motion.

### ⚠ DANGER

Read the furnace manufacturer's user manual. If the information in the manual is not followed exactly, a fire or explosion may result, causing property damage, personal injury, or loss of life. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

### ⚠ DANGER

#### If You Smell Propane

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the propane supply at the propane container or source.
- Do not touch any electrical switch or use the phone or radio in the vehicle.
- Do not start a generator.
- Contact the nearest propane supplier or qualified service center for repairs.
- If you cannot reach a propane supplier or qualified service center, call the fire department.

### ⚠ DANGER

Do not turn on the propane supply until the propane leak(s) has been repaired. You, as the owner/user, should inspect the furnace monthly during the heating season for presence of soot on the vent. The presence of soot indicates incomplete combustion. Operating the furnace under this condition could lead to serious property damage, personal injury or loss of life. If soot is observed on the vent, immediately shut the furnace down and contact a qualified service center.

## Thermostat



Many factors influence the ambient temperature inside your RV. The purpose of a thermostat is to keep the air temperature at the level you have selected.

There are several things you can do to help manage the inside temperature to avoid over-stressing your heating and cooling appliances.

### Heating

1. Check to be sure there are no gaps in windows or doors that would allow loss of heat.
2. Park the RV so the front or rear of the RV takes the brunt of wind force.
3. Have your furnace checked to ensure it is operating at its highest capacity.
4. Keep all vents free of obstruction.

# APPLIANCES

Setting the temperature and leaving the thermostat on AUTO will allow the device to detect changes in temperature. While some people lower the temperature at night or when leaving the RV, when you return and reset the thermostat, the furnace or air conditioner has to run longer to reach the new temperature you set. It is recommended to set it at a comfortable temperature and leave it.

## Cooling

1. Park the RV in a shaded area.
2. Use window shades, blinds or curtains.
3. Keep windows and doors shut or minimize usage.
4. Avoid the use of heat producing appliances.
5. Installing window awnings will reduce heat gain by removing direct exposure to the sun.

Starting the air conditioner in the morning and giving it a head start on the expected high outdoor ambient temperature will greatly improve its ability to maintain the desired indoor temperature.

Whether using the HEATING or the COOLING function of your thermostat, condensation is always an issue. Keeping your RV at a constant temperature helps keep condensation at a minimum. For more information on the effects of condensation on your RV, refer to Living Quarters section.

For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## Air Conditioner

Your recreational vehicle may be equipped with an optional roof-mounted air conditioner. It operates on 120VAC power and is located in the living/dining area and also in the bedroom area of some models. Your RV may have come factory equipped with the wiring and necessary bracing for the insertion of an air conditioner even if it was purchased without the air conditioner installed at the factory. Check with your dealer for additional information.

Refer to the air conditioner manufacturer's users' manual for complete operating and service instructions. Efficiency when using the air conditioning can be increased by closing all windows and curtains and parking your RV in the shade. Air conditioning consumes a large portion of the electric power available in the recreational vehicle and efficient operation can be an important consideration.

Even though your recreational vehicle is equipped with 30 or 50 amp capabilities, be aware that some campgrounds may offer less than 30 amp service. Check with the campground before utilizing excessive power, which may create a fire hazard or trip breakers, in either the recreational vehicle or the outside power source.

### NOTE:

Always turn off the air conditioner (and all electrical appliances) before disconnecting the RV from its 120VAC power source.

### NOTE:

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

## Water Heater

### NOTE:

Carefully follow the water heater manufacturer's detailed instructions regarding the correct operation of your water heater. Failure to do so could void your warranty.

### NOTE:

Water heaters require very little care. However, the most common cause of problems with your water heater is initiating operation before the tank is filled with water. Even running it for a brief period of time without water will damage the electric heating element.

### NOTE:

Prior to operating the RV's water heater for the first time, be sure there is water in the water heater tank. Be sure that the water heater bypass valve, if installed, is open to allow water flow into the tank. Next, connect the RV to a water source or turn on the onboard water pump. Open a hot-water tap and wait until water is flowing with no air in the line. When water is flowing from the tap, the water heater tank is full, and it is safe to operate the water heater.

## **⚠ DANGER**

**Do not store or use gasoline or other combustible materials or liquids near or adjacent to the water heater or any other appliance.**

## Automatic Shut Off

The water heater is equipped with a high temperature limit switch, which will shut down the water heater if the temperature reaches above 180 ° F. If the limit switch should fail, the water heater is equipped with a pressure relief valve which is designed to open if the temperature of the water reaches 210 ° F or if excessive pressure builds up. The valve will close automatically once the pressure falls below 50 PSI. Until the pressure falls below 50 PSI, dripping may occur. This is normal and indicates the pressure relief valve is functioning properly by releasing pressure, causing temporary dripping.

## Winterizing

For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).



## NOTE:

If your water heater plumbing system is equipped with a bypass kit, use it to close off the water heater, drain it completely and leave it closed (in the bypass position). If you are introducing antifreeze into the system, be aware that it can be very corrosive to the anode rod causing premature failure and leaving heavy sediment in the tank (if so equipped).

## Water Odor

Odor from the water is not a warranty or service issue. Many water supplies contain enough sulphur to produce a 'rotten egg' odor. It is not harmful, only unpleasant. The solution is to chlorinate the water. You may add about 6 ounces of common household liquid bleach per 10 gallons of water in the tank.

Run the chlorinated water throughout the system, opening each faucet one at a time until you smell the chlorine. Do not operate the water system for a couple hours, allowing the chlorine to take care of the problem; however, then you must remove the chlorine by flushing the system with fresh water. You may need to do this more than once. If this process does not remove the smell from the water, you may need to replace the anode rod. You may also consider adding a filtering system as a preventive measure.

## Sanitization

For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## Turn Off Water Heater

1. Turn switch to OFF position.
2. Turn off electrical power to the appliance.
3. Turn off propane supply.
4. If vehicle is to be stored or heater is going to be turned off while subject to freezing temperatures, drain the water heater.

## Storage And Draining

If your RV will be stored during winter months, drain the water heater to prevent damage from freezing.

1. Turn off electrical power to water heater either at the switch or the breaker.
2. Shut off propane supply to water heater.
3. Turn off water pump on main water system.
4. Open both hot and cold water faucets.

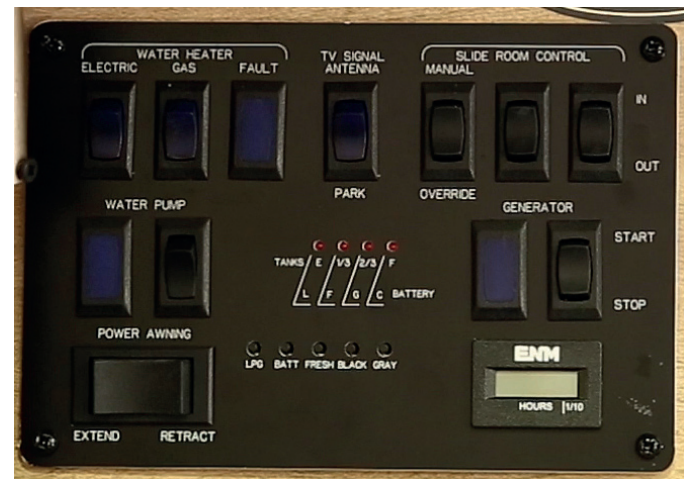
Remove anode rod (Suburban only) from tank. Refer to Section 5 of the Suburban water heater manual regarding draining and/or winterizing your water system.

## Entertainment/Electrical

### Antennas

The optional roof-mounted antenna control is located in the ceiling of the lounge/kitchen area and/or in the bedroom. The antenna can only be used when the recreational vehicle is parked.

### To Raise The Antenna



Check your parking location for obstructions before raising the antenna. Also be sure the power booster switch is in the on position.

1. Crank the handle (if applicable) in the UP direction as indicated by the arrow on the large control knob.
2. Continue to rotate the handle until you feel resistance (about 13 turns).
3. Do not force the handle beyond the point that resistance is felt.
4. When the antenna is up, fine tune the signal by grasping the large rotating knob, pulling it slightly down and turning it until the clearest picture and sound are available.



# APPLIANCES

- 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 cannot be lowered by cranking the handle in the down direction. Continue to rotate the handle until you feel resistance (about 13 turns). To be sure the antenna is working properly, tune the TV receiver to the nearest station and rotate the antenna until you get good picture and sound. Then, turn off the switch on the power booster.

## NOTE:

Before leaving the campground, be sure the antenna is lowered.

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 several times to distribute the lubricant to 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. Reinstall set screw.

## Television

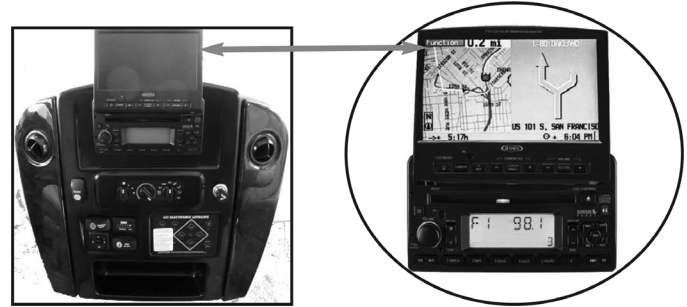
Due to the large selection of televisions used in the manufacturing of Forest River RVs, it is impossible to list all of them in this manual. Therefore, you will find general information that will be applicable to almost all televisions.

For more detailed information regarding the specific television installed in your RV, please refer to the television manufacturer's user guide included in your Forest River Owner's packet. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

Your RV is prewired for cable. Televisions run on 12VDC and 120VAC power. Your recreational vehicle must be connected to shore power have the generator (optional) connected for the TV to operate. For more information, please consult the individual owner's manual or on-line at [www.forestriverinc.com](http://www.forestriverinc.com).

## Audio Visual (DVD, Cablebox, Rear Vision System etc.)

### Rear Vision, Stereo CD Player, and GPS System (Optional)



- Power**  
Press the power button or any other button on the front of the radio (except the eject button) to turn the unit on. Press the power button again to turn the unit off.
- Mode**  
Press MOD to select a different mode of operation as indicated on the display panel. Available modes include Radio, CD and CDC. CD mode will only appear in the menu if a CD is loaded. CD changer mode (CDC) will only appear if a CD changer is connected to the unit.
- Audio Mute**  
Press MUT to momentarily mute the audio volume. Press MUT again to restore volume to the previous setting.
- Volume**  
To increase the volume, rotate the volume control clockwise. To decrease the volume, rotate the volume control counter-clockwise.
- Sound Adjustment**  
Press PUSH/AUDIO to step through the following sound adjustment options: BAS (bass), TRE (treble), BAL (balance) and FAD (fader). When the desired option appears in the display, rotate the volume control to adjust that audio feature. When no adjustments have been made for five seconds, the unit will resume normal operation.

## NOTE:

Your radio is SiriusXM satellite ready. A tuner and antenna must be purchased to receive the ID number that SiriusXM needs to establish your service. (Tuner and antenna may be purchased from your Forest River dealer.)



**NOTE:**

If the battery has been disconnected or is dead, all settings must be reset.

## ***Converter/Battery Charger***

The power converter is designed to supply the nominal 12VDC filtered power for all 12VDC operated devices. Although the converter is an excellent battery charger, the converter does not require a battery to be connected to it for proper operation. Average charge rate will depend on several variables such as condition of the battery(s), temperature, and the length of time the battery(s) is connected to the converter.

**NOTE:**

When installing a battery(s), always observe polarity. Connecting a battery with reverse polarity will blow the power converter output fuses.

# CARE AND MAINTENANCE

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Periodic maintenance and cleaning of your recreational vehicle are 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.

Keep good records of maintenance functions performed and be sure to follow 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 affect service timetables. Driving in extreme conditions, such as heavy dust, continuous short trips, or start-and-stop heavy traffic, means that the length of time between service appointments will be shortened. Discuss service timetables with both your dealer and chassis service representative.

Preventative maintenance will pay for itself many times over by catching or preventing problems before they occur. Many repair costs are greatly increased by ignoring problems when they are small ones, allowing them to build into larger problems and possibly voiding your warranty due to neglect, misuse or abuse. If left unattended, small problems may also begin to affect other parts and systems of the recreational vehicle.

## Fiberglass

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The care of all fiberglass is basically the same as any automotive finish. Any finish will deteriorate with time. Dulling and fading can be increased by exposure to extreme sunlight, air pollutants and excessive moisture. Regular washing will help prevent this from occurring. If surface deterioration, such as yellowing or chalking, occurs, consult with your dealer for proper procedures.

- Wash the exterior monthly with warm water and a mild detergent.
- Avoid spraying water directly into refrigerator and furnace vents.
- Immediately remove bird droppings, tree sap, insects and tar to avoid staining.
- Wax at least once a year with a standard liquid or paste wax.
- Prolonged storage of the RV should be in a sheltered environment when possible.

### NOTE:

Physical damage to fiberglass should be addressed immediately to avoid moisture 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.

### Seals And Adhesives

It is important to maintain the seals and adhesives to prevent moisture from entering and destroying recreational vehicle components. When washing your RV, inspect the seals for signs of drying out and wear. Be

aware that weather 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 regarding the correct method for renewing the seals, or you may prefer to have the dealership inspect and reseal your RV if necessary.

### NOTE:

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

## Water Pump

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### Water Pump Care And Operation

Frequent pump cycling may be caused by excessive pressure created by one or more of the following within the plumbing system:

- Low flow from partially open faucet.
- Water filters not on separate feed lines.
- Clogged water filters.
- Restrictive elbows and valves are possible in the first 2 feet after the pump.
- Flow restrictors in faucets and showerheads.
- Long lengths of small I.D. (inside diameter) lines.
- If replacing pipe/tubing, be sure it is at least 1/2" I.D. (inside diameter) for main lines.

To minimize cycling, consider removing plumbing restrictions or install an accumulator after the pump. Cycling should be minimized to prevent pulsing flow and to achieve maximum pump life.

The water pump supplied with your RV is designed to deliver a smooth, consistent flow of water at all ranges of operation while drawing only a low current.

## Windows and Doors

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Check the seals around the windows regularly (at least every 6 months) if sealant is present. Follow the above instructions for care and maintenance of window and door seals and repair as necessary and if applicable.

Adjust and lubricate latches and moving parts annually to ensure windows remain operative. Also check the condition and operation of door locks, adjusting and lubricating as necessary.

Vinyl seals around windows and doors should be cleaned regularly and kept flexible by using a silicone spray or lubricant. Be sure to follow the directions on the product container.

### NOTE:

If your roof should become punctured or ripped, cover the puncture or tears to seal out moisture and have it repaired immediately.

## **⚠WARNING**

Use caution when storing items on the roof. If a factory-installed roof rack and/or ladder are present, the roof has been reinforced. If you have an aftermarket roof rack or ladder, use extreme caution when on the roof. Chances are that your roof has no reinforcement, and you may need to use boards across the roof for temporary reinforcement. (Remember to remove the boards when leaving the roof area.)

## **Frame/Extrusions/Aluminum Surfaces**

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 driving your recreational vehicle in the winter, in areas where road salts are used. To help avoid surface pitting, clean and wax all extrusions, when waxing RV sidewalls. Special aluminum cleaners are available to restore the original luster to aluminum surfaces. Be sure to follow the instructions as outlined on the product package.

## **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 dry, cracked or weathered seals, reseal or replace as necessary. Check with your dealer for the type of caulking required for rubber roofs and correct methods of resealing or replacing. A mild household soap solution and a soft brush can be used to clean a rubber roof.

## **⚠WARNING**

If your roof should become punctured or ripped, cover the puncture or tear to seal out moisture and have it repaired immediately.

## **⚠WARNING**

If a factory installed roof rack and/or ladder are present, the roof has been reinforced. If you add an aftermarket roof rack or ladder, use extreme caution when on the roof. You may need to use boards across the roof for temporary reinforcement. (remember to remove the boards when leaving the roof area.)

## **Propane System**

To ensure proper operation, have the propane system checked frequently for leaks and road damage. The entire system, including regulator pressure, should be checked annually or sooner if you suspect a problem. Have the system checked by a qualified propane service technician using proper equipment. The method of checking the system for leaks and propane safety precautions can be found in the Identification and Safety section.

### **NOTE:**

Line pressure for propane appliances should be checked at least every six months. Most propane suppliers have equipment to test the lines. The optimum line pressure for all RV propane appliances is 11 inches of water column pressure.

## **Lights**

Check the operation of exterior lights often. Check clearance, turn signal, brake and back-up lights to be sure they are working correctly. Replace any cracked, broken or missing light covers to avoid moisture infiltrations and possible damage to the electrical system.

## **Storage Tips**

### **Winter Precautions**

- **Water Systems** - In severe cold, it is wise to monitor the water temperature in the tank and take steps to drain and winterize if necessary. It is also a good idea in severe cold to open lower cabinet doors in the kitchen and bath to allow warm air to circulate around water fixtures. To minimize freezing damage, insulate drain lines exposed to the outside.
- **Food Storage** - If left in an unheated RV for a period of time, canned goods and other foods packed in water should be stored as high as possible since heat rises. Refrigerators can also be used for storage, even when unplugged, as they are well insulated.
- **Heating** - Use only the RV furnace for heating as it is properly vented to the outside. NEVER USE THE RANGE FOR HEATING AS FIRE, CARBON MONOXIDE OR ASPHYXIATION COULD RESULT.
- **Condensation** - Moisture can collect on inside surfaces during cold weather when inside humidity is high. While the trailer is in use, a family can vaporize up to three gallons of water daily through daily living. Consider using a dehumidifier to remove moisture. Refer to Living Quarters section for additional tips regarding condensation.

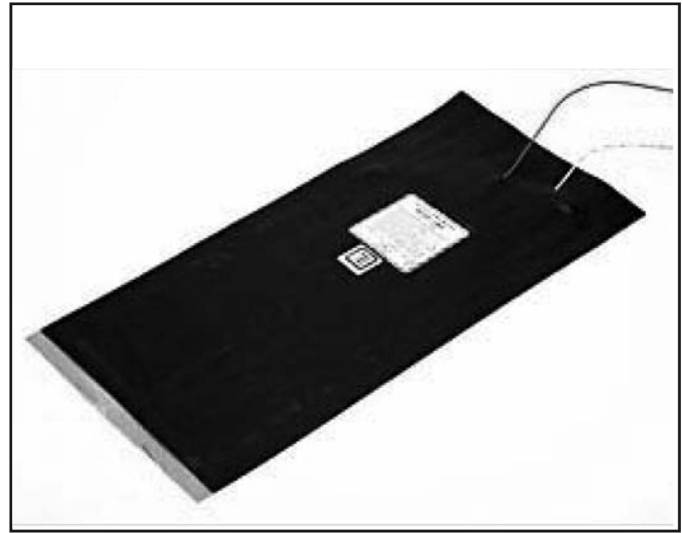
# CARE AND MAINTENANCE

## Storage Tips

1. Park your RV on a level surface.
2. Winterize the chassis and the generator (optional) as outlined in the chassis's and the generator's owner's manuals.
3. Clean your recreational vehicle thoroughly, inside and out, as previously outlined in the section.
4. Turn off all electrical switches and appliances.
5. Close all shades and curtains. Consider protecting the curtains from sun fade by placing foil or paper between the windows and the screens.
6. Be sure all windows, doors and vents are securely closed. Cover exterior appliance vents to prevent moisture and insects from entering during storage.
7. Check the interior of the RV periodically to be sure leaks have not developed or that condensation has not formed, causing damage to interior components. Condensation can most readily be observed as moisture accumulation on windows and mirrors. To reduce the possibility of condensation, air out the RV occasionally during storage.
8. Be sure that both the chassis and auxiliary batteries have the proper electrolyte level and that they are fully charged. A discharged battery will freeze and crack the case. In storage, a battery will gradually lose charge after 30–45 days, even when disconnected by the battery disconnect switch. We recommend that you check the battery for charge once a month. If the charge is 80% or less, it must be recharged. You may wish to remove the battery and store it in a heated area. However, even when warm, the battery level must be maintained.
9. Be sure the tires are inflated to correct pressure and check periodically.
10. Keep the roof free from snow and ice. Check it periodically and after a heavy snowfall.

Winterize the water systems and protect exterior hoses and lines from freezing. Follow the winterizing procedure outlined in the Plumbing section. Also follow all component manufacturers' instructions regarding their particular products. (If their procedure differs from this manual, follow the component manufacturer's instructions.)

## Heating Pads



1. When the outside temperature is near freezing, simply turn ON the holding tank heater's 12 VDC power switch and/or plug in the 120 VAC power cord.
2. There must be liquid in the holding tank, pipes, and elbows when UltraHeat™ heaters are ON.
3. The tank heater immediately starts protecting your holding tank from freezing up.
4. The thermostat on the heater will turn ON the tank heater as soon as the tank temperature drops to 44° F (7° C). The tank heater immediately starts protecting your holding tank. When the temperature in the holding tank rises to 64° F (18° C), the tank heater will automatically turn OFF.
5. If using a generator or other power source, which exceeds the heater's voltage requirements, turn the heater OFF and/or unplug the power cord to avoid eventual damage to the heater's thermostat.
6. Turn the power switch OFF (and/or unplug the power cord on the Dual Voltage Model) when the outside temperature is above freezing.
7. Failure to follow these operating instructions could result in the voiding of your warranty. (The control is generally located in the command center.)

### NOTE:

Tank heaters are thermostatically controlled. This product has been tested and designed to be used as a heating device for RV fresh water supply and waste water holding tanks made of standard grade plastics. Ultra-Heat, Inc. assumes no liability for any usage of product for purpose other than what is consistent with the original design and testing.



# CARE AND MAINTENANCE

## Care and Maintenance Charts

### Storage Preparation

When storing your RV for the winter, certain precautions need to be taken to protect your RV. Be sure to talk with your local dealer concerning any special requirements, for storage, in your particular geographic location. The following steps are general and your dealer can help you choose those which are most appropriate for your needs.

#### Before Each Trip

Item	Procedure
Tires and Wheels	Check lugnuts are tightened to specified torque value. Check tire inflation pressure.
Windows and Doors	Check vinyl seals when washing exterior.
	Check seals for damage and repair as needed.
	Lubricate door hinges and step components with WD40.
	Adjust and lubricate window latches with WD40.
	Lube all door locks and strike pockets.
Water and Drainage	Check drainage systems for leaks and road damage.
Electrical System	Check GFCI circuits.
Appliances	Remove food and ice from refrigerator after each trip.
Safety Equipment	Test all detector components.
Carpeting	Vacuum after each trip.
Weight and Distribution	Keep within specified load limits.

#### Monthly

Item	Procedure
Fiberglass Exterior	Wash with warm water and mild detergent.
Water and Drainage	Check hoses, fittings and connections for leaks and wear.
Appliances	Clean fan blades and wash filter on range exhaust hood.
	Check for obstructions and dirt on ext. appliance vents.
Safety Equipment	Check fire extinguisher pressure and condition.
Wood Surfaces	Clean prefinished panels and wood with wood cleaner.

#### Every 6 Months

Item	Procedure
Fiberglass Exterior	Wax with liquid or paste wax.
Roof and Roof Components	Inspect and reseal as needed.
Axles	Torque mounting bolts to 145-150 foot pounds.
Brakes	Check operation and for uneven wear.

#### Yearly

Item	Procedure
Roof and Roof Components	Lubricate roof vent mechanism with light oil and clean completely.
Propane System	Have qualified service center check pressures and complete system.
Water and Drainage	Winterize system depending on local conditions.
Safety Equipment	Clean all detector components.
Bearings	Repack wheel bearings yearly.

#### As Required

Item	Procedure
Propane System	Check for leaks and road damage.
Water and Drainage	Sanitize system.
Electrical System	Maintenance on generator per generator manual.
	Check and service battery/s.
Carpeting	Clean per carpet manufacturer's instructions.
Seats	Lubricate all mechanisms and inspect for proper operation.
	Check all seat belt buckles, release mechanisms and webbing.
Chassis and Components	Follow chassis lubrication and maintenance procedures.
Bearings	Repack wheel bearings yearly.
Brakes	Check operation and for uneven wear.

## Effects of Formaldehyde

### Formaldehyde From Building Materials

Certain building products such as particle board, fiberboard and hardwood plywood are manufactured with an adhesive containing urea-formaldehyde. These products emit a small quantity of formaldehyde into the air.

# CARE AND MAINTENANCE

Other products containing formaldehyde or urea-formaldehyde resins are some carpets, draperies, upholstery, fabrics, deodorizers, cosmetics and permanent press fabrics. Formaldehyde is also a by-product of combustion and is produced by cigarettes and gas appliances.

The concentration of formaldehyde in the indoor air depends upon the quantity and emission rates of all the emitting products in the structure compared to the volume of indoor air and the fresh air ventilation rate. As with other indoor pollutants, ventilation should reduce formaldehyde levels.

## **WARNING**

**Formaldehyde levels in the indoor air can cause temporary eye and respiratory irritation and may aggravate respiratory conditions or allergies.**

## **WaterPur™ Water Treatment System**

To help you choose quality water treatment products, the Water Quality Association developed its Gold Seal program. WQA tests water treatment equipment and awards the Gold Seal only to those systems that meet or exceed industry standards for performance, capacity and integrity in removing a variety of drinking water contaminants. WQA Gold Seal testing and validation is available for drinking water treatment units. It provides the following assurances:

1. Performance Testing — measures contaminant reduction capabilities over the life and capacity of the unit.
2. Structural Integrity — measures durability under pressurization beyond the usual demands of home water systems, simulation 10 years of normal use.
3. Materials Safety — confirms a product does not add anything harmful to the water being treated.
4. Literature Review — verifies clarity and accuracy of product literature sales and advertising copy, installation and maintenance instructions, and product labeling.

Gold Seal labeled products must meet the Water Quality Association's Code of Ethics standards. Only the Water Quality Association can award the Gold Seal, and only products meeting comprehensive industry standards can earn it.

For more information, write:

Water Quality Association

4151 Naperville Rd.

Lisle, IL 60532-1088

(a not-for-profit organization)

Visit their website at [www.wqa.org](http://www.wqa.org).



The WaterPur™ system filters all water going into your RV, not just drinking water, thereby protecting your complete plumbing system from contaminants, providing filtered cold and hot water, and providing filtered water to your bathroom. It also:

- Removes over 99% of chlorine (taste and odor)
- Removes over 99% of turbidity
- Removes over 99% of Giardia and Cryptosporidium
- Does not channel, fluidize, or bypass like a granular activated carbon filter
- Does not permit the passage of cultivated bacteria like a granular activated carbon filter
- Does not contain silver nitrate or any other pesticide or harmful chemical
- Is constructed from all NSF listed materials
- Is rated for 10,000 gallons or one year
- Has a flow rate of 2.5 gallons per minute

The WaterPur™ cartridge is made of activated carbon particles fused into a uniform block, providing micron filtration. Service life is greatly extended by a 15 micron polypropylene prefiltration medium and a layer of 5 micron polypropylene melt blown intermediate filtration medium.

The replaceable cartridge, which is the heart of The WaterPur™ system, has been tested to meet the material requirements of NSG Standards 42, 53 and 58. It has been tested to meet the performance requirements of NSF Standard 42 for Class 1 Chlorine reduction and Standard 53 for Class 1 Turbidity and Cyst reduction.

Sanitize prior to using your RV's fresh water system with The WaterPur™ filter installed; the entire system should be sanitized and rinsed. When sanitizing, make sure The WaterPur™ filter cartridge is not in the filter housing.

- Place one ounce of household bleach (such as Clorox) in your RV's fresh water tank for each ten gallons of capacity. (If your tank holds 30 gallons, put 3 ounces of bleach in the tank.) Fill your RV's fresh water tank with potable water.
- SLOWLY open the faucets in the RV and allow water to flow until you smell chlorine at each faucet, and then close the faucet. DO NOT PERMIT THE CHLORINATED WATER TO SPLASH ONTO CLOTHES, WALLS, COUNTERS OR FLOORS. Allow the system to sit overnight.
- Drain the fresh water tank and fill with potable water. Run the faucets until the chlorine smell is gone. Repeat as necessary.
- Shut off the fresh water pump or disconnect from your city water supply. Open the kitchen faucets to remove pressure. Place a shallow pan beneath The WaterPur™ housing by turning counter-clockwise, being careful not to spill the water in the housing. Empty the water from the housing.
- Unwrap the WaterPur™ cartridge and place it in the housing (either side up). Make certain that the 'O' Ring is properly seated, and reattach the housing to the filter cap by turning clockwise. Tighten the housing firmly by hand. DO NOT over-tighten.

# CARE AND MAINTENANCE

- Close the kitchen faucets and either turn on your fresh water pump or your city water supply. Check for leaks at the filter housing. Tighten if necessary. Open the kitchen faucet and allow water to flow for ten minutes. Your WaterPur™ system is now ready to deliver fresh-tasting, filtered water to all of the faucets in your RV.

To winterize your RV's water system, remove The WaterPur™ cartridge from the housing and follow manufacturer's directions for de-winterizing, then replace The WaterPur™ cartridge. The cartridge should be replaced every 12 months or 10,000 gallons, whichever comes first.

An easy way to remember to do this is to replace the cartridge when you de-winterize in the spring. Replace The WaterPur™ cartridge only with a genuine WaterPur™ cartridge available from your Forest River Inc. dealer.

Operational Note: The WaterPur™ cartridge is not to be autoclaved or steam sterilized. Use the WaterPur™ cartridge with microbiologically safe water. Activated carbon filters are not designed to kill or remove bacteria or viruses. Actual results obtained will vary with various combinations of organic contaminants, changes in pH or other conditions encountered in actual use. All information presented is based on data believed to be reliable. It is offered for evaluation and verification, but is not to be considered a warranty of any kind. The contaminants removed by The WaterPur™ cartridge are not necessarily in your water. Some jurisdictions tax, regulate, or restrict devices making health related or aesthetic claims. WaterPur™ makes no claims in those jurisdictions.

## Warranty

The WaterPur™ system is warranted against defects in material and workmanship for a period of one year from date of purchase. Warranty does not cover damage due to abuse, neglect, improper installation, exposure to pressure or temperature above or below stated operating parameters, or improper winterizing.

The Seller makes no other warranties of any kind, expressed or implied, concerning this product, including warranties of merchantability or fitness for a particular purpose except that this product should be capable of performing as described in this manual.

Seller's obligation for this product's performance below specifications shall be limited solely to the replacement of product proven defective, at the Seller's sole discretion. Determination of suitability of product of uses contemplated by Buyer shall be the sole responsibility of Buyer. Use of this product constitutes Buyer's acceptance of this limited liability.

## Description:

The WaterPur™ system is a Household Class, Group 2, water filtration device designed for installation in recreational vehicles. It has a micron rating of 1 micron, a capacity of 10,000 gallons of chlorine removal at 2.5 gallons per minute. This capacity was determined under WQA Standard S-200 Test Conditions and may vary with local water characteristics.

The cartridge consists of activated carbon particles fused into a uniform block with enhanced absorptive capacity and efficiency. The cartridge flows in a radial outside-to-inside direction providing increased dirt capacity and low pressure drop (8 psid @ 1 gpm service flow, maximum differential pressure of 100 psid and a collapse pressure of 200 psid).

Unlike granular activated carbon (GAC) filters, the extruded carbon will not channel or bypass due to the extreme uniformity of its extruded activated carbon core. Service life is greatly extended by a layer of 15 micron polypropylene spun-bonded prefiltration medium and a second layer of 5 micron polypropylene melt blown filter medium.

Maximum cartridge operating pressure is 125 psid and maximum operating temperature is 1250° F. Minimum operating temperature is 400° F. The housing and cartridge are constructed of 100% NSF listed materials.





## Definitions

Accessory weight - the combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio, and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

Curb weight - the weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

Maximum loaded vehicle weight - the sum of:

1. Curb weight;
2. Accessory weight;
3. Vehicle capacity weight; and
4. Production options weight.

Light truck (LT) tire - a tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

Non-pneumatic rim - a mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

Non-pneumatic spare tire assembly - a non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

Non-pneumatic tire - a mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

Non-pneumatic tire assembly - a non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

Normal occupant weight - 68 kilograms times the number of occupants specified in the second column of Table I.

Occupant distribution - distribution of occupants in a vehicle as specified in the third column of Table I.

Passenger car tire - a tire intended for use on passenger cars, multipurpose passenger vehicles, and trucks, that have a gross vehicle weight rating (GVWR) of 10,000 pounds or less.

Production options weight - the combined weight of those installed regular production options weighing over 2.3 kilograms in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

Rim - a metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Rim diameter - nominal diameter of the bead seat.

Rim size designation - rim diameter and width.

Rim type designation - the industry of manufacturer's designation for a rim by style or code.

Rim width - nominal distance between rim flanges.

Vehicle capacity weight - the rated cargo and luggage load plus 68 kilograms times the vehicle's designated seating capacity.

Vehicle maximum load on the tire - that load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

Vehicle normal load on the tire - that load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I) and dividing by 2.

Wheel center member - in the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between the tire and the vehicle.

### Other regulatory definitions:

Cold Tire Pressure - the tire pressure measured when the tire has not been driven on for at least three (3) hours.

Recommended Tire Pressure - the vehicle manufacturer's recommended cold tire pressure with the vehicle fully loaded.

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