NAVISTAR RV MOTORHOME LIMITED WARRANTY – 2013

WHAT THE PERIOD OF COVERAGE IS:

This Limited Warranty provided by Navistar RV, LLC ("Warrantor") for your Monaco® or Holiday Rambler® motorhome covers those components, assemblies and systems of your new motorhome not excluded under the section "What The Warranty Does Not Cover" and when sold by an authorized dealer, for twelve (12) months from the original retail purchase date or the first 24,000 miles of use, whichever occurs first. However, this Limited Warranty covers the internal steel or aluminum structural support frames inside the walls and roof (excluding slide-outs) for sixty (60) months from the original retail purchase date or the first 50,000 miles of use, whichever occurs first. If you use your motorhome for any rental, commercial or business purposes whatsoever, the Limited Warranty provided by Warrantor covers your new motorhome when sold by an authorized dealer for ninety (90) days from the original retail purchase date or the first 24,000 miles of use, whichever occurs first, and it covers the internal steel or aluminum structural support frames inside the walls and roof (excluding slide-outs) for twelve (12) months from the original retail purchase date or the first 24,000 miles of use, whichever occurs first. A conclusive presumption that your motorhome has been used for commercial and/or business purposes arises if you have filed any tax or other form claiming any business use, ownership, or tax benefit related to your motorhome. The above Limited Warranty coverage periods apply to all owners, including subsequent owners, of the motorhome.

LIMITATION AND DISCLAIMER OF IMPLIED WARRANTIES:

IMPLIED WARRANTIES, IF ANY, ARISING BY WAY OF STATE LAW, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE TERM OF THIS LIMITED WARRANTY AND ARE LIMITED IN SCOPE OF COVERAGE TO THOSE PORTIONS OF THE MOTORHOME COVERED BY THIS LIMITED WARRANTY. WARRANTOR DISCLAIMS ALL IMPLIED AND EXPRESS WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ON COMPONENTS AND APPLIANCES EXCLUDED FROM COVERAGE AS SET FORTH BELOW. There is no warranty of any nature made by Warrantor beyond that contained in this Limited Warranty. No person has authority to enlarge, amend or modify this Limited Warranty. The dealer is not the Warrantor's agent but is an independent entity. Warrantor is not responsible for any undertaking, representation or warranty made by any dealer or other person beyond those expressly set forth in this Limited Warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

WHAT THE WARRANTY COVERS:

Warrantor's Limited Warranty covers defects in the manufacture of your motorhome and defects in materials used to manufacture your motorhome. "Defect" means the failure of the motorhome and/or the materials used to assemble the motorhome to conform to Warrantor's design and manufacturing specifications and tolerances. Also see the section "What the Warranty Does Not Cover" set out below.

WHAT WE WILL DO TO CORRECT PROBLEMS:

Warrantor's sole and exclusive obligation is to repair and/or replace, at its option, any covered defect if: (1) you notify Warrantor or one of its authorized servicing dealers of the defect within the warranty coverage period and within five (5) days of discovering the defect; and (2) you deliver your Motorhome to Warrantor or Warrantor's authorized servicing dealer at your cost and expense. It is reasonable to expect some service items to occur during the warranty period. The performance of warranty repairs shall not extend the original warranty coverage period. Further, any performance of repairs after the warranty coverage period has expired or any performance of repairs to component parts and appliances that are excluded from coverage shall be considered "good will" repairs, which shall not alter the express terms of this Limited Warranty. If the repair or replacement remedy fails to successfully cure a defect after Warrantor received a reasonable opportunity to cure the defect(s), your sole and exclusive remedy shall be limited to Warrantor paying you the cost of having an independent third party perform repair(s) to the defect(s). Warrantor may use new and/or remanufactured parts and/or components of substantially equal quality to complete any repair.

Imperfections and/or damage to interior and exterior surfaces, trim, upholstery and other appearance items may occur at the factory during manufacture, during delivery of the motorhome to the selling dealer or on the selling dealer's lot. Normally, any such imperfections are detected and corrected at the factory or by the selling dealer during the inspection process performed by the Warrantor and the selling dealer. If, however, you discover any such imperfection or damage when you take delivery of the motorhome, you must notify your dealer or Warrantor within thirty (30) days of the date of purchase to have repairs performed at no cost to you in accordance with this Limited Warranty. If not reported within this time, such imperfections are conclusively presumed to be the result of normal wear and tear.

If a servicing dealer is unable or unwilling to solve a problem you are convinced is covered by the Limited Warranty, or that concerns the safety of your motorhome, or that may involve local consumer protection or "lemon" laws, then you must, to the extent permitted by law, notify Warrantor directly in writing of the failure to successfully repair the defect(s) so that Warrantor can become directly involved in performing a successful repair.

HOW TO GET SERVICE:

For warranty service simply contact one of Warrantor's authorized service centers for an appointment, then deliver your motorhome (at your expense) to the service center. If you need assistance in locating an authorized warranty service facility, contact Warrantor's Warranty Department (1-877-466-6226).

HOW TO GET SERVICE (cont'd):

The Warrantor's mailing address is:

Navistar RV, LLC
P.O. Box 8160
Coburg, Oregon 97408

The "Acknowledgement of Receipt of Warranty/Production Information" form must be returned to Warrantor promptly upon purchase to assure proper part replacement or repair of your towable product. Failure to return the "Acknowledgement of Receipt of Warranty/Production Information" form will not affect your rights under the Limited Warranty so long as you can furnish proof of purchase

In the event the motorhome is inoperative due to malfunction of a warranted part, Warrantor will pay the cost of having the motorhome towed to an authorized repair facility provided you notify Warrantor prior to incurring the towing charges. Because Warrantor does not control the scheduling of service work by authorized servicing dealers, you may encounter some delay in scheduling and/or in completion of the repairs.

WHAT THE WARRANTY DOES NOT COVER:

This Limited Warranty does not cover: any motorhome sold or registered outside of the United States or Canada; exterior fiberglass and gel coat; items which are added or changed after the motorhome leaves Warrantor's possession; items that are working as designed but which you are unhappy with because of the design; normal wear and usage, such as fading or discoloration of fabrics, or the effects of moisture inside the motorhome; defacing, scratching, dents and chips on any surface or fabric of the motorhome; owner maintenance, including by way of example wheel alignments and resealing exterior sealant areas; the automotive chassis and power train, including, by way of example the engine, drivetrain, steering and handling, braking, wheel balance, muffler, tires, tubes, batteries and gauges; appliances and components covered by their own manufacturer's warranty including, by way of example the microwave, refrigerator, ice maker, stove, oven, generator, roof air conditioners, hydraulic jacks, VCR, television(s), water heater, furnace, stereo, radio, compact disc player, washer, dryer, inverter and cellular phone; or flaking, peeling and chips or other defects or damage in or to the exterior or finish caused by road hazards, airborne pollutants, salt, tree sap, hail, or any other cause. Component part and appliance manufacturers issue limited warranties covering portions of the motorhome not covered by the Limited Warranty issued by Warrantor. To learn more on what specific component parts and appliances are excluded from the Limited Warranty issued by Warrantor please contact your selling dealership or Warrantor directly or review the warranty packet inside the motorhome.

EVENTS DISCHARGING WARRANTOR FROM OBLIGATION UNDER WARRANTY:

Misuse or neglect, accidents, unauthorized alteration, failure to provide reasonable and necessary maintenance (see Owner's Manual), damage caused by off road use, collision, fire, theft, vandalism, explosions, overloading in excess of rated capacities or other utilization of the product contrary to its design instructions or intended uses, and odometer tampering shall discharge Warrantor from any express or implied warranty obligation to repair any resulting defect.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES:

THE ORIGINAL PURCHASER OF THE MOTORHOME AND ANY PERSON TO WHOM THE MOTORHOME IS TRANSFERRED, AND ANY PERSON WHO IS AN INTENDED OR UNINTENDED USER OR BENEFICIARY OF THE MOTORHOME, SHALL NOT BE ENTITLED TO RECOVER FROM WARRANTOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN THE MOTORHOME, INCLUDING BY WAY OF EXAMPLE FUEL AND TRANSPORTATION EXPENSES TO DELIVER THE PRODUCT TO THE SERVICING DEALER, HOTEL ROOMS, LOST WAGES AND MOISTURE DAMAGE SUCH AS MOLD AND MILDEW. THE EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES SHALL BE DEEMED INDEPENDENT OF, AND SHALL SURVIVE, ANY FAILURE OF THE ESSENTIAL PURPOSE OF ANY LIMITED REMEDY. Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above exclusions may not apply to you.

LEGAL REMEDIES:

THESE LIMITED WARRANTIES ARE NOT INTENDED TO, AND DO NOT "EXTEND TO FUTURE PERFORMANCE." ANY ACTION SEEKING REMEDIES FOR BREACH OF WARRANTY OR SEEKING TO ENFORCE THIS LIMITED WARRANTY OR ANY IMPLIED WARRANTIES SHALL NOT BE COMMENCED MORE THAN ONE (1) YEAR AFTER THE EARLIER OF: (i) THE EXPIRATION OF THE WARRANTY COVERAGE PERIOD DESIGNATED ABOVE; (ii) THE FAILURE OF THE WARRANTOR TO REPAIR THE DEFECT AT ISSUE; OR, (iii) THE DATE ON WHICH THE BUYER'S ACTION ACCRUED UNDER APPLICABLE LAW. UNLESS PROHIBITED BY LAW, THE PERFORMANCE OF REPAIRS SHALL NOT SUSPEND THIS LIMITATIONS PERIOD FROM EXPIRING. THESE TERMS AND ALL WRITTEN AND IMPLIED WARRANTY DISPUTES BETWEEN WARRANTOR AND PURCHASER SHALL BE GOVERNED BY THE SUBSTANTIVE LAWS OF THE STATE OF OREGON, WITHOUT REGARD TO CONFLICTS OF LAW RULES. Some states do not allow the reduction in the statute of limitations, so the above reduction in the statute of limitations may not apply to you.

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

LARGER PRINT VERSION AVAILABLE WITHIN THE OWNERS MANUAL AND UPON REQUEST ADDRESSED TO YOUR SELLING DEALER OR WARRANTOR'S WARRANTY DEPARTMENT

2013 Monarch

The information contained in this document is intended to reflect standard and optional equipment included in a typically equipped model at the time of delivery to the initial retail owner. Your actual unit may vary from this document as a result of optional equipment that is not generally offered on this model. In the case that you are not the initial retail owner of the unit, this document will not reflect modifications that may have been performed by previous owners.

Product information and specifications are shown herein as of the time of printing. The motorhome manufacturer reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligation.

Check online for Addendums or Tech Tips that may apply to your motorhome.

MANUAL ADDENDUMS & TECH TIPS

www.monacocoach.com

Click on the **brand** logo, then click on **SERVICE** link and choose either **MANUAL ADDENDUMS** or **TECH TIPS** from the menu.

General Information

Section 1

CALIFORNIA PROPOSITION 65 WARNING:

Most vehicles, including this one, contain and/or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Engine exhaust and a wide variety of vehicle fluids, components, and parts—including building materials used in the interior furnishings in this vehicle—contain and/or emit these chemicals, including formaldehyde. In addition, battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling. Consult with your doctor or other health professional for further advice concerning exposure from this vehicle to chemicals known to the State of California to cause cancer and reproductive harm.

WARRANTY INFORMATION FILE

In addition to this Owner's Manual you will find a Warranty Information File in your unit. This file contains valuable documents about your motorhome's systems and equipment. Many of the component manufacturer's warranty registration cards can be found in the box. They will need to be filled out and mailed. Be sure you read and understand all the information in this file to help you safely operate, maintain and troubleshoot those items.

Additional Information:

Changes, additions and supplemental information in the form of Manual Addendums and "Tech Tips" can be obtained by visiting our Web Site at **www.monacocoach.com**. Select one of the products from the product lineup. Go to the Service menu. A submenu will appear.

It may also be helpful to browse the "Tech Tips" menu for the other product lines. The tips may not completely apply to your particular model, but information contained therein can be useful.

REPORTING SAFETY DEFECTS

If you believe that your motorhome has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Navistar RV, LCC.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall or remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer or Navistar RV, LCC.

To contact NHTSA, you may call the Vehicle Safety Hot line toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to *http://www.safercar.gov*; or write to: Administrator, NHTSA, 1200 New Jersey Avenue, SE, Washington, DC, 20590. You can also obtain other information about motor vehicle safety from *http://www.safercar.gov.*

SAFETY TERMS

Many of the safety terms are personal safety instructions. Definitions for the terms are listed below. It is important to thoroughly read and understand the safety instructions displayed throughout the manual. Failure to comply with specific instructions may result in personal injury or death. Many instructions are required by National Safety Associations.

WARNING:
Warnings contain information regarding personal safety and/or pertaining to potential extensive or permanent damage to the motorhome or its components by means of hazards or improper use.

CAUTION:
Cautions pertain to potential damage to the motorhome and/or its components.

POISON:
A warning or caution pertaining to safety and/or use of a poisonous substance or harmful chemical.

NOTE:
Information and reminders concerning proper operation of the motorhome and/or its components.

INSPECTION:
Inspection of the motorhome and/or its components is required. Additional instruction may follow.

LUBE:
Lubrication, or addition of a lubricant product, to the motorhome and/or a specified component or part is required. Additional instruction may follow.

ASSEMBLE or REPAIR:
Assembly, disassembly or installation of a component or part, and/or repair to the motorhome may be required. Assistance of Technical Support or a Technician may be necessary.

INFORMATION:
References to additional information regarding operation of the motorhome and/or its components found in additional sources, other than this Owner's Manual. Also refers to the Warranty Files located within the Warranty Information Box.

TIP:
Tips contain information, helpful hints and/or suggestion for ease of operation of the motorhome or its components.

GLOSSARY OF TERMS

AC Electricity - Alternating current also known as household power.

Alternating Current (AC) - A current that varies periodically in magnitude and direction. A battery does not deliver alternating current. Also referred to as shore power, utility power, inverter power, generator power, etc.

Ampere (Amp) - The unit of measure of electron flow rate of current through a circuit.

Ampere-hour (Amp-hr. AH) - A unit of measure for a battery electrical storage capacity, obtained by multiplying the current in amperes by the time in hours of discharge. *Example:* A battery that delivers 5 amperes for 20 hours, delivers 5 amperes times 20 hours, or 100 Amp-Hr. of capacity.

ANSI - American National Standards Institute.

ASTM - American Society for Testing and Materials.

Black Water - Term associated with the sewage holding tank. The toilet drains directly into this tank.

CCA - Cold Cranking Amperage is the amount of current a battery can deliver for 30 seconds at 0° F. without dropping below a specified voltage, usually 10.5 Volts DC.

Chassis Battery - Powers chassis 12 Volt accessories and starts engine.

Circuit - An electric circuit is the path of an electric current. A closed circuit has a complete path. An open circuit has a broken or disconnected path.

City Water - A term associated with the water supply used during hook-up at campgrounds. It is called city water because water is accessed from a central source (like in a city) and not the fresh water tank.

Curbside - This refers to the side of the motorhome which faces the curb when it is parked. Often called the door side or the passenger side.

Current - The rate of flow of electricity or the movement rate of electrons along a conductor. It is comparable to the flow of a stream of water. The unit of measure for current is the ampere.

Cycle - In a battery, one discharge plus one recharge equals one cycle.

DC Electricity - Direct current also known as battery power.

Direct Current (DC) - Power that is stored in a battery bank or supplied by photovoltaics, alternator, chargers and DC generators. Direct current is also known as battery power. Current only flows one way.

Drain Trap - This is a curve that is in all drains. Water is trapped in the curve and this creates a barrier so tank odors cannot escape through the drain.

Dry Camping - Camping in the motorhome when there is no city water hook-up or shore power. In other words, using only the water and power that is in the motorhome and not from another source.

Dump Station - A site where the waste (grey) and sewage (black) tanks can be drained. In most states it is illegal to drain waste tanks anywhere other than at a dump station.

Dump Valve - Another name for the T-handle valve used to drain the sewage (black) and waste (grey) tanks.

Escape (Egress) Window - The formal name for the emergency window located in the rear of the motorhome. Egress windows can be easily identified by their red handles.

Full Hook-Up Site - A campground that has city water, shore power and sewer hook-ups or connections available.

Grey Water - Term associated with the waste water holding tank. Water from the sink drains and the shower go into this tank.

House Battery - Powers 12 Volt DC lights and accessories inside motorhome.

LED (Light Emitting Diode) - Indicator light.

LLA (Liquid Lead Acid) Battery - A type of battery that uses liquid as an electrolyte. Periodic maintenance is required, such as cleaning the connections and checking the electrolyte level.

Low Point Drain - The lowest point in the plumbing. Drains are placed here so that water will drain out of the lower end of the motorhome. These drains must be closed when the water tank is filled.

OEM - Term for Original Equipment Manufacturer.

OHM - A unit for measuring electrical resistances.

Ohm's Law - Expresses the relationship between Volt (E), amperes (I) in an electrical circuit with resistance (R). It can be expressed as follows: E = IR. If any two of the three values are known, the third value can be calculated by using the above formula.

Potable Water - Potable water is water that is safe to be ingested by humans.

Potentiometer - A device for measuring an unknown potential difference or electromotive force.

Pounds Per Square Inch Gauge (psig) - Pressure measured with respect to that of the atmosphere. This is a pressure gauge reading in which the gauge is adjusted to read zero at the surrounding atmospheric pressure. It is commonly called gauge pressure.

Roadside - This refers to the side of the motorhome which faces the road when it is parked. Often called the off-door side or the driver side.

Shore Cord - The electrical cord that supplies AC power from an outlet to the motorhome. AC power can be 30 amp 120 Volt AC or 50 amp 240 Volt AC.

Stinger - An arm attachment on a tow truck that is used to lift the motorhome slightly so that it can be towed.

Volt - The unit of measure for electric potential.

Watt - The unit for measuring electrical power, i.e. the rate of doing work, in moving electrons by or against an electric potential.

LIMITED WARRANTY TRANSFER APPLICATION/CHANGE OF OWNER INFORMATION

Mail to:

Navistar RV, LLC
Warranty Transfer
P.O. Box 8160
Coburg, OR 97408

Please read terms and representations below before signing.

Submitted By:

Name:_____

Address:_____

City:_____ State:_____ Zip:_____

Phone: (_____)_____

☐ Limited Warranty Transfer

☐ Address Change

A. Current Owner Information:

_____ _____ _____
First Name Initial Last Name

_____ _____ – _____ _____
Vehicle Identification Number Unit # (15 digits) (6 digits) Model/Year

B. New Owner Information, Transfer Coverage To:

_____ _____ _____
First Name Initial Last Name

(_____)_____ _____ _____ _____ _____
Phone Number Street Address City State Zip

_____ _____
Date of Transfer (If Applicable) Odometer Reading at Transfer (If Applicable)

C. Signatures:

_____ _____ _____ _____
(New) Owner's Signature Date Selling Dealer's Signature (If Applicable) Date

Terms & Representations

By your signature(s) on face side of this form, and in order to induce Navistar RV, LLC to transfer its Limited Warranty, you represent the following:

1. That you have received and read a copy of the Limited Warranty.
2. You understand that the unit is to be used only for family camping and cross country travel on improved roads.
3. All information provided by you on face side of this form is true and correct.
4. You understand that you are purchasing a pre-owned recreational vehicle and Navistar RV, LLC does not make any representation as to its present condition.

TEAR OFF PAGE. AND MAIL WARRANTY TRANSFER FORM TO:

NAVISTAR RV, LLC.
WARRANTY TRANSFER
P.O. Box 8160
COBURG, OR 97408

Notes

Driving & Safety
Section 2

DRIVING & SAFETY

Section Two contains information on driving tips, emergency situations, towing, safety devices, weighing the motorhome and tires.

NOTE:
The motorhome has electronic data recording devices that may record information about direction, road speed, engine speed, brake application, steering attitude or other vehicle operating data. Data recording devices can be present in engines, transmissions, ABS (Antilock Brake Systems) or other systems affiliated with operation of the vehicle. Information from data recording devices can be examined in case of an accident. Contact the component manufacturer to learn more about these devices.

Inspections

Differences between a passenger automobile and a motorhome are significant. Be aware of these differences when traveling. The key to safely operating the motorhome is inspection and maintenance. Problems on the road can result in lost time and increased repair costs. Several states require a special driver's license endorsement and vehicle inspection prior to registration. Traffic laws do vary between states. Be aware of these varying state traffic laws.

Conduct a systematic detailed inspection prior to moving the motorhome. Examine the condition of the motorhome and the surrounding area. Look high and low when walking around the motorhome.

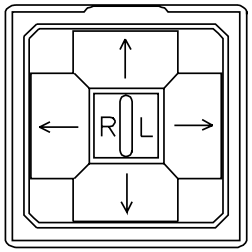
The location of the driver's seat is higher and farther to the left than most vehicles causing a different perspective of the roadway. Use the outside mirrors to gauge the center of the road and to check conditions behind the motorhome. The dashboard may include more gauges and controls than are normally found in passenger automobiles. Become familiar with these gauges and their indications before starting out.

Mirror Adjust

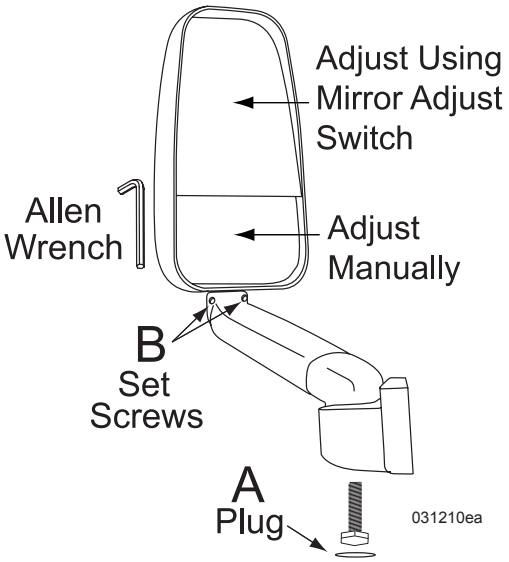
Adjust the mirrors prior to starting out. Have an assistant help to ease the mirror adjustment process.

Mirror Adjusting:

- Tools needed: Allen wrench, flat blade screw driver and socket wrench.
- Adjust the driver seat to the travel position.
- Remove plug at the bottom of the arm.
- Use a socket wrench to loosen the bolt located at the base of the arm (see point A on the drawing).
- Adjust the mirror for a clear side view of the motorhome.
- Tighten the bolt once the proper adjustment is made.
- Reinstall the plug.
- To adjust the "head" of the mirror, loosen the set screws located below the mirror shown as point B. Adjust the head of the mirror to the left or right.
- Manually adjust the bottom section of the mirror.
- Tighten set screws once the proper adjustment is made.
- Repeat procedure for passenger side mirror.
- Use the mirror adjust switch located on the driver's console to fine tune the view.



Mirror adjust switch



Safety Seat Belts

All occupants must be furnished with and use seat belts while the motorhome is moving. The driver's seat, and all other seats designed to carry passengers while the motorhome is in motion, are equipped with safety seat belts. Do not occupy beds or seats that are not equipped with a safety belt while the motorhome is in motion. The driver's seat must be locked in the forward facing position while motorhome is in motion. Seat belts are designed for individual use. Do not use a seat belt for more than one person.

To fasten the seat belt, pull the belt out of the retractors and insert the tab into the buckle; a click will sound when the tab locks into the buckle. Seat belt lengths automatically adjust to each occupants size and sitting position. Do not route belts over armrest or under the arm.

WARNING:
Safety belts are supplied at affixed seating positions. Do not occupy seats not equipped with safety belts while the motorhome is in motion. Seat belts must only be used on permanently mounted seats. Do not use a single seat belt on more than one person. Pilot and Co-pilot seats must be locked in a forward facing position with seat belts fastened while the motorhome is in motion. Do not rotate the seat while in transit.

WARNING:
Refer to the manufacturer of the child seat for installation guidelines. Adhere to all instructions, cautions and warnings for proper securement of the child safety seat or booster seat.

Child Passenger Safety:

Child restraint requirements are determined by age *and* weight. According to NHTSA (National Highway Traffic Safety Administration), there are four stages to child restraint safety.

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Step 1:


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For the best possible protection keep infants in the back seat, in rear-facing child safety seats, as long as possible up to the height or weight limit of the particular seat. At a minimum, keep infants rear-facing until a minimum of age 1 and at least 20 pounds.

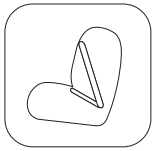
Step 2:

When children outgrow their rear-facing seats (at a minimum age 1 and at least 20 pounds) they should ride in forward-facing child safety seats, in the back seat, until they reach the upper weight or height limit of the particular seat (usually around age 4 and 40 pounds).

Step 3:

Once children outgrow their forward-facing seats (usually around age 4 and 40 pounds), they should ride in booster seats, in the back seat, until the vehicle seat belts fit properly. Seat belts fit properly when the lap belt lays across the upper thighs and the shoulder belt fits across the chest (usually at age 8 or when they are 4', 9" tall).

Step 4:



When children outgrow their booster seats, (usually at age 8 or when they are 4'9" tall) they can use the adult seat belt in the back seat, if it fits properly (lap belt lays across the upper thighs and the shoulder belt fits across the chest). All children under age 13 should ride in the back seat.

NOTE:
The motorhome manufacturer is not the author of Child Passenger Safety. The information provided is reprinted from the National Highway Traffic Safety Administration's website. Visit NHTSA's website at www.nhtsa.gov for the most recent and up to date information.

Tips:

- Go to **www.nhtsa.gov** and choose "Child Safety Seat Information" from the menu or click on the child passenger safety icon. The site includes child safety seat installation tips, product ratings, recalls and other useful information.

- For more information about child safety seats, booster seats, inspection/fitting stations in your area, seat belts, air bags, and other highway safety issues, call the DOT Vehicle Safety Hotline at: **1-888-327-4236**.
- A certified child passenger safety technician can check your installation and answer questions. To find a technician or an inspection station near you, go to **www.nhtsa.gov**, click on the child passenger safety icon, and then click on the Fitting/Inspection Station link, or go to **www.seatcheck.org**.

The child safety seat can be positioned in two places: the front passenger (co-pilot) seat and forward facing permanently mounted booth dinette seat equipped with safety belts.

NOTE:
Individual states and Canadian provinces may have laws that can exceed the requirements as described in this section. It is the responsibility of the owner to know and comply with the laws in the state or province in which the motorhome will travel.

NOTE:
Use of a safety or booster seat in the front seat may be prohibited in some states and Canadian provinces.

WARNING:
Do not transport children unrestrained. Infants must be placed in approved safety seats - small children must be restrained in child safety seats. Do not use a single seat belt on more than one child. Failure to comply with these rules can lead to injury or death.

WARNING:
There are many styles of safety and booster seats. Refer to the safety seat OEM manual on how to properly install and secure the safety or booster seat.

Seat Belt Care:
Keep the belt clean and dry. Clean with mild soap and lukewarm water. Do not use bleach, dye or abrasive cleansers that may weaken the belt material. Periodically inspect belts for cuts, frays or loose parts, and replace damaged parts. Do not disassemble or modify the system. Replace the seat belt assembly after a severe impact, even when damage is not obvious.

DRIVING TIPS

The motorhome is a complex vehicle that requires increased driving awareness because of its size and various components. Turning radius will be much wider than that of a standard automobile due to increased length. Pay close attention to the perimeter of the motorhome including front, sides, rear, roof and undercarriage. Ensure the surrounding area is clear of obstacles. Use the mirrors to observe traffic conditions as well as the exterior including tires, bay doors, blind spots, etc.

Use a push-pull method of steering, with both hands parallel on the steering wheel. The motorhome is considerably heavier than an automobile and has a higher center of gravity. These factors will necessitate advanced reaction time. Swerving and sharp cornering performed high speeds could result in loss of control.

Keep size and weight of the motorhome in mind. Drive with increased caution to avoid situations that might require quick momentum changes. Increase reaction time by paying attention to traffic and road conditions 12 to 15 seconds ahead.

The motorhome will travel safely and comfortably at highway speed limits. However, it takes more time to reach highway speed. When passing another vehicle, allow extra time and space to complete the pass due to increased length.

Manually shift to a lower gear when descending a long hill. Begin the descent at a slow speed. Do not allow the motorhome to gain momentum before trying to slow down. Use the transmission and engine to help control downhill speed and can extend the service life of the brake lining. Distance required to stop the motorhome is greater than an automobile. Practice stopping away from traffic to get the feel of distance required to stop.

Note weight limits of bridges before crossing. Signs should be posted at bridge entrances. Check posted height of all overpasses and situations where overhead clearance is limited. Keep in mind road surfaces may be repaved or packed with snow; therefore, the actual posted clearance would be less in such conditions.

Use the pilot seat controls to comfortably position the seat. Stay seated and adjust the outside mirrors if necessary to gain a clear line of vision down both sides of the motorhome.

Adjust to Driving Conditions

Adjusting to road, weather and terrain conditions is necessary to keep the motorhome under control. Pay attention to road signs that advise of local road hazards and driving conditions. Do not operate the motorhome when road, weather and terrain conditions seem unsafe.

The cockpit, dash area and windshield are larger than those found on passenger cars and trucks. Keep the windshield clear of humidity in the form of water or ice. Start the motorhome and turn on the dash defrost to help remove moisture from inside the windshield. It may be necessary to use a clean cloth to wipe away moisture. Do not operate the motorhome if the windshield is not clear.

Keep windshield wipers in good working order at all times. Do not operate the motorhome when road, weather and terrain conditions are considered unsafe.

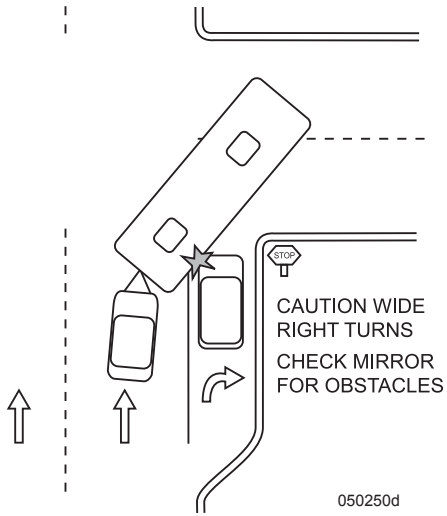
Driving Cautions:

- Avoid getting too close to the shoulder of the road, which may be too soft to support the weight of the motorhome.
- Side spacing is best maintained by keeping the motorhome centered in the driving lane.
- Driving lanes in work zones can be uneven, congested and more narrow than usual.
- Be cautious of road debris that can damage the undercarriage of the motorhome or become lodged in the dual tires and cause damage to the tires, wheel rims or tow vehicle.
- On back roads and single divided roads, tree branches and shrubbery can protrude into the roadway. Watch for low hanging branches especially during inclement weather. Rain and snow will cause branches to hang lower than usual.
- Keep in mind that posted speed signs are usually passenger automobile rated. Be extra aware of driving conditions and use the appropriate speed for a motorhome when necessary, especially on corners and mountain roads.
- Downgrade speed should be at least 5 mph less than upgrade speed, or downgrade speed should be attainable within three seconds of a brake application.
- Use a four second rule when following other vehicles at speeds under 40 mph. Use a five second rule when following at speeds over 40 mph.

Right Turns:

Negotiating a right hand turn in a motorhome can be difficult. Many drivers fear they cannot make the turn without entering into the other lane or jumping the curb. Here are a few tips to make a right hand turn easier:

- As the turn approaches, look into the mirror to ensure the lane to the left is clear, then move wide over to the left.
- When making the right turn, the left rear wheel should touch the center line of the road and the driver's hips should be parallel to the roadside curb of the corner being turned to aid in avoiding a premature turn.
- Make the turn slowly.



- Make the turn slowly.
- Check mirrors frequently. Stay aware of necessary clearance and space management of the motorhome while negotiating the turn.

Left Turns:

- Do not proceed with the turn until the driver's seat is aligned with the center of the intersection. If two lanes are available, use the right hand lane. Vehicles or objects are more easily seen by the driver on the left hand side.

Ascending a Grade:

When approaching a grade, assess the grade and length before ascending. Prepare early for a long ascent. To avoid overheating, downshift to a lower gear and use less throttle where engine temperature remains stable.

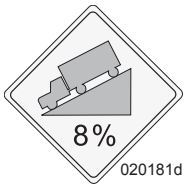
Power output from the engine depends on the following circumstances:

- **RPM** - Every engine has a RPM range that produces the most efficient torque curve.
- **Fuel/Air Mixture** - There is a limit to how much air is drawn into the combustion chamber. Conversely there is a limit to how much fuel can be injected to produce the most efficient state of combustion.

The drivetrain is more efficient when temperatures remain stable during long grades.

IMPORTANT SAFETY TIP:
Turn on the hazard lights if road speed decreases to the point where the motorhome is moving significantly under the posted speed. Use pullouts if traffic is accumulating. Once in a pullout, if there is sufficient clearance for safety, idle the engine for a while to allow the exhaust to cool. While these are cooling, the transmission will also cool. Continually monitor the gauges while waiting.

Descending a Grade:



Prepare to descend a grade at the crest of the hill. Observe any signs indicating grade angle and duration. The sign may suggest maximum downhill speed according to Gross Combined Weight (the combined weight of the motorhome and a trailer/tow car). At the crest of the hill, manually shift the transmission into a lower gear. Do not allow the motorhome to gain momentum before slowing down.

Use moderately heavy pressure on the brake pedal to reduce speed and manually downshift to maintain a safe, slow speed. Pumping and riding the brake pedal is not recommended when descending a grade. Brakes can overheat, resulting in loss of effectiveness.

Night Driving:

- Be well rested and alert. If necessary, find a safe to stop and rest until ready to continue.
- Avoid using interior lights that create a glare on the windshield and decrease visibility.
- Dim dash lights to a comfortable level to reduce glare.

Extreme Heat/Hot Weather Conditions:

- Frequently observe all gauges. Variations from normal conditions should be promptly evaluated.
- Check tire pressure before traveling in hot conditions. Tire air pressure increases with heat. Do not let air out of a hot tire. When the tires cool down they will return to the correct/previous tire pressure.
- Pay extra attention to hoses and belts that are more susceptible to fatigue in extreme heat.

Winter and Cold Climate:

- The motorhome should be prepared for cold weather use.
- Keep speeds slow and steady. Make moves gradually and look further ahead to increase reaction distance.
- During cold weather tire air pressure can decrease. Check tires and ensure tires are at proper inflation pressure.
- If road or weather conditions are treacherous, find a safe place to stop until conditions improve.
- Avoid downshifting on wet or slippery surfaces that can cause the drive wheels to skid.
- Wiper blades should be in good condition. Fill the washer reservoir with antifreeze formula window washer fluid.
- Use mirror heat to keep mirrors clear.
- Remove any ice build-up from the entry step to avoid accidental slipping.

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Located on Driver's Console

Wet Conditions:

- Worn or improperly inflated tires can increase risk of hydroplaning.
- Heavy rain or deep standing water can cause brakes to apply unevenly or grab.

Refueling:

- Truck stops are good refueling points.
- Check overhead clearance before pulling into the fuel island.
- Be aware of concrete/steel posts installed around fuel islands.

- Avoid running over the fuel hose as it can get hung up on the motorhome and cause body damage.
- Use of gloves is recommended for refueling. Store gloves in the outside compartment.
- To prevent grease and fuel deposits from being tracked into the motorhome when refueling, change shoes before entering. Store the extra pair of shoes near the entry door.

WARNING:
Propane and gasoline are highly flammable and can ignite, resulting in explosion, fire or death. Ensure all flames are extinguished and all propane appliances are turned off and the primary propane shut-off valve is turned off prior to refueling.

Fuel Economy:

Driving style, wind resistance, terrain, vehicle weight, and engine-driven accessories are some of the factors that affect fuel economy.

Guidelines to Help Increase Fuel Efficiency:

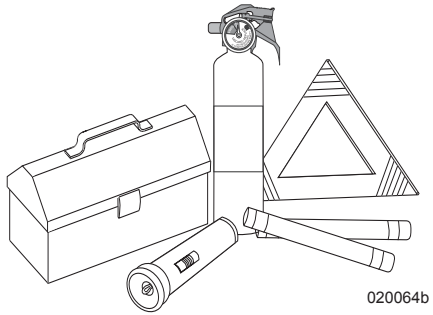
- When starting out, apply the throttle lightly and accelerate gradually. Avoid excess throttle and accelerating quickly.
- Check the tire pressure. A low tire is not only a safety hazard but also increases rolling resistance and fuel consumption. Keep the engine at a low to mid operating range of 1100 to 1500 RPM, which requires less fuel than operating at higher RPM.
- Avoid using full throttle when ascending a long hill. This wastes fuel and increases engine operating temperature from incomplete combustion. Manually shift to a lower gear and use less throttle. Fuel will burn more efficiently.
- Avoid extended idling to warm-up the engine. Start the engine and wait for normal oil pressure to register. The engine is now ready for travel. Whenever coolant temperature is below operating temperature (idling engine) incomplete combustion occurs, causing carbon build-up and raw fuel to wash lubricating oil from the cylinder walls and dilute the crankcase oil.
- Follow the maintenance schedule for the engine.

Trip Preparation

The following suggestions are general guidelines to follow when preparing for a trip:

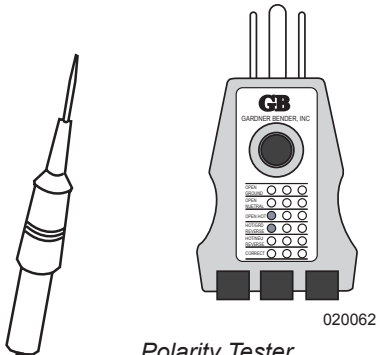
Items to Carry:

- An emergency road kit containing a flashlight, road flares, warning signs and a fire extinguisher.

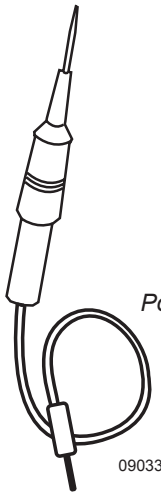


Tool Box & Emergency Road Supplies

- Local, State and National Maps, as well as a 'Motor Carrier' road atlas (for refueling station and truck repair facility locations).
- Hand tools, a 12 Volt DC test light, a 120 Volt AC polarity tester, battery hydrometer, an assortment of blade fuses, mini fuses and alternator belt.
- Potable and non-potable water hoses, a water pressure regulator and various termination connectors for sewage.



Polarity Tester



Test Light

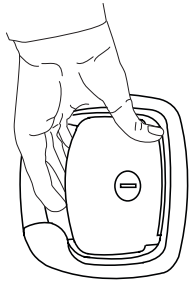
Inspection:

- Ensure all exterior items are stowed or secured.
- Check belts, hoses, battery and engine fluid levels. Inspect the engine, transmission and generator per the OEM manuals.
- Evenly distribute and secure cargo. Store heavy items near the rear axle and lighter items toward the front to prevent uneven stress and abnormal handling.
- Check all tires for accurate inflation pressure and physical condition. Look around, above and under the motorhome for obstruction or leaks. Test all exterior lighting: headlamps, taillights, brake and clearance lights.
- Inside the motorhome, store and secure heavier objects in the lower cabinets to maintain a low center of gravity for sway reduction.
- Secure loose items to prevent weight shifts.
- Store lighter items in the overhead cabinets.
- Close and secure all cabinet doors and drawers, shower and pocket doors.
- Turn off interior lighting.
- Adjust exterior mirrors and check dash gauges for proper operation.

INFORMATION:
Refer to the chassis OEM manual for maintenance recommendations.

CAUTION:
Open the bay doors slowly. Cargo may shift during travel.

WARNING:
To avoid injury, never place hands or fingers near the edges of the bay door when opening or closing. Always use the latch handle. Apply pressure with the other hand just above the latch handle.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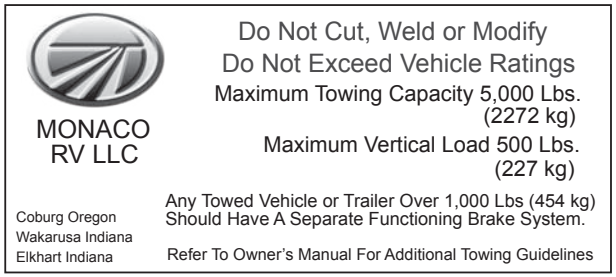
TIPS:
Multi-purpose items, versatile clothing and periodic removal of unused cargo will streamline cargo storage.

HITCH
Using the Rear Receiver

When using the rear hitch receiver, remember that the motorhome is intended for towing light loads and is primarily designed as a recreational vehicle. Safety and durability of the hitch receiver requires proper use. Avoid excessive towing loads or other misuse of the receiver. Towing will affect fuel economy.

Weight pushing down on the rear hitch (tongue weight) must not exceed 10% of maximum tow capacity. It is recommended to weigh the motorhome when fully loaded to ensure proper weight distribution of the GCVW (Gross Combined Vehicle Weight).



33' - 36' = 5,000 lb hitch rating

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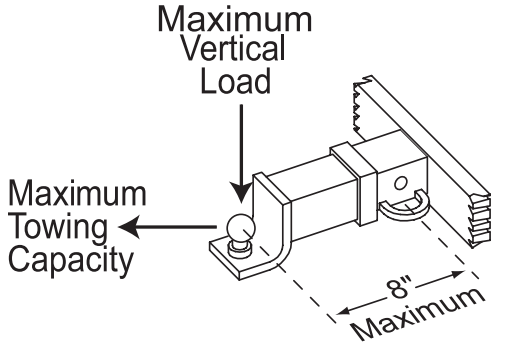
When weighing the motorhome, include all passenger weight. The motorhome fully loaded, including fresh water, propane and any vehicle or trailer towed, must not exceed the GCWR (Gross Combination Weight Rating).



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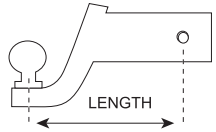
WARNING;
Most states and Canadian provinces require trailers and/or towed vehicles to have adequate auxiliary brakes. Failure to comply with these State and Canadian province requirements may result in fines and/or pose a safety hazard, which may result in an accident.

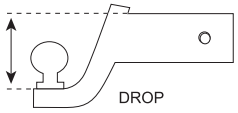
WARNING;
Do not tow a trailer or vehicle that exceeds the rated capacity of the hitch receiver. Overloading the hitch receiver can cause unusual handling characteristics and overstress the hitch receiver and chassis. It could also void the warranty. If there are any questions, call customer support.

Ball Mount:

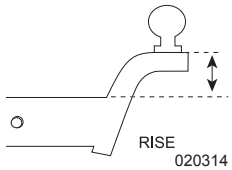
Ball mounts come in various configurations and weight limitations. There are three things to consider when selecting a ball mount: weight rating, pin to ball center length and rise/drop. The weight rating of the ball mount, tongue weight and tow weight must meet or exceed the total load weight.



Distance from the center of the hitch ball hole to the center of the pin hole.



Distance from the shank to the top of the hitch ball platform.



Distance from the top of the shank to the top of the hitch ball platform.

Pin to ball center should not exceed 8". Ball mounts of longer length will significantly reduce the weight rating of the hitch receiver. Observe weight reduction percentages that may be listed on ball mounts longer than 8". Selecting how much rise or drop a ball mount will need is relative to hitch receiver height and height of the towed load with respect to the type of towing equipment between the motorhome and towed load.

Weight Distributing Hitches:

A weight distributing hitch uses spring bars of spring steel to compensate for lack of adequate rear suspension of the tow vehicle. This type of hitch is generally used for towing heavier loads as tongue weight and gross tow weight increases. The spring bars attach to the hitch head assembly and the trailer frame.

Hitch Ball:

The hitch ball is what the trailer attaches to. A hitch ball is available in three common diameters, 1-7/8", 2" and 2-5/16". The larger the diameter of the hitch ball, the higher the weight rating. The diameter of the hitch ball shank also factors into weight rating. Match shank diameter with the hole in the ball mount or weight distributing head. Shank clearance should not exceed 1/16". There should be at least two additional threads extending past the nut when the hitch ball is secure.

Safety Chains:

Safety chains are required by law when towing any load. The chains and any fasteners used to attach the chains to the hitch receiver must be rated for the load being towed. Attach chains so they crisscross under the towing equipment. Allow just enough slack in the chains to make sharp corners. Too much slack will allow the chains to drag on the road surface. If the towed load should become uncoupled from the hitch ball, the towing equipment will be cradled by the safety chains. If the towed load does uncouple, do not attempt to make a sudden stop and exacerbate the situation. Apply the brakes with gentle, steady pressure. Pull over to the side of road at a safe location.

Tow Capacity and Class Ratings:

Several components may comprise a tow hitch system. The weight rating of individual components that are part of the towing system must be greater than the gross weight of the load being towed.

Components are classified into weight groups to help define weight capacity of towing equipment. Maximum tow capacity is limited to the component with the lowest weight rating in the tow hitch system. Example: a ball mount may have a weight rating of 5,000 lbs., but the hitch ball is rated 3,500 lbs. Maximum tow capacity is reduced to 3,500 lbs. Many times a component will have a class weight rating. These groups are shown in chart:

WARNING:

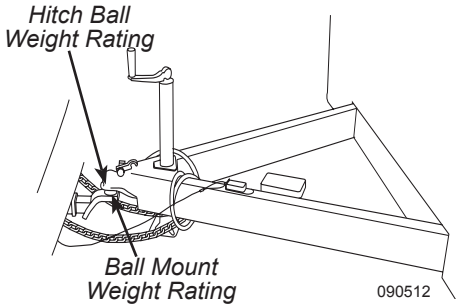
Be sure the weight ratings of the ball mount, tow ball and safety chains are equal to or greater than the load. Use of an extension to the receiver or extended ball mount will significantly reduce hitch receiver weight ratings. Modifications to the hitch receiver, or use of the hitch receiver other than intended, can void the warranty of the hitch receiver, chassis or both.

	CLASS I	CLASS II	CLASS III	CLASS IV	CLASS V
Weight Carrying Hitch	TW - Up to 200 lbs.	WC TW - Up to 350 lbs.	TW - Up to 500 lbs.	TW - Up to 750 lbs.	TW - Up to 1,200 lbs.
	GTW - Up to 2,000 lbs.	WC GTW - Up to 3,500 lbs.	GTW - Up to 5,000 lbs.	GTW - Up to 7,500 lbs.	GTW - Up to 12,000 lbs.
Weight Distributing Hitch	---	---	---	TW - Up to 1,200 lbs.	TW - Up to 1,400 lbs.
	---	---	---	GTW - Up to 12,000 lbs.	GTW - Up to 14,000 lbs.

- **GTW** = Gross Trailer Weight. Weight of trailer fully loaded.
- **TW** = Tongue Weight. Weight pushing down on Tow Ball.
- **WC** = Weight Carrying. Weight carrying capacity of the Ball Mount.
- **WD** = Weight Distributing. Weight carrying capacity of a weight distributing hitch.

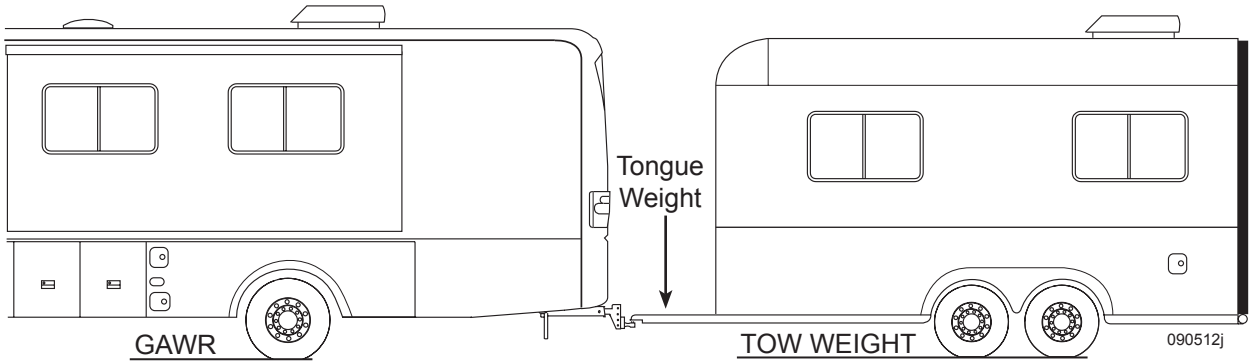
Calculating Tow Capacity:

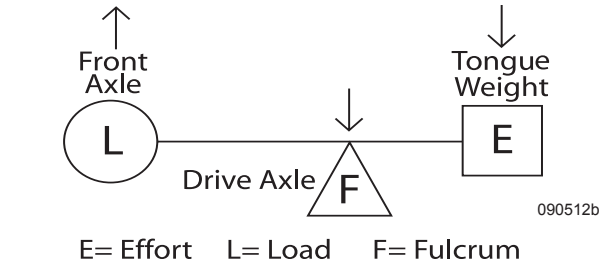
Several variables must be reviewed and calculated to properly determine towing capacity. Limiting factors include GCWR (Gross Combination Weight Rating), GAWR (Gross Axle Weight Rating), hitch receiver weight rating and the weight rating of each piece of towing equipment. One or some of these variables will limit tow capacity.



Example: The motorhome has a GCWR of 35,000 lbs. The motorhome in a fully loaded, ready for travel condition, weighs 29,500 lbs. The hitch receiver is rated at 700 lbs. tongue, 7000 lbs. tow. The load being towed weighs 4,200 lbs. with a tongue weight of 400 lbs. However, the hitch ball is rated at 3,500 lbs. In this case tow capacity is limited to 3,500 lbs. due to the rating of the hitch ball, even though the rest of the towing equipment, hitch receiver and vehicle GCWR are within specifications.

It is possible to be within the GCWR but exceed the GAWR. When tongue weight is applied, mechanical advantage increases with distance (lever) from the hitch ball to the drive axle. The drive axle now becomes a pivot point (fulcrum).





As tongue weight increases (effort), weight on the drive axle also increases (fulcrum) while weight on the front axle decreases (load) as weight is displaced from the front axle.

It may be necessary to weigh both the tow vehicle and towed load as an assembly to ensure the GAWR has not been exceeded.

It is also possible to be within the rating of the hitch receiver and yet exceed the GCWR.

Due to changes in weight, the motorhome must be weighed in a loaded, ready for travel condition that includes passengers, cargo and liquids. Subtract the weight of the motorhome in a loaded, ready to travel condition from the GCWR to determine tow capacity. Whether towing a vehicle or trailer, the load being towed must be weighed to ensure the towed weight, when added to the tow vehicle, will not exceed the GCWR and the weight ratings of each tow system component are equal to or greater than the load being towed.

WARNING:

The motorhome and towed load must be weighed after they are loaded for travel to determine if actual weights are within towing specification. Each component of the towing system must be rated equal to or greater than the load being towed. Do not exceed the gross combination weight rating (GCWR).

Taillight Configuration:

Taillights come in a 2-wire or 3-wire configuration. A 2-wire configuration has all red lens. A 3-wire configuration usually has red and amber lens. Amber is used for turn signals only and red for taillight and brake light. These systems are electrically different. Whenever hooking a 2-wire system to a 3-wire system, or vice versa, a converter box must be installed for correct taillight function. A taillight converter is available from auto and RV supply stores. Do not attempt to wire a tow plug connector if unfamiliar with these systems. A trained technician will install the proper converter so the taillights and turn signals work correctly on the motorhome and towed vehicle or trailer when the tow plug connection is made.

Towing Weight Checklist				
Towed Load	(Tongue Weight) _____	(Overall) _____	Yes	No
Towing Equipment	(Ball Mount) _____	(Hitch Ball) _____	Yes	No
Hitch Receiver	(Tongue) _____	(Tow) _____	Yes	No
GAWR	(Rated) _____	(After Hitching) _____	Yes	No
GCWR	(Rated) _____	(After Hitching) _____	Yes	No

Insert Weight Ratings: Check Yes or No if within specifications.

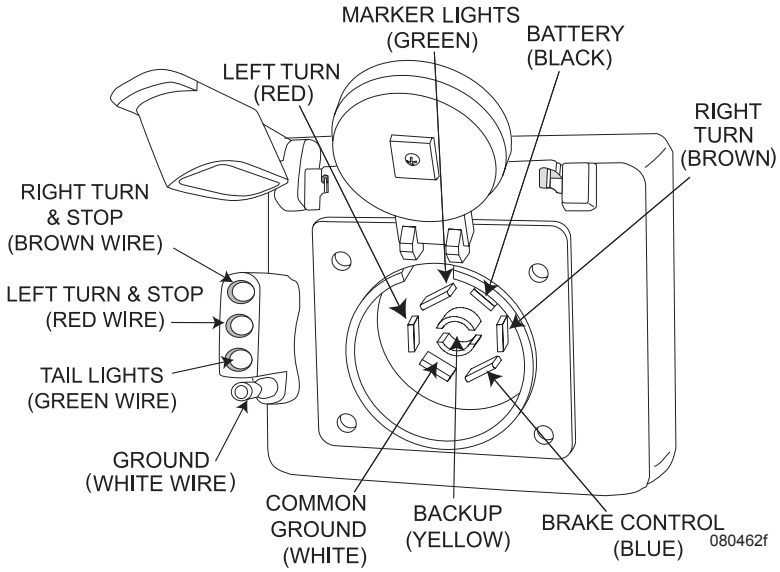
Tow Plug Connection

The motorhome is pre-wired from the factory with an electrical connection for towing. The connection is located near or on the hitch receiver. Convoluted tubing protects the tow harness wires. Current draw should not exceed 10 Amps for each designated light circuit. Within the electrical connection is a positive terminal for use when towing a trailer equipped with a battery. The positive terminal maintains the charge of the trailer battery.

When preparing a tow plug connection, strip the wires 3/8". Twist the wire strands and place under the clip and secure the screw. Make sure there are no loose strands of wire that could short against the case or other terminals. Be careful to not accidentally mirror image wire locations when making the trailer connection.

To Tow a Car or Trailer:

- Connect a tow car or trailer to the motorhome with safety chains rated for the weight being towed.
- Make the electrical connection and perform a light check before starting a trip and at each rest stop.
- Check the tires frequently. Flat tires on a towed vehicle cannot be detected from the motorhome while driving. A flat tire is a safety hazard and will cause extensive damage.



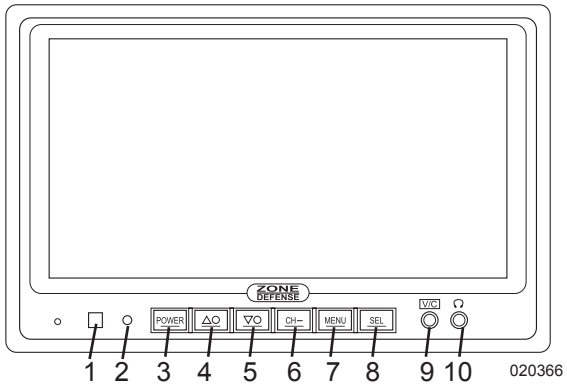
REAR VISION SYSTEM (OPTIONAL)

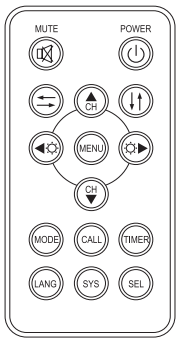
The rear vision system consists of a non-adjustable rear camera located at the rear of the motorhome. This camera is designed to provide the operator with a rear view when backing up.

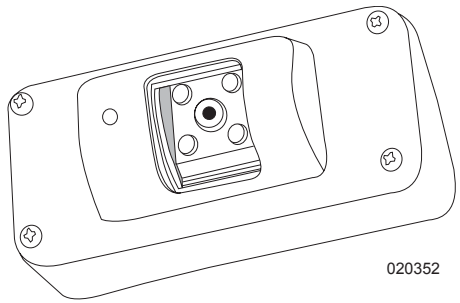
A camera is also located in each side mirror and are not adjustable. These cameras provide the operator with a views of the roadside and curbside of the motorhome.

The system may be used while driving in forward, reverse or when parked. The system must be powered on for use.

<u>INFORMATION:</u>
Refer to the OEM for detailed operating instructions.







Rear Camera

Precautions:

- Do not expose the monitor to excessive heat or cold.
- Do not use the monitor near water. The monitor is not waterproof.
- Do not use the monitor where excessive dust or smoke exist.
- Do not puncture, scratch or use abrasive cleaning materials on monitor.
- Do not strike or drop objects on the monitor.

Features:

1. **Remote Control Sensor:** The remote control must be pointed at the infrared sensor for the system to operate.
2. **Power Indicator:** Green light indicates the system is on. Red light indicates there is power to the system.
3. **Power Switch:** Press to turn system On/Off. Turning the system on will allow continuous operation of the rear vision system when ignition key is on.
4. **Brightness Increase:** Press to increase screen brightness and use to change a value in a menu item selected.
5. **Brightness Decrease:** Press to decrease screen brightness and use to change a value in a menu item selected.
6. **Channel Selection:** Turns grid On/Off. The grid appears with the rear view camera. The grid is used as an aid to judge distance. Use button to scroll through a menu.
7. **Menu:** Press to display menu items.
8. **Selector:** Press to change camera views. The monitor will display each camera separately.
9. **Audio/Video:** Can be utilized with an external video source such as a DVD.
10. **Earphone Jack:** Used for rear camera sound and can be utilized with an external video source such as a DVD.

NOTE:
The rear vision system will automatically turn on when the gear selector is placed in reverse.

NOTE:
The side cameras will display either the left or right view when a corresponding turn signal is activated.

BACKING UP A MOTORHOME

Whether a long time owner of recreational vehicles or just starting out, backing up can be a challenge. Following some simple guidelines may help to reduce that challenge. When backing up, the driver (pilot) should be comfortable using the mirrors, the back-up camera and the co-pilot's directions (ground guide) for assistance.

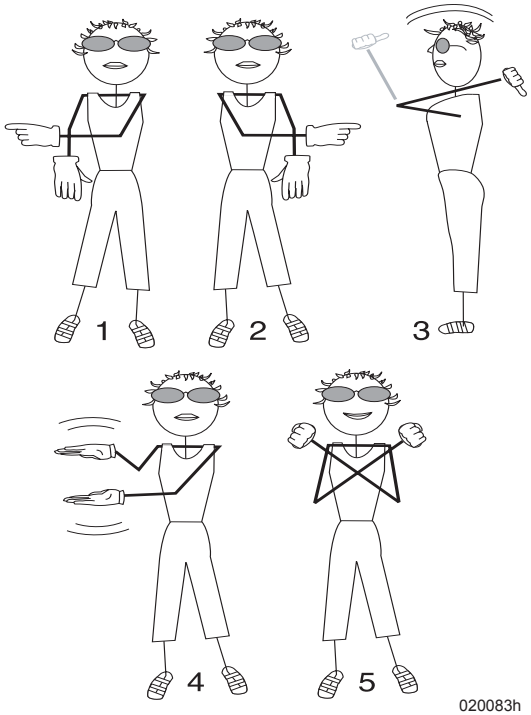
Practice backing up with the co-pilot's guidance in a large unobstructed parking lot. Backing up is a team effort. The backing process should begin while the motorhome is in forward motion. Maneuver the motorhome to align with the chosen site. Aligning the motorhome with the site after the backing process begins may require more than one attempt. When the motorhome is properly aligned with the site, the parking area will be visible in both mirrors. Use road markings as reference points when possible.

When pull-through sites are not available, pick a solid, level site on the left side for a better field of vision using the roadside mirror. If the site is on the right, use the curbside mirror for backing up, but stay aware of blind spots. Get out and walk the area prior to backing in. Look for potential hazards or obstacles that may damage the motorhome. If the site is satisfactory, prepare to back in carefully. Have the co-pilot provide guidance using the five hand signals. Use of walkie-talkies will also aid in guidance.

The co-pilot will perform just as important a job as the driver. When guiding the driver, the co-pilot should be located safely at the left rear corner of the motorhome, facing forward, while remaining visible in the roadside mirror at all times. The co-pilot should make a conscious effort to maintain sight of the driver through the roadside mirror as the motorhome maneuvers. If the driver loses sight of the co-pilot, stop the backing up process until the co-pilot returns to view. To avoid mishaps, the co-pilot should be focused only on what the driver is doing, with brief observation moments.

If necessary, stop the backing up process to have co-pilot **inspect** other areas or angles of concern. The driver should receive directions only from the co-pilot. When the co-pilot is guiding the driver, five clearly defined signals should be used, with only one signal given at a time. Flailing arms with indecisive signals confuse the driver. Signals should be given with purpose and confidence. Directional signals are directing travel of the rear of the motorhome.

If the desired direction is left, the co-pilot points left. **For example:** The co-pilot will use his/her right arm and forefinger pointing distinctly left with arm and finger held on a horizontal plane, indicating desired direction of travel of the rear of the motorhome. The directional signal given should remain steady until the desired movement is complete.



Five Directional Signals:

1. Co-pilot uses left hand and arm held horizontal, with forefinger pointing right, to direct rear of motorhome to the right.
2. Co-pilot uses right hand and arm held horizontal, with forefinger pointing left, to direct rear of motorhome to the left.
3. Co-pilot uses both arms and hands parallel with thumbs pointing up and to rear in a waving vertical motion. This signals driver to maintain a straight back direction.
4. Co-pilot holds arms horizontally, hands open with palms facing one another. Start with a wide separation, gradually closing distance of hands in a rate appropriate to vehicle speed to indicate amount of distance to the stop point.
5. Closed fists and crossed arms indicate **STOP**.

Backing Up Trailers:

Towed vehicles using a tow bar or tow dolly have more than one pivot point and are not suitable for backing. Attempting to back up the motorhome while connected to a tow bar or tow dolly can jack-knife the towing device. Damage to towing device, tow car and motorhome can occur. If necessary, disconnect the tow vehicle to avoid a backing up situation.

Trailers have one pivot point and may be backed up. The same rules for backing a motorhome can be applied to backing a trailer.

When preparing to back the trailer into a space, maneuver the motorhome sweeping wide. Turn back to the opposite direction to maneuver the trailer into the space. Turn the bottom of the steering wheel in the desired direction of travel for the trailer.
For example: If the desired direction of the trailer is left, rotate the bottom of the steering wheel left. If the trailer moves in an undesired direction, pull forward just far enough to re-align the trailer with the space. The co-pilot should stand safely at the left rear corner of the trailer within view of the driver in the roadside mirror, using the five hand signals for guidance.

CAUTION:
Tow bars or car dollies are generally made to travel in a forward direction only. Most towing equipment of this type is not designed for backing. Never attempt short back up distances with a tow bar or tow dolly. Damage to the motorhome, vehicle or towing device will result.

SET-UP PROCEDURES

If the site for the motorhome provides full hook-ups, use this quick reference as a guide only. This information is an overview on hooking up the utilities and preparing appliances for use. Specific information on the slideout room(s), awning, leveling system, water system, entertainment and propane operations is discussed in detail in other sections.

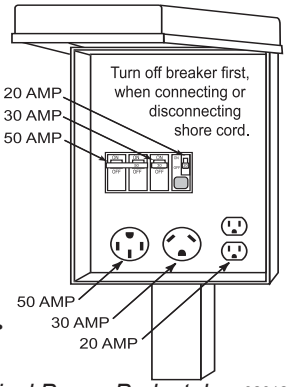
1. Level the Motorhome:

- Follow procedures and guidelines for extending the slideout rooms in section 5 ***"Slideout Operation"*** then **"*Leveling the Motorhome*"** in Section 5. When using the hydraulic jacks confirm that the parking surface will accommodate the weight placed on the jacks.

2. Hook up utilities and prepare appliances for use:

- Open the primary propane valve on the propane tank.
- Prepare the shore cord for connection. Uncoil and inspect the cord. Install proper electrical adapters if 50 Amp service is not available. Operate electrical appliances in sequence when hooked to limited shore power service. Turn shore power circuit breaker OFF prior to plugging in the shore cord.
- If hooked to less than 50 Amp service, operate appliances in sequence rather than at the same time to avoid shore power overload. Start the water heater and furnace (if needed).

NOTE:
If shore power is less than what is rated for the motorhome, electrical adapters will be required and power consumption must be reduced to avoid tripping the shore power breaker.



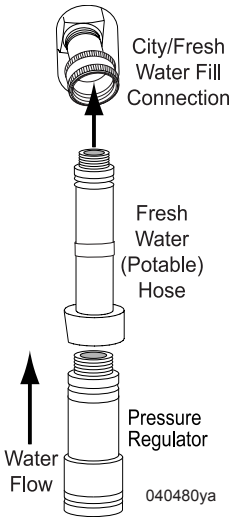
Typical Power Pedestal 020125

CAUTION:
Do not remove cover from the shore power supply to troubleshoot electricity to the motorhome. Serious personal injury or death may occur. If there is no power to the motorhome, inform the park manager. It is the park manager's responsibility to fix any problems with the power pedestal at the site.

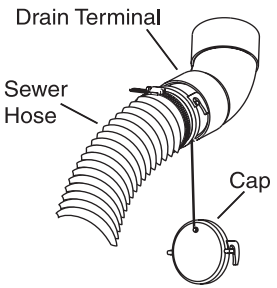
CAUTION:
If shore power service is limited to 15 or 20 Amps, use of light duty extension cords and electrical adapters will create a voltage loss through the cord and at each electrical connection. Line voltage loss and the resistance at each electrical connection can be a hazardous combination. Damage to sensitive electronic equipment may result.

NOTE:
To avoid shore power overload when hooked to 30 Amp service, determine appliance current load prior to turning on appliances or using interior outlets.

- If cable service is provided, hook up a 75 Ohm RG59 or RG6 cable to the cable connection in the roadside rear compartment.
- A phone connection port is provided in the water service compartment. Phone utility outlets are placed throughout the motorhome, including a phone line to be attached to a satellite receiver for Pay-Per-View movies and events.
- Hook the potable water hose to the city water connection in the water service center.
- Hook-up the sewer hose. Sewer drain pipe diameters are generally either three or four inches. Proper sewer hose adapters will ensure against leaks or spillage. With the sewer hose properly connected open the grey water valve (liquid waste drain). The black water valve (solid waste drain) remains closed until the tank is full or until time of departure.



DRY CAMPING



Sewer Termination Drain Connection 030834d

Follow the suggestions below when staying at a location that does not have electrical, water or sewage hook ups. Plan ahead and conserve resources.

Before arriving at the site, ensure batteries are fully charged and properly maintained (**see Section 8 in Batteries - House under "*Battery Maintenance*"**), the fresh water tank and water heater are full and waste holding tanks are empty.

To conserve water and fuel:

- Operate the refrigerator on propane (if applicable). Plan what is needed from the refrigerator prior to opening. Conserve propane by cooking over a campfire.
- Turn the water heater on about twenty minutes prior to use. Once heated, water will remain hot for several hours. Turn the water heater off when not in use.
- Set the thermostat temperature slightly lower than desired to prevent frequent cycling of the heating system.
- Know tank capacities and routinely check fuel levels, especially during cold weather.
- Use ventilation fans or open windows to reduce use of the roof air conditioner.
- Frequently monitor water consumption. Limit shower usage; turn water off when soaping down and back on to rinse. When water conservation is critical, take a sponge bath or use campground shower facilities if available. Do not fill the sink with water to wash only a few dishes. Use disposable dishes when possible.
- Evacuate waste holding tanks prior to filling fresh water tank.

To conserve battery power:

- Do not allow batteries to fully discharge before operating the generator. If possible, run the generator twice a day, morning and afternoon, to charge the batteries.
- Turn off the inverter (if equipped) when not in use.
- Turn off interior 12 Volt DC power whenever possible. Refrigerator, battery charging and inverter (if equipped) function is not affected. Turn off small battery operated items i.e., porch, bay exterior step, generator and engine compartment lights, etc. Turn off the antenna boost when not watching TV. One light left on can quickly reduce battery reserves.

Typical Current Draw	
Battery Cut-out	1.5 Amps
13" TV	1.7 Amps
Rope Light (10 ft.)	1.3 Amps
Porch Light	2.0 Amps
Fluorescent Bulb (1)	2.1 Amps
Halogen Ceiling Light (1)	.09 Amps

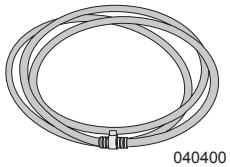
- Keep a working flashlight handy for night trips through the campsite and inside motorhome. When interior lighting is desired, use one light in a central location such as the vanity. Disconnect all but one or two bulbs.
- Turn on the water pump only when using water.
- If weather does not permit or no outdoor table is available, eat at the dinette table by candlelight.
- Operate the generator when using convection microwave oven.

BREAKING CAMP

Preparing the motorhome for travel will require several small tasks. Properly securing and storing items will help to prevent them from getting lost or damaged. Below is a checklist guide to reference when preparing to break camp.

Outside Checklist:

- Disconnect the cable TV.
- Disconnect and stow the telephone line.
- Retract awnings and secure them for travel.
- Close the primary propane shut-off valve.
- Connect the sewer hose.
- Drain and flush holding tanks. Start by closing the grey water valve. Run enough cold water down sink and shower drains to fill the grey tank at least 50%. Use caution to avoid overfilling or flooding the grey tank. Open the black tank valve and allow adequate time for black tank to drain. If applicable, connect a non-potable water hose to the “Tank Flush” connection and flush the black tank system. Close black tank valve and open grey water valve. Water from the grey tank will help to flush the drain hose. Once evacuated, close grey water valve. Disconnect the sewer hose and flush with clean water from a non-potable hose. Store the hose. Replace the sewer cap.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Screw the ends of the hose together before storage to prevent leakage and to prevent dust and insects from entering the hose.

- Fill the fresh water tank then disconnect fresh water hose from the source. If applicable, remove the water pressure regulator from the city water faucet and store.
- Turn shore power breaker off and disconnect shore line. Wind up and store shore cord. Secure door.
- Check all tire pressures.
- Inspect tires and wheels.
- Secure all compartment doors.
- Check for fluid leaks under and around the motorhome.

Engine Checklist:

- Inspect the engine, transmission and the engine compartment for fluid leaks.
- Inspect the area under the motorhome for fluid leaks or puddles.
- Check all fluid levels: oil, antifreeze, transmission, hydraulic fluid and washer fluid.
- Inspect belts and hoses for wear.
- Inspect wiring for loose, frayed or corroded connections.
- Start engine and listen for unusual noise.
- Inspect gauges and controls for proper operation.

Interior Checklist:

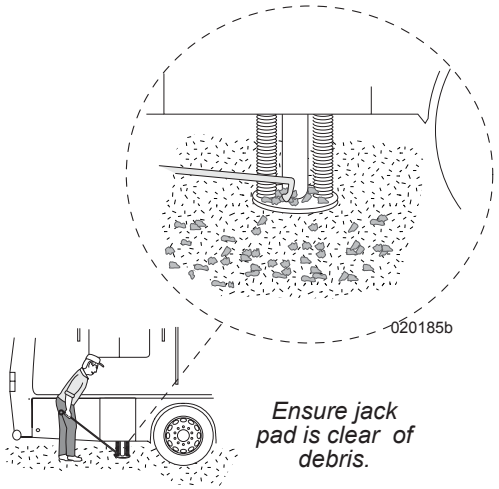
- Retract leveling jacks
- Start the engine to allow the air suspension to obtain proper ride height.
- Clear the slide room path, clean the floor and move the driver and passenger seats forward.
- Retract the slide room.

CAUTION:
To extend or retract the slideout room, the ignition must be off and the park brake set, hydraulic jacks retracted and the motorhome supported by the suspension. Do not operate the slideout room when the motorhome is supported by hydraulic jacks. Damage to the slideout room, mechanism or seals can occur. Confirm the house batteries are fully charged.

- Secure and fasten all interior doors. Lock the shower door.
- Close roof vents and windows.
- Secure all loose, heavy or sharp objects in case of a sudden stop.
- Close all cabinet doors and drawers.
- Turn off interior lights.
- Turn off the water pump.
- Check fuel level and all other gauges for operation and correct level indications.

Departure Checklist:

- Check items in storage bays to ensure shifting or damage of items will not occur.
- Look around, above and under the motorhome for obstructions. Check for debris stuck between the rear dual tires.
- Outside compartment doors should be closed and locked.
- Check operation of all exterior lights, headlamp, taillamp, brake and clearance lights.
- Secure all awning and travel locks.
- Ensure jack pad is clear of debris when retracting hydraulic jacks. Loose rocks, gravel and debris can be thrown from the jack pad and can possibly damage the tow car.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Ensure jack pad is clear of debris.

- Secure and lock the entry door for travel.
- Pull forward out of the campsite. Inspect site for overlooked items.

EMERGENCY ROADSIDE PROCEDURES

If an emergency situation occurs, use the appropriate braking technique and pull off the roadway a safe distance from traffic (if possible). Set the parking brake and turn on the hazard warning flashers, especially when parked alongside traffic lanes. In the event of an emergency stop due to a mechanical breakdown or other motorhome related problems, contact customer support or an emergency service provider.

Road flares or reflective warning signs should be displayed if the motorhome is on the side of the road for any length of time. Guidelines for placing warning triangles depend upon the road characteristics and visibility. For example: The standard placement is 10, 100 and 200 ft. from the rear of the motorhome when on a divided highway or one-way road. On a two-way road, with traffic traveling both directions, the same placement is required at the front of the motorhome. Roads with curves and hills may require the placement of the last/furthest triangle to be 500 ft. behind the motorhome in order to safely warn approaching traffic.

In Case of Flat Tire


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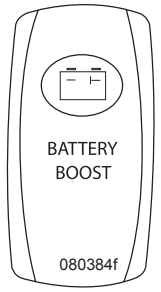
In the event of a flat tire, it is recommended to call for roadside assistance. The size and weight of the motorhome and its tires require proper equipment to change the tire. A professional service technician will have the equipment and training needed to repair or replace the tire. In the case of sudden tire failure, avoid heavy braking. Hold the steering wheel firmly and gradually decrease speed. Slowly move to a safe off-road place which should be a firm level spot. Turn the ignition off and turn the hazard flashers on. Save the old tire for possible warranty coverage.

WARNING:
DO NOT crawl under the motorhome for any reason if a wheel has been removed. Any number of circumstances could cause the motorhome to suddenly fall, resulting in severe injury or death.

Dead Chassis Battery

A discharged battery will not supply the amount of amperage necessary to crank and start the engine. If the engine fails to crank, or cranks slowly due to a discharged chassis battery, the Battery Boost switch will allow a temporary connection of the house battery to the chassis battery to increase amperage.

Battery Boost Switch:



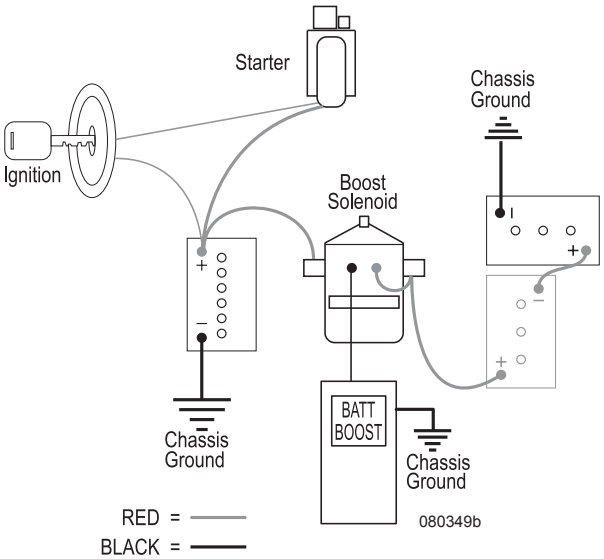
The Battery Boost switch engages a heavy-duty solenoid to electrically connect the house batteries to the engine battery in the event the engine will not crank or cranks slowly. The solenoid is designed for short-term high-current intermittent use. Engaging the boost solenoid for an extended period will damage the solenoid.

Jump Starting Using Battery Boost Switch:

- With ignition key Off, press and hold the Battery Boost switch for ten seconds. After ten seconds, continue to hold the switch and attempt to crank the engine.
- If the engine fails to crank or does not crank fast enough, discontinue the attempt. Continued attempts will only diminish any remaining surface charge in the chassis battery and end future alternative attempts.
- Next, start the generator. This may require using the Battery Boost switch for the generator to start from the engine battery. Once the generator is operating, the electrical combination of the generator and the converter will charge the batteries.

EMERGENCY SERVICE PROVIDER		
Equipment	**Provider**	**Emergency Number**
Motorhome	**Navistar RV** Customer Support	877-466-6226
Ford Chassis	Roadside Assistance	800-241-3673
	Customer Assistance	800-444-3311
Towing	Owner's Advantage Program	877-211-8135
Tires:	Michelin	800-847-3435
	Goodyear	877-484-7376

- Allow the generator to run approximately ½ hour before attempting to crank the engine.
- Press the Battery Boost switch and attempt to crank the engine.
- If the engine fails to crank, or does not crank fast enough to start the engine, the chassis battery may be depleted and the motorhome will require a jump start or connect an external charger to the chassis battery.

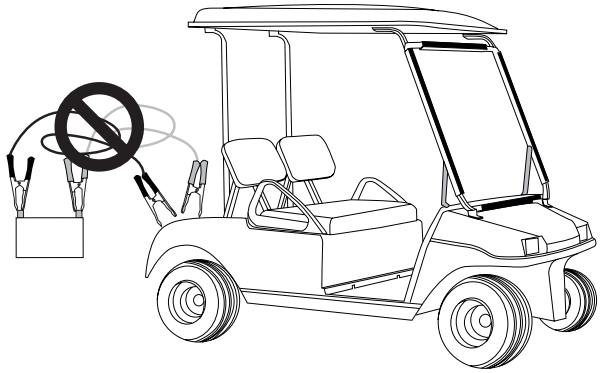


Jump Starting Using an External Source:

When using jumper cables to start the engine, the cables must connect in a parallel configuration. That is, positive **(+)** to positive and negative battery **(-)** to negative chassis **(-)**. Always connect the positive **(+)** before connecting the negative **(-)**. To prevent arcing when disconnecting the cables; disconnect the negative **(-)** before disconnecting the positive **(+)**.

WARNING:

Always ventilate the battery compartment prior to any work or service to the batteries. Gas emitted by the batteries can explode when exposed to smoking material, flames, sparks or other sources of ignition, resulting in injury or vehicle damage. Batteries contain sulfuric acid that can burn skin, eyes and clothing. Do not connect the end of the second cable to the negative (-) terminal of the battery to be jumped. Connect only to the chassis, away from the battery.



Do not use incompatible voltage sources for jump starting

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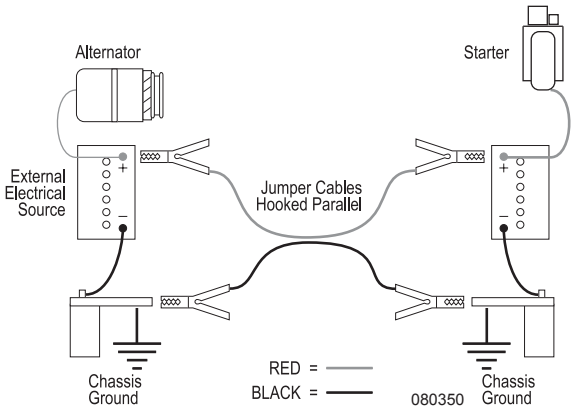
CAUTION:

A large amount of electrical current is required to jump-start an engine. The sizes of the battery, alternator and jumper cables supplying the "jump" are current limiting factors. Wait a sufficient amount of time for a surface charge to build before attempting to start the engine. Voltage fluctuations that occur during a jump-start procedure can damage sensitive electronic equipment and charging systems. If a jump-start is necessary, it is recommended to call Roadside Assistance. They will have the equipment necessary to jump start the motorhome.

CAUTION:

Do not use the towed vehicle for jump starting. The charging system of the towed vehicle does not supply the amperage necessary to jump start the motorhome. Voltage sensitive equipment on the towed vehicle can be damaged and render the towed vehicle disabled.



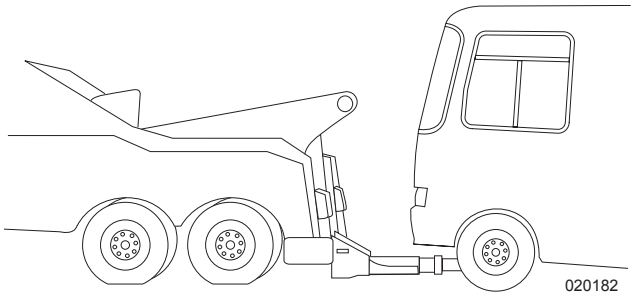
- When using an external electrical source to connect to the chassis battery, turn the chassis and house battery disconnect switches off prior to hooking up the jumper cables.
- Hook up the cables then wait several minutes to allow a surface charge to build in the chassis battery before attempting to start the engine.
- Turn on the chassis and house battery disconnect switches and attempt to start the engine. **Do not** crank the engine more than a few seconds.
- After the engine starts, disconnect the cables. Disconnect the negative **(-)** cables before disconnecting the positive **(+)** cables to prevent arcing.
- If the engine does not crank, or cranks slowly, **DO NOT** continue. Extensive damage, fire or injury can occur. Obtain help from a qualified technician.

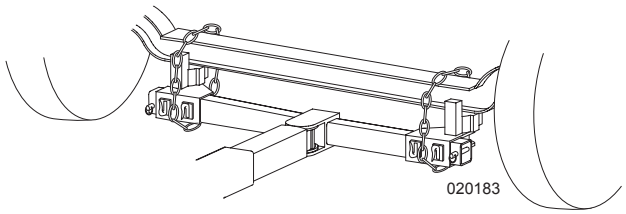
TOWING PROCEDURES

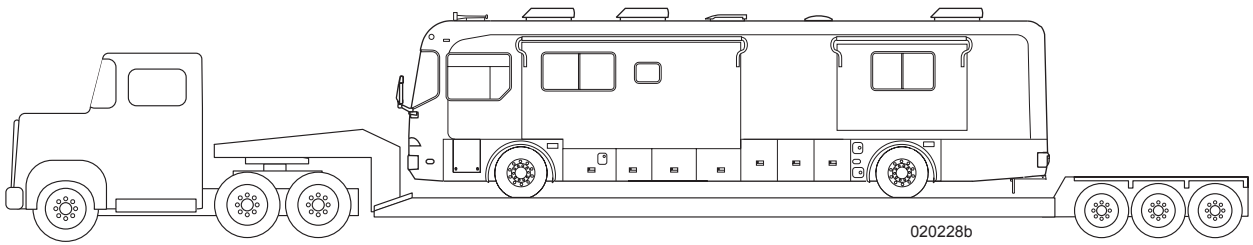
If calling a towing company for service, it is recommended to use a lowboy type of trailer. If a tow truck is used it needs to have a support arm that goes under the motorhome and secures to the front axle. Inform the tow company of the axle weights, overall height and total weight of the motorhome. Other important information is the length of the motorhome, number of passengers and milepost location. Two tow trucks may be necessary to tow the motorhome and to tow a trailer or tow vehicle if it is not operational. Generally, if the motorhome ever needs to be towed, use the following instructions.

- Secure any loose or protruding parts if the motorhome is damaged.
- Inspect the points of attachment on a disabled motorhome. If attachment points are damaged, select other attachment points at a substantial frame structural member.
- Never allow anyone under a motorhome while it is being lifted by towing equipment unless the disabled motorhome is adequately supported by safety stands.
- Do not tow the motorhome from the rear. Towing from the rear will severely overload the front tires and suspension, possibly resulting in tire and/or front suspension failure. Rear frame extensions are not designed to support weight loads imposed by lifting the motorhome from the rear.
- If the rear wheels are disabled, place the motorhome on a flat bed trailer, or use a heavy duty dolly under the rear wheels and tow the motorhome from the front.
- The drive shaft must be removed to prevent damage to the transmission. Secure end caps to prevent losing or contaminating the needle bearings.
- The mud flap may need to be removed to prevent damage due to limited ground clearance.

WARNING:
In case the motorhome requires towing, ensure all precautions are followed. The drive shaft must be disconnected and the mud flap may need to be removed. The manufacturer will not cover damage to the motorhome caused by a towing company.







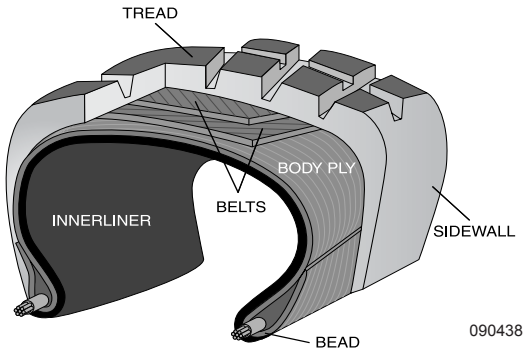
Lowboy trailer

TIRES

Maintaining proper tire inflation pressure is important for proper tire load carrying capacity and wear. Improper pressure will lead to abnormal wear and/or sudden tire failure. Weigh the motorhome fully loaded for travel to determine proper tire inflation pressure. If one tire position on the axle is heavier than the other side, inflate both sides according to the heaviest side. This will provide correct tire inflation pressure across the axle while cornering. To obtain the maximum wear and best service from tires, it is helpful to understand tire components and their functions.

Tire Components:

- **Tread:** Provides traction and cornering grip.
- **Belts:** Stabilize and strengthen the tread.
- **Sidewall:** Protects the side of the tire from road and curb damage.
- **Body Ply:** Provides tire strength and flexibility.
- **Bead:** Assures an air-tight fit with the wheel.
- **Inner Liner:** Keeps air inside the tire.



Importance of Air Pressure

The most important factor in maximizing the life of the tires is maintaining proper inflation pressure. Driving with an underinflated or overinflated tire is dangerous and may cause premature wear, tire damage, sudden tire failure that can result in loss of control of the motorhome.

An underinflated tire will cause excessive heat that can exceed design limits of the rubber and radial cords and could result in sudden failure. An underinflated tire will also cause poor motorhome handling, rapid and/or irregular tire wear and an increase in rolling resistance that results in decreased fuel economy.

An overinflated tire will reduce the tire's footprint/contact patch with the road, thus reducing traction, braking capacity and handling of the motorhome. Overinflation of a tire for the load will result in a harsh ride, uneven tire wear and is susceptible to impact damage.

Maintaining correct tire inflation pressure is of the utmost importance and should be a part of regular maintenance checks.

WARNING:
Driving on a tire that is underinflated can exceed the design limits of the tire and may damage the sidewall. A damaged sidewall can burst upon inflation resulting in serious damage, injury or death. Aged tires are also susceptible to sidewall damage.

Load Inflation Table

Federal law requires the size of the tire, the tire's maximum inflation pressure and load capacity as well as load range be molded into the sidewall of the tire. The amount of inflation pressure to use is dependent upon the weight of the motorhome when fully loaded ready for travel. The load inflation table indicates inflation pressure based on weight.

Always comply with the tire manufacturer's recommended inflation pressure. This requires the motorhome be weighed in a loaded, ready to travel condition, to determine actual weight carried by the tires. Actual weight of the motorhome can vary significantly depending on how it is loaded. For optimum tire wear, ride and optimum handling always comply with the manufacturer's suggested inflation pressure. From the factory, tires are inflated to pressure(s) appropriate for the actual weight on each axle in the unloaded, as shipped condition. When the motorhome is loaded ready for travel, check and adjust inflation pressure on each tire as indicated in the load inflation table.

WARNING:
Do not overinflate or underinflate tires. Sudden tire failure can result.

The Federal Certification Label, attached to the wall adjacent to the Pilot's seat, lists the Gross Axle Weight Ratings (GAWR). These ratings are the maximum allowable weights per axle position. When the actual loaded weight of the motorhome and the weight on each axle is unknown, follow the recommended tire inflation pressure(s) listed on the federal certification label.

Never exceed the Gross Vehicle Weight Rating (GVWR) or the GAWR for each axle. Contact the tire manufacturer for further information concerning inflation pressure and other tire concerns.

NOTE:
The motorhome manufacturer will not be responsible for substitution of an incorrect tire size or load range. Verify actual tire brand, size and load range before obtaining replacement tires.

Understanding the Load Inflation Table:
The tire size is listed in the left margin of the table. Inflation pressure and weight rating will vary depending if the wheel position has a single tire indicated by S or a dual wheel position (drive axle) indicated by a D. Locate the corresponding psi at the top columns to obtain the correct inflation pressure for a given wheel position. All tires on any axle must be inflated to the heaviest wheel position on that axle due to weight transfer that occurs when cornering.

NOTE:
Every load range has a maximum rating as well as a minimum rating. Do not exceed those ratings.

NOTE:
If weight of a wheel position is under the minimum weight rating, the tire(s) must be inflated to the minimum weight rating as listed in the table.

WARNING:
Do not exceed the tire manufacturer's maximum speed rating.

Inspecting & Pressure

Inflation pressure is rated at a cold psi. Cold psi is defined as early in the morning before the day's ambient temperature, sun's radiant heat or the heat generated while driving have caused the inflation pressure to temporarily increase. Check tire inflation pressure every morning before driving. Use a quality truck tire gauge with an angle airhead to ensure access to the dual wheel positions of the drive axle.

Ensure the valve cap is replaced on the stem after the inflation pressure is checked. Use valve stem caps with a positive seal to prevent air escaping from the valve stem. If there are extension hoses on the valve stem, make sure they are good quality reinforced stainless steel braid. Attach hoses securely to the outer wheel.

The valve stem cap guarantees the valve core will remain free of dirt and foreign material. Material lodged between the valve core and internal stem can cause slow leaks resulting in tire failure.

Optimum tire performance is achieved at proper inflation pressure for the load carried. Do not mix tires of different tread patterns, size or construction on the same axle. The difference in traction could cause rear end gear bind and mechanical damage to the drivetrain.

CAUTION:
Never let air out of a hot tire.

WARNING:
A slow leak may go unnoticed on one of the dual tires. This can cause the good tire to fail by exceeding the load limit. Tires with damaged sidewalls can burst upon inflation. A flat or nearly flat tire can also generate enough heat from friction to ignite.

Tire Size	Max Speed Rating (MPH)	Single (S) Dual (D)	Inflation Pressure - PSI								
			70	75	80	85	90	95	100	105	110
235/80R22.5 Load Range G	75	S	3470	3645	3860	3975	4140	4300	4455	4610	4675**(G)**
		D	6320	6630	7050	7230	7530	7940	8110	8390	8820**(G)**

The motorhome manufacturer is not the author of this chart and makes no representation or warranty concerning the accuracy of the information disclosed by the chart. Navistar RV is not responsible for the accuracy of the information disclosed or for any errors within the Load Inflation Chart.
WARNING: Do not exceed the tire manufacturer's maximum speed rating.

Overinflation can cause:

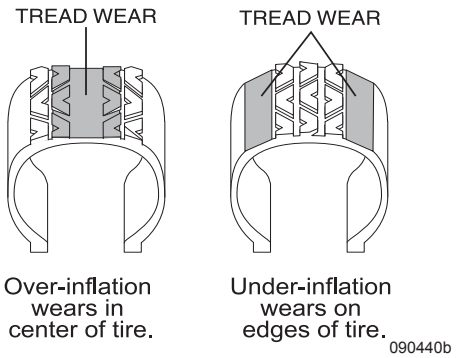
- Hard ride.
- Tire bruising or carcass damage.
- Rapid tread wear in the center of the tire.

Underinflation can cause:

- Tire squeal on turns.
- Separations.
- Rapid and uneven wear on the edges of the tread.
- Circumferential breaks.
- Tire container may bruise or rupture.
- Higher risk of road hazard.
- Tire cord breakage.
- Loss of casing durability.
- Excessive tire temperature.
- High fuel consumption.
- Reduced handling quality.

Unequal tire pressures on same axle can cause:

- Uneven braking.
- Swerve upon acceleration.
- Steering lead.
- Torque steer.
- Reduced handling quality.



<u>WARNING:</u>
For safety purposes, clear the area of people and pets during tire inflation. Inflate tires using a remote inflation device.

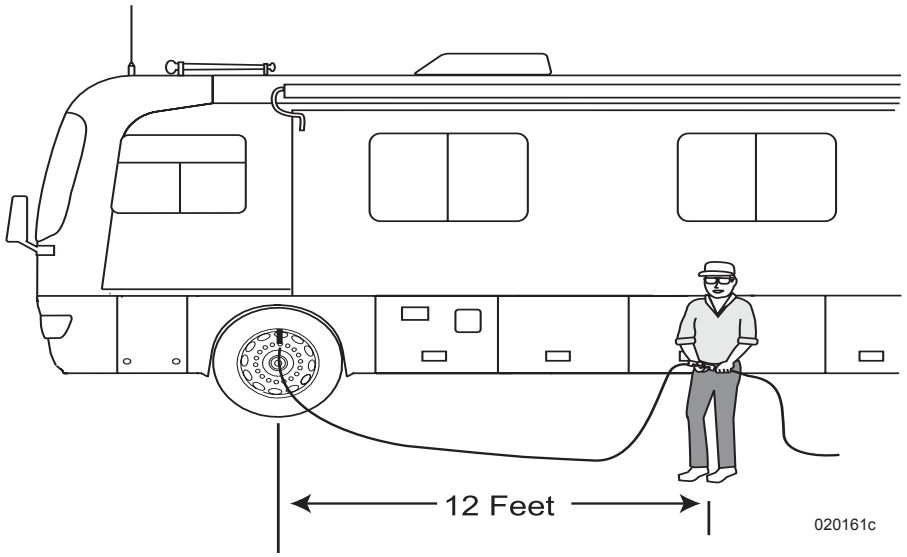
Air Pressure Checklist

- When inspecting the tires, confirm the tires are cool before increasing or reducing air pressure. Driving a short distance can heat up tires.

<u>NOTE:</u>
If the motorhome must be driven a distance to get air, check and record the tire pressure first and add the recorded calculation when reaching the pump. It is normal for tires to heat up and the air pressure inside to go up as driven. Do not reduce air pressure when tires are hot.

- Remove the cap from the valve.
- Firmly press the tire gauge onto the valve and record reading.
- Add air to achieve recommended air pressure.
- If the tire is overinflated release air by pushing on the metal stem in the center of the valve. Recheck the pressure.
- Replace the valve cap.
- Repeat with each tire.
- Inspect all the tires for nails or other objects that could be embedded or puncture the tire and cause a leak.
- Check the sidewalls for gouges, cuts, bulges, or other irregularities.

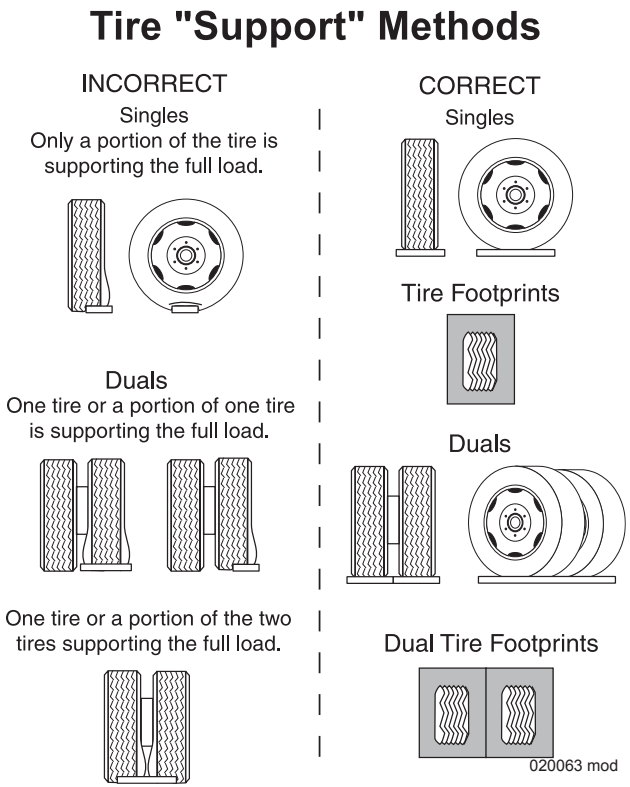
<u>NOTE:</u>
Air pressure in a tire increases (warm weather) or decreases (cold weather) one to two pounds for every 10° F. of temperature change.



Tire Support When Leveling

Extreme caution must be taken to ensure the tires are fully supported when placing blocks under the tires. The load on the tire should be evenly distributed on the support block. In the case of dual tires, distribute the load evenly on blocks for both tires. If not properly supported, the steel cables in the sidewall of the tires may be damaged and could lead to premature fatigue of the sidewall.

CAUTION:
Supporting the tires prevents damage to the sidewall of the tires but does not prevent tire roll.



Tire Vibration

Sudden tire failure is often preceded by tire vibration. Symptoms that can cause tire failure are a bulge in the sidewall or swelling in the tire carcass. Striking an object or large hole in the road surface can damage a tire. Inspect the tires periodically thereafter as rotational forces can continue to stress damaged areas and later manifest in tire failure. If an unusual vibration begins or a bulge is noticed in the sidewall, have the tires evaluated by a qualified professional as soon as possible.

Tire Rotation

Tire rotation can increase the useful life of the tires by achieving uniform wear on all of the tires. Have the tire manufacturer determine the rotation pattern. The first tire rotation is the most important in determining which rotation pattern to use. Any unusual or unique wear patterns, or indications of uneven wear that may have developed, should be evaluated for possible tire rotation. Misalignment, imbalance or other mechanical problems may exist and will need to be corrected prior to rotation.

Tire Replacement

As represented within the tire manufacturer's published tire data guide, the size and rated load carrying capacity of the original equipment tires on your motorhome meet or exceed the motorhome's maximum axle weight/load ratings. Criteria used to determine when tire replacement is necessary are road hazard damage, wear, and age.

Tire replacement based on wear is determined by either measuring the tire's groove depth or a visual inspection of wear bars. Replace tires when the groove depth is 2/32" or less on rear tires and 4/32" or less on front tires. Wear bars are raised areas cast into the groove of the tire. Replace the tire when the wear bar in the groove is even (preferably before) with the road surface contact patch. A worn out tire cannot adequately channel water through the groove, which will result in hydroplaning.

The tire manufacturer determines tire replacement based on age. While ozone inhibitors in the rubber help extend the life expectancy of a tire, exposure to the elements slowly breaks down the rubber, which can then suddenly fail when put to use. Tires that are five to seven years old (depending upon environment) are considered age worn and need to be replaced for safety even though the tire may not outwardly show age weathering and still has considerable tread.

Replacement tires on any axle, must be of the same manufacturer brand, model, size, and load range and must have a load rated carrying capacity equal to or greater than the original equipment tires. Mixing tires on any axle of a different brand, model, size, load rating and load range can cause unusual handling and uneven braking due to different traction coefficient and could result in sudden tire failure or loss of control due to non-symmetrical handling.

WARNING:
Any and all replacement tires must have a rated load carrying capacity equal to or greater than the gross axle weight/load ratings as identified by the federal certification label located adjacent to the pilot's seat.

WARNING:
In many instances tire life is not determined by mileage or wear but by age. Tires are subject to weathering. Weathering cracks can appear in the sidewall and also run along the edge of the tire. Though the sidewall of the tire may look structurally sound, weathering can occur inside the groove of the tread. If any tire exhibits age weathering, replace all tires.

CAUTION:
Signs of irregular tread wear, exhibited by scalloping or unusually smooth areas on the tire surface, are cause for concern. Immediately have the tire manufacturer inspect the tires.

Storage of Tires - Long Term

A cool, dry garage with a sealed cement floor is the preferred method of storage. Tires stored outside may prematurely age.

Prior to Storage:
- Thoroughly clean the tires.
- Unload the motorhome to reduce weight on the tires.
- Ensure the surface is reasonably level, firm, clean and has good drainage.
- Inflate the tires to the maximum inflation pressure as indicated on the Federal Certification Label.

During Storage:
- Cover the tires to block direct sunlight.
- Periodically ensure tires are at proper pressure.
- Move the motorhome every three months to prevent cracking in bulge areas, as well as flat spotting from prolonged sidewall strain and tread deflection.

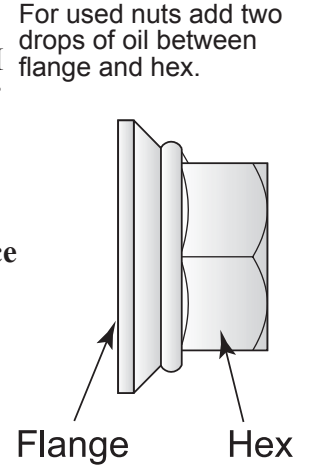
Removal from Storage:
Before removing the motorhome from long-term storage thoroughly inspect each tire's tread area and air pressure. If the tires have lost air during storage, inflate them to the correct pressure.

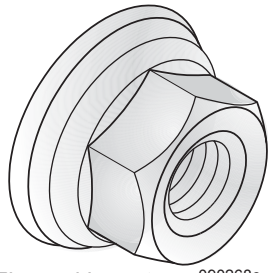
WHEEL MOUNTING

Hub Piloted Mounting:
For used flange nuts, apply two drops of oil between the flange and hex nut before assembly. This will allow the flange to rotate freely and provide proper clamping force when torqued. Use any common lubricant typically used for fasteners. Examples are motor oil and general purpose lubricating oils. Excessive lubricant is not desirable and will not improve torque. Excess lubricant makes the nuts hard to handle, attracts dirt, and may cause unsightly appearance to the wheel. Only used nuts require lubrication.

- Flange nuts generate higher clamping force. Always use grade eight studs with hub mount wheels.
- Before installing the wheels, lubricate the hub pilot pads with a drop of oil to prevent galling. Do not lubricate any other wheel or hub surface.
- For a hub with intermittent pilot pads, position a pad at the twelve o'clock position to center the wheel and reduce runout.

CAUTION:
See the Ford OEM chassis manual for proper tightening pattern. Loosen and tighten lug nuts in pattern indicated. Sequence tighten nuts to 50 ft. lbs, then tighten in pattern to manufacturer's recommended torque specification. Over-tightening can cause distortion.




Flanged lugnut 090268c

WARNING:
Never use wheels or lug nuts different than the original equipment as this could damage the wheel or the mounting system. Damage to the wheel or mounting system could cause a wheel to come off while the motorhome is in motion.

Front Wheels:
Slide the front wheel over the studs. Use caution to avoid damaging stud threads. Snug the nuts in correct pattern. Do not fully torque until all nuts have been seated.

Dual Rear Wheels:
Slide the inner dual wheel over the studs. Use caution to avoid damaging threads. Align the hand-holds for valve stem access and slide the outer dual wheel over the studs again using caution to avoid damaging threads.

- Before installing the wheels, lubricate the hub pilot pads with a drop of oil to prevent galling. Do not lubricate any other wheel or hub surface.
- For a hub with intermittent pilot pads, position a pad at the twelve o'clock position to center the wheel and reduce runout.
- See the Chassis OEM Manual for lugnut torque specification.

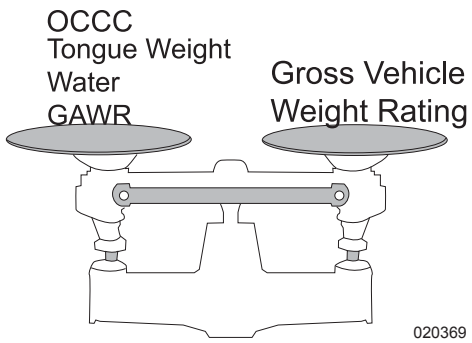
Snug nuts in sequence but do not tighten them fully until all are seated. Tighten the nuts in the pattern indicated in the Chassis OEM manual. Hub mount wheels use two-piece flange cap nuts for both front and rear applications. No inner cap nuts are required.

Torque the Nuts Properly:
- Tighten the wheel nuts to the recommended lug nut torque. Do not over tighten.
- Maintain the nut torque at the recommended level through planned periodic checks or at 10,000 mile intervals, whichever comes first.
- If air wrenches are used, they must be periodically calibrated for the proper torque output. Use a torque wrench to check air wrench output and adjust line pressure for the correct torque.

CAUTION:
Dual wheels require tightening the lugnuts to the specified torque at 100 miles and again at 500 miles of initial operation. Preform same procedure any time a wheel has been removed.

WEIGHING THE MOTORHOME

Proper weight distribution, load management and operating within established limitations will aid in safe and enjoyable travel. The information in this section outlines guidelines and provides information on the proper techniques for weighing to accurately determine total weight, axle weights, balance and tire inflation pressure. According the National Highway Traffic Safety Administration, most tire failures are a result of under-inflated tires.



Load management, weight distribution and properly inflated tires are the responsibility of the operator. The motorhome must be weighed in a loaded, ready to travel condition to correctly determine how much weight is placed on each wheel position, then added to determine the overall weight upon a single axle. This may require one or more adjustments and the motorhome subsequently weighed again to verify proper and adequate adjustments. The first thing to determine is the maximum allowable weight of the motorhome. This information is found on the Federal Certification Label located adjacent to the driver seat under Gross Vehicle Weight Rating. This is the maximum allowable gross weight and cannot be exceeded.

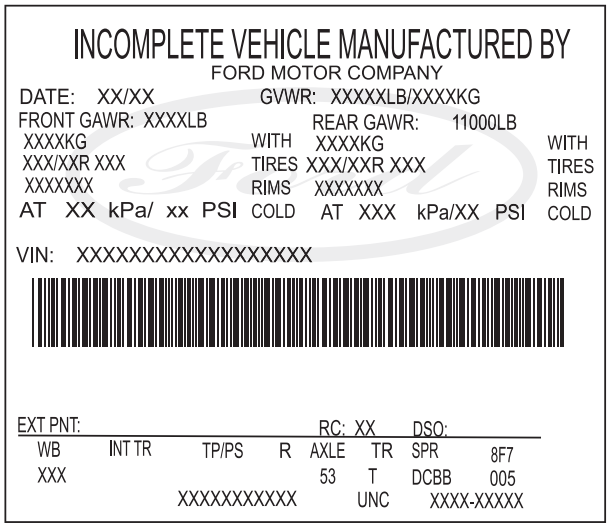
Federal Certification and Weight Labels:
There will be two Federal Certification build labels and as many as three Federal Weight label(s) affixed to the motorhome.

Incomplete Vehicle Manufactured By –

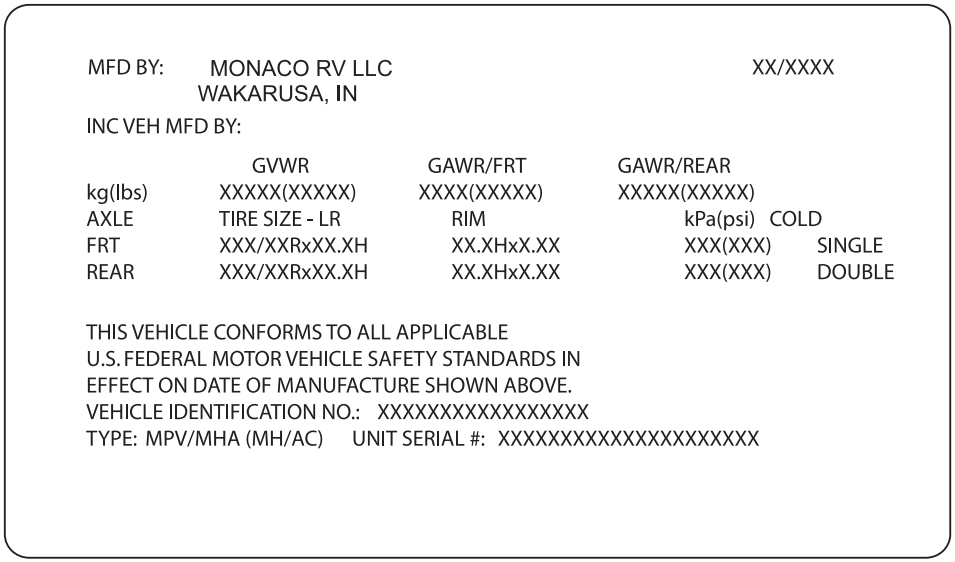
This certification label lists the name of the chassis manufacturer, date of completion and location of construction. The gross vehicle weight rating and gross axle weight ratings. The tire size, load range and appropriate tire inflation pressure based on gross axle weight ratings when compared to the tire manufacturer load inflation table. Confirms the chassis conforms to U.S. Federal Motor Vehicle Safety Standards (FMVSS) under their respective guidelines. The Vehicle Identification Number (VIN) is located in the lower portion of the certificate.

Manufactured By –

This certification label lists the body builder company and designate name, date of completion and location of construction and the name of the incomplete vehicle manufacturer. The gross vehicle weight rating and gross axle weight ratings. The tire size, load range and appropriate tire inflation pressure based on gross axle weight ratings when compared to the tire manufacturer's load inflation table. Confirms the completed vehicle conforms to all applicable U.S. Federal Motor Vehicle Safety Standards in effect as of the date of completion of manufacture. The vehicle identification number and the body builder Unit Serial number are located at the bottom of the label.



Incomplete Vehicle Certificate 100230f



Body Manufacture Certificate 100230f

Factory Installed Federal Weight Label –
This factory installed certification label attached on the screen door lists the vehicle identification number. The maximum allowable combined weight in Occupants and Cargo Carrying Capacity (OCCC). The designated number of seating positions equipped with safety belts for travel and the total amount of weight of fresh water based on the capacity of the fresh water tank and water heater tank. A duplicate weight label is installed next to the Federal Certification labels adjacent to the driver seat.

Dealer Installed Federal Weight Label –
If this certification label is attached next to the factory installed weight label on the screen door, the dealer has installed equipment and/or accessories after the motorhome left the factory and prior to retail sale. This dealer installed label will list the amount of weight in equipment and/or accessories installed by the dealer. The amount of weight listed on the dealer installed label will reduce the amount Occupant and Cargo Carrying Capacity as stated on the factory installed label by the amount stated on the dealer installed weight label.

NOTE:
Do not remove these Federal Certification labels. These certificates confirm the chassis and body conform to guidelines and build practices as specified by the respective governmental agencies. The information on these certificates is used by the vehicle owner and the Department of Motor Vehicles (DMV) to register ownership and license the vehicle for travel.

CAUTION:
Most States limit the amount of weight carried by any single axle position. It is the responsibility of the operator to know the legal weight limit of the State in which they travel. Side roads, surface streets and bridges may further impose weight restrictions.

Weight Terms:
The following are definitions of terms used when weighing. It is important each weight term is understood.

- **Gross Vehicle Weight Rating (GVWR):** Maximum permissible weight of this motorhome. GVWR is equal to or greater than the sum of UVW plus OCCC.
- **Gross Combination Weight Rating (GCWR):** The sum of the maximum allowable loaded weight of this motorhome and any towed trailer or towed vehicle.
- **Gross Axle Weight Rating (GAWR):** Load-carrying capacity specified by manufacturer of a single axle system, as measured at tire ground interfaces.
- **Occupant and Cargo Carrying Capacity (OCCC):** Is the weight comprised of occupants, cargo, full fresh potable water weight including water heater and tongue weight of a towed load. Dealer installed equipment and/or accessories reduce OCCC.
- **Unloaded Vehicle Weight (UVW):** Is the weight of this vehicle as built at the factory with full fuel, engine oil, coolants, propane. Factory UVW may be increased by the addition of dealer installed equipment and/or accessories. UVW does not include occupants, cargo, full fresh potable water weight, including water heater, and the tongue weight of a towed load.

MOTOR HOME OCCUPANT AND CARGO CARRYING CAPACITY vin xxxxxxxxxxxxxxxxx
THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED xxxx kg or xxxx lbs
Safety belt equipped seating capacity: x
CAUTION: A full load of water equals xxx kg or xxx lbs @ 1 kg/l (8.3 lbs/gal) and the tongue weight of a towed trailer counts as cargo.

Factory Installed Federal Weight Label 100179i

CAUTION: LOAD CARRYING CAPACITY REDUCED
Modifications to this vehicle have reduced the original load carrying capacity by
_____kg or _____lbs

Dealer Installed Federal Weight Label 100179j

Weight Limits:

Weight limit sign. 100232

Numerous Federal, State and local governments mandate weight limits. Understanding the terminology and performing proper weighing procedures will help eliminate confusion. It is important to weigh the motorhome in a loaded, ready to travel condition to ensure the Occupant and Cargo Carrying Capacity (OCCC), GVWR or GAWR are not exceeded. The total weight of the motorhome in a loaded, ready to travel condition must not exceed the Gross Vehicle Weight Rating (GVWR) or the GAWR for a single axle.

The GVWR is the maximum total weight for which the motorhome is rated including occupants, fluids and cargo and any dealer installed equipment or accessories. The GAWR is the maximum weight for which a single axle is rated. The GCWR is the combined total of the GVWR and any towed load. The tires, wheels, chassis frame and/or drive train component(s) may limit the GVWR, GAWR or GCWR or any combination thereof.

Every recreational vehicle, even of the same make and model, will vary in actual loaded axle weight due to different options, floor plans, occupants and cargo. The motorhome must be weighed in a loaded, ready to travel condition to determine actual weight carried by each wheel position and axle.

Each wheel position must be weighed to determine no wheel position is overloaded and to confirm no single axle is overloaded.

It is possible be within the GVWR yet overloaded on one wheel position or axle. For this reason it is necessary to weigh each wheel position to determine the actual gross vehicle weight in a loaded, ready to travel condition and how that weight is distributed.

There are two important factors to consider when loading the motorhome: total weight and balance. When loading for travel, place heavy objects as low as possible, preferably on the floor or below in storage compartments. Load weight must be distributed as evenly as possible. Instructions and diagrams to properly weigh the motorhome are presented on the following pages. The heaviest wheel position on an axle will determine the tire inflation pressure for all tires on that axle. Reference the tire manufacturer load inflation table to determine the correct cold inflation pressure.

CAUTION:
State and Local authorities may impose weight restrictions to surface streets, bridges and parkways. These reductions can include maximum single axle weights or an overall maximum weight limitation based on the number of axles per vehicle.

Tire Pressure

The motorhome may weigh slightly heavier on one side. The heaviest wheel position (if applicable) on a single axle will determine the inflation pressure for all tires on that axle due to weight transfer that occurs when cornering. Improperly inflated tires can result in sudden tire failure (blowout). Cargo not properly balanced on the suspension, can result in poor handling, over-stressed chassis components, overloaded wheel positions and/or tires.

How the motorhome is loaded will influence tire inflation pressure and load carried by each axle. This is why each wheel position must be weighed. When the actual loaded weight of the motorhome and the weight on each axle are unknown, follow the recommended tire inflation pressure(s) listed on the federal certification label.

NOTE:
When adjusting tire inflation pressure, each tire on any axle must be inflated to the same pressure. The wheel position carrying the most weight will determine the tire inflation pressure for each tire of that particular axle.

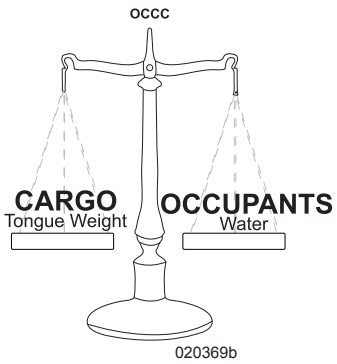
WARNING:
Improperly inflated or overloaded tires can cause a blowout. An overloaded axle can cause a component failure of the suspension system. Tire blowouts or broken suspension components can lead to loss of vehicle control resulting in property damage, personal injury or death.

NOTE:
Contact the tire manufacturer for further information concerning tire inflation pressure and other tire concerns.

Occupant & Cargo Carrying Capacity:

Each motorhome, even of the same model year, floor plan and length, will weigh different due to options and accessories. The GVWR limits the weight of the entire load combination, regardless of the amount of weight of occupants, cargo, water, propane and tongue weight. Weighing will determine the GVWR is not exceeded as this is maximum allowable weight. However, Occupant & Cargo Carrying Capacity (OCCC) weight is comprised of variables in occupants, cargo, fresh water and tongue weight.

While the OCCC is a guide to the maximum allowable weight in combinations of occupants, cargo, water and tongue weight, the amount of weight in each of the categories (occupants, cargo, and water and tongue weight) can be adjusted so one can offset another or reduced entirely to gain advantage in GCWR. While maximum allowable weights are not to be exceeded, if one chooses to carry less water or no water, that can allow an increase in payload of cargo or tongue weight, offsetting one for another and still under maximum allowable weight of GVWR, GAWR, GCWR or OCCC.

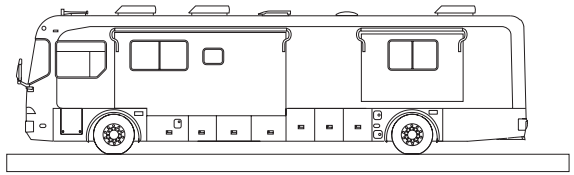


Scales

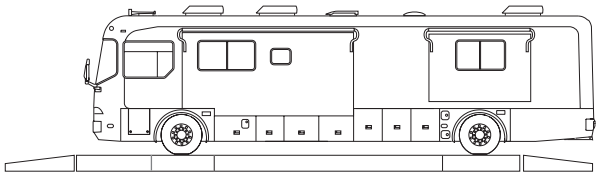
Certified public scales are located in moving and storage lots, farm supplies with grain elevators, gravel pits, recycling companies and large commercial truck stops. To locate a nearby public scale, check the yellow pages under Scales-Public or Weighers. Expect to pay a small fee.

Three basic types of scales:

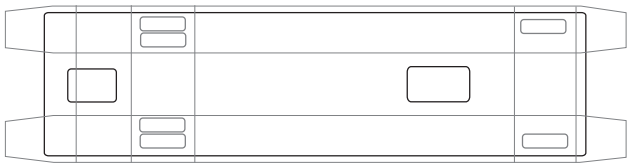
- A large platform scale will allow the entire motorhome to fit on the scale to read the gross vehicle weight in one scale recording.
- A segmented platform scale is designed to weigh one axle at a time.
- A segmented platform scale per wheel position reads each wheel position at a time.



Single Platform



Segmented Platform per axle.



Segmented Platform (Top View) per wheel position. 100233

Each wheel position requires weighing to accurately determine the correct tire inflation pressure. When weighing, the scales and the motorhome must be level to obtain accurate scale readings. A definite lean in the motorhome will produce inaccurate scale readings.

INFORMATION:

The most accurate weighing method is to weigh each wheel position independently. Weighing the entire motorhome or a single axle will not reflect the actual weight carried by each wheel position. A segmented platform scale that reads a single axle may be used if a platform scale that will weigh each wheel position is unavailable. Divide the total axle reading by two for an approximation of what each wheel position may average. When weighing the dual wheel position on the drive axle, dividing that wheel position scale reading by two will determine the weight carried by each tire.

Four-Point Weighing

The motorhome must be weighed in a loaded, ready to travel condition to obtain accurate scale readings and to determine the proper tire pressure. All slide rooms must be retracted when weighing. The purpose for weighing the motorhome is to ensure the GVWR, GAWR and GCWR are not exceeded and that the tires are inflated to the correct pressure as recommended by the tire manufacturer. The exemplar worksheet is a guide.

- Record the GAWR of the front (steer) axle. Example: GAWR of the front axle listed on the Federal Certification label is 13,000 lbs. Using the chart, record 13,000 lbs. under front axle GAWR

Weigh roadside side front axle (Scale A) and record weight on chart Roadside front axle. Example: 6150 lbs.

Weigh curbside side front steer axle (Scale C) and record weight on chart Curbside front axle. Example: 6,200 lbs.

- Record the GAWR of the rear (drive) axle. Example: GAWR of the rear axle listed on the Federal Certification label is 20,000 lbs. Using the chart, record 20,000 lbs. under rear axle GAWR.

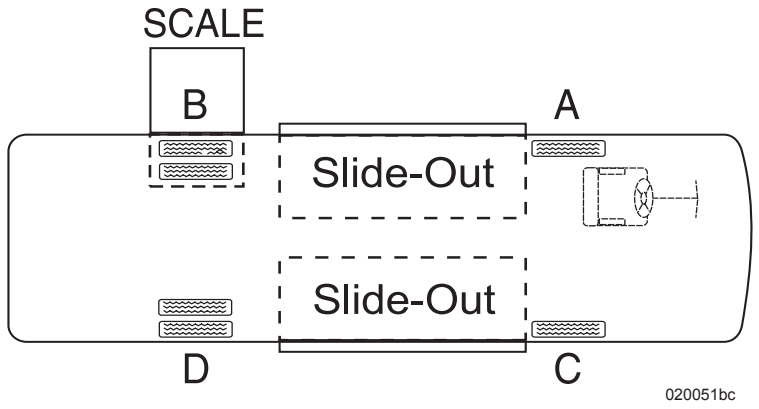
Weigh roadside drive axle (Scale B) and record weight on chart Roadside rear axle. Example: 9,350 lbs.

Weigh curbside drive axle (Scale D) and record weight on chart Curbside rear axle. Example: 9,500 lbs.

- Add scale readings from Roadside and Curbside front axle. Example: 12,350 lbs.
- Add scale readings from Roadside and Curbside rear axle. Example: 18,850 lbs.

	Gross Axle Weight Rating (GAWR)	Roadside	Curbside	Total Axle Weight	Sum DIfference
Front Axle	13,000	A. 6150	C. 6200	12,350	650
Rear Axle	20,000	B. 9350	D. 9500	18,850	1,150
Total	33,000	15,500	15,750	31,200	1,800

Exemplar Worksheet 100235b



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If necessary, adjust payload so that no single GAWR is exceeded. Total weight must not exceed the GVWR. Once weights are verified, the next step is to determine tire size. This information is stamped into the sidewall of the tire. Example: The tire size reads as follows: 295/80r 22.5 with a load range H. Cross reference the tire size and load range to the Load Inflation Table. The heaviest wheel position of an axle will determine tire pressure for all tires on that axle due to weight transfer that occurs when cornering.

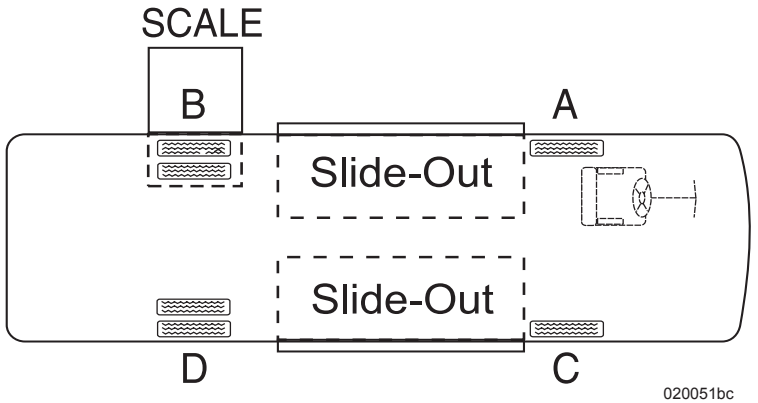
- Example: The curbside tire is the heavier wheel position on the front axle weighing 6,200 lbs. Tire pressure for a 295/80r 22.5 @ 6200 lbs. according to the Load Inflation Table with load range H will be 95 PSI.
- Drive axle uses two tires at one wheel position. Dividing the weight by two for that wheel position will determine how much weight each tire is supporting. The curbside drive axle wheel position weighs 9500 lbs. Each tire is supporting 4750 lbs. This falls below the minimum weight listed. The minimum inflation pressure would be 80 PSI for the drive axle tires.

WARNING:
Improperly inflated or overloaded tires can cause a blowout. An overloaded axle can cause a component failure of the suspension system. Tire blowout or broken suspension components can lead to loss of vehicle control resulting in property damage, personal injury or death.

	Gross Axle Weight Rating (GAWR)	Roadside	Curbside	Total Axle Weight	Sum DIfference
Front Axle		A.	C.		
Rear Axle		B.	D.		
Total					

Actual Worksheet 100236b

CAUTION:
If actual weight carried by any tire is below the load inflation table minimum pressure, inflate the tire(s) to the minimum inflation in the load inflation table. Setting tire pressure below the minimum inflation pressure can overheat and damage the tire casing leading to premature tire failure or blowout.



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Weight Record Sheet

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

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TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
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= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ______________________

PLACE: ______________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

SMOKE DETECTOR

Statistics show that most fire casualties are not caused by direct flame, but by less visible smoke (products of combustion). The smoke detector automatically returns from alarm to normal state when the reason for activation, the presence of smoke, is completely removed. Reduce risk of fire by being safety conscious.

Located on ceiling

WARNING:
There is no way to ensure against injury or loss of life in a fire; however, the smoke detector is intended to help reduce the risk of tragedy. Additional smoke detectors may help to reduce the risk. Proper use and care of the smoke detector could save lives.

INFORMATION:
Refer to the smoke detector OEM manual for detailed information and maintenance information.

Operation

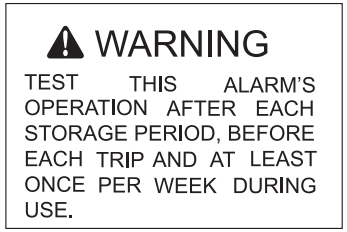
When a 9 Volt DC battery is correctly connected the LED flashes every minute and a loud alarm will sound when a production of combustion is sensed.

NOTE:
The unit will not operate without a battery. A battery flag will pop up preventing the unit from being installed to the mounting bracket without a battery. Carbon Zinc batteries average a service life of one year. Alkaline batteries average a service life of one to two years.

Testing

Simply press the test button on the smoke alarm cover for approximately three seconds. The alarm will sound if all electronic circuitry, horn and battery are working properly. The smoke alarm should be tested at least once a week when the motorhome is in use, prior to each trip and when the motorhome has been in storage. When testing the smoke alarm it is advised to stand at arm's length or muffle the alarm.

CAUTION:
Never use an open flame to test the smoke alarm as this may ignite the alarm or surrounding area.



Maintenance

Maintenance for Proper Operation:
- Test the smoke alarm once a week.
- Keep a supply of 9 Volt DC batteries on hand.
- Periodically vacuum the slots in the cover and sides with a soft brush attachment. Test the smoke alarm after the unit has been vacuumed.
- The smoke alarm will beep once a minute when battery power is low. Immediately replace the battery.

Troubleshooting

If the alarm does not sound when the test button is pushed, or with a smoke test, try the following:

- Inspect alarm for obvious damage.
- Check for the recommended battery type.
- Check the battery for proper connection or replace the battery if needed.
- Gently vacuum as recommended.

If these procedures do not correct the problem, do not attempt repairs. Contact the manufacturer of the alarm if the smoke alarm is within the warranty period. Smoke detectors beyond the warranty period cannot be economically repaired.

CARBON MONOXIDE DETECTOR

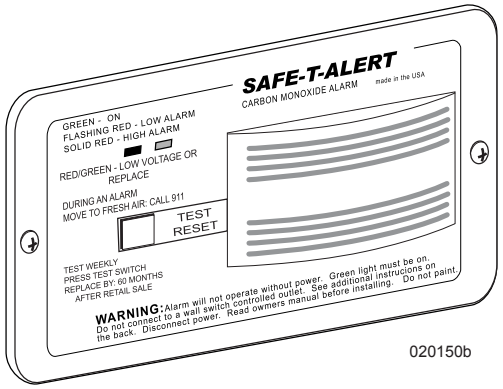
American National Standards Institute **(ANSI) 119.2 - Fire & Life Safety 6.4.6 Carbon Monoxide Detectors** states *"CO detectors used must be listed as suitable for use in RV's and installed in accordance within the terms of their listing. No specific mounting location is mandated for CO detectors; only that they be installed in accordance with their listing. The installation of the CO detector mounting bracket alone will be considered acceptable as long as the CO detector is provided.*

A CO detector is required to be installed in any RV that either contains an internal combustion engine or is designed to have one installed. This would include all motorized RV's, regardless of whether the fuel source is gasoline, diesel, propane, or other alternate fuel. This would also include an RV equipped with a generator or designed to accommodate future installation of a generator (commonly called "generator prep" setups). This would not include RV's equipped to store or transport internal combustion engine vehicles.

Also, all truck campers must have a CO detector installed, since an internal combustion engine is ultimately present once the truck camper is mounted on a pickup truck."

INFORMATION:
Refer to the CO detector OEM manual for detailed information and maintenance information.

CAUTION:
Ensure storage switch is set to On to provide power to the CO detector. See *Front Distribution Panel* section 9.



Located in bedroom

The motorhome is equipped with a Carbon Monoxide detector. Everyone is at risk with Carbon Monoxide poisoning. Carbon Monoxide (CO) is a colorless, odorless and tasteless gas that binds with hemoglobin reducing the body's ability to absorb and carry oxygen to vital organs. Even low levels of CO have been known to cause brain and other vital organ damage in unborn infants, with no effect on the mother.

When removed from exposure, the symptoms dissipate as Carbon Monoxide is expelled through the lungs. Level of contamination in the body reduces at half-life increments at approximately four-hour intervals. Treatment with Oxygen will quicken recovery time.

In cases of mild exposure, the symptoms may include: a slight headache, nausea, vomiting and fatigue. Some consider this a "Flu-like Symptom." Symptoms for medium exposure may include a severe throbbing headache, drowsiness, confusion and fast heart rate. Extreme exposure can result in unconsciousness, convulsions, cardiorespiratory failure and death.

Young children and household pets may be the first affected. Other highly sensitive people include the elderly and those with lung or heart disease or anemia. The CO detector is designed to detect the toxic CO Gas resulting from incomplete combustion of any fuel. This can be gasoline, propane, natural gas, oil, charcoal or wood. Anything that burns fuel such as engines, generators, furnaces, gas stoves or water heaters, produce CO Gas. Consequently, it is uncommon for household smoke from cigarettes or normal cooking to cause the alarm to sound.

CAUTION:
Activation of this device indicates the presence of Carbon Monoxide (CO), which can be fatal. A concentration of above 100 PPM will cause a warning condition. Individuals with medical problems may consider using detection devices with lower Carbon Monoxide alarming capabilities. Prolonged exposure to the horn at a close distance may be harmful to hearing.

WARNING:
Constant beeping and a flashing red light means CO gas has been detected. Shut off all sources of CO such as propane appliances, the engine, generator ect. Open vents and windows to ventilate the motorhome. Evacuate the motorhome until conditions are safe to re-enter. Determine the source of the alarm and have the problems corrected before resuming operation.

The CO detector is wired to the house batteries. This allows reliable protection by alerting the build up of potentially dangerous levels of Carbon Monoxide. Once powered, the detector will run through a brief warm-up and shelf check prior to monitoring for CO gas.

Operation

The detector is equipped with a self-cleaning CO sensor and requires a ten minute initial warm-up period to clean the sensor element and achieve stabilization. During the warm-up period, the green power light will flash On and Off. The green power light should be lit when the power is on. If the light is not lit, turn off the power and check all wire connections. If the power is on and the connections are correct, but the indicator still does not light, the detector should be returned for service. Do not attempt to fix the detector. The indicator light displays a specific color to monitor along with a matching sound pattern.

Indicator Lights and Sound Patterns:

- On or normal condition is indicated by green. The CO detector has power and is sensing air for the presence of CO Gas. The alarm will not sound.
- Flashing red indicates low CO alarm condition along with four beeps then off for five seconds. The alarm will sound and can be reset by the Test/ Reset button. The CO detector has detected the presence of 60 ppm.
- Steady red indicates a CO alarm condition. The detector has sensed the presence of levels over 100 ppm of Carbon Monoxide. The alarm will sound continuously until the Reset switch is reset.
- Alternating red and green indicates a malfunctioning alarm.

Alarm

If the alarm sounds, have the detector and the motorhome checked by an authorized service technician as soon as possible. Never disconnect a CO detector to silence an annoying alarm. Evacuate the motorhome immediately when the red light is lit and the alarm sounds. Do a head count to check that all persons are accounted for. Call the nearest fire department and ask them to determine the source of the Carbon Monoxide. Do not re-enter the motorhome until it has been aired out and the problem corrected.

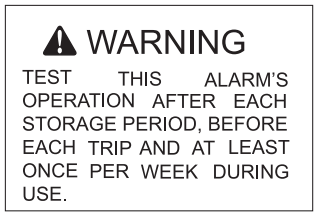
Potential Sources of CO in the motorhome:

- Engine Exhaust
- Portable Grills
- Portable Space Heaters
- Camp Fires
- Gas Stoves and Ovens
- Generator Exhaust
- Portable Generators
- Nearby Motorhomes
- Defective Engine Exhaust System

Testing

Test Procedures:

Test the Carbon Monoxide detector operation after the motorhome has been in storage, before each trip and at least once a week during use. Test by holding the Test/Reset button in until the alarm sounds four beeps and the indicator lamp is steady red. Six seconds later the alarm will again beep four times and the indicator light goes steady green.



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Peak Level Memory:

The CO detector has the capability to remember the level of Carbon Monoxide that activated the alarm.

Press the Test/Reset button for less than one second and observe the visual and audible signals.

- One beep and one green flash indicate memory is clear.
- Two beeps and two red flashes indicate less than 100 ppm.
- Three beeps and three red flashes indicate less than 200 ppm.
- Four beeps and four red flashes indicate greater than 200 ppm.

NOTE:
Memory is erased when power is disconnected for 15 seconds.

Cleaning & Maintenance

Use a vacuum cleaner to remove dust or any other buildup on the detector. Do not wash. Wipe the detector with a damp cloth and dry with a towel. Do not open the detector for cleaning. Do not paint the detector. It is recommend that the Carbon Monoxide detector be replaced every five years.

The CO detector has no user service parts. If there is a problem with the detector refer to an authorized service center. Do not remove power.

INSPECTION:
Test the CO detector weekly and at the beginning and end of each trip.

FIRE EXTINGUISHER

The fire extinguisher in the motorhome is located near the main entrance door. Please read the operating instructions printed on the fire extinguisher. If there is any doubt on how to operate the fire extinguisher practice using it. Replace or recharge the extinguisher immediately after use.

Maintenance

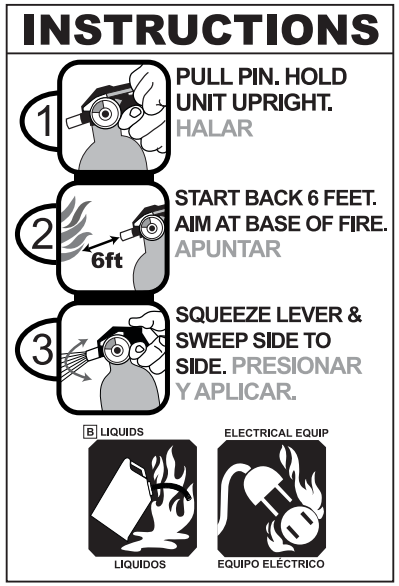
Inspect the fire extinguisher at least once a month. Inspect more frequently if the extinguisher is exposed to weather or possible tampering. Do not test the extinguisher by partially discharging. Internal pressure will escape and the fire extinguisher will need to be replaced.

Use the PASS method:
Pull the pin. Hold extinguisher upright.

Aim at the base (bottom) of the fire and stand six feet away.

Squeeze the lever to discharge the agent.

Sweep the spray side to side until fire is totally extinguished.



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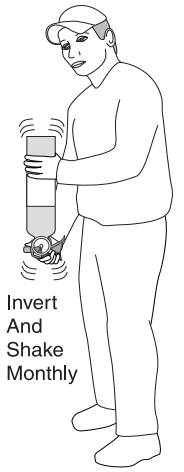
WARNING:
Road vibration will cause extinguisher powder to compact and may cause extinguisher malfunction. Invert and shake extinguisher monthly.



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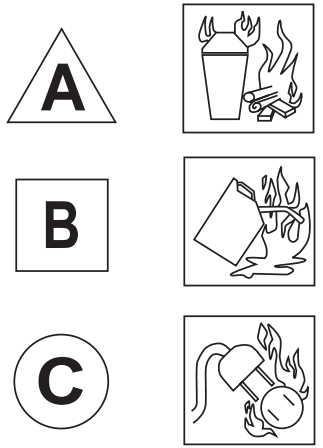
Three classes of fire can occur in a motorhome. Any fire can fall into more than one class; a fire that involves both burning paper and kitchen grease is a Class AB fire.

Classes of Fire:

A - Fires that are fueled by materials that leave a residue when they burn: paper, wood, cloth, rubber, and certain plastics.

B - Fires that involve flammable liquids and gases: gasoline, paint thinner, kitchen grease, propane and acetylene.

C - Fires that involve energized electrical wiring or equipment. If electricity to the equipment is turned off, a class C fire becomes one of the other two class fires.



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ESCAPE (EGRESS) WINDOW

The Egress window, designated for use as an emergency exit, is identified inside of the motorhome by a red locking handle and Exit label.

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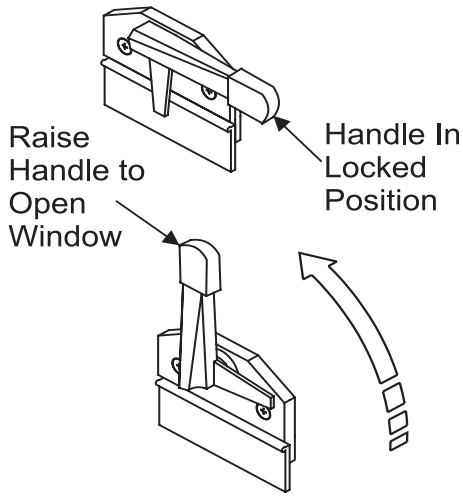
To Operate:

- To open, lift the red handle and push window outward.
- To lock, pull window closed and lower handles to lock.

Hinges along the outside window top identify the Egress window on the motorhome exterior. The glass slider in the Egress window operates the same as all other windows in the motorhome.

Maintenance:

- Occasionally open and close the Egress window to prevent the rubber seal from sticking.



Egress Window Handle

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Notes

Interior and Exterior Care

Section 3

INFORMATION:
This section is on general cleaning and maintenance. Some of the articles within "Exterior & Interior Care - Section 3" may not apply to all models. Improper or inadequate maintenance may affect your warranty coverage. Please review this section carefully. For more information, see the terms and conditions of the Limited Warranty in the front of this Manual.

EXTERIOR CARE

Corrosion

The most common cause of corrosion to the motorhome exterior is accumulation of road salt, grime and dirt. These elements, combined with moisture, may possibly cause early component failure. The undercarriage, around wheel openings and the radiator charge air cooler package require periodic cleaning to prevent component failure caused from corrosive materials collected on roadways.

If the motorhome is stored or driven in areas where road salts are used or near the ocean, it should be washed at least once a week, including the undercarriage. Otherwise, it is recommended to hose off the undercarriage area at least once a month to help slow the process of corrosion.

High-pressure washers or steam cleaners are the most effective way of cleaning the undercarriage and inside wheel openings. However, these devices can cause damage if used improperly. Avoid spraying directly at the painted surface with a high-pressure washer of any type. Also avoid spraying electrical wiring, connectors or electro-mechanical components with high pressure.

CAUTION:
It is up to the motorhome owner to properly wash and protect the motorhome and its components from corrosion. Sources of corrosion can come from road surfaces treated with de-icing agents or atmospheric conditions such as coastal regions.

CAUTION:
Exercise caution when cleaning the radiator charge air cooler package. Damage to the fins can result when using a high-pressure washer or steam cleaner. The nozzle discharge pressure of these devices can exceed 1800 psi. Also avoid using high-pressure/high-temperature steam cleaners on the exterior paint surfaces. Remove all spattered washing debris from the exterior paint surfaces as soon as possible.

Winter Drive Protection

Various substances and chemicals are applied to roadways to reduce hazardous winter driving conditions. These substances can include rock salt, sand, gravel or chemical applications such as Liquid Magnesium Chloride (LMC).

Road salts are known for their corrosive properties to steel and other metals. Road salt can also damage other vehicle components and materials. Vehicles located in or traveling through areas where road salt is used are subject to rapid corrosion. LMC is a moisture activated chemical applied directly to the road surface for the purpose of lowering the freeze point of water. According to published information, LMC is a suitable replacement for road salt or sanding.

The consequence of using LMC is that it is highly corrosive to all metals, plastics and can even destroy rebar embedded in concrete. After application, road traffic will cause LMC to become an airborne vapor traveling as much as 2000 feet from the point of origin. Vehicles located within that distance, even when stored outside, are exposed to the same corrosive affects as vehicles traveling over a road treated with LMC. LMC lowers the freeze point allowing moisture to further penetrate surfaces, and remains active down to 27% humidity. Foot traffic will also track road salt and LMC into living spaces.

While most sand, road salt and LMC accumulation can be washed away through use of a high-pressure washer, road salt and LMC is still bonded to all exposed surfaces including paint. Only chemical washing can neutralize road salts or LMC. However, chemical washing can only neutralize open surfaces. LMC and road salt remains trapped between mating surfaces and will corrode wiring as well.

Local or state governments determine what to apply to the road surface during winter months and substances can change by location. It is possible to encounter one or all of these substances while driving. Only regular weekly washing of the exterior and undercarriage can slow corrosion during the winter months. No single treatment can be used to eliminate and neutralize the affects of these corrosive substances.

Diligent washing and awareness of what substances applied to the road surface will dictate if a neutralizing agent must be applied to help slow the process of corrosion to exterior surfaces including the paint finish.

Therefore; it is up to the motorhome owner to perform regular washing maintenance and neutralize any corrosive agent applied to the roadway by local or state governments.

Washing

The motorhome is painted with a "base coat, clear coat system." Clear coat is a polyurethane-based material that brings out the shine and luster to the base coat paint. Periodic cleaning will help to preserve the paint finish. Care should be used when washing the motorhome. Use only mild detergents or (preferred) specifically designed automotive detergents. Avoid abrasive cleansers or laundry detergents that will scratch the clear coat and leave a soap film. Use a soft cotton cloth or specially designed microfiber and/or wool washing mitt to wash the paint finish. Avoid brushes as they can scratch the surface and damage the paint. Before washing the motorhome, remove most of the accumulated dirt and road wash behind wheel openings, below the windshield and on the rear of the motorhome. If build up is excessive, run water over a soft cotton cloth while gently wiping the surface in one direction. This will help float away the "build-up" from the clear coat. Avoid back and forth or circular motions as this may act like sandpaper, scratching the clear coat and leaving a haze or swirl marks.

After removing the heavy build-up, use the mixed detergent solution to wash the motorhome. Start washing at the top of the motorhome working towards the bottom. If possible, wash the motorhome in a shaded area when the exterior is not hot to the touch.

If necessary, turn the motorhome around to keep the area being washed in the shade. Try not to allow the detergent to dry onto the clear coat surface. Use plenty of water when rinsing the surface to remove all detergent residue.

Drying

Chamois cloths come in natural and synthetic materials. Either type is acceptable as long as the surface is clean. Soak the chamois in clean water, then wring it dry. Remove the water from the surface, starting at the top and working towards the bottom, using a downward "S" pattern. Wring out the chamois as needed. Using a chamois cloth to remove the rinse water is not necessary, but the effort can be worthwhile.

Waxing

It is recommended to wax the motorhome twice a year: spring and fall. Many types of protective barriers are available today that may be applied to the clear coat: glazes, waxes, polishes, rubbing compounds or combinations of these products.

NOTE:
Use a grease and wax remover before applying another coat of wax. Chemicals can become trapped between layers of wax, possibly damaging the paint finish.

INFORMATION:
When selecting a product, follow the product manufacturer's recommended application instructions.

Types of Products:

Glazes - Glazes are generally used to fill very fine scratches in the clear coat. They are applied either by hand or by using a polisher with a special pad.

Waxes - Waxes come in many types of chemical make-up. Most contain cleaning agents, lubricants and wax. Cleaning agents remove oxidation and leave a high gloss. Wax leaves a clear film that protects the finish

NOTE:
Recommended waxes are Menzerna Full Molecular Jacket (FMJ) or Meguiars NXT Generation Tech Wax 2.0.

Polishes - Polishes combine wax based substances with abrasives to clean and polish at the same time. These products can be too abrasive for clear coats and are not recommended for use.

Rubbing Compounds - These types of products are generally applied by using a buffer. The use of rubbing compounds should be left to professionals as undesired results can quickly occur. These types of products are generally used to correct or flatten a surface by removing high spots or small amounts of material.

When selecting a product, the container should be marked, “safe for clear coats” or “clear coat safe.” Carefully follow the application instructions when using a product. Upon first use of a product, try it on a small test spot in an inconspicuous area in case an undesired reaction occurs.

Observe the test area from different angles to check for hazing or swirl marks. If an abnormal reaction to the finish occurs, discontinue product use and consult the product manufacturer. If the product is a paste, **do not** allow dried paste to be baked on by the sun. Remove paste shortly after drying. Clean, dry, 100% cotton cloths are best suited for the removal of dried paste. Turn the cloth often. Use a separate clean cloth to buff. The surface should feel slick when rubbing the cloth lightly over it. Avoid repeated wax applications which can cause build up. Some very fine scratches or swirl marks may be removed by application of a glaze. These types of glazes fill the scratches or swirl marks.

The motorhome has a large surface area. Washing and waxing may not be completed in one afternoon. Select sections to wax until the motorhome is complete. If the task seems overwhelming, have a professional detailer perform the task.

Paint Codes

The motorhome color scheme is comprised of specific paint colors, each assigned a code used to achieve a desired color of paint. “Touch-up” paint may be used to repair a small scratch or imperfection in the paint surface. To paint a larger area, it is necessary to obtain the paint code to get the correct color match.

To Obtain the Paint Code:

- Contact **Parts** at **1-877-466-6226**.
- Specify the year, model, serial number and exterior color scheme name (if known).
- This formula can be mixed at a local Dupont paint store.

NOTE:
All special paint schemes require contacting Navistar RV, LLC directly for paint codes.

Tire Care

Proper care and methods in cleaning must be used to obtain the maximum service years out of the tires. Use a soft brush and a mild detergent to clean the tires. If a dressing product is used to “protect” the tires from aging, use extra care and caution. Tire dressings that contain petroleum products or alcohol may cause deterioration or cracking.

In many cases it is not the dressing that causes a problem but the chemical reaction that subsequently occurs. When these same dressing products are used on a passenger car tire that is replaced every three to four years, it is rare to see a major problem. However, in most cases motorhome tires may last longer due to limited annual mileage and exposure.

Bright Metal

All chrome and stainless steel should be washed and cleaned each time the motorhome is washed. Use only automotive approved non-abrasive cleaners and polishes on exterior bright work. Do not use rubbing compounds. Do not use abrasive cleaners or compounds to clean the mirrors.

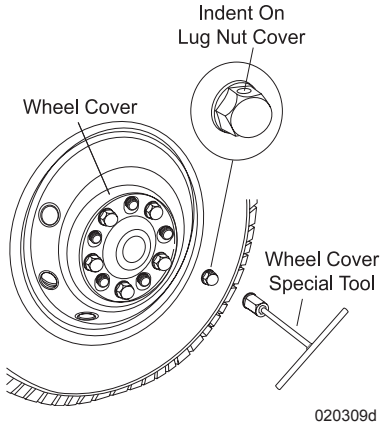
NOTE:
When applying chemicals to remove road tar, use only automotive products that are recommended for painted surfaces and fiberglass. Observe the warning recommendations and directions printed on the container.

Wheel Covers

Clean the wheel covers frequently with high pressure water from a hose using a mild detergent. Do not use harsh alkalis, alcohol or acidic cleansers. A secondary hand washing with a soft cloth may be required to remove stubborn road grime. To remove the wheel covers from the wheel for a thorough cleaning use the special tool that was included with the motorhome. Each wheel cover is secured by lug covers identified by indent or notch markings. When the wheel covers are removed tires and rims can be cleaned and inspected.

Remove dirt, corrosion or any foreign material from the tire side of the rim using a wire brush. Do not use a wire brush or other abrasive substances to remove dirt and corrosion from the wheel covers. To maintain the original appearance of the wheel covers the following procedures are recommended:

- After reinstalling wheel covers (prior to operating the motorhome) use a sponge, cloth or soft fiber brush to wash the exposed wheel surfaces with a mild detergent/warm water solution.



- Rinse thoroughly with clean water.
- Wipe dry to avoid water spots.
- Use a high quality, non-abrasive polish to remove stubborn road tars, insects or hard to remove deposits.
- To protect the surface appearance on wheel covers, wax the cleaned surface with a high quality car wax.
- Clean the wheel covers frequently to maintain appearance.

Wheels - Polished Aluminum

Outside:

The outward side of the aluminum wheel is a polished finish and should be treated the same as the paint finish on the motorhome. Road soils, grime and brake dust trap moisture which can cause corrosion over a period of time.

1. Frequently clean using high-pressure water.
2. Wash with a 100% cotton cloth and a mild soap solution (dish soap or car wash soap is recommended).
3. Rinse all remaining soap residue with high-pressure water and wipe the surface dry using a 100% cotton cloth to avoid water spots.
4. A secondary hand washing may be required to remove some stubborn road films.
5. Carnauba wax can be applied to help protect the finish.

CAUTION:
Rinse aluminum wheels using high-pressure water to remove debris from the surface before washing. Do not scrub. Rubbing debris against the surface of the wheel can result in scratches. Do not allow soap solution to dry on the finish of the wheel as spotting will occur.

NOTE:
Allow heated wheels that are extremely hot to cool before spraying with cold water.

Do not use the following items on polished aluminum wheels:

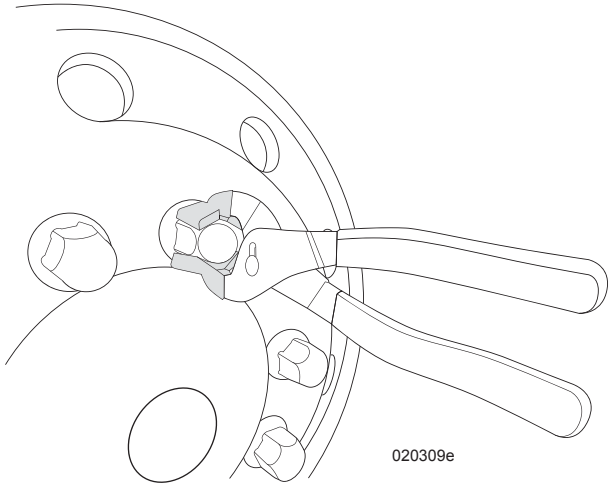
- Synthetic cleaning pads, wire or abrasive brushes, steel wool or scouring pads (these can mar or scratch the finish).
- Strong detergents, alkaline or acidic cleaners, acids or lye-based chemical products or solvents.

Inside:

If the tires are removed, inspect and clean the entire rim. Air used to fill the tire may contain moisture and can cause the areas of the wheel under the tire to severely corrode.

Use a soft brush to remove foreign material from the tire side of the rim. Lubricate the rim and tire bead with a non-water-based lubricant before mounting the tire and ensure the inside of tire is dry before installing.

WARNING:
Do not use a flammable solution to coat the inside of the rim. This can lead to an explosion during tire inflation or in subsequent operation of the motorhome.



Lug cap removal tool (not provided)

EXTERIOR MAINTENANCE

The motorhome is exposed to extreme temperatures, humidity, ultraviolet rays, rain and other environmental conditions. While in operation the motorhome is subject to twisting and flexing caused by rough roads, potholes and winding mountain roads. Maintenance is necessary not only to keep the exterior looking nice but also to keep it in proper working order.

Fiberglass

Inspect the fiberglass exterior. Periodic **inspection** may reveal that flexing of the fiberglass exterior has created imperfections in the surface commonly known as "spider" or "hairline" cracks. A crack that has opened up to reveal the cloth weave threatens the integrity of the fiberglass. If the exterior exhibits signs of damage, prevent moisture penetration, particularly in freezing climates. Cover the area using plastic sheeting and/or tape, and have the damaged fiberglass repaired as soon as possible.

Roof Care & Seal Inspections

Wherever there is something affixed to the motorhome, such as the "beltline" or vent attached on the roof, there is a seal preventing water intrusion.

There are many types of sealants and each has a specific use. While the beltline uses a silicone or urethane base sealant to prevent water intrusion, roof openings use an acrylic based sealant. Moisture intrusion can occur at any time for a number of reasons. Therefore, regular sealant inspection and maintenance will greatly reduce the likelihood of moisture intrusion and costly repairs.

The motorhome is sealed at the factory. However, extreme weather conditions can shorten the life of the sealant. Harsh road conditions can compromise sealant integrity. Maintaining sealant is part of regular motorhome maintenance. Inspect all joints, seams and openings at least once every six months. While sealant integrity may appear fine, a small void under the right conditions can quickly cause major damage.

Make a full interior inspection for signs of moisture intrusion every two weeks if the motorhome is in storage.

CAUTION:
Inspect exterior seals, seams and joints for sealant integrity at least twice a year. Make a full interior inspection for water leaks every two weeks while the motorhome is in storage.

INSPECTION:
Surface must be clean and dry. Inspect seal for voids, cracks, bubbling, peeling or pulling away. Sealant that looks fine without imperfections is acceptable for continued service. Sealant that is old, cracking, flaking or bubbling will allow moisture intrusion and must be repaired.

WARNING:
Inspecting sealant will require use of a ladder or scaffold assembly. Roof access is also required. Follow proper safety measures accordingly. Exercise extreme care whenever using a ladder/ scaffold assembly. Avoid getting on the roof if it is icy or moisture laden as the surface can be very slick. Use judgment if inspection is considered dangerous. Have the motorhome inspected or sealed (if necessary) by a qualified service technician.

Sealant Replacement:

Carefully remove sealant that is cracking, flaking, bubbling, peeling or pulling away from the surface. The area under the removed sealant will need to be clean and dry before applying new sealant. Applying new sealant over a dirty or moisture laden surface will not allow proper adhesion.

Sealant application may require simple hand tools and paper towels or rags for cleanup. Some sealants may be labeled hazardous or require chemicals for cleanup. Follow all of the manufacturer's warnings and precautions when dealing with these substances.

WARNING:
Some sealants may be labeled hazardous or require use of petroleum distillates for cleanup. Use proper precautions as suggested by the sealant or chemical manufacturer. Use of protective eye wear, gloves, respirator or open ventilation may be required. Use judgment when working with chemicals. If health limits exposure to chemicals or inhibits skills or abilities, employ a qualified service technician to perform the tasks.

Sealant Types

Roof: Manus-Bond/API Polyurethane

This product is used for large roof openings such as around vents, skylights, any roof mounted antennas and ladder roof mounts. Clean the old sealant that is lifting before applying the new. Make sure the roof is dry and free of dirt. Care should be used when near an edge or roof corners as the product will spread out. Apply masking tape around the area to avoid runs.

WARNING:
Consult manufacturer data for application and safety instructions.

Roof Air Conditioner:

Roof air conditioners use a closed cell foam base gasket. No sealants are required. The roof air conditioners should be checked for tightness by the four mounting bolts located in each interior corner of the air conditioner roof opening. Torque specification is 40 to 50 in/lbs. The base gasket should be compressed to about ½".

Exterior Attachments: Silicone

Primarily used on the sidewalls around windows, doors, handles, beltline molding, latches and bases of surface mounted items such as clearance lights. Old peeling sealant should be removed with nylon sticks or equivalent. Avoid using metal utensils that can scratch the painted surface. Use nylon sticks or equivalent. Avoid lacquer thinners or ketone based solvents as these chemicals can damage painted surfaces. Confirm that surface is clean and dry before a new application. Cut the tube at an angle with the smallest usable opening. Avoid a heavy bead as a little goes a long way. Use a finger at a 45° angle on the beaded surface to smooth out product. Do not moisten finger, use a disposable latex glove.

Keep rags or paper towels handy for clean up. Use care when applying silicone and plan ahead before starting a bead. Look for obstacles that may impede application.

Undercarriage: Spray Foam

This product is used as a sealant where a hole has been made for items such as water lines or wires that are coming through a floor or bulkhead opening. Consult manufacturer data for application and safety instructions.

Windshield: Black Polyurethane

Used for sealing the windshields not to fill holes or other imperfections. Product comes in a tube and applies much the same way as silicone. Clean up using solvents such as paint thinner. Gloves are required as product is considered hazardous.

WARNING:
Avoid eye and skin contact and breathing of vapors. Consult manufacturer data for application and safety instructions.

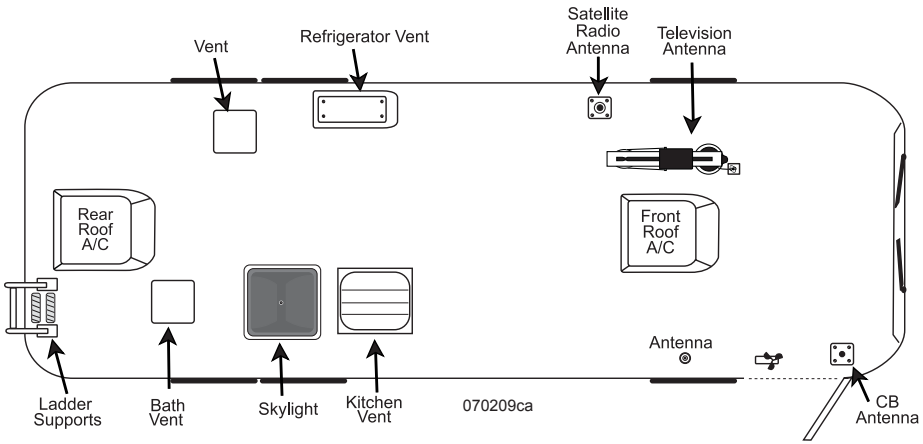
Painted Surface: Acrylic Sealants

Used where items are sealed under a painted surface such as the metal corners of slideout rooms and roof mounted awning brackets. The material is specially formulated to allow paint adhesion. Consult manufacturer data for application and safety instructions.

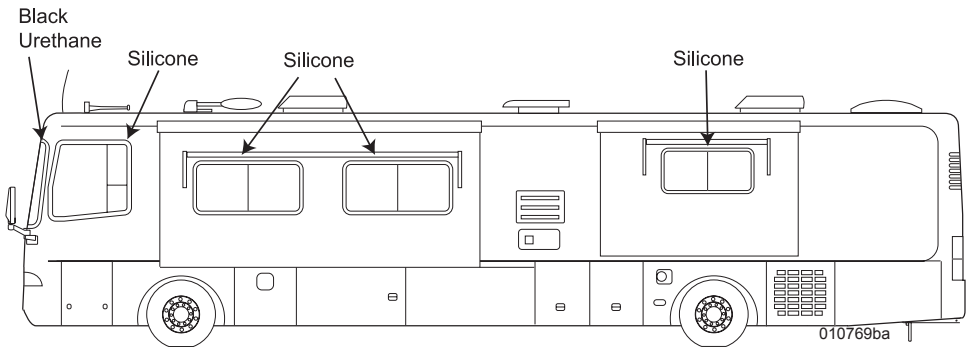
INTERIOR CARE

Cockpit

The dashboard is a molded assembly that is vinyl wrapped. The instrument panel is comprised of various gauges and switches. The dashboard and instrument panel have different cleaning requirements. Clean the vinyl wrapped dashboard following the instructions under ***"Vinyl"*** in this section. If a blemish or small cut occurs in the vinyl, contact a professional upholstery repair service.



Typical roof layout



Typical side view

Clean plastic or Plexiglas® instrument panels with a cloth dampened with a mild soap and water solution. Dry using a separate cotton cloth. Plastic polish products that can help brighten the appearance of plastic or Plexiglas instrument panels are *Novus Plastic Care*®, a three-part system; *Meguires*® and *Johnson Paste Wax*®. These products will require buffing and rubbing. Only glass lens gauges can be cleaned using glass cleaner. Spray cleaner on the cloth, not directly onto the lens to prevent overspray or runoff.

CAUTION:
Do not use glass cleaner on plastic or Plexiglass surfaces. Most glass cleaners will haze plastic finishes and cause brittleness.

TIP:
To determine if a lens is glass or plastic, tap the lens with a fingernail. Plastic lens will have a dull hollow sound whereas glass will have a clear ping sound.

FABRICS

General Care & Cleaning

Use care when the motorhome is exposed to high-humidity climates for an extended period. Protect fabrics from prolonged exposure to moisture to prevent mold. Cover all upholstery and make sure window coverings are down to protect fabrics from sun damage. Frequently used items require more attention than those items not regularly used.

If a spill occurs, blot the moisture as quickly as possible. Do not use soap and hot water as this may set a stain. Clean the spot as soon as possible.

Cleaning Upholstery Fabrics:

- Water-based cleaners are not recommended.
- If a spill does occur, blot the soiled area, do not rub it.
- Some solvents may have an adverse reaction on the backing of the upholstery fabric and is not recommended.
- To prevent overall soiling, frequently vacuum or lightly brush to remove dust and grime.
- Clean spots using a mild water-free solvent or dry cleaning product.
- Clean only in a well ventilated area and avoid any product containing carbon tetrachloride or other toxic materials.
- Use a professional furniture cleaning service for overall cleaning.

Vinyl

Several areas of the motorhome, such as the dash, ceiling and items of furniture, may be covered in vinyl. The care and cleaning of these areas are as follows:

Normal Cleaning:

Most common stains can be cleaned using warm soapy water and a clear water (distilled water preferred) rinse. Moderate scrubbing with a medium bristle brush will help to loosen soil from the depression of embossed surfaces.

For stubborn stains use the following commercially available mild detergents in accordance with the manufacturer's instructions: *Mr. Clean* or *Fantastik*®.

Full strength rubbing alcohol or mineral spirits may be tried cautiously as a last resort on very stubborn stains if the previous suggestions do not work. Indiscriminate use of any solvent or solvent containing cleaner can severely damage or discolor the vinyl. Stains may become permanent if not immediately removed.

NOTE:
Detergents should never be used on a regular or repeated basis for normal cleaning.

CAUTION:
Powdered cleaners containing abrasives, steel wool and industrial strength cleaners are not recommended for vinyl.

Bird Excreta & Vomit Stains:
Sponge the area with a soapy water and diluted bleach solution until stain is removed. Rinse thoroughly with clean water.

Urine Stains:
Sponge with soapy water containing a small amount of household ammonia. Rinse thoroughly with clean water.

Surface Mildew:
Wash with diluted bleach and use a soft brush for stubborn growth. Rinse repeatedly with clear, cold water.

Ballpoint Ink:
Wipe the stain immediately with rubbing alcohol in a well ventilated area.

WARNING:
If flammable solvents such as alcohol, turpentine or varsol are used for cleaning, use only small quantities in well-ventilated areas. Exercise proper caution by notifying any persons in the area. Keep away from any ignition source. Always wear protective gloves.

Latex Paint:
Wipe fresh paint off with a damp cloth. Hot soapy water will normally remove dried latex.

Oil-Base Paint:
Use turpentine in a well ventilated area to remove any fresh paint. Dried paint must be moistened using a semi-solid, gel-type stripper. The softened paint can be gently scraped away. Rinse with soap and water.

CAUTION:
Lacquer solvent will cause immediate irreparable damage to the vinyl. Do not use wax on vinyl upholstery as it will cause premature embrittlement and cracking. Dilute chlorine bleach before using. Never use full strength bleach. Paint strippers will remove the print pattern and damage the vinyl if it comes in direct contact.

Tar or Asphalt:
Remove immediately. Prolonged contact will result in a permanent stain. Use a cloth lightly dampened with mineral spirits and rub the stain gently, working from the outer edge of the stain toward the center to prevent spreading. Rinse with soap and water.

Crayon, Mustard or Ketchup:
Sponge with mild soap and water. For stubborn stains that have set, use a cloth soaked in diluted mild detergent with gentle rubbing. Any remaining stain should be washed with diluted bleach. Rinse repeatedly with cold water.

Candy, Ice Cream, Coffee, Tea, Fruit Stains, Liquor, Wine, Tanning Lotion or Soft Drinks:
Loose material should be gently scraped with a dull knife. Use lukewarm water and sponge repeatedly. Any soiled area that remains after drying should be gently rubbed with a cloth or dampened with a mild detergent solution. Rinse thoroughly with clean water.

Chewing Gum:
Scrape off as much gum as possible using a dull knife. Rub the gum with an ice cube to harden and for easier removal. In a well ventilated area, use a cloth saturated with mineral spirits and gently rub the remaining gum. Rinse thoroughly with clean water.

Lipstick, Grease, Oil, Make-Up or Shoe Polish:
Apply a small amount of mineral spirits with a cloth. Rub gently. Be careful not to spread the stain by smearing beyond the original source. Remove shoe polish immediately as it contains a dye that will cause permanent staining. Rinse thoroughly with clean water.

Blood or Plant Residue:
Rub out spots using a clean cloth soaked in cool water. For stubborn spots, use household ammonia and rinse repeatedly with a clean, wet cloth. **Do not** use hot water or soap suds as this will set the stain.

TIP:
Vinyl requires periodic cleaning to maintain its appearance and to prevent the buildup of dirt and contaminants that may permanently stain or reduce the life of the vinyl if left untreated. Frequency of cleaning and procedures used depend upon the amount of use and the environmental conditions in which the vinyl is subjected.

NOTE:
Tears or holes in the vinyl can be temporarily covered with clear tape to prevent further damage. Repairs should be made by a professional upholstery shop. Commercial repair products may contain lacquers and cause the vinyl to become brittle and more difficult to repair.

Optima Leather & "O" Vinyl

Cleaning Suggestions:
Follow cleaning steps in sequence. Each subsequent step is to be used if the previous step was not successful. Clean area with warm water after each process.

For General Cleaning:
Wipe the soiled area with warm water, a mild detergent soap, and a soft cotton cloth.

For Oil-based Stains:
Spray soiled area with household cleaner, such as *409*® or *Fantastik*®, and wipe with warm water using a soft cotton cloth.

For Marker-type Stains:
Dab stained area with solution of 50% Isopropyl Alcohol and 50% warm water using a soft cotton cloth.

WARNING:
Avoid open flames or hot lighting when using an alcohol solution.

CAUTION:
Do not use any abrasive cleaner with this material.

NOTE:
A five parts water to one part bleach solution is recommended for disinfecting.

Ultra-Leather

Care Instructions:
- Spot clean with mild soap and water.
- Air dry or dry quickly with warm setting of a hair dryer.
- For stubborn stains, use mild solvent.
- For tougher stains, try Fantastik® brand spray cleaner. Disinfect with a 5:1 non-chlorinated (only) bleach solution.
- Dry clean using commercial dry cleaning solvents only.
- Use a mild detergent for:
  - Red Wine, Liquor, Coffee, Tea, Cola, Milk
  - Ketchup, Mustard, Mayonnaise, Steak Sauce, Soy Sauce
  - Butter, Salad Oil, Chocolate, Lipstick, Make-up, Face Cream
  - Suntan Oil, Machine Oil, Urine, Blood

Removing ballpoint pen stains:
Wipe the stain off with ethanol (ethyl alcohol). Follow all manufacturer safety instructions when using chemicals.

Use the following procedure if stain the remains:
- Dilute household bleach (sodium hypochlorite) with the same amount of water. (One part to one part solution.)
- Apply the bleach/water solution to a piece of tissue (do not apply too much). Place the tissue on the stained surface and cover it with polyethylene film to prevent the solution from drying.
- Periodically remove the tissues to check on the condition of the stain. When the stain is almost gone, remove the tissues completely. Do not leave on for more than one hour.
- Wash the stain with sufficient amount of clean water.

CAUTION:
If bleach residue remains, the polyurethane resin and back cloth will yellow and deteriorate.

To Neutralize Bleach:
- Place a piece of tissue, as in Step 2, and apply hydrogen peroxide solution (15%).
- Leave the solution on for approximately 30 minutes then remove the tissue.
- Completely remove the residue of hydrogen peroxide on the Ultra-leather with water.

Bleach is the only chemical that will remove ballpoint pen stains. However, this may cause polyurethane to yellow or the back cloth to deteriorate. It is recommended to remove ballpoint pen stains as early as possible with ethanol.

FLOORS

Carpet Cleaning

Spot Removal Procedures:
- Act quickly when anything is dropped or spilled. Remove spots before they dry.
- Blot liquids with a clean, white absorbent cloth or paper towel.
- For semi-solids, scoop up with a rounded spoon.
- For solids, break up and vacuum out as much as possible.
- Pre-test the spot removal agent in an inconspicuous area to make certain it will not damage the carpet dyes.
- Apply a small amount of the cleaning solution recommended for the particular spot. Do not scrub. Work from the edges of the spot to the center. Blot thoroughly. Repeat until spot is removed.

- Follow steps on the Carpet Spot Removal Guide.
- After each application, absorb as much as possible before proceeding to the next step.
- Absorb remaining moisture with layers of white paper towels, weighted down with a non-staining glass or ceramic object.
- When completely dry, vacuum or brush the pile to restore texture.
- If the spot is not completely removed, contact a professional carpet cleaner.

Cleaning Solutions:

A. Dry Cleaning Fluid: A non-flammable spot removal liquid, available in grocery and hardware stores.

B. Nail Polish Remover: Any acetate, that often has a banana fragrance. Do not use if it contains acetone.

C. Detergent Solution: Mix two cups of cold water and 1/8 teaspoon mild liquid detergent (no lanolin, non-bleach).

D. Warm Water: Lukewarm tap water.

E. Vinegar Solution: One cup white vinegar to one cup water.

F. Ammonia Solution: One tablespoon household ammonia to one cup water.

G. Stain Removal Kit: Available from retail carpet stores or professional cleaners.

H. Call Professional: Additional suggestions, special cleaning chemicals or the ability to patch the area may be available.

Use the solution specified in order from 1-8 until stain is removed.	A DRY CLEANING FLUID	B NAIL POLISH REMOVER	C DETERGENT SOLUTION	D WARM WATER	E VINEGAR SOLUTION	F AMMONIA SOLUTION	G STAIN REMOVAL KIT	H CALL PROFESSIONAL	I PERMANENT CHANGE
SPOTS									
Acid				2		1		3	*
Acne Medication		1		2	5	4	3	6	*
Alcoholic Beverage			1	4	3	2			*
Ammonia				2	1				*
Bleach		1	2					3	*
Blood		1	3		2	4			
Candle Wax	1					2			
Cement & Glue	2	1	3		5	4	6		*
Chalk		1	2						
Charcoal		1	2						
Chewing Gum	1								
Coffee			1	3	2		4	5	*
Cosmetics		2	1	3	6	5	4	7	*
Crayon	1		2	3					
Drain/Toilet Cleaner			2	1	3			4	*
Dye	1		2		4	3	5	6	*
Food			1	4	3	2	5	6	*
Fungicides, Insecticides, Pesticides	1		2	5	4	3	6	*	
Furniture Polish (Water Based)			1	4	3	2	5	6	*
Furniture Polish (Solvent Based)	2	1	3	6	5	4	7	8	*
Furniture Stain	2	1	3	6	5	4	7	8	*
Graphite		1	2						
Grease	1	2	3				4	5	*
Ink	2	1	3	6	5	4	7	8	*
Iodine	1		2	5	4	3	6	7	*
Lipstick	2	1	3	6	5	4	7	8	*
Medicine	2	1	3	6	5	4	7	8	*
Merthiolate			1	4	3	2	5	6	*
Nail Polish	2	1	3				4	5	*
Oil	1		2	4		3		5	*
Paint	2	1	3				4	5	*
Plant Food			1	4	3	2	5	6	*
Rust			2	3	1		4	5	*
Shoe Polish	2	1	3	5		4	6	7	*
Soft Drinks			1	4	3	2	5	6	*
Soot	1		2	3				4	*
Tar	1						2	3	*
Toothpaste			1						
Urine			1		2		3	4	*
Vomit			1	4	3	2	5	6	*

* While recommended cleaning agents are effective, some stains may become permanent.

I. Permanent Change: Due to the nature of the stain, there may be color loss. The carpet has been permanently dyed or the carpet yarns have been permanently damaged.

NOTE:
While the recommended cleaning agents have proven to be effective, some stains may become permanent.

Laminate Floor

Laminate flooring used in the motorhome provides style, durability and ease of maintenance.

Laminate flooring is constructed of three main material components. The surface, similar to many countertops, contains aluminum oxide particles to form an extremely hard, durable outer layer. The carrier (core layer) is constructed from high-density fiberboard. A tongue and groove design provides a tighter bond. The backer (bottom layer) is also made of laminate for strength.

Cleaning and Maintenance:

For everyday cleaning, vacuum the floor to remove dirt and debris. It is recommended to occasionally mop the floor using a cotton string mop and a minimal amount of water. Use a mixture of soap-free household cleaner (either vinegar or ammonia work well) and water for a more thorough cleaning.

Tile Floor

Tile floors vary in porosity and surface irregularities. Regular maintenance is important to keep the tile in the motorhome looking showroom new. Once the slideout has been extended, keep the tile floor clean to prevent dirt from scratching the tiles prior to retracting the slideout.

NOTE:
Tile is ceramic and will chip or break. Avoid dropping heavy or sharp objects on the tile.

Cleaning Tile:

Use a damp sponge mop or a cloth to clean tile. If moderate staining occurs, cleaning with a window cleaner such as *Windex*® should do the job. A mild solution of hot water and all-purpose cleaner for tile floors, walls and countertops can also be used. Rinse well with clear water and dry with a soft cloth to prevent streaking. Avoid cleaning tile with soap. Soap forms a film to dull the luster. Soap also promotes the growth of mildew and bacteria. Do not use powdered cleaners on unglazed tile floors. Undissolved powder will dull the surface. Grout sealers are available that protect the porous surfaces. If a sealer is used, follow the sealant manufacturer guideline for application. Never use sealers on unglazed tile. With the exception of terra cotta, which may be oiled or waxed, tile does not need to be polished or buffed to maintain its finish.

NOTE:
Before using any solution to clean the tile, check the manufacturer's warning label to ensure safety of the product. If there is any doubt, apply several test patches of the solution in an inconspicuous place to determine product suitability.

Grout:

Grout used is a two part concrete mix and can develop surface cracks over time. Due to flexing of the flooring while driving, this process may accelerate. If the grout requires cleaning, scrub with a plastic brush. Do not use steel wool as small particles may remain and produce unsightly stains.

Sealing the Tile:

Apply sealant to the tile floor and grout to prevent discoloring from soils and spills. One pint should be sufficient to seal the floor. Follow application instructions carefully.

CAUTION:
Sealants can contain petroleum distillate. Open windows, vents and doors to provide adequate airflow during application.

NOTE:
It is recommended to test a small amount of sealant on an inconspicuous area before applying sealant to the entire floor. Avoid getting sealant onto surfaces other than the flooring.

To Apply:

1. Extend slideout room(s) and clean floor. Allow floor and grout to thoroughly dry.
2. Working from rear towards doorway. Apply sealant direct from container onto a cloth towel or broom handle applicator. Grout sealant applicators are available at large hardware stores.
3. Apply sealant per manufacturer instructions. Do not allow sealant to puddle in grout lines. Extra care should be used to make sure all grout has been sealed.
4. Refer to container for cure time.

NOTE:
If a spill occurs before sealant has cured, it may be necessary to clean and additionally treat the area with sealant as needed.

SHOWER

Showers are susceptible to soap build-up. To control mildew growth, spray the shower with household chlorine bleach. Allow it to stand for five minutes, then rinse with clear water. Clean the glass shower doors with window cleaner on a weekly basis to maintain shine. If water spots cannot be removed from glass, rub lightly with the flat edge of a razor blade to remove deposits.

To prevent excessive moisture and a continual growth of mildew, use the shower only with adequate ventilation. The sealant in a regularly used shower should be replaced once a year. To replace sealant, remove the old sealant using a sharp non-metallic instrument. Apply new sealant that can be obtained at most hardware stores.

CEILING

Hardwood, Vinyl and Decorated Paneling:
Certain cleaning agents will affect the surface on both printed and non-printed vinyl. Use only a mild, non-abrasive detergent and warm water with a soft cloth or sponge to clean. Do not use bleach, alcohol, oil-based spray cleaners or cleaning agents that contain solvents, citrus oil or harsh chemicals.

WALL COVERINGS

Immediately remove solvent based or pigmented substances from wall coverings. Do not use abrasive cleaners containing chlorine bleach or solvents. *Fidelity* and *Jolie* brands are recommended. Always begin with a mild detergent or soap and warm water. To remove normal dirt, clean with a soft sponge. Rinse and wipe dry.

Before applying a cleaner, test the cleaning agent on a small, inconspicuous portion of the wall covering to ensure the cleaner does not affect the color or gloss of the wall covering.

Care for the Tower Wall Covering:
Remove ordinary stains with mild soap and warm water. Sponge on. Rinse well and dry with a soft cloth. To remove ball point pen, blood, lipstick, etc., use a sponge or soft bristle brush and *Formula 409®*, *Fantastik®* or a similar product. Rinse well and dry. Finish cleaning by applying full strength isopropyl alcohol with a sponge or soft brush. Rinse well and dry.

Care for the Satinesque Wall Covering:
Remove stain quickly to minimize the reaction on the wall covering, especially if the stain is solvent-based or pigmented. **Examples:** nail polish, oil, shampoo, lacquer, enamel, paint, ink and lipstick.

Begin cleaning the stain with a mild soap-based detergent; and if necessary, move to a stronger cleaner such as household bleach, liquid household cleaners or rubbing alcohol. Before applying a stronger cleaner, test the cleaning agent on a small inconspicuous portion of the wall covering to ensure the cleaner does not affect the color or gloss of the wall covering.

Specific Stain Type Removal Procedures:
Normal Dirt:
Remove normal dirt using a mild soap or detergent and warm water. Allow it to soak for a few minutes then rub briskly with a cloth or sponge.

Nail Polish, Shellac or Lacquer:
Remove liquid using a dry cloth. Use care not to spread the stain. Quickly clean the remaining stain with rubbing alcohol. Rinse with clean water.

Ink:
Remove immediately by wiping with a cloth dampened in rubbing alcohol. Rinse with clean water.

Chewing Gum:
Rub with an ice cube to cool and harden. Gently pull off the bulk of the gum. Remove remaining gum with rubbing alcohol.

Pencil:
Erase as much of pencil mark as possible. Wipe remaining marks with rubbing alcohol.

Blood, Feces or Urine:
Remove these staining substances as quickly as possible. Wash the stained area with a strong soap. If the stain does not disappear, rinse the soapy area thoroughly with clean water. Mix a solution of 50% water and 50% household bleach. Clean the stained area with the bleach solution. Rinse with clean water.

WOOD CARE

For general cleaning, regularly wipe wood surfaces using a soft cloth lightly dampened with clear warm water. Thoroughly dry to prevent streaking. For stubborn stains, use a clean cloth dampened with a solution of mild non-alkaline soap (dish washing liquid) and water and rinse. Dry thoroughly, buffing in the direction of the wood grain. Never use abrasive cleaners, scouring pads or powdered cleansers. Polishing products used on the solid wood surface depends on individual preference. Always follow product instructions.

Excessive dampness, dryness, heat, or cold can damage solid wood finishes. Sunlight can change the color or age the wood. Never allow moisture or spills to stand, always blot dry immediately. Solvents, alcohol, nail polish and polish removers, as well as harsh cleaners, should not be used on finished wood surfaces.

Minor damage to solid wood surfaces can be repaired quickly and effectively with a bit of hard work, some careful attention to details, and most importantly, the right materials. However, any wood repair or finishing job is best left for a professionally trained individual.

NOTE:
It is important to inform the service technician of any products used for the care and cleaning in the event of wood repairs.

Sanding and Sandpaper:

The following table is a general guide and may vary with wood type. The key to sanding is using the right sandpaper for the repair that is needed. Always sand with the grain.

GRIT	GRADE	USE
80-120	Medium	Smoothing the surface, removing small marks.
150-180	Fine	Final sanding prior to finishing.
220-240	Very Fine	Sanding between coats of sealing.
280-320	Extra Fine	Removing dust spots or marks between finish coats.
360-600	Super Fine	Removing luster or surface blemishes.

Steel Wool:

Abrasive material composed of long steel fibers. Coarser grades are used to remove paint and other finishes; finer grades for polishing or smoothing a finished surface.

Nail Holes and Small Cracks:

Fill nail holes and small cracks with wood putty or dough for unstained woods prior to any sanding. Stained finishes require filling holes and cracks after the stain has been applied. Putty should match the stain closely in color.

TIP:
A little sawdust and wood glue can be used to make putty for end grains.

Scratches and Nicks:

"Quick and simple" rarely describes repairs to stained wood finishes; however, a few tricks used by professional woodworkers can be tried to repair nicks and scratches.

Fixing Scratches in Stained Woodwork:

Light scratches will often disappear when carefully rubbed with furniture polish or paste wax. When scratches appear lighter than the surrounding dark-stained woodwork, it usually means either the scratch goes through the stain into the wood or that the varnish is flaking off. Deeper scratches can be hidden by carefully rubbing with a piece of oily nut meat such as Brazil nut, black walnut or pecan. Be careful to rub the nut meat directly into the scratch to avoid darkening of the surrounding wood. Color the scratch with brown coloring crayon or liquid shoe dye (especially good on walnut).

Always test a procedure on an inconspicuous area on the wood to ensure no damage to the finish occurs.

Staining a Scratch with Iodine:

Mahogany - Use new iodine.
Brown or Cherry Mahogany - Use iodine that has turned dark brown.
Maple - Dilute one part iodine with one part denatured alcohol.

Commercial scratch removers, or stick wax to match the wood finish, can also be used. After the scratch has been hidden, polish or wax the entire area. Deep scratches should be repaired and finished by a professional.

Dents:

Small dents may be repaired by using steam. To raise a small dent, place a damp cloth over the area and hold a medium-hot iron on it. The steam causes the wood fibers to swell back into place. It may be necessary to repeat this process until the dented area is level with the surface. Allow the area to dry.

Restoring the Clear Finish:

The finished surface on the wood is a clear lacquer coating. The lacquer finish can be repaired should the finish become dulled or scratched. Scratches extending into the wood will require wood repair by filling the damaged area. If there is light damage, the wood can be steamed to bring the wood surface level.

Lacquer finish sheen can be restored by carefully using 0000 steel wool or equivalent. Sand damaged lacquer with fine sandpaper. Once the scratched surface is smooth, apply a clear lacquer coating using an aerosol. Lacquer can be applied by cloth or brush, but best results are obtained from an aerosol. If necessary, use 0000 steel wool or equivalent to bring out the luster and smooth overspray.

CAUTION:
Use top coats and finishes in accordance with the manufacturer's safety instructions. Use only in well ventilated areas with proper respiratory filters and masks.

Re-staining the Wood:
If bare wood is visible at the bottom of the scratch, the wood will need to be re-stained. To remove damaged varnish, lightly roughen a small area around the scratch with sandpaper, steel wool or synthetic steel wool. Find a stain that is a shade lighter than the wood finish. Stain the bare wood with a very small amount of stain on a rag, brush or cotton swab. If the color is too light, apply additional coats. Rub away excess stain with a dry rag. If the wood becomes too dark, use a rag moistened in mineral spirits to lighten the wood. Select a lighter color stain and continue. Several companies have simplified this repair process by designing oil-based wood stain into marker-like containers to rub on the scratch. Torn and scratched wood fibers will absorb stain and darken quickly. Start with a stain color that is lighter than the original finish.

A second coat can always be applied if the color of the first coat is too light. Once the color is blended, patch the clear finish as described above and apply a wipe-on finish.

COUNTERTOPS

Solid Surface

Routine Care:
The solid surface countertops have a matte/satin finish. Soapy water or ammonia-based cleaners will remove most dirt and stains from all tops and bowls. Individual techniques may be used to remove different stains. Follow the recommendations below.

NOTE:
Do not cut directly on the solid surface.

Cleaning the Countertops:
Most dirt and stains: Use soapy water or ammonia-based cleaner.

Water marks: Wipe with damp cloth and towel dry.

Difficult stains: Use Soft Scrub® and a gray Scotchbrite® pad. If Scotchbrite is used, buffing may be necessary to restore finish.

Disinfecting: Occasionally wipe surface with diluted household bleach (one part water and one part bleach).

Repairing Cuts and Scratches

Solid surface countertops are renewable. Use the following instructions to repair minor cuts and scratches:

- If scratch or imperfection is deep, sand area with highest grit sandpaper to remove the blemish. Never sand in one small area. Feather out lightly at each increase in sandpaper grit to blend restoration.
- Switch from sandpaper to 3M™ # 35 Trizact™ micro-abrasive disc. Apply water while using Trizact discs to prevent clogging.
- Work downward to #10 Trizact micro-abrasive disc until blemish is gone.
- Buff surface with wool pad and 3M Imperial Compound and Finish Material.

Preventing Heat Damage:
Hot pans and heat-generating appliances, such as frying pans or crock pots, can damage the surface. To prevent heat damage, always use a hot pad or a trivet with rubber feet to protect the surface.

Other Important Tips:
Avoid exposing the solid surface to chemicals such as paint removers or oven cleaners. If these chemicals come in contact with the solid surface, quickly wash with water. Avoid contact with nail polish or nail polish remover. If contact is made, quickly wash with water.

Laminate

Clean laminate countertops with a damp cloth or sponge. Use a spray cleaner to remove stubborn stains. Avoid harsh abrasives, scouring powders, peroxides or bleaches. These products may dull or damage the surface. Avoid contact with dyes, bleaches and indelible inks used on food packages. Do not use laminated countertops as a cutting board. Laminated countertops are resistant to minor heat; however, hot pans, irons and lit cigarettes damage the surface. Use hot pads under pans taken directly from the stovetop.

CAUTION:
Do not cut directly on the laminate surface.

STAINLESS STEEL SURFACES

Stainless steel can be easily damaged by improper cleaners. For example: many liquid cleansers designed to be gentle on smooth surfaces will damage stainless steel. Only use the methods outlined below, and always follow the directions that come with the cleaner (usually located on the bottle).

General Cleaning:
- Use warm, soapy water and dry with a soft, clean cloth.

For Heavy Soiling:
- Only use a stainless steel cleaner designed specifically for appliances.
- Follow all directions from the manufacturer of the cleaner.

Do not use:
- Abrasive powders or cleaners
- Acidic citrus or vinegar based cleaners
- Ammonia
- Steel wool pads
- Abrasive cloths
- Oven cleaners

CAUTION:
Citric acid permanently discolors stainless steel. Immediately remove mustard, tomato juice, marinara or citrus-based sauces or products from stainless steel surfaces.

CAUTION:
Do not cut directly on the stainless steel surface.

WINDOWS

Water Spots:
Glass will develop water spots when not properly cleaned. Water spots are magnified on a reflective finish. Use a squeegee immediately after washing to reduce water spotting. To remove stubborn water stains from reflective glass use *Cerium Oxide Polishing Compound*, made by C.R. Lawrence, available at most glass shops.

Condensation

Condensation develops when water vapor is present in the air. More vapor is added by breathing, bathing, cooking, etc. and collects wherever air space is available. When the temperature reaches dew point, water vapors in the air condense and change to liquid form.

Controlling Moisture Condensation:
Reduce or eliminate interior moisture condensation during cold weather by using the following steps:

- Partially open roof vents and windows to allow outside air to circulate into the interior. Increase ventilation when a large number of people are in the motorhome. Even in damp weather conditions, the air outside will be far drier than the interior air.
- Install a dehumidifier. Continuous use of a dehumidifier is effective in removing excess moisture from interior air. Use of a dehumidifier is not a cure-all, however, it will reduce the amount of outside air needed for ventilation.
- Run the range vent fan when cooking and the bath vent fan (or open the bath vent) when bathing, to reduce water vapor. Avoid excessive boiling or use of steam producing hot water.
- Do not heat the motorhome interior with the range or oven. This increases the risk of toxic fumes and depletes oxygen. Open flames also add moisture to the interior air and increase condensation.
- In very cold weather, leave cabinet and closet doors partially open. Air flow will warm and ventilate the interior storage compartments and exterior walls to reduce or eliminate condensation and prevent the possibility of ice formations.

WINDOW TREATMENTS

Mini-Blinds

Dusting:

Regular dusting will maintain the appearance of the mini-blinds. Keep blinds looking their best by periodically wiping with a soft cloth or a dusting mitt. By tilting the slats down, not quite closed, most of the top surface of each slat can be cleaned. Blinds may be cleaned while hanging in place using this method.

Vacuuming:

For deeper cleaning, vacuum gently with the soft brush attachment of a vacuum cleaner.

Compressed Air or Hair Dryer (non-heat setting):

Blow dust off each slat. Dust is air-borne using this method. Ventilate the motorhome.

Spot-Cleaning:

Spot-clean shades and blinds using a soft cloth or a moistened sponge with lukewarm water. Add mild detergent, if needed. Blot gently to avoid creasing. In a dusty environment, the blinds may need to be cleaned regularly using a sponge or dampened soft cloth. Use warm (not hot) water and a mild detergent that does not contain abrasives. Rinse the blinds using a clean cloth and water to prevent water spots. Place a towel directly under the blinds to absorb water that may drip.

Ultrasonic cleaning:

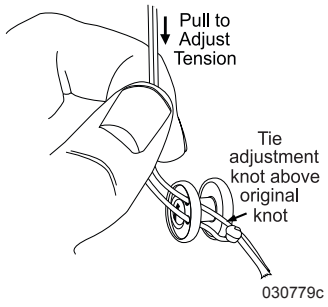
Professional ultrasonic cleaning may be preferred.

Day/Night Shades

Leave Day/Night shades in the up position when not in use to help the shades hold their shape.

Tension Adjustment:

Tension should be adjusted if the shades are loose or there is excessive vibration. A button is located on the bottom of the shade at each end. Two lines on each side of the shade are threaded through the button and tied off.



- Pull the tied-off lines through the button to increase tension. Leave some slack so the shades are not too tight.
- Tie the lines off at the new position. Adjust each side equally.
- Operate the shades to ensure tension is set correctly and equally on both sides.
- Trim excess line from both sides if desired.

Dusting:

Vacuum with a brush attachment or use a dusting tool on a regular basis.

Cleaning:

A dry foam cleaner may be used for soil and dirt removal. Follow all directions on the container, or use a cleaning solution of ¼ oz. clear liquid soap to 8 oz. water.

NOTE:
Do not use colored liquid soap as a stain may appear when fabric dries.

MOLD & MILDEW

What is Mold?

Mold is a type of fungus that occurs naturally in the environment and can leave a musty odor, discolor fabrics, stain surfaces and cause considerable damage to the motorhome.

What Does Mold Need to Grow?

Mold requires a food source, such as grease or soil. Synthetic fabrics, such as acetate, polyester, acrylic and nylon are mildew resistant, but soil on the surface of these fabrics are susceptible to mold.

Temperate climate and moisture also help to cultivate mold growth. Moisture in the motorhome can result from unattended spills, leaks, overflows and condensation. Moisture allowed to remain on a growth medium can develop mold within 24 to 48 hours. Minimizing moisture inside of the motorhome can reduce or eliminate favorable mold growth conditions. Good housekeeping and regular maintenance are essential in the effort to prevent or eliminate mold growth.

Consequences of Mold:

All mold is not necessarily harmful, but certain strains of mold have been shown to cause, in susceptible persons, allergic reactions, including skin irritation, watery eyes, runny noise, coughing, sneezing, congestion, sore throat and headache. Individuals with suppressed immune systems may risk infection. Some experts contend that mold causes serious symptoms and disease which may even be life threatening.

However, experts disagree about the level of mold exposure that may cause health problems and about the exact nature and extent of the health problems that may be caused by mold. Moreover, the Center for Disease Control states that a casual link between the presence of toxic mold and serious health conditions has not been proven.

Standards or threshold limit values for concentration of mold or mold spores have not been set. Currently, there are no EPA regulations or standards for airborne mold contaminants. There is simply no practical way to eliminate all mold and mold spores in the indoor environment. For example, studies have shown that ozone cleaners are not effective at killing airborne mold or surface mold contamination.

Controlling Mold Growth:

The motorhome owner should eliminate mold growth in the motorhome. Take the following steps to eliminate mold growth in the motorhome:

- Carefully examine items for signs of mold before loading them in the motorhome. Potted plants (roots and soil), furnishings, clothing and linens, as well as many other household items, may contain mold.
- Regular vacuuming and cleaning will help reduce mold levels. Mild bleach solutions and most tile cleaners are effective in eliminating or preventing mold growth.
- Indoor humidity can be reduced by 30 to 60% when venting clothes dryers to the outdoors. Ventilate the kitchen and bathroom by opening windows, using exhaust fans or a combination of both. Operating the air conditioning will remove excess moisture in the air and help facilitate evaporation of water from wet surfaces.
- Promptly clean up spills, condensation and other sources of moisture. Thoroughly dry any wet surfaces or material. Do not let water pool or stand in the motorhome. Promptly replace materials that cannot be thoroughly dried.
- **Inspect** for leaks on a regular basis. Look for discolorations or wet spots. Repair leaks promptly. Inspect condensation pans (refrigerators and air conditioners) for mold growth. Take notice of musty odors and any visible signs of mold.
- Should mold develop, thoroughly clean the affected area with a mild solution of bleach. First, test to see if the affected material or surface is color safe. If mold growth is severe, call on the services of a qualified professional cleaner.
- If mold cannot be removed, throw the item away.

Whether or not a motorhome owner experiences mold growth depends largely on how the motorhome is managed and maintained. As a manufacturer, our responsibility is limited to things that we can control. As explained in the written warranty, we will repair or replace defects in the construction (defects defined as a failure to comply with reasonable standards of motorhome construction) for the Limited Warranty coverage period provided.

THE MANUFACTURER WILL NOT BE RESPONSIBLE FOR DAMAGE CAUSED BY MOLD THAT MAY BE THE CONSEQUENCE OF OR ASSOCIATED WITH DEFECTS IN THE CONSTRUCTION.

PEST CONTROL

Regardless of the area one lives in or travels to, it is safe in stating there will be pests waiting. These pests are not only annoying; they can pose a health risk and create serious damage to the motorhome.

- Common pests include insects such as ants, cockroaches, termites, flies, pantry pests and wasps as well as wildlife such as rodents, raccoons, bats, birds and snakes. It is important to remember that pests are searching for food, water and a place to live. Eliminating any one of those elements will help control the pest infestation. Take immediate steps to remove pests as soon as their presence is detected.

Steps to help control pests:

- Reduce clutter inside the motorhome and storage bays. All storage items, particularly food (including pet food), should be kept in tightly sealed containers. Seal all cracks and holes, and insure that window, door and vent screens are securely in place.
- Routinely clean the motorhome, including storage bays. Wipe down the water bay. Promptly remove all crumbs from areas where food is regularly prepared and eaten. Garbage should be placed in a sealed container and removed to an outside receptacle daily. Only put out pet food that will be immediately eaten.
- Keep foods such as flour, cereal, spaghetti and pet food in resealable containers with tight lids.
- Sweep and vacuum often (especially in eating areas) to help eliminate a food source for pests.
- Pests seek indoor shelter with food and water. Limit their access to water or moisture sources by sealing cracks and leaks in pipes and faucets. Reduce moisture in the motorhome by controlling condensation, immediately wiping up spills and promptly repairing leaks. Be extra alert around areas that attract rodents and insects, including the sewer hose, fresh water hose, bay doors and items that may be leaning against the outside of the motorhome, such as fishing poles and golf clubs.
- When the motorhome is stored outdoors, clear the surrounding area of all rodent friendly hiding places: shrubs, trees and clutter. Completely seal the underside of the motorhome. Wire mesh will work well to prevent points of entry, but beware of blocking necessary air vents. Prior to operating the motorhome after storage, remove all insect and animal nests that may have developed around vents, engine compartments, the exhaust pipe and in the wheel wells.
- Seal cracks, crevices, and gaps around doors and windows.

Rodents:

Rodents may chew through wires or build nests in components of the motorhome. Signs of rodent infestation include droppings, shredded material or chewed furniture fabrics and vinyl. Rodents like to build nests with wire insulation and are commonly attracted to the outside coating of 120 Volt AC wiring more than 12 Volt DC wiring.

NOTE:
Although the back cap of the motorhome is well sealed, rodents are capable of chewing through the foam insulation and that area should be routinely inspected.

If signs of rodent infestation exist around the motorhome, place traps or poisons in suspected areas. Keep traps and poisons safely away from pets and children. Cheese is not the best bait for a rodent trap. Use peanut butter or chocolate in small amounts.

Place the bait on the trigger of the trap to induce the rodent to climb onto the trigger to reach the bait. Rodents do not limit invasion to unused vehicles.

Insects:

Eliminate insects when signs of infestation appear. If the type of insect cannot be identified, purchase sticky traps from the hardware store and place the tape where the insects have been seen. Once a sample is caught, seek assistance in identifying the insect to determine what will be required to remove the infestation.

Regularly inspect the exterior of the motorhome for signs of a budding wasp nest, and promptly destroy small nests before they become too large.

Spiders can be in any structure. Immediately remove spider webs. Some types of spiders like to nest on top of the fuel tank and around the fuel hoses. Dispense of spiders using a vacuum. Use care to capture the spider and egg sacs. Throw the vacuum bag away in a sealed bag.

Fruit flies invade the motorhome by attaching to fresh fruits and vegetables. Determine what food items are generating the flies and discard that item in an outdoor trash receptacle. Fruit flies can be eliminated with a homemade trap. Pour a few ounces of vinegar into a cup and cover the cup with plastic wrap. Secure the wrap with tape or a rubber band and poke a ¼" hole in the plastic. Place the trap in the area where fruit flies are present.

Ants live in colonies. Only a fraction of the ant colony will leave to seek food. Spraying pesticides will only kill the ants that are away from the colony. The colony must be destroyed to eliminate all ants. Keep ants away from the sewer hose by spraying the hose ends with a soap and water solution.

Fleas can be removed by properly treating pets with a veterinarian approved treatment and by thoroughly cleaning the motorhome. Vacuum vinyl areas and tile floors to remove dust, flea larva and flea eggs. Follow by thoroughly washing those areas with soap and water. Carpets must be vacuumed and treated with a residual flea control product labeled safe for indoor carpet and furniture use. Perform the cleaning treatment daily for three days to ensure that all fleas have encountered the treatment.

Flying outdoor insects are attracted to bright light. Yellow porch light covers on the motorhome work to discourage insect invasion. During nighttime hours insects will be attracted to docking lights or other bright exterior lighting.

If the presence of moths is detected inside the motorhome, usually by holes appearing in material, clean the affected clothing and all other items stored in the same area. Follow by completely cleaning the closet, dresser or storage area. Seal cracks and treat the area with a product labeled safe for indoor pest control.

Birds:

Even birds can be considered pests, particularly when the motorhome is parked in the flight path of a flock. Bird droppings are hard to remove and will leave stains. Prevent permanent staining to the motorhome roof by regularly cleaning the surface to remove all bird droppings.

Damage from Pests:

Lizards have been known to crawl into the inverter and short out the circuit board. Lizards can be captured using glue traps. To remove the lizard from the trap, dissolve the glue with vegetable oil and release it outside and well away from the motorhome. A scorpion will glow blue-green in UV light. Be extra careful as scorpions stings can be poisonous.

Best sources of information about common household pests:

The Internet is a great place to find information about common pests. The National Pest Management Association web site can be a useful resource for common pests. Another good source of information is colleges and universities with entomology (study of insects) departments.

Electronic pest control devices can be costly and most likely will not work on all types of rodents and insects. When calling on the services of a professional to combat pest infestation, call a reputable business that is licensed in handling pesticides. Check references.

Explain that you are seeking assistance for a motorhome, as treatments may differ from standard household jobs. If a pest problem is suspected in the motorhome, consider professional pest control help. The following guidelines can be used for selecting a pest control service:

- Seek referrals from those who have used pest control services. Inquire about the type of pest problem encountered and if they were satisfied with the service.
- Membership in the national, state or local pest control associations is a good indicator that the company has access to modern technical information and is committed to further education.
- Reach a complete understanding with the company before work starts; find out what the pest is, how the problem will be treated, how long the period of treatment will be, and what results can be expected.
- Be sure to understand what is guaranteed and what is not.

STORAGE

Short Term

Short term storage is defined as storing the motorhome for a period of thirty days or less. Properly preparing the motorhome during periods of short term storage will make bringing the motorhome out of storage a much easier process. Winterize the plumbing system if the motorhome is stored in winter months, or if stored when temperatures are below 32º F.

Checklist - Short Term Storage:

- Retract slide rooms. **Do not** store the motorhome with slideout rooms extended.
- Shut off all appliances. Close the primary propane valve.
- If applicable, disable the automatic generator start feature.
- Remove all articles from refrigerator/ freezer and clean thoroughly. Prop doors open to prevent mildew.
- Drain the holding tanks. Winterize the fresh water system using FDA RV antifreeze or air pressure to evacuate the plumbing system.
- Retract and secure all awnings.
- Turn off the interior house power using the battery cut-off switch.
- Store house and chassis batteries fully charged. Batteries stored in a discharged state will readily freeze and damage the battery.
- If possible, position the motorhome so the house and chassis batteries are accessible for charging or changing without having to move the motorhome.
- If available, hook to shore power. This will allow the batteries to be charged while in storage. It is recommended to inspect the level of battery electrolyte at least once a month.
- Careful placement of a small heat source in the interior will help control moisture. Desiccate filter systems will help remove interior moisture.
- If possible, store the motorhome inside a storage building.
- If stored outside, inspect all seams and seals twice a month for possible leakage.
- Store the motorhome with a full tank of fuel to minimize moisture condensing at top of fuel tank.
- Close vents and windows to prevent entrance of wind driven rain.
- Store tires at maximum inflation pressure.
- Leave open cabinet doors and drawers to facilitate air movement behind those areas.
- Perform a full interior inspection for water leaks twice a month. Be sure to check behind all cabinet doors.

Long Term

Long term storage of the motorhome can be defined as leaving a motorhome unattended for a period of thirty days or more. A motorhome requires protection from the elements just as a house or a car would. When left out in the environment without proper storage or maintenance, a motorhome is vulnerable to the moisture and oxidation processes inherent in the environment.

NOTE:
The natural process of condensation will occur with temperature changes of 30º F. or more in one day. Humidity readings of 60% or greater will allow the accumulated moisture to remain for extended periods of time.

If AC power is not available in storage area:

- Retract slide rooms. **Do not** store the motorhome with slideout rooms extended.
- Turn off all appliances.
- Turn off interior house power using the battery cut-off switch.
- If applicable, disable the automatic generator start feature.
- If possible, situate the motorhome so the house and chassis batteries remain accessible. This allows a battery to be charged or replaced without moving the motorhome.
- Charge house and chassis batteries to a full state of charge.
- Turn both the house and chassis battery disconnect switches off.

- Check battery voltage while the motorhome is in storage if stored outside.
- Preventive measures should be used if the voltage readings are low. It will make it easier to remove the motorhome from storage or move the motorhome in an emergency situation.

NOTE:
Batteries in a low state of charge will readily freeze and damage the battery.

If AC power is available:

The house battery disconnect switch should remain on. The converter will charge both the house and chassis batteries. 30 Amp shore power service will be more than adequate.

CAUTION:
A 20 Amp service using light duty extension cords and the required adapters create serious voltage losses. Line voltage loss and the resistance at each electrical connection is a hazardous combination and should be avoided. Damage to sensitive electronic equipment may result.

Parking/Storage Surfaces:

- Avoid parking the motorhome on a grass or gravel surface to prevent moisture accumulation.
- Concrete pads seal the surface and allow better ventilation under the motorhome.
- Storage buildings with concrete floors, or heated storage facilities, greatly reduce the amount of moisture accumulation and protects the motorhome from moisture damage.

Outdoor Storage Area:

- The interior should be heated to help prevent mold and mildew growth. Moisture removing desiccate filter systems are available from hardware and RV supply stores. Place the filter system inside the motorhome to reduce interior moisture condensation or humidity.
- Proper winterization of the fresh water system will prevent potential damage in extreme cold.
- Ultraviolet radiation affects soft goods and rubber products such as privacy curtains, window shades and tires. These items should be protected. Store Day/Night Shades in the Up position.
- Cardboard templates can be made for the windows to protect the interior from exposure to direct sunlight.
- Tire covers are available to protect the sidewall of the tires from cracking. Make sure tires in storage contain the correct inflation pressure to prevent damaged caused by underinflation.
- Regularly wash the exterior to help control moss accumulation. Waxing the motorhome twice a year will augment these substances.

Inspect the motorhome:

- Perform a full interior inspection for water leaks every two weeks while the motorhome is in storage. Check inside all cabinets for signs of dampness or leaks. Inspect the ceiling areas around roof vents or other roof openings.
- Leave cabinet doors and drawers open to facilitate air movement behind those areas.
- Inspect and clean the roof and sidewall seams at least twice a year. **Inspect** for exterior sealant gaps of all roof seams, vents, skylights, roof air conditioners and windows.

Fuel:

Storing the motorhome with a full tank of fuel will minimize moisture condensing at the top of the tank. Fuel stabilizers may be added to extend degradation of the fuel. Consult the engine manufacturer's owner's manual or a distributor for further detailed information on fuel stabilizers and additives.

Brakes:

Brakes suffer from non-use during periods of storage. The bare metal machined surfaces of brake drums or rotors have only a light coating of dust from the brake lining friction material. The brake dust is the only thing protecting the bare metal surfaces from rusting. Only regular brake applications dry the moisture preventing rust on brake drum or rotor surfaces. During periods of non-use, oxygen and moisture oxidize the machined surfaces. Only occasional use keeps these surfaces from oxidizing. Rusty brake drum or rotor surfaces permeate the brake lining upon the first few applications, reducing the friction action of the linings.

Engine:

Internal combustion engines need to be "exercised" on a regular basis to ensure an adequate supply of lubricating oil coats the cylinder walls and piston rings. Valve and valve seat surfaces also suffer from non-use. Some valves will remain open depending at which part of the combustion cycle the engine has stopped. The heat and cold of the day allows moisture to accumulate through the exhaust system. Start all engines, including the generator, at least twice a month.

Electric Motors:

Electric motors in the motorhome should be occasionally operated to help lubricate and keep surfaces freely rotating. These items include the roof air conditioners, dash fans, dash blower motor, furnace and powered roof vents.

Winter Storage Checklist

- **Plumbing Lines -** Drain and protect. ***(See Winterizing - Section 6.)***
- **Fresh Water Tank -** Drain.
- **Body -** Clean and wax. Reseal the roof as needed.
- **Countertop and Cabinets -** Wash with mild soap and water.
- **Curtains -** Remove and clean according to care specifications.
- **Windows -** To protect interior fabric from fading, cover windows by pulling blinds. For Day/Night shades cover with a separate cover such as a sheet or a cut out template. Day/Night shades hold their shape better if stored in the up position.
- **Holding Tank -** Drain and rinse. Close valves.

LUBE:
Add a small amount of RV antifreeze to waste holding tanks to keep valves and gaskets lubricated.

- **Drain Traps -** Pour RV antifreeze down all drains.
- **Refrigerator -** Clean and leave both doors propped open. Cover exterior panels and roof vents. If equipped with an icemaker, drain icemaker and icemaker tray. See the refrigerator OEM manual for more detail.
- **Batteries -** Add distilled water and recharge if needed. If necessary, disconnect the cables, remove the batteries and store them in a cool dry place. Check and recharge as needed.
- **Air Conditioner -** Remove the air filters. Clean or replace.
- **Roof -** Keep clear of snow accumulation or damage may occur.
- **Interior/Exterior -** Storing under cover or indoors helps extend interior and exterior life.
- **Fuel Tank -** Fill the fuel tank to reduce space for condensation of water.

Removal from Storage

Extensive freeze damage or other serious deterioration can occur if the motorhome is not properly winterized. If the motorhome is properly and carefully prepared for storage, removal from storage will not be difficult. The following checklist pertains to items or areas that should be inspected when it is time to take the motorhome out of storage and put back into operation. If there are any questions regarding storage or winterization, consult a qualified service technician.

- Thoroughly inspect the exterior of the motorhome. Look for animal nests in the wheel wells or in other out of the way places.
- Remove all appliance flue vent covers, ceiling vent covers and air conditioning covers. Clear the refrigerator openings of debris, insect nests, webs, etc.
- Open all doors and compartments. Check for animal or insect intrusion, water damage or other types of damage which may have occurred.
- Check the state of charge of the batteries. If necessary, fill battery cells with distilled water only. Charge as necessary. Inspect the cable ends and terminals. They should be secure and free of corrosion.
- Check all the chassis fluid levels: engine oil, engine coolant, hydraulic fluid reservoir, transmission oil and rear axle oil.

- Start the engine, allowing it to reach operating temperature. Ensure gauge readings indicate a proper range.
- While the engine is running, check the headlights, taillights, turn signals, back-up lights, license plate light and emergency flasher. Operate the dash air conditioner. If the air conditioner does not work or the compressor makes unusual noises, have the system checked by a qualified air conditioner technician.
- Shut the engine off. Adjust or add fluids as necessary. Inspect around the engine and under the motorhome for fluid leaks.
- Drain, sanitize and flush the fresh water system as outlined in the ***Water Systems - Section 6***. Inspect the sewer drain hose and connections for leaks. Replace if necessary.
- Operate all faucets and fixtures in the fresh water system. Run a sufficient amount of fresh water through all the water lines and faucets to thoroughly purge any potable antifreeze from the fresh water system.

NOTE:
Discard at least the first two trays of ice from the icemaker to ensure the ice does not contain traces of antifreeze or other contaminates.

- Open cabinet doors and drawers. Inspect for water leaks at fittings. Repair as necessary.
- Operate all 12 Volt DC lights and accessories. If something does not work there may be a bad 12 Volt DC circuit breaker or blown fuse.
- Install new batteries in battery operated safety detectors or devices. Test the carbon monoxide, propane and smoke detectors for proper operation.
- Check that the monitor panel is properly functioning.
- Inspect the 120 Volt AC electrical system which includes the power cord, inverter, all outlets and exposed wiring.

NOTE:
Prepare the generator for operation following the instructions in the generator OEM manual.

- Start and run the generator.
- Confirm that the batteries are charging. Operate the 120 Volt AC appliances and air conditioners. If an electrical item or appliance is not properly functioning, contact the dealer or an authorized service center to have it evaluated.
- Have a qualified technician inspect the propane system and perform a propane leak test. The leak test should also include an propane regulator adjustment (if needed). The test can also verify if the regulator is faulty and should be replaced. Have the propane tank inspected.

- Operate each propane appliance. Observe all burner/pilot flames for proper color and size.
- Inspect and clean the interior.
- Check the sealant around all roof and body seams and windows. Reseal if necessary.
- Lubricate exterior locks with a graphite lubricant.
- Check condition of the windshield wiper blades. Check the wiper/washer operation.
- Wash and wax the exterior. Check the body for scratches or other damage; touch up or repair as necessary. Flush the underside thoroughly.
- Run through the operational checks for steering, brakes, engine and transmission. Operate the motorhome slowly during these checks to allow sufficient circulation of fluids and resetting of the components.
- If desired, have the dealer or repair center double-check preparation to make necessary adjustments and/or correct defects.

NOTE:
Road vibration can cause fittings and fasteners to loosen. Perform periodic inspection of fasteners and fittings.

Appliances

Section 4

APPLIANCES - INTRODUCTION

This section covers operation and care of various appliances found in the motorhome: refrigerator, cooktop, microwave, roof air conditioner and optional appliances. These appliances operate on AC or DC current, propane or a combination of the three.

NOTE:
Appliance features and options vary with floorplans.

INFORMATION:
Detailed information with CAUTION or WARNING instructions for the various appliances, other than what is found in this section, can be found in the OEM manuals.

WARNING:
Before entering any type of refueling station, turn off all propane operated appliances. Most propane appliances are vented to the outside. When parked close to a gasoline pump it is possible for fuel vapors to enter this type of appliance and ignite, resulting in an explosion or fire.

WARNING:
Carbon Monoxide gas may cause nausea, fainting or death. Operating a propane appliance with inadequate ventilation or partial blockage of the flue can result in Carbon Monoxide poisoning. Do not store flammable liquids such as lighter fluid, gasoline or propane in the outside refrigerator compartment.

REFRIGERATOR

Follow the specific guidelines in the refrigerator OEM manual for detailed operating and maintenance instructions. The refrigerator requires annual service. Keep a record of this service for any future warranty concerns. Annual service will help ensure longevity and proper operation of the refrigerator. With proper care and maintenance, the refrigerator should provide years of trouble-free service.

INFORMATION:
Refrigerators equipped with an icemaker will require special winterization procedures. Refer to the refrigerator OEM manual for winterization instructions.

TIP:
Reduce the possibility of food spoilage by keeping refrigerator temperature at or below 40º F. Lower temperature can also lead to increased frost build-up.

Operation Specifics

- The refrigerator operates from propane or 120 Volts AC electric.
- DC Voltage for operation should be between 9.5-15 Volts DC.

Leveling

The refrigerator must be relatively level during operation when parked. The margin of level for safe operation is within “comfortable living conditions”.

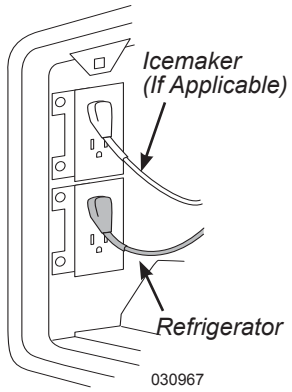
The refrigerator can be damaged if operated when parked on noticeable slope such as a driveway. Leveling the refrigerator is not required during travel.

CAUTION:
Operating the refrigerator off-level when parked separates chemicals, causing them to crystallize and block the circulation action of the cooling unit. Damage is cumulative and irreversible.

WARNING:
Do not use the refrigerator if there is an ammonia smell inside or outside of the refrigerator, or if a yellowish substance appears inside or at the outside access compartment. This can be an indication of a refrigerant leak. Contact an authorized repair facility.

Refrigerator Operation:
- House batteries must be charged.
- The primary propane valve must be open.
- **Figure A:** The refrigerator 120 Volt AC cord(s) must be plugged in (located outside behind refrigerator access door).

Figure A



Control Panel 2 Door - Dometic

On/Off Button:
Turns the refrigerator on or off.
- Push the On/Off button to turn on the refrigerator.

Gas Button:
Sets mode of operation.
- Automatic operation (Gas button not selected) sets mode of operation to 120 Volt AC as the primary energy source. If 120 Volt AC is not available, the refrigerator will automatically switch to Gas (propane) operation.
- Press the Gas button to select Gas (propane) only operation.

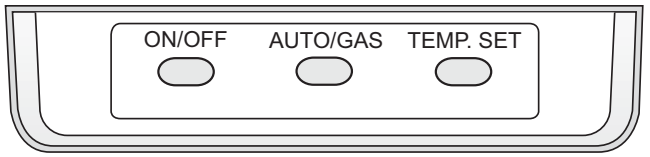
Operation:
Auto feature selects 120 Volt AC as the primary energy source. If AC discontinues or is unavailable, the refrigerator will automatically switch to propane operation.
- Leave the Gas button in the out position for automatic energy selection.
- Press the Gas button to switch to propane operation only.
- Temperature is present and not adjustable.

Control Panel 4 Door - Dometic

On/Off Button:
- Turns the refrigerator on or off.

Auto/Gas Button:
Controls mode of operation.
- Selects between Automatic mode or Gas (propane) only operation.

Temp Set Button:
Adjusts the temperature.
- To adjust, press and release the Temp Set button until the desired setting is obtained.
- Number “5” is the coldest setting.

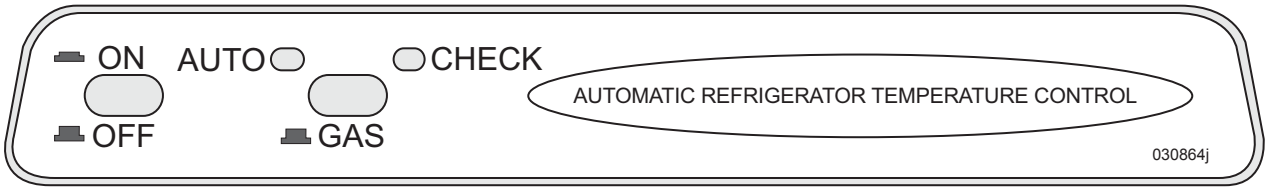


Dometic 4 door control panel

Automatic Mode:
Automatic mode selects AC over propane operation. If AC discontinues or is unavailable, the refrigerator will automatically switch to gas (propane) operation. Once AC becomes available, the refrigerator will automatically switch to AC operation. Press the Auto/Gas button until the light displays below Auto in the LED display.

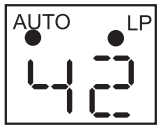
Gas Mode:
Gas only mode (propane operation) is selected by pressing the Auto/Gas button until the light displays next to LP in the LED display.

Temp Set:
Press and release the Temp Set button until the desired setting of 1-5 is selected. The LED display will temporarily indicated the temperature setting then switch to actual temperature inside the refrigerator.

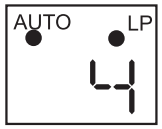


Dometic 2 door control panel

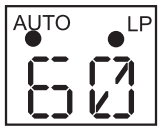
LED Display - 4 door Dometic



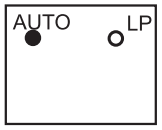
Actual Temperature



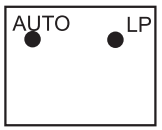
Temperature Set Point



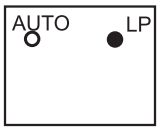
Temperature out of Range



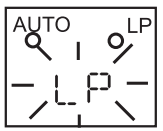
Auto Mode in AC Electric



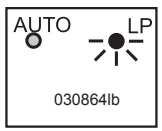
Auto Mode in Propane



Gas Mode



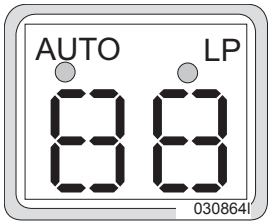
LP Flashing Indicates
Propane Lockout.
Ensure Propane Supply is On.
Reset by Turning Off then On.



Auto Mode w/LP Flashing
AC not Available.
Propane Mode not Working.
Check AC and Propane
Supplies.

LED panel legend

The LED display indicates mode of operation, temperature settings, actual temperature inside the refrigerator and fault codes.



Dometic LED display

See LED Panel Legend for details

Control Panel 4 Door - Norcold

ON/OFF Button:
Turns the refrigerator on or off.

- Push the On/Off button to start the refrigerator in Auto mode.
- Push and hold the On/Off button for two seconds to shut it off.

LED Display:
This screen is used for mode, temperature and fault code display.

MODE Button:
Controls the operation mode of the refrigerator.

- Press the Mode button to select between Automatic AU, AC or LP operation.

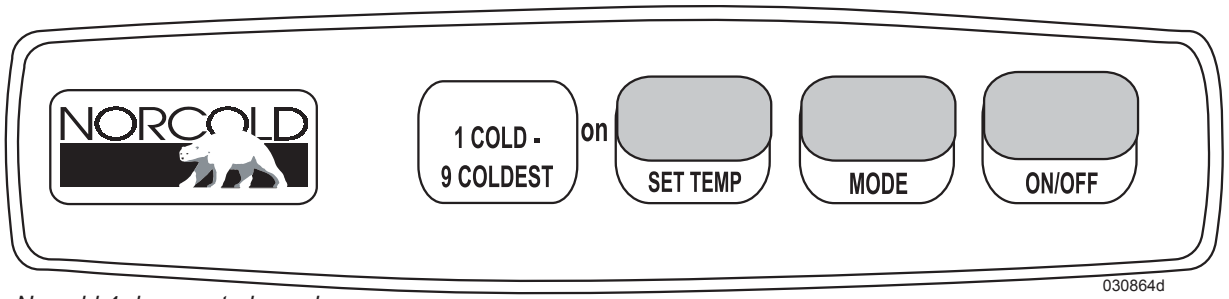
SET TEMP Button:
Adjusts the temperature.

- To adjust, push and hold the Set Temp button.
- Number “9” is the coldest setting.

Manual Mode (MAN):
When one of the two manual modes is selected:

1. **AC** = The refrigerator is operating on AC electric.
2. **LP** = The refrigerator is operating on propane.

Automatic Mode (AU):
This feature selects AC over propane operation. If AC discontinues, the refrigerator will automatically switch to propane operation. An alarm will sound and a code will display if the propane igniter fails to light.



Norcold 4-door control panel

- Press the Mode button until AU displays. Release the button.
- Press and hold the Set Temp button until the desired temperature displays. Release button.
- In Auto mode, AU/AC or AU/LP will alternate three times when a mode has changed.

If the propane does not ignite within 30 seconds, the control changes to a different energy source or the gas safety valve closes and “NO” “FL” displays. Turn the refrigerator off then back on. If the burner does not ignite after several attempts, consult an authorized service technician.

Refrigerator Alarm - Norcold

The Alarm Will Sound for the Following Reasons:

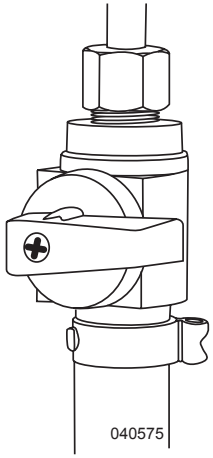
- DC or AC voltage is higher or lower than allowed.
- The refrigerator fails to light on propane or fails to light after a period of operation.
- Refrigerator is set to Auto, 120 Volts AC is discontinued and propane fails to light. NO AC will display, followed by NO FL, and the alarm will sound. Consult the OEM manual.
- Door is open longer than two minutes.
- The circuit board detects a failure. The control panel will display a code.

NOTE:
If the alarm sounds, note the code in the LED display and turn the refrigerator off to silence the alarm.

INFORMATION:
Refer to the refrigerator OEM manual for the list of codes and their meanings.

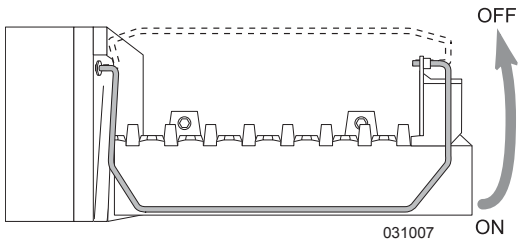
Icemaker - 4 door

The icemaker requires 120 Volts AC to operate. Only after the freezer reaches freezing temperature will the icemaker function. City water or the water pump must be on and the water valve for the water supply line to the icemaker must be on.



Valve shown in off position

- Pull the metal arm (bail) down to turn the icemaker on.
- Push the arm up to turn the icemaker off.



- Depending upon water pressure, the water refill rate for the ice tray may need to be adjusted to produce proper size cubes. See the OEM manual for refill adjusting instructions.

Important:

- Do not operate icemaker while the motorhome is in transit. Water may spill out during travel.
- Do not use the first one or two trays of ice following storage.
- Do not operate the icemaker without water pressure supplied to the refrigerator. Damage to the icemaker assembly could occur.

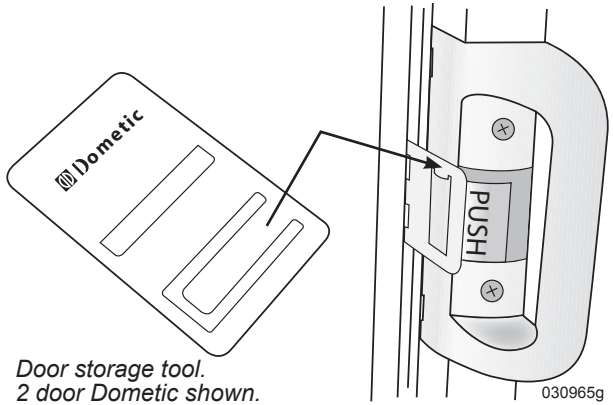
Doors

The refrigerator doors use a positive latch that secures the door with a “click” to prevent the door from opening during travel.

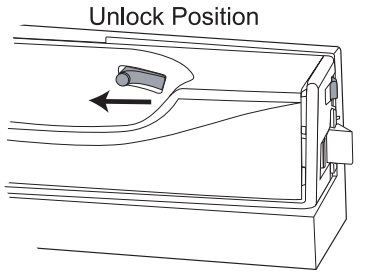
Storage Procedures

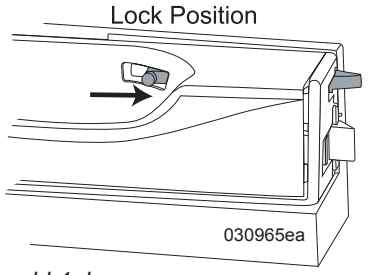
When the refrigerator will not be used or when placing the motorhome in storage, it is recommended remove all items from the refrigerator and thoroughly clean the interior and doors using mild soap and water only.

The doors should be positioned partially open to allow airflow to help prevent mold and mildew growth. The Dometic refrigerator doors use a storage lock device to hold the doors in a partially open position.



Door storage tool.
2 door Dometic shown.





Norcold 4 door

To use the refrigerator storage position:

- Completely empty the refrigerator.
- Thoroughly clean the interior using mild soap and water. Use a 100% cotton cloth to dry.
- Insert door storage tool (Dometic only) into door(s) and position doors in the partially open position.

CAUTION:
Do not use a heating gun or hair dryer to remove frost. Permanent damage could result to plastic parts. Do not use a knife, ice pick or any other sharp instrument to remove ice from the freezer as these can puncture and damage the interior or cooling unit.

Service

The Dometic refrigerator will require an annual service at an authorized Dometic repair center. The technician will perform a series of required checks as well as service the propane burner and flue. A record of annual service, such as the receipt, is required as proof of service should the refrigerator need repair during the warranty period.

NOTE:
Retain a record of annual service in case repair is required during the warranty period. See OEM manual for annual service record and details.

NOTE:
The Norcold refrigerator should be serviced annually to maintain satisfactory performance.

Over time, the BTU output of the burner can change affecting the refrigerator's performance. The annual service will entail a thorough cleaning of the burner, orifice (jet) and flue. Ambient temperature, high humidity and altitude above 5,500 ft. can affect performance and function. If possible, switch mode operation to AC while at a higher altitude.

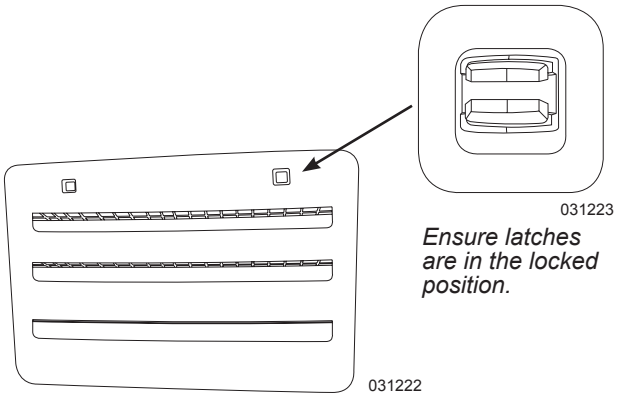
Tips

- Cool items first, if possible, before putting them into the refrigerator.
- Keep the doors shut. Think about desired contents before opening the doors.
- Allow the refrigerator 24 hours of operation before actual use to get a head start on the refrigerator process.
- A box of open baking soda will help absorb food odors.

Exterior Refrigerator Access Panel

After opening the refrigerator access panel, the panel must be properly closed and secured.

CAUTION:
Ensure the exterior refrigerator access panel is properly secured after installation. Failure to do so may result in the panel jarring loose during travel.



Ensure latches are in the locked position.

Ensure tabs are inserted.

Air in Propane Supply Lines

For safety reasons, the refrigerator will attempt to ignite on propane within a specified amount of time. When starting the refrigerator for the first time after storage or after servicing the propane supply system, propane supply lines may contain air. Due to air in the supply lines the refrigerator may not ignite on propane within the specified amount of time. Follow the procedure on how to remove air from the propane supply lines.

To remove air from the propane supply lines:

- Ensure the primary propane shut-off valve is open.
- Light cooktop burners first to quickly purge air from the main distribution line.
- Push the On/Off button to turn the refrigerator on.
- Set refrigerator operation to propane. The refrigerator will begin the ignition cycle during which the propane safety valve opens and the igniter sparks.
- If the refrigerator fails to light, turn off the refrigerator to reset the ignition cycle then turn the refrigerator back on. If after several attempts the refrigerator fails to light, stop and consult an authorized refrigerator service center.

REFRIGERATOR - RESIDENTIAL (OPTIONAL)

The refrigerator operates from shore power, the generator or the inverter. For ease of operation, thermostat controls are located on the freezer door with the water and ice cube dispenser. Ice can be dispensed as crushed or cubed.

NOTE:
The refrigerator operates on 120 Volts AC, not from propane.

INFORMATION:
See the OEM manual for detailed information and instructions.

Refrigerator Operation from Inverter While Traveling:

Turn the inverter and refrigerator on. The electrical combination of the engine alternator and the inverter will supply the power necessary to operate the refrigerator on 120 Volts AC while traveling.

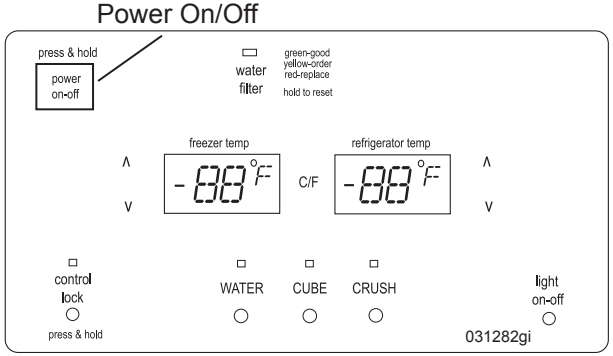
NOTE:
Be sure to turn the inverter off after travel. Hook to shore power to continue refrigerator operation.

Refrigerator Operation while Dry Camping:

Start the generator or turn the inverter on to power the refrigerator. If using the inverter, enable the Automatic Generator Start feature (through inverter remote) to avoid dead house batteries and the possibility of food spoilage. The AGS feature will start the generator based on parameters set in the inverter remote. See ***"Inverter"*** in Section 8 for information on programming AGS.

Control Panel

Features include temperature adjustment, water filter monitoring and filter alert reset. LED's indicate water filter status. Dispense water and ice, monitor the water filter and set temperature from the control panel. LED's indicate when a feature is active.



Control panel

On/Off Button:

Press and hold On/Off for three seconds to turn the cooling system on or off. This will not disconnect power to lights or other electrical components.

NOTE:
Turning off the refrigerator does not disable refrigerator power consumption. The refrigerator must be unplugged to remove power for lighting and control panel operation.

Temperature Controls:

Press the up or down arrow to display temperature. The current set temperature momentarily displays before reverting to current temperature. The current temperature display is for reference only.

Place a separate thermometers in the freezer and fresh food compartments for accurate temperature indications.

CAUTION:
Keep the fresh food compartment temperature at or below 40º F. to reduce the possibility of food spoilage. Place a separate thermometer inside the freezer or fresh food compartment to accurately monitor temperature.

Allow the refrigerator to operate for at least 8 to 12 hours before storing food inside to ensure safe food storage. Adjust temperature gradually allowing time for the new preset temperature to stabilize.

Water:
Press this button to select water from the dispenser.

Cube:
Press this button to select cubed ice from the dispenser. Press the drinking glass against the dispenser paddle as far up as possible to catch all ice.

Crush:
Selects crushed ice from the dispenser. Press the drinking glass against the dispenser paddle as far up as possible to catch all ice.

Light:
Turns dispenser light on and off. The light will automatically turn on and off with water and ice dispenser use.

Filter Reset:
The Filter Status light above the Filter Reset button will illuminate when water or ice is dispensed. The light will change color depending on water filter condition. (See Water Filter)

Lock:
The ice and water dispenser can be locked to prevent unwanted use. Press and hold the Lock button until the red LED illuminates to lock the dispenser; press and hold until the red LED turns off to release dispenser.

To Dispense Water:
Press a drinking glass against the water dispenser arm. Release dispenser arm to stop water flow. Water is not chilled; add ice for cold water. Do not pour water or ice in the dip tray as there is no drain.

To Dispense Ice:
Select crushed or cubed ice by pressing the corresponding button on the control panel. Press a drinking glass against the ice dispenser arm. Keep the glass as high as possible to catch all ice.

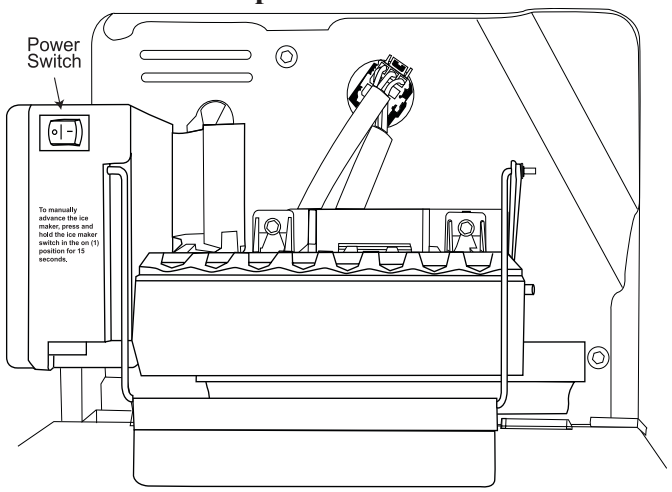
NOTE:
Use only cotton cloth and mild soap to wash refrigerator components. Harsh detergents such as window cleaner or bleach or use of scouring pads can damage the finish.

Icemaker

The icemaker requires 120 Volt AC power to operate. The icemaker will begin producing ice within 24 hours after the refrigerator is properly cooled.

Operation:
- Hook to city water or turn on the water pump.
- Open the valve for the water supply line located behind the exterior refrigerator access panel.
- Remove the shelf above the icemaker tray to access the icemaker power switch.
- Use the power switch to turn on the icemaker. Do not use the bail arm to manually turn the icemaker on or off.
- Before traveling, turn the icemaker off to prevent water from spilling during transit.

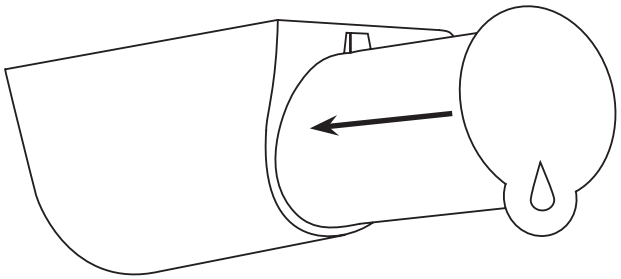
NOTE:
Discard the first batch of ice as it may contain impurities.



Power switch for icemaker. 031282c

Water Filter

The refrigerator is equipped with a water filter for the ice and water dispenser. The filter cartridge is located at the top of the fresh food compartment. The filter is rated at a capacity of about 200 gallons. The filter element is installed at the factory, so no initial installation is required. A monitoring system alerts the user when filter replacement is necessary. The Filter Status light, located on the control panel, will illuminate when water or ice is dispensed. The light will change color depending on condition of the water filter.



Firmly push inwards on water filter to release. 031282h

Green: Filter is operating within specified life cycle.

Amber: Filter is approximately 80% used.

Red: Filter is completely used. Replace as soon as possible.

Water Filter Replacement:

Monitor the Filter Status light on the control panel to determine water filter replacement. Also replace the water filter after extended periods of non-use.

Filter Removal:

Turn the icemaker off (power switch is located on the icemaker). Firmly press the filter inward to release the filter. Pull the filter cartridge straight out of the filter housing. A small amount of water may leak from the filter cartridge. Do not operate the water or ice dispenser without the filter in place.

Filter Installation:

Note cartridge index position and insert new cartridge in same position. Firmly push in the new cartridge until it locks into place.

Turn the icemaker on.

Dispense water into a glass. Check the filter housing for leaks. The Filter Reset button is located on the water and ice dispenser control panel. Press and hold the Filter Reset button for 10 to 15 seconds to reset the monitoring system.

Priming the Water System:

Prime the water system after changing the water filter and whenever the water source is changed. Ensure the water supply valve is open. The valve is located in the outside refrigerator compartment. Press and hold a drinking glass against the water dispenser arm until water flows. Sputtering is normal as air is purged. Allow water to flow for three minutes to flush the system of air and impurities.

NOTE:
The dispenser automatically shuts off after three minutes of use. Release and depress the dispenser arm to reset.

Tips:

- If the temperature display flashes, the control system has detected a fault. Call Frigidaire customer service at 1-800-944-9044. A qualified service technician can interpret the flashing message.
- If possible, cool items first before putting them into the refrigerator.
- Keep the doors shut. Plan ahead what is needed before opening the doors.
- Do not block cold air vents with food items.
- Allow the refrigerator 24 hours of operation before actual use to help it get a head start with the refrigeration process.
- A box of open baking soda will help absorb food odors.
- To prevent dead batteries when dry camping, use the Automatic Generator Start feature and inverter to supply AC power to the refrigerator.

CONVECTION MICROWAVE OVEN

The convection microwave oven operates from 120 Volt AC supplied by shore power, the generator or inverter.

Operation Tips:

- The glass tray and roller guide must always be in place during cooking.
- Ensure the door is firmly closed before use.
- Ensure cookware being used is microwave safe. Gold paint and some glazes may contain a trace amount of gold which is electrically conductive and not compatible for the convection microwave. Hand painted china commonly contains traces of metal.
- If the control pad is not lit, plug another electrical appliance into the same outlet to verify 120 Volt AC power is present. If the test item works, contact an appliance repair facility to have the convection microwave oven checked.
- Steam accumulating inside or around the outside of the oven door may occur when the convection microwave oven is operated under high humidity conditions and in no way indicates a malfunction of the unit. Wipe away steam using a soft cloth.

Convection Microwave Facts:

One of the most useful documents is the convection microwave OEM manual. Read the document carefully and keep it for detailed information, operating instructions and reference. A properly functioning convection microwave oven presents no hazard with ordinary use. Safety features should be kept in good condition. Never attempt to bypass safety interlocks or allow debris or residue to accumulate on the door or oven face. If the oven is damaged, discontinue use. Oven adjustments or repairs should be made by qualified service personnel.

CAUTION:
If a fire flares up when using the cooktop, turn off the convection microwave oven ventilation fan as it may spread the flames. The ventilation fan cannot manually turn off when automatically started from a heated cooktop. Turn off the main circuit breaker located in the Load Center. This will help prevent flames from spreading into the microwave.

NOTE:
When dry camping, minimize using the inverter to operate the convection microwave oven due to the high rate of battery consumption.

NOTE:
The convection microwave oven is for food preparation only. Do not use the convection microwave oven to dry clothes, newspapers, shoes or other items.

INFORMATION:
For more detailed information and operating instructions, refer to the convection microwave oven OEM manual.

CAUTION:
Long-term use of the inverter to operate the convection microwave while in transit will damage the alternator. Use the generator to operate the convection microwave while in transit.

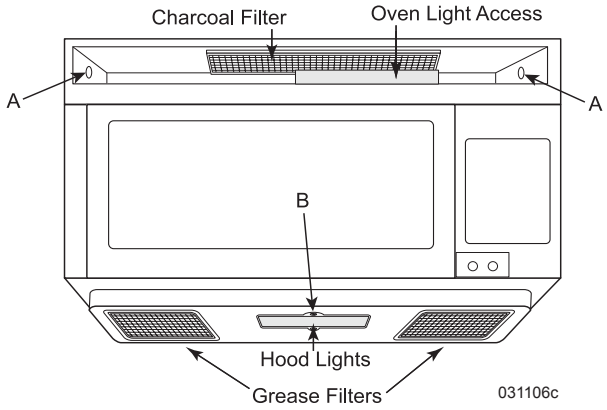
Care & Cleaning

The exterior of the convection microwave oven is plastic and metal. The interior is metal. Do not clean with scouring pads, harsh or abrasive cleaners, chemical cleaners or petroleum based thinners that can damage the finish. Use mild soap and water with a damp cloth or paper towel to remove stains or spills. When cleaning the touch pad, open the door to prevent accidental operation. Use mild soap and water with a soft cloth. Avoid using excess amounts of water on the touch pad. The turntable plate and oven racks are dishwasher safe.

Charcoal Filter:

Depending on use, the charcoal filter should be replaced every 6 to 12 months. Use the following procedure to remove the louvers to replace the charcoal filter and oven light:

- Remove power to the convection microwave oven.
- Remove screws (A) securing the louver.
- Insert a flat blade screwdriver over each tab pressing downward and move the louver away from the convection microwave.
- Remove and replace the charcoal filter. Ensure the filter is positioned on the supporting tabs.
- Replace louver and mounting screws.



Oven Light:

- Remove the louver as previously indicated.
- Slide the metal light cover forward and lift upwards.
- Remove the light bulb and replace only with an equivalent watt bulb. Do not exceed 30 watts.
- Replace light cover, louver and mounting screws.

Hood Light:

- Remove power to the convection microwave oven.
- Remove the screw (B) securing the light cover.
- Remove the light bulb and replace only with an equivalent watt bulb. Do not exceed 30 watts.
- Close cover and re-secure with screw.

CAUTION:
Light cover may be hot. Do not touch glass with lamp on. Never use the light for prolonged periods, such as a night light.

Grease Filters:

Operating the convection microwave oven without the grease filters in place can damage the unit. Grease filters should be cleaned at least once a month. To remove the filters, use the pull-tab to slide the filter to the end of the opening and tip down. Soak the filters in the sink or in a dishpan filled with hot water and detergent.

- Do not use ammonia or other alkali-based products that may darken the filter material.
- Agitate the filter. Use a scrub brush to remove caked on grease.
- Rinse the filter thoroughly and shake dry. Place the filter back into the opening, tip upward and slide filter to the end of the opening. Lock in place. Be careful not to kink or warp the filter upon installation.

Cleaning Tips:

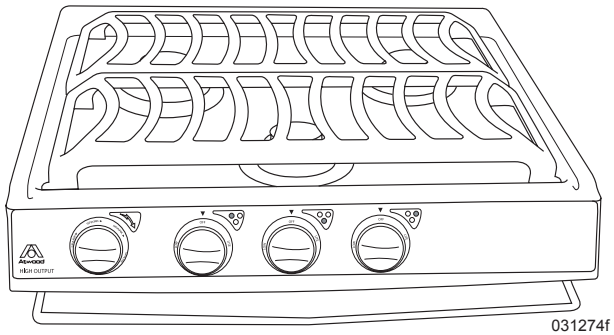
- Turn the oven off before cleaning.
- Cover food while cooking to keep spattering to a minimum.
- Clean up all spills or spatters before they dry. Wipe up food spatters or spilled liquids with a damp cloth. Mild detergent may be used for stubborn spills. Do not use harsh detergent or abrasive cleaner.
- It is occasionally necessary to remove the glass tray for cleaning. Wash the tray in warm, sudsy water or in a dishwasher.
- The roller guide and oven cavity floor should be regularly cleaned to avoid excessive noise. Wipe the bottom surface of the oven with mild detergent water or window cleaner and then dry. The roller guide may be washed in mild sudsy water.
- Food odors may linger inside oven. To help eliminate odors, combine the juice and the peel from one lemon, several whole cloves and 8 oz. of water into a two cup bowl. Place in oven on high power; bring to a boil for several minutes. Let cool in the oven for several minutes.
- Clean the exterior surface with soap and water. Wipe away any residue using a damp cloth. Dry with a soft cloth. To prevent damage to the operating parts, do not allow water to seep into the ventilation openings.
- If the control panel becomes wet, clean with a soft, dry cloth. Do not use harsh detergents or abrasive when cleaning the control panel.

COOKTOP

The cooktop uses propane as a fuel source. The burners are ignited with piezo ignition. The cooktop is intended for cooking purposes only. It is not designed as a heating source. The flame should have a blue appearance with a lighter blue defined flame at the burner head.

A yellow flame or yellow tips indicate a rich fuel mixture that can leave carbon on the bottom of cooking utensils.

INFORMATION:
For detailed cooktop information, operating instructions and safety refer the OEM manual.

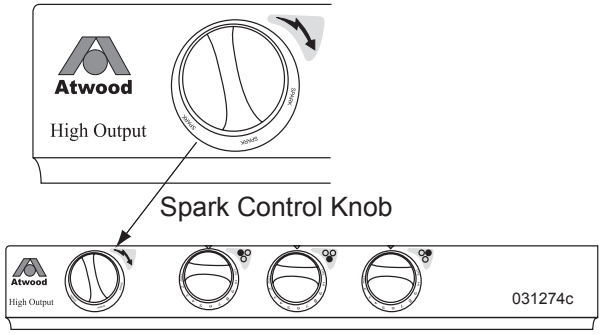


To Use the Cooktop:

- Open the primary valve on the propane tank.
- Battery cut-off switch is on.
- House batteries are charged.

Lighting the Burners

- Place cookware on burner grate over the desired burner.
- Push in and turn the appropriate burner knob to Lite. Do not attempt to light more than one burner at a time.
- Rotate Spark Control Knob clockwise until the burner lights.
- When the burner lights, rotate knob to the desired flame setting.



WARNING:
Do not leave burners unattended during cooking. Do not leave burner valve(s) open while burner(s) are not lit. Propane is heavier than air and will settle on the floor and "hide" in corners. If a propane smell exits, extinguish all open flames. Open all windows and doors. Do not touch any electrical switches. They may cause a spark that can ignite. Evacuate the motorhome and shut off the primary propane valve. Liquid propane is highly volatile, highly explosive and extremely dangerous. Explosion, fire, property damage, injury or death can result. Contact a qualified service center to have the problem correctly diagnosed and repaired before resuming operation.

Operation Tips:

- A yellow flame is an indication of incorrect fuel/air ratio. Lowered BTU output and carbon build-up can occur.
- When cooking at an altitude above 5,000 ft., the flame may change appearance and the flame BTU output will be lowered. Allow extra cooking time.
- Do not allow the tips of the flame to extend beyond pan or pot edge. When this occurs heat is wasted and possibility of injury increases.
- Cooking time can be reduced if the least amount of liquid is used.
- Cookware type and style can make a big difference in heat distribution.

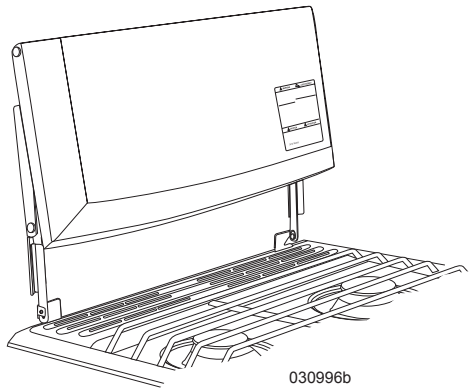
Safety

- Do not leave children alone or unattended in the galley area when the cooktop is in use.
- Never allow anyone to sit, stand or climb on any part of the range cooktop. Serious injury or burns could occur.
- Do not store items that children may want above the cooktop. Children can be burned or injured.
- Do not wear loose or hanging garments when using the cooktop.
- Use only dry pot holders. Damp pot holders on hot surfaces may result in burns from steam. Do not let potholder touch an open flame.
- Do not heat unopened containers. Containers could explode.

CAUTION:
Never leave the cooktop unattended.

Cooktop Cover

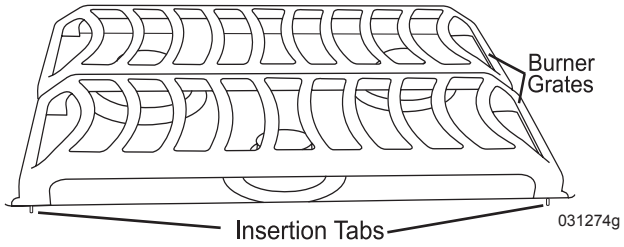
The cover must be open before using the cooktop.



- Do not lower the cover on the cooktop while burners are lit.
- Do not use the cover as a griddle.
- Lift up on hinges then fold cover closed while the motorhome is in transit.

Burner Grate

The burner grates are attached to the cooktop by four insertion tabs and can be removed for cleaning. Place a cloth down to protect the countertop. To remove a burner grate, pull up on the grate. To re-install a burner grate, align the insertion tabs with the grommets and push down.



Care & Cleaning

Regularly clean the cooktop with a soft cloth and a warm soapy solution. Do not use abrasive or harsh cleaners such as steel wool, bleach, ammonia or oven cleaner as these can damage the finish.

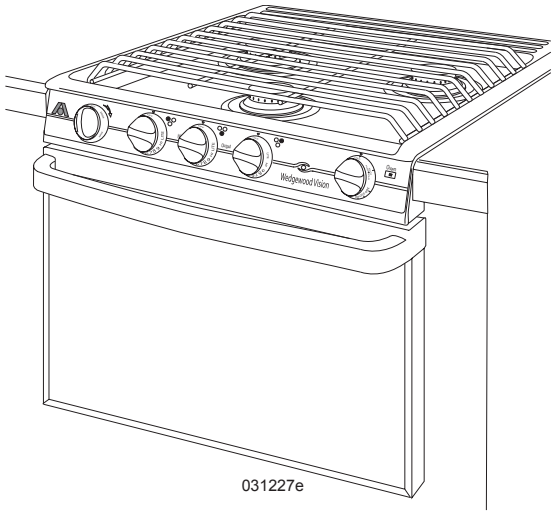
Use a dry paper towel or cotton cloth to wipe up spatters or spills while the cooktop surface is still slightly warm. To avoid accidental burns, do not clean the cooktop when it is hot to touch. Do not allow food to bake on. Clean the surface burner grate and caps using the same guidelines as the cooktop surface.

To avoid dulling the finish, wipe up the spill before it is baked on. Steel wool and course, gritty cleanser will scratch or mar the surface. Use gentle kitchen cleanser powder or grease cleaner. Hopes *"Perfect Cooktop"* can be used to maintain the finish.
Hopes: 800-325-4026.

Porcelain Enamel:
Porcelain enamel, a type of glass fused on steel at a very high temperature, is not extremely delicate but must be treated as glass. Sharp blows, radical surface temperature changes, etc., will cause enamel to chip or crack. Some foods, such as vinegar, lemon juice, tomatoes and milk, contain acids which can dull the finish of the enamel. To avoid dulling the finish, wipe up the spill before it is baked on. The surface is glass and must be given consideration when cleaning. Steel wool and coarse, gritty cleanser will scratch or mar the surface. Any gentle kitchen cleanser powder or grease cleaner will be suitable. Hopes *"Perfect Cooktop"* can be used to maintain the finish.
Hopes: 800-325-4026.

COOKTOP WITH OVEN

The cooktop and oven use propane as a fuel source. The cooktop burners are ignited with piezo ignition. The oven pilot is lit with a match. The cooktop is intended for cooking purposes only. It is not designed as a heating source. The flame should be blue with a lighter blue defined tips at the burner head. A yellow flame or yellow tips indicate a rich fuel mixture that can leave carbon on the bottom of cooking utensils.



INFORMATION:
For detailed information, operating instructions and safety refer to OEM manual.

WARNING

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

Cooking appliances need fresh air for safe operation.
Before operation:
1.Open overhead vent or turn on exhaust fan.
2. Open window.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

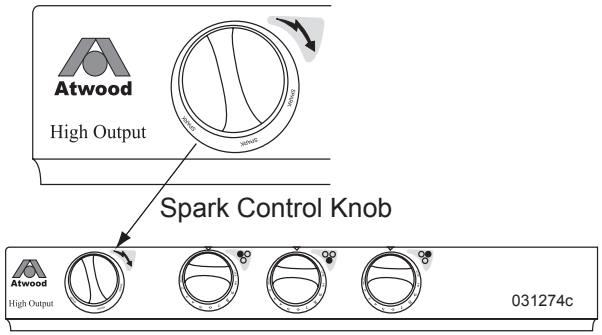
020327

To Use the Cooktop:

1. The primary propane valve is open.
2. The battery cut-off switch is on.
3. House batteries are charged.

Lighting the Cooktop Burners

- Place cookware on burner grate over the desired burner.
- Push in and turn the appropriate burner knob to Lite. Do not attempt to light more than one burner at a time.
- Rotate Spark Control Knob clockwise until the burner lights.
- When the burner lights, rotate knob to the desired flame setting.



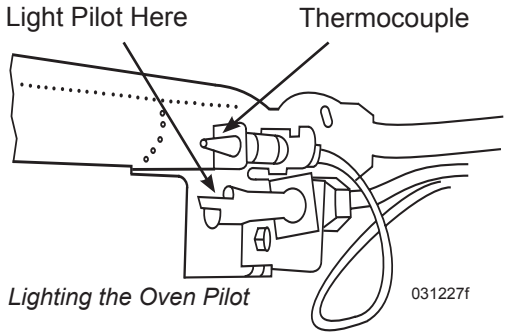
Using the Oven

Lighting Oven Pilot:

- Light a cooktop burner to purge air from system then shut off the burner.
- Push in oven control knob and rotate to Pilot On.
- Push and hold knob inward and light pilot under broiler shelf.
- Once pilot is lit, hold in control knob for several seconds then release. Ensure oven pilot remains lit.
- Rotate control knob to desired temperature.
- To extinguish pilot, push in the oven control knob and rotate to Off.

WARNING:
Extinguish oven pilot when refueling or traveling. Do not block vents in oven with any objects.

CAUTION:
It is recommended to open the cooktop cover when using the oven.



WARNING:
If a propane smell exists, extinguish all open flames and turn off the main gas supply. Liquid propane is highly volatile, highly explosive and extremely dangerous. Explosion, fire, property damage, injury or death can result. Propane is a "heavy" gas and will lay on the floor and "hide" in corners. Open all windows and doors. Do not touch any electrical switches. They may cause a spark which can ignite. Contact a qualified service center to have the problem correctly diagnosed and repaired before resuming operation.

Safety

- Do not leave children alone or unattended in the galley area when the cooktop is in use.

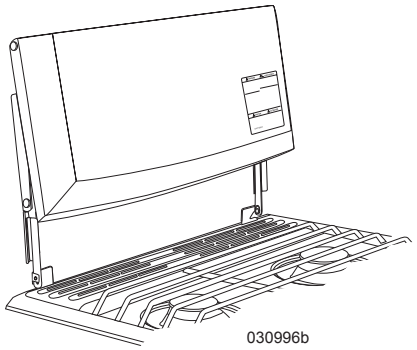
- Never allow anyone to sit, stand or climb on any part of the range cooktop. Serious injury or burns could occur.
- Do not store items that children may want above the cooktop. Children can be burned or injured.
- Do not wear loose or hanging garments when using the cooktop.
- Use only dry pot holders. Damp pot holders on hot surfaces may result in burns from steam. Do not let potholder touch an open flame.
- Do not heat unopened containers. Containers could explode.

CAUTION:
Never leave the cooktop unattended.

Cooktop Cover

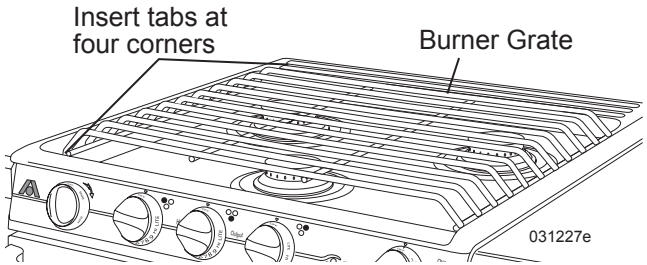
The cover must be open before using the cooktop.

- Do not lower the cover on the cooktop while burners are lit.
- Do not use the cover as a griddle.
- Lift up on hinges then fold cover closed while the motorhome is in transit.



Burner Grate

The burner grates are attached to the cooktop by insertion tabs and can be removed for cleaning purposes. Place a cloth down to protect the countertop. To remove a burner grate, pull up on the grate. To re-install a burner grate, align the insertion tabs with the grommets and push down.



Operation Tips:

- A yellow flame is an indication of incorrect fuel/air ratio. Lowered BTU output and carbon build up can occur.
- When cooking at an altitude above 5,000 ft., the flame may change appearance and the flame BTU output will be lowered. Allow extra time cooking time.
- Do not allow the tips of the flame to extend beyond pan or pot edge. When this occurs heat is wasted and possibility of injury increases.
- Cooking time can be reduced if the least amount of liquid is used.
- Cookware type and style can make a big difference in heat distribution.
- Pre-heat the oven for 10 minutes prior to use.

Cleaning Tips:

- Clean all surfaces as soon as possible after boil overs or spill overs.
- Use warm soapy water to clean the burner grates, cooktops, painted surfaces, porcelain surfaces, stainless steel surfaces and plastic items on the range or cooktop. Grit or acid-type cleaners may ruin the surface. Glass cleaner should only be applied to the cooktop surface using a paper towel. Do not spray directly on the cooktop surface.
- Use only non-abrasive plastic scrubbing pads.
- Do not allow foods containing acids (such as lemon or tomato juice, or vinegar) to remain on porcelain or painted surfaces. Acids may remove the glossy finish. Wipe up egg spills when cooktop is cool.
- Allow porcelain surfaces to cool before cleaning. Burns from the heated surface may occur or the porcelain can crack.

Regular cleaning with a soft cloth and a warm mild soap solution is recommended. Wash, rinse and dry with a soft cotton cloth. Thoroughly clean the cooktop when cool. Use a dry cloth or paper towel while the surface is warm to the touch to clean splatters or spills. Cleaning will be more difficult if spills bake on to the surface.

Do not spray glass cleaner directly on the surface. Do not use abrasive cleaners or steel wool. Harsh cleansers like bleach, ammonia and oven cleaner should never be used. The surface burner grate and caps should be cleaned using the same guidelines as the cooktop surface.

ROOF A/C

The roof air conditioner operates from 120 Volts AC. The thermostat controls roof A/C functions and the furnace.

INFORMATION:
Refer to air conditioner OEM manual for detailed information and operating instructions.

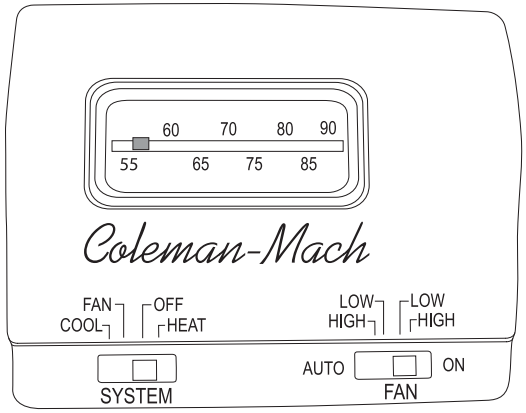
Thermostat

System Switch:
Off – Turns the thermostat off.

Fan - Operates the roof A/C fan only. The compressor will not engage in Fan mode.

Cool - The fan operates continuously for even cooling. The thermostat regulates compressor cycle according to temperature setting.

Heat – Sets the thermostat to operate the furnace. Fan speed of the furnace is not adjustable.



Standard thermostat 031063k

Fan Switch:
Auto Mode
Low Fan – The roof A/C fan operates continuously at low speed. Thermostat temperature setting will cause the fan to cycle on and off.
High Fan – The roof A/C fan operates continuously at low speed. Thermostat temperature setting will cause the fan to cycle on and off.

On Mode
Low Fan – The fan operates continuously at low speed.
High Fan – The fan operates continuously at high speed.

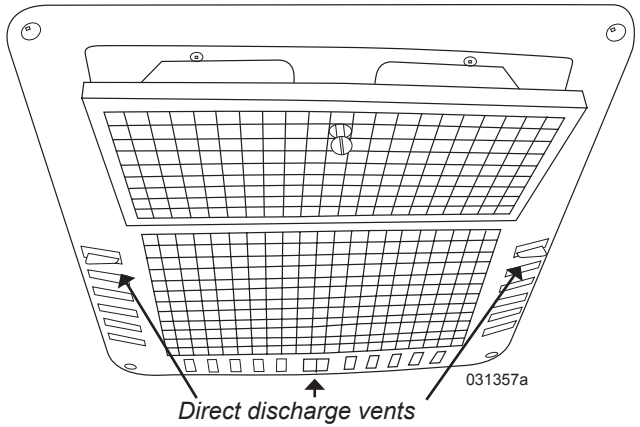
NOTE:
The temperature setting regulates the cycle of the compressor in Cool mode. The blower runs continuously in Cool mode to circulate air and maintain an even temperature.

CAUTION:
Wait 2 minutes after the compressor cycles off before setting the thermostat to a cooler setting. This allows refrigerant pressure to equalize and compressor to easily restart.

Maintenance

Periodically remove and clean return the air filter. The filter is located above the removable panel. Avoid use without the filter in place.

Return air filter



Remove and clean filter and housing with mild soap and water. Do not use harsh cleaners, scouring powders or petroleum based cleaners as this can damage the filter and housing finish.

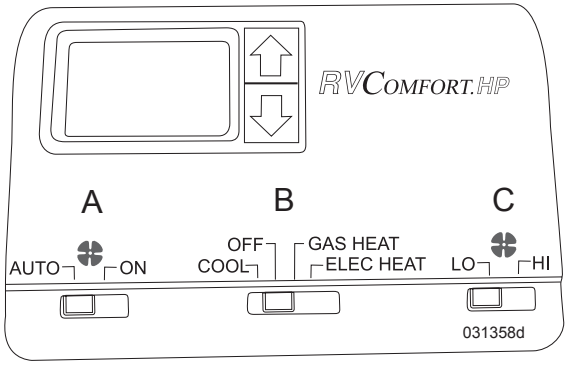
Energy Saving Tips:
1. Select a temperature setting that suits comfort needs.
2. Regularly clean return air filters.
3. Park in a shaded area during extreme outdoor temperatures. Keep windows and doors closed. Keep blinds or shades closed. Avoid use of heat producing appliances.

ROOF A/C HEAT PUMP (OPTIONAL)

Thermostat

The RV Comfort thermostat controls the HVAC (Heating, Ventilation, and Air Conditioning) system comprised of roof top air conditioners and the furnace.

The RV Comfort thermostat must be on to operate any HVAC function. Room temperature will be displayed when the thermostat is turned on. Room temperature will change over to temperature set point when adjusting temperature.



Thermostat used with heat pump

A = Fan control switch
B = Mode switch
C = Fan speed switch

Due to ambient temperature limitations in heat pump mode, the furnace can become the primary heat source. While in Elec Heat mode (Heat Pump), if room temperature and temperature set point is greater than 5º F., the furnace will automatically be selected as the primary heat source. In this case, "DIFF" will display indicating the heat pump function is in standby mode.

The system will automatically switch back to heat pump operation (Elec Heat) when ambient temperature allows heat pump operation or when disparity of room temperature and temperature set point is less than 5º F.

Fan Control:

The fan control switch selects either Auto fan speed or when set to On, fan speed can be adjusted using the fan speed switch.

In Auto mode, fan speed is adjusted automatically depending on disparity of temperature set point and actual room temperature.

Mode Switch:

The mode switch selects mode of operation.

- Cool selects air conditioning mode.
- Off turns the HVAC system off.
- Gas Heat selects furnace mode.
- Elec Heat selects heat pump mode.

Fan Speed:

Fan speed is adjustable when the fan control switch is in the on position.

- Lo selects low fan speed of the roof air conditioning.
- Hi selects high fan speed of the roof air conditioner

NOTE:
The motorhome will not heat or cool faster by selecting a very high or very low temperature setting.

Air Conditioning - Roof

The roof air conditioners operate from 120 Volts AC supplied by shore power or the generator. The wall thermostat requires 12 Volt DC to operate.

NOTE:
The air conditioning system freezes moisture in the air. It is recommended to set the blower fan speed to high when operating in high humidity.

Operation Requirements:

- 120 Volts AC, from either shore power or the generator is supplied.
- The interior house power is on and the house batteries are charged.

Air Conditioner Operation

Setting the thermostat to control air conditioner functions:

- Set mode switch to cool.
- Set fan control switch to auto or on.
- If necessary, set fan speed to low or high.
- Set desired temperature by pressing the Up or Down buttons.

NOTE:
The compressor will engage approximately two minutes after blower motor activation to prevent accidental compressor operation against high pressure.

Heat Pump Operation

In heat pump mode the air conditioning principle is reversed, supplying heated air instead of refrigerated air. There are ambient temperature limitations in Heat Pump mode.

- Set mode switch to Elec Heat.
- Set desired temperature by pressing the Up or Down buttons.

NOTE:
Fan speed is not adjustable in heat pump mode.

NOTE:
The roof air conditioner will not operate in heat pump mode in cold ambient temperature (approximately 46° F.). If room temperature and temperature set point is greater than 5º F., the furnace will be used as the primary heat source until temperature disparity is less than 5º F.

NOTE:
The propane must be on for the backup heat source (furnace) to function.

Air Conditioner Maintenance

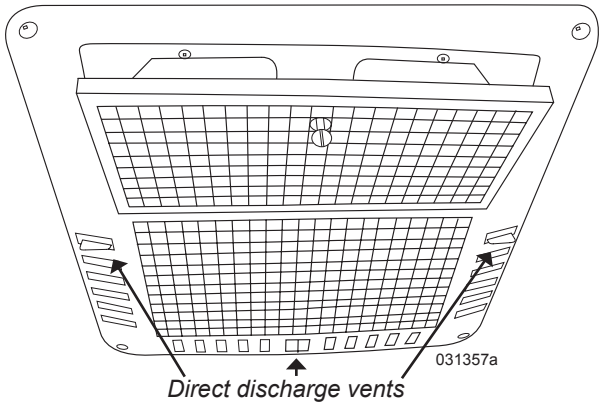
Return Air Filters:

Frequently clean the return air filters. The filters are located behind the return air vent cover.

To Lower Vent Covers:

- Use a suitable driver or coin to unscrew vent intake cover fastener.
- Remove cover and filter.

Return air filter

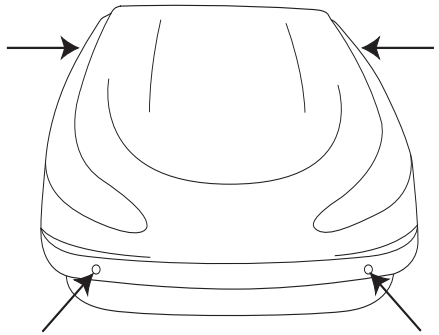


To Clean the Return Air Filter:

- Wash filters in warm soapy water. Do not use solvents.
- Rinse filters thoroughly with fresh water. Allow them to dry.
- Install filters and secure intake vent covers.

Mounting Bolts:

The AC mounting bolts should be re-torqued every six months. Four bolts are located behind the return air filter. Torque the mounting bolts to approximately 40 to 50 in. lbs. The base gasket should be compressed to approximately ½".



Ensure the A/C cover screws (location as illustrated by arrows) are tight when the roof is accessed.

AC Cover Screws:

Use a screwdriver to ensure the AC cover screws are tight whenever the roof is accessed.

FURNACE

The furnace is 12 Volt DC operated and uses propane as the fuel source. Electronic circuitry (automatic ignition) ignites the burner. The furnace uses outside air for burner combustion. Exhaust is expelled through the outside vent. Inside air is drawn into the furnace and blown across the internal heat exchanger. Heated air is then discharged through ducted hoses to the heat registers.

Operation

The furnace is controlled by either an analog thermostat used with standard roof A/C or electronic thermostat used with roof A/C with heat pump. The air conditioner sends an electrical signal to the furnace to begin ignition cycle. There is a small time delay before the blower motor begins.

Once the blower motor attains a predetermined speed it will close the air prover or sail switch. The sail switch, which is now closed, sends the electrical signal through a high-temperature protection switch, then to the automatic ignition circuit board.

The automatic ignition circuit board will attempt to light the burner three times. If the burner does not light by the third attempt, the ignition board will go into “lock-out”. The furnace blower motor will continue to run and the thermostat will have to be cycled off to reset the ignition cycle.

After the thermostat is satisfied the propane valve closes and extinguishes the burner. The blower motor will continue to operate for two or three minutes to cool the furnace.

INFORMATION:
See the furnace OEM manual for complete operation information.

WARNING:
If a propane smell exists, extinguish all open flames and turn off the main propane supply. Propane is an extremely dangerous gas that can ignite and explode, resulting in property damage, injury or death. Propane is heavy and can float on the floor or hide in corners. Open all windows and doors. Do not touch electrical switches as they may spark. Keep open flame, spark producing devices and smoking material out of the area. Contact a qualified service center to have the problem correctly diagnosed and repaired before resuming operation.

CAUTION:
Do not store any items or materials in the furnace area. Restricted air flow can hamper furnace operation leading to failure and/or fire hazard.

CAUTION:
Avoid a direct stream of water into the outside furnace vents. This can damage the furnace.

NOTE:
It is not advisable to use the furnace to heat the interior of the motorhome during transit.

Operation Requirements:
- Primary propane shutoff valve on the propane tank is open.
- House batteries are fully charged.
- Battery cutoff switch is on.

Thermostat

There is a short time delay before the blower motor begins once the thermostat is set.

- Standard Roof A/C:
- Set System switch to Heat.
- Set temperature to desired setting.

- Roof A/C with Heat Pump:
- Set Mode switch to Gas Heat
- Set desired temperature by pressing the Up or Down buttons.

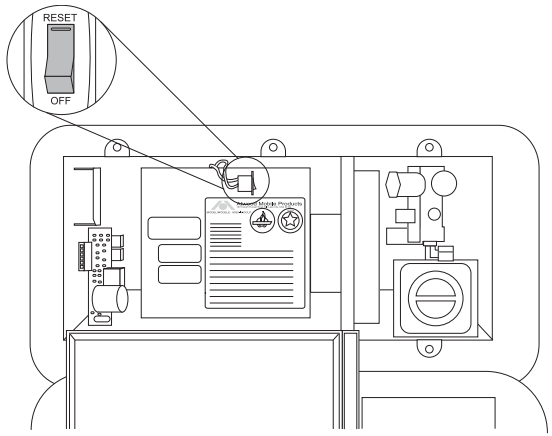
Tips:
- A musty smell may occur during the first couple of heat cycles after the motorhome has been removed from storage.
- Operating the furnace at altitudes above 5,000 feet reduces the BTU output due to air/fuel ratio.
- Have the furnace periodically serviced by a qualified technician, especially if the system makes unusual noise or emits an unusual smell.

Troubleshooting

- Make sure the primary propane shut-off valve is open.
- The furnace will not light if the blower motor fails to spin at a specified speed. This may be due to a low house battery charge condition.
- Hookup to shore power, start the generator, or start the motorhome.

If the blower motor fails to operate after verifying the batteries are charged and the fuses are good, use a screwdriver or coin to open the furnace access panel to inspect the circuit breaker.

To Reset the Circuit Breaker:
- Turn the circuit breaker to Off and then back to Reset.



Reset switch located through exterior access

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WATER HEATER

The water heater uses two different methods to heat water:

- 120 Volt AC supplied either by shore power or the on board generator.
- Propane supplied by the propane tank.

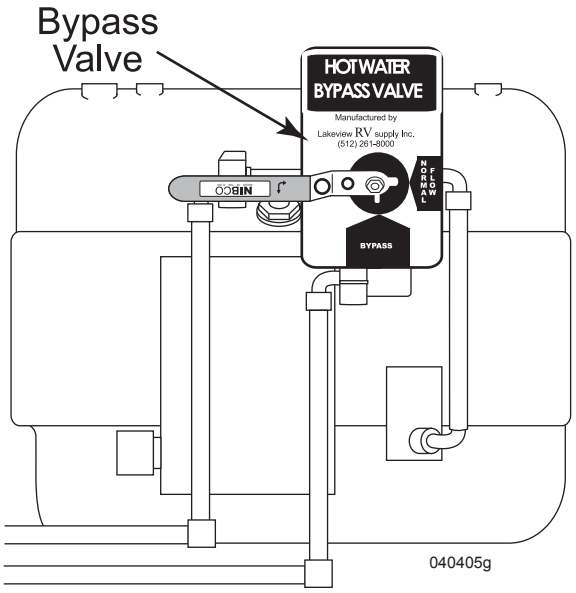
The 120 Volt AC function is most energy efficient when operated from shore power. The burner for propane operation is controlled by an automatic ignition circuit board powered by 12 Volt DC. Two thermostats control water temperature, one for 120 Volt AC and the other for propane. Thermostat temperature is preset and is not adjustable. For ease of winterization, the water heater is equipped with a tank drain plug and bypass valves.

INFORMATION:
Refer to the Water Heater OEM manual for detailed information and operating instructions.

Before Using the Water Heater:
Use water to purge air from the water system and water heater and if necessary, purge FDA approved RV antifreeze from the system.

To Purge Air and Pressurize the System:

- Turn the water heater bypass valve (located on back of water heater) to Normal Flow.
- If necessary, install the drain plug.



Bypass valve shown in Normal Flow

- Fill the fresh water tank or hook to city water.
- Turn on the water pump or city water.
- One at a time, open the hot and cold valves of all faucets until a steady stream of clear water flows with no bubbles or pockets of air.
- Do not operate the water heater until the system is purged of air.
- Inspect the water heater and water system for leaks after the water system is purged of air.

CAUTION:
After purging the water lines and water heater, small air pockets or hydrogen gas may be present. After the first heat cycle of the water heater, initially open hot water faucets slowly to minimize potential spattering of hot water.

WARNING:
If a propane smell exists, extinguish all open flames and turn off the main propane supply. Propane is an extremely dangerous gas that can ignite and explode, resulting in property damage, injury or death. Propane is heavy and can float on the floor or hide in corners. Open all windows and doors. Do not touch electrical switches as they may spark. Keep open flame, spark producing devices and smoking material out of the area. Contact a qualified service center to have the problem correctly diagnosed and repaired before resuming operation.

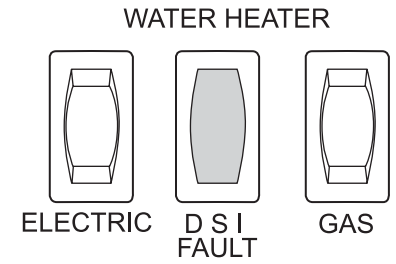
Propane & Electric Water Heater

The water heater uses propane and an automatic ignition system to light the main burner and/or 120 Volt AC to heat water. The thermostats are non-adjustable. Both propane and electric functions can be operated simultaneously for large volume use.

Propane operation:

- Open the primary propane tank valve.
- Light burners on cooktop to help purge air from the propane system.
- Ensure battery is charged.
- Turn the water heater gas switch On.

NOTE:
The water heater will attempt 3 ignition cycles after which ignition lockout will occur indicated by the red light. Turn switch off then back on.



Located on Command Central 060332b

Electric operation:

- Have either shore power (preferred) or the generator supplying AC voltage.
- Ensure water heater circuit breaker is on.
- Turn on the Electric Switch.

NOTE:
The electric element is rated 1500 Watts.

NOTE:
Both propane and electric operation can be on simultaneously for large volume use.

CAUTION:
Do not operate the water heater without water. Damage to the thermostats and electric heating element can occur.

TIP:
It is not fuel efficient to use the generator to operate the water heater on 120 Volt AC.

WARNING:
Before beginning any service or work on the water heater, make sure the propane is turned off and the 120 Volt AC and 12 Volt DC sources have been disconnected. Failure to do so can result in explosion, fire or injury.

CAUTION:
It is recommended not to operate the water heater on propane while the motorhome is in transit. The water heater must be off before refueling.

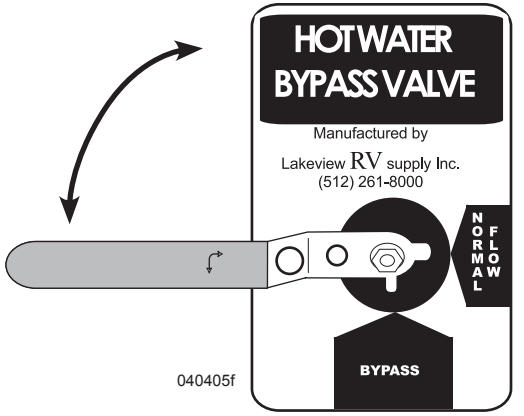
High Temperature Thermostat:

Separate thermostats are used for propane and AC electric. If a thermostat fails, a high-temperature safety limit switch will open.

CAUTION:
If the high-temperature safety limit should open, discontinue using the water heater. Have the water heater inspected by a qualified technician to determine the cause of the over temperature condition.

Water Heater Bypass Valve:

The bypass valve is located at the back of the water heater. Turn the valve to the Bypass position. This prevents water from entering the water heater. Turn the valve to the bypass position when winterizing. For normal operation, set the valve to Normal Flow.



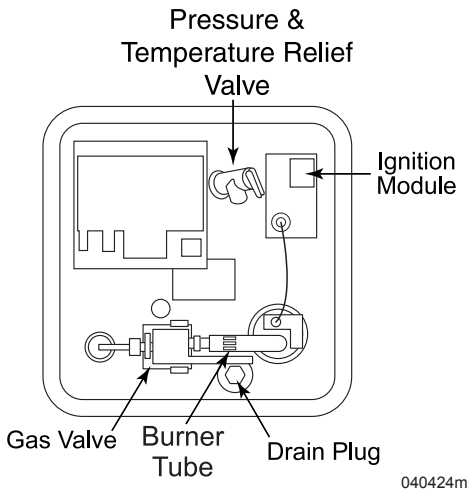
Valve shown in Normal Flow

Pressure & Temperature Relief Valve:

The water heater is equipped with a Pressure & Temperature (P & T) relief safety valve. The P & T valve is designed to open if water temperature in the tank exceeds 210° F. (98.8° C.) or internal pressure exceeds 150 psi. If water begins to weep from the valve, it may be due to a loss of the air pocket in the tank and not a defective valve. See re-establishing the air pocket.

Re-establishing the Air Pocket:

Water may weep from the P & T valve under normal operation. This is not necessarily a faulty valve but more likely caused by lack of an air pocket and water expansion. The water heater tank is designed with an internal air pocket. Eventually, the cyclic expansion of water will absorb the air pocket.



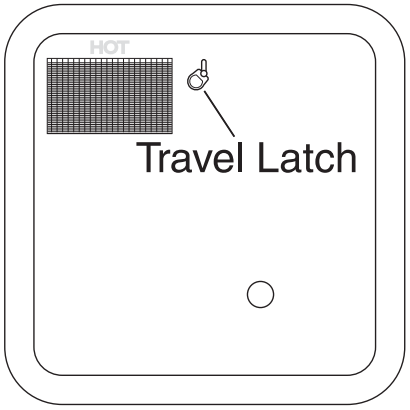
If weeping from the valve occurs, the air pocket will need to be re-established utilizing the following procedure. If the valve continues to weep after establishing the air pocket, contact a qualified service center to evaluate the valve.

CAUTION:
Ensure the water heater is cool prior to establishing the air pocket.

- Turn off the water heater.
- Turn off the incoming water supply.
- Open the hot water faucet closest to the water heater.
- Open the handle of the P & T valve.
- Allow excess water to drain from the water heater through the P & T valve. When draining is complete, close the P & T valve by allowing it to snap shut. Close the faucet and turn on the water supply.
- Turn on the water heater.

Water Heater Compartment:
Periodically inspect the water heater compartment and door screen for foreign material that can prevent the flow of combustion and ventilating air. The water heater drain plug and pressure relief valve are located inside.

CAUTION:
Do not block any opening.



Tips

- Conserve propane by turning off the water heater when not in use.
- Conserve energy and hot water by shutting off the shower water when not rinsing
- Use caution when hooked to anything less than 30 Amp shore service. When the water heater element is in operation it will use approximately 12 Amps at 120 Volts AC. Appliances will need to be operated in sequence to avoid overloading the shore power breaker.
- Operate the water heater on propane when hooked to 30 Amp shore power. This will reduce the likelihood of tripping the shore power breaker.
- Water may drip occasionally from the Pressure-Temperature relief valve until the pressure has dropped. Avoid opening the Pressure-Temperature valve manually as collected minerals may cause the valve to leak continually. The valves can be purchased from most hardware stores.

Draining & Storage:
Drain the water heater to prevent freeze damage if the motorhome is to be stored during the winter months.

- Turn off electrical power to the water heater.
- Turn off the primary propane shut-off valve.
- Open low point drains.
- Open both hot and cold on all faucets.
- Remove water heater drain plug.
- Turn the bypass valve to the bypass position.

NOTE:
Be sure to refill the water heater with water before resuming operation.

Troubleshooting:

- Insects may make nests in the burner tube. Check the burner tube for obstruction if the water heater fails to light. It is recommended to clean the burner tube with a brush and not compressed air. Compressed air may not fully remove obstructions.

- If the water heater indicator light does not illuminate and the water heater does not ignite, ensure the interior house power is on. Ensure shore power is plugged in and working, and the AC breaker is on. Check for a blown fuse in the house distribution panel.
- If the water heater still fails to operate, the high-temperature safety fuse may be blown. Have a qualified technician inspect the water heater.

WASHER/DRYER STACKED (OPTIONAL)

Washer

The front-loading washer is a large capacity washer that operates on 120 Volts AC from shore or generator power. Water usage will vary with each load, and fill time will vary depending upon water pressure.

CAUTION:
Hook the motorhome to shore services when using the washing machine due to limited fresh water supply and grey tank capacity.

CAUTION:
Do not use the washer while traveling as damage will occur to the washer and motorhome.

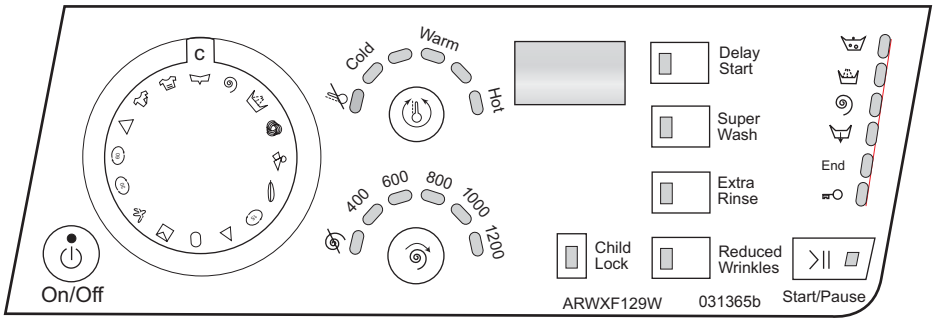
INFORMATION:
The washer has many features. Refer to the manufacturer's manual in the owner's information file for detailed operating instructions.

Test Cycle

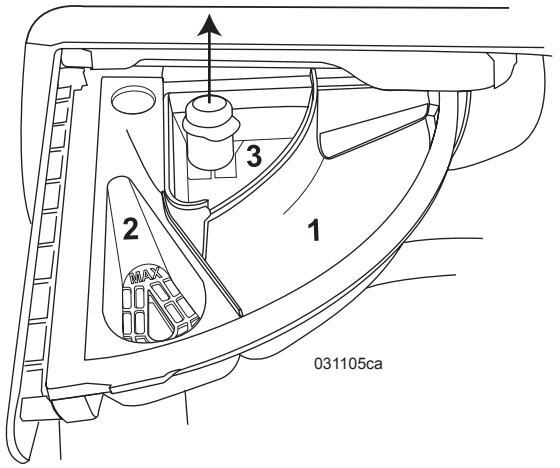
Perform a test cycle before using the washer for the first time or after a long period of non-use. The test cycle will confirm the unit is working correctly, remove RV antifreeze that may be present, and verify all hardware, plumbing and electronic components are functioning.

Test cycle requirements:

- Wipe the exterior and interior of the unit with a damp cloth to remove accumulated dust.
- Ensure water lines are secure and all necessary valves are open to supply water.
- Hook to city water or turn on the water pump (must have sufficient water in tank and storage space in holding tanks).
- Hook up to shore power, or turn on the generator.



Washer control panel



Detergent trays are removable for cleaning

Conducting test cycle:

1. Add ½ tablespoon of detergent to the detergent chamber (**#1** in illustration) of the automatic dispenser.

CAUTION:
Ensure the automatic dispenser is in place before starting the washer. Do not open the automatic dispenser when the washer is running.

2. Close the detergent dispenser.
3. Turn the cycle knob to **#15** (light load).
4. Set the temperature knob to warm (rinse is always cold).
5. Set a spin speed between 400-1200.
6. Press On/Off button to turn on the machine. Press and hold to turn off.
7. Press Start/Pause to start cycle. Press again to stop.
8. The door lock light (key symbol) will turn off when the cycle is complete.

Operating Instructions

1. Load the machine and ensure door is closed and firmly latched. See OEM manual for load types and weight limits.
2. Set the cycle knob to the appropriate wash program. See OEM manual for recommendations.
3. Adjust temperature with temperature knob (rinse is always cold).
4. Adjust spin speed according to garment type.
5. To further customize the wash program, press one of the wash option buttons (Soaking, Extra Rinse, etc.). See OEM manual for more information.
6. Open dispenser drawer and add appropriate cleansers and softeners. Close dispenser door.
7. Press Pause/Start button to start cycle.
8. The door lock light (key symbol) will turn off when the cycle is complete.

Cleaning the Washer

Clean the exterior, interior and automatic dispenser as needed.

Exterior:

- Clean the exterior with a soft cloth dipped in lukewarm, soapy water. Never use polish of any kind.

Interior:

- To remove build-up, run the washer through a complete cycle using hot water and two cups of non-precipitating water softener.
- Apply paste wax periodically to the inner door to prevent staining.

Automatic Dispenser:

- Remove the inner portion of the dispenser tray by pulling up and out.
- Rinse under warm water until buildup dissipates.

Winterizing the Washer

To Winterize:

- Ensure the washer is off, and pour 1 pint of FDA approved RV antifreeze into the washer drum.
- Close the door and turn the cycle knob to a spin cycle.
- Press the on/off button and wait one to two minutes.
- Press the on/off button to turn washer off.
- Disconnect power supply and turn water faucets off.
- Disconnect and drain inlet hoses.

To De-winterize:

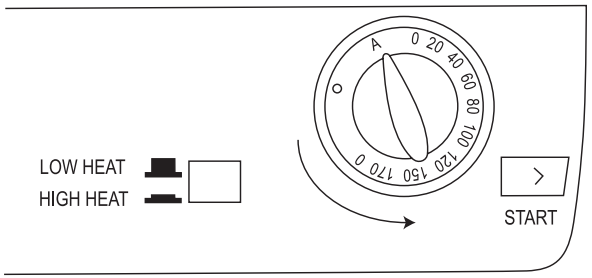
- Connect inlet hoses and turn water faucets on.
- Connect power supply.
- Add ½ tablespoon of detergent to the dispenser detergent compartment #1.
- Turn cycle knob to **#15**, and let the washer run through the complete cycle to ensure all antifreeze is purged.

CAUTION:
Replace inlet hoses every five years.

INFORMATION:
See the OEM manual for more detailed instructions and maintenance procedures.

Dryer

The front-loading dryer operates on 120 Volts AC from shore power or the generator.



Dryer control panel 031366

INFORMATION:
Read the instructions in the dryer OEM manual located in the owner's information file.

CAUTION:
Open a window or vent while operating dryer. Negative air pressure inside the motorhome can be dangerous while operating fuel burning appliances.

CAUTION:
Do not use the dryer while the motorhome is in motion as it can damage internal components of the dryer.

NOTE:
Before using the dryer, wipe the interior drum with a damp cloth to remove accumulated dust.

CAUTION:
Do not dry articles that have previously been cleaned, washed, soaked or spotted with gasoline, dry cleaning solvents or other flammable or vaporous substances that can ignite or explode.

CAUTION:
Do not use heat to dry articles containing foam rubber or similar textured, rubber-like materials. Clean the lint screen (located inside the dryer door) after each use. Keep the exhaust opening and adjacent areas free from accumulation of lint, dust and dirt.

Operation

1. Load laundry loosely into dryer and close the door. Allow space for the clothes to tumble freely.
2. Select appropriate cycle and heat (see OEM manual for detailed instructions).
3. Press the Start button to initiate the cycle.
4. Open the door to stop the dryer at any time.

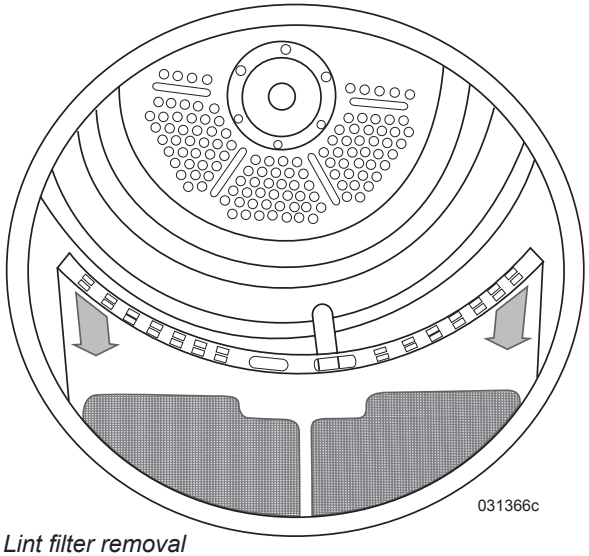
NOTE:
Timer knob rotates only counterclockwise.

Dryer Maintenance

Clean the exterior and interior as necessary, and clean the lint filter after each load.

Lint Filter:

- Open the door and pull the lint filter upwards.
- Remove lint and replace the filter.



Lint filter removal

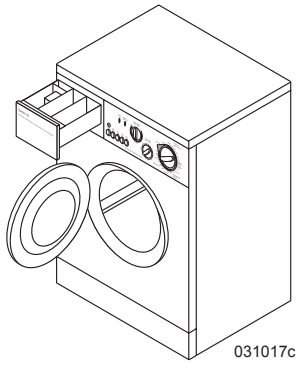
CAUTION:
Do not operate the dryer without the filter in place.

Exterior:
Clean with a soft, damp cloth. Do not use solvents or abrasives.

Interior:
Do not use abrasives, steel wool or stainless steel cleaning agents to clean the dryer drum. Discoloration from fabric softeners and water is normal and does not affect dryer operation.

Technical Service:
For detailed technical service contact Splendide at 1-800-356-0766.

WASHER/DRYER (OPTIONAL)



The automatic washer/dryer is front loading for easy access. Several wash programs are available along with variable water temperature settings.

Both the washer and dryer operate on 120 Volt AC from shore power or generator. The washer uses approximately 7 to 18 gallons of water per wash cycle. It is recommended to hook to shore services when operating the washer.

INFORMATION:
Refer to the washer/dryer manufacturer's manual in the owner's information file for detailed operating instructions.

WARNING:
Open a window or vent while operating the dryer. The dryer can create negative air pressure inside the motorhome that can accumulate Carbon Monoxide or propane while operating fuel-burning appliances.

CAUTION:
Do not use the washer/dryer while traveling. Suspension movement, combined with the weight of the drum while in the wash cycle, can damage the internal components of the washer/dryer.

Test Procedure

Before using the washer for the first time, after winter storage or a long period of non-use, conduct a validation test of the washer to verify that all the hardware and electronic components are functioning.

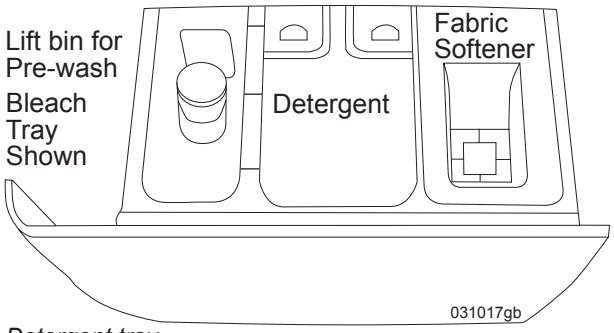
NOTE:
Perform this test before putting the washer/dryer in use for the first time or after the winter months. This will also clear the water lines and drum of winterization antifreeze.

Test Procedure Requirements:

- Ensure water lines are secure and water valves are open.
- Hook to city water or turn on the water pump.
- Hook to shore power or start the generator.

To Conduct the Test Procedure:

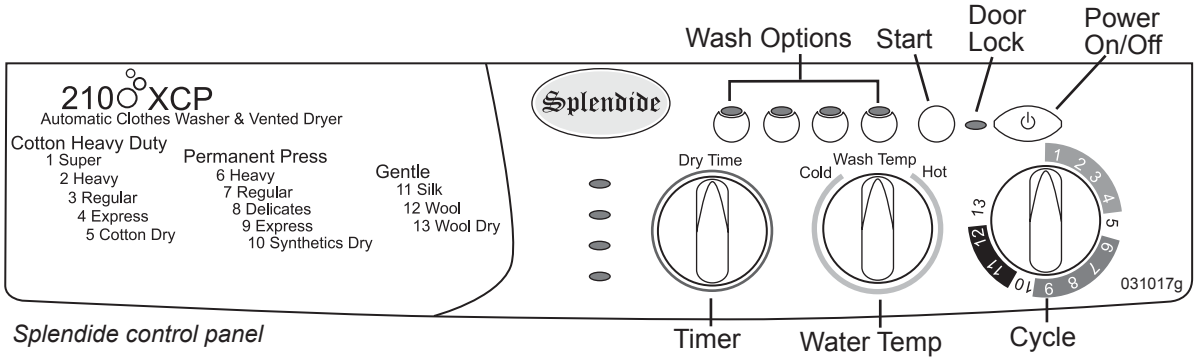
1. Press the On/Off button to turn on the washer/dryer.
2. Add a small amount of detergent (1 Tbsp.) to number 2 detergent tray slot.
3. Set Cycle select knob to number 2.
4. Press the Start button to begin the test cycle. Allow washer to complete the cycle.



Detergent tray

Locking Door

The door will lock closed during a wash cycle. The "Door Lock" LED will illuminate when the door is locked closed. This prevents the door from opening or being opened resulting is water spillage or potential safety hazard. Press the On/Off button to open the door after it has locked closed. The door can be opened at any time during a drying cycle.



Splendide control panel

WARNING:
Do not wash or dry articles that have previously been cleaned, washed, soaked or spotted with gasoline, dry cleaning solvents or other flammable or vaporous substances that could ignite or explode. Do not add gasoline, dry cleaning solvents or other flammable or explosive substances to the wash water.

CAUTION:
Do not use heat to dry articles containing foam rubber or similar textured, rubber-like materials.

To Begin a Wash Load

- Sort and pre-treat clothes.
- Add the measured amount of detergent suggested by the package directions (maximum two tablespoons).
- Load wash tray with detergent.
- Load the laundry loosely into the washer. Close the washer door.
- Turn the Wash Temperature knob to the desired temperature setting.
- Choose the desired washing cycle option using the Cycle knob.
- Press the Start button to initiate the wash cycle.
- After cycle is complete, wait two minutes for the door lock to release before attempting to open the door.

Dryer

The dryer is self-cleaning in most instances and does not have a lint trap. Lint will collect in the pump screen and generally is cleared during a rinse cycle. While a full load of clothes can be washed, the dryer is limited in quantity of laundry that will dry most efficiently. If a full load of clothes is laundered, it is recommended to divide the full load in half for maximum drying efficiency. The dryer can be set so it automatically begins drying at the end of a wash cycle.

For Automatic Drying:

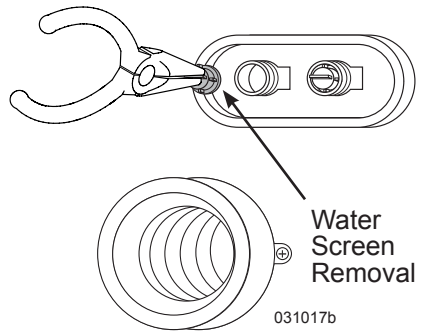
- Once a wash load has begun, set the dryer timer for the desired amount of drying time.
- Once the wash cycle is complete, the dryer will automatically begin.
- Half-way through drying cycle, shake open laundered items so they tumble open and free.

For Manual Drying:

- Shake open laundered items so they tumble open and free.
- Set Cycle knob to setting 5, 10 or 13.
- Set the dryer timer knob to the desired time then press Start.
- Half-way through the drying cycle, check to ensure clothes are still open and tumbling free.
- Drying time will vary depending on garment type, washing spin speed and amount of laundry being dried.

Maintenance

Occasionally wipe the exterior cabinet of the washer/dryer with a damp cloth or sponge. Wipe dry with a soft cloth. Do not use polish on plastic trim. In areas of hard water, detergent can accumulate in the drum. Obtain a packaged water softener. Add quantity as specified by the manufacturer directly to the drum. Run the washer through a complete cycle using hot water. Repeat the process if necessary. Remove hard water deposits using only cleaners labeled as washer safe. Wipe the inside of the washer/dryer door with a soft cloth to remove moisture. Periodically apply a thin coat of paste wax to the inner door, especially to the area that is immediately next to the door window. This will protect the door finish from laundry spills and discoloration.



If water flow to the washer is reduced, the hot and cold water inlet screens may be clogged. Remove water pressure and undo water lines at the back of the washer/dryer. Use tweezers or pliers to remove screens from fittings. Clean and install screens and water lines. Hook to city water or turn on the water pump. Check for water leaks before using the washer/dryer.

NOTE:
Should the washer/dryer need removal for service, care should be taken as the washer/dryer weighs approximately 170 lbs. Proper accommodations should be made to avoid risk of injury or damage to the flooring or cabinetry.

Winterizing

Winterize Using Air Pressure:

1. Hook an airline (regulated to 45 psi or less) to the water inlet of the motorhome.
2. Rotate Cycle knob to a wash position. Set water temperature to Warm.
3. Press the power button. Press the Start button. Air pressure will clear the Hot and Cold water lines.
4. After water lines are clear, rotate Cycle knob to a spin setting. Allow the pump to drain the drum.
5. Once drain pump is clear of water, press the On/Off button to turn the washer off.
6. Open door and pour in ¼ gallon of RV antifreeze.
7. Set Cycle knob to a spin setting. The pump will prime with antifreeze.
8. Press the power button to turn the power off.

CENTRAL VACUUM (OPTIONAL)
Operation

INFORMATION:
Refer to the vacuum OEM manual for detailed operation and maintenance.

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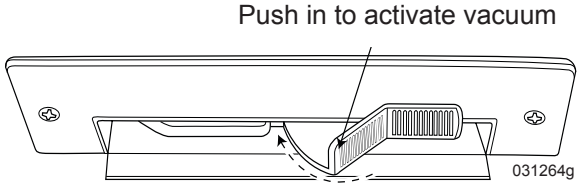
Inlet located in living room or bathroom area.

- Hook to shore power or start the generator.
- Lift lid on wall receptacle to start vacuum. Insert the hose.
- Connect desired attachment on hose.

Floor Receptacle:
- Push handle to open receptacle.
- Sweep debris into the receptacle.



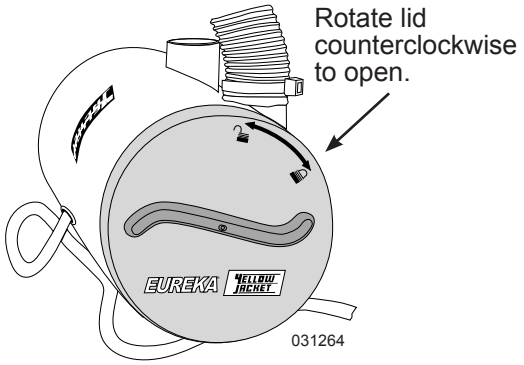
Not all units

Maintenance

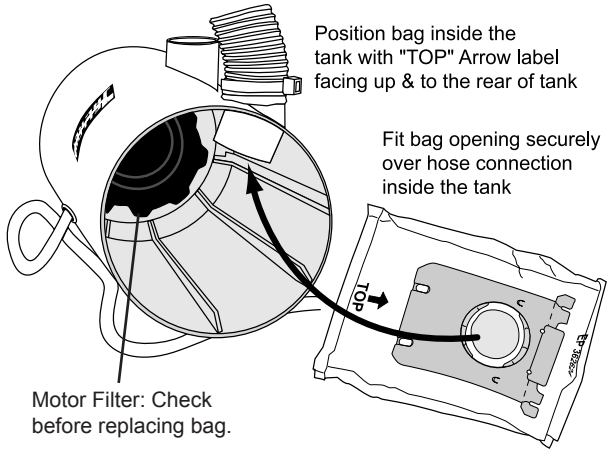
The thermal protector for the motor may have tripped should the vacuum stop working after a period of operation. The thermal protector will automatically reset in about ½ hour. If the brushes or bearings of the motor are worn out, the protector will trip again after a short period of operation. Have the vacuum inspected by a qualified service technician.

Changing the Bag:
To maintain vacuum efficiency, change the filter bag at regular intervals. Replace filter bag when it is about ¾ full.

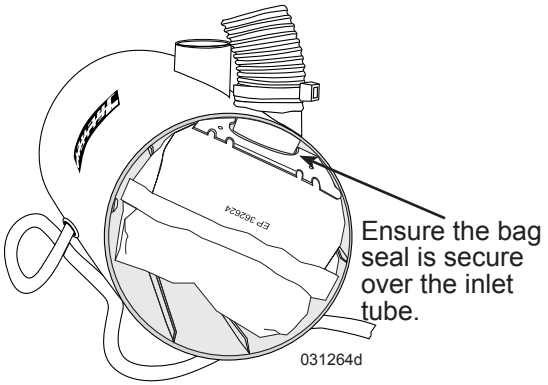
- Unplug the vacuum from outlet.
- Rotate lid counterclockwise to remove cover.



- With a finger on each side of the inlet, slide the bag off the inlet tube.
- Pull the center cardboard tab to automatically seal the bag and prevent dust leakage.



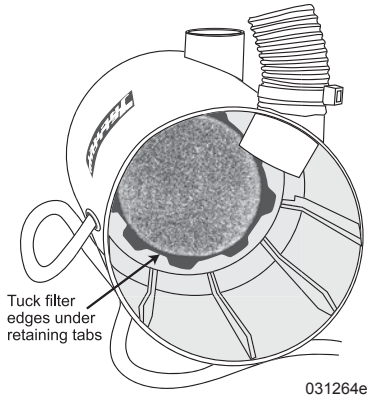
- Remove the bag from the vacuum and discard. Do not reuse.
- Check support (motor) filter.
- Unfold the new "OX" bag and insert into the vacuum so the center cardboard seal tab is toward bag cover. The top arrow should point to the bag cover.
- With a finger on each of the cardboard tabs, slide the bag on the inlet tube.
- Line up the mark on the lid with the unlock symbol and rotate clockwise to lock.



INFORMATION:
Replacement bag is "OX". Bag is accurate of time of printing. Confirm part number/letters before ordering or obtaining replacement.

Cleaning the Motor Filter:

- Inspect during each bag change. The filter should be cleaned about every fifth bag replacement or when excessively dry.
- Remove dust bag as previously instructed.
- Motor filter is located at the bottom of the bag compartment. Replace torn or obstructed filters.
- Clean filter with warm water.
- Let air dry.
- Reinstall dry motor filter before use. Be sure filter is tucked under retaining tabs.
- Reinstall dust bag.



To reduce risk of fire, electric shock or injury:

- Unplug and disconnect power before servicing.
- Avoid wet surfaces.
- Use only manufacturer recommended attachments.
- Do not use without dust bag and/or motor filter in place.
- Do not pick up anything that is burning or smoking, such as cigarettes, matches or hot ashes.
- Use extra caution when cleaning on stairs.
- Do not use to pick up flammable or combustible liquids such as gasoline.

Notes

Equipment
Section 5

EQUIPMENT - INTRODUCTION

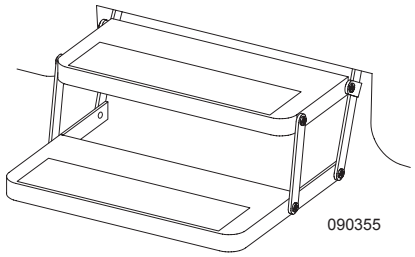
This section covers the basic operation and care of equipment found in the motorhome, most of which are provided for entertainment and comfort. More detailed information about specific equipment may be found in that particular OEM manual. Optional equipment will also be discussed in this section that may not apply to all motorhomes.

INFORMATION:
Detailed information with CAUTION or WARNING instructions for the various electronics, other than what is provided in this section, can be found in that specific OEM manual.

ENTRY STEP

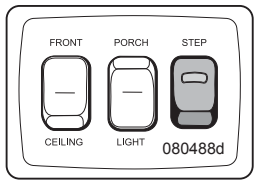
Operation

The exterior electric entry step will extend and retract with door opening and closing, automatic retraction with the ignition key in the run position and a "last out" feature. The entry switch illuminates when turned on.



NOTE:
When dry camping, it is important to note that when the switch is illuminated all step circuits are active and drawing current from the chassis battery.

Entry Step Operation:
With entry step switch on, the step will extend and retract when the entry door opens and closes.



Located entry door.

Cancel Step Operation When Parked:
Open door to extend step. Turn entry step switch off. Entry step will remain extended.

Last Out Feature:
Turn the ignition off and open the door. The step will extend. This is the "last out" feature.

Ignition Override:
When the ignition is on, the step will extend and retract with door movement with the entry step switch off. This ensures the step will not be extended during travel and will extend when the door is opened.

WARNING:
The entry step will retract when the ignition switch is turned on. Always confirm the entry step is fully extended and locked in position prior to exiting the motorhome.

CAUTION:
High curbs can impede step operation. Use caution when parked on surface streets.

WARNING!

This vehicle is equipped with an automatic electric step. Turning the ignition switch to the "ON" position while the vehicle is parked will cause the step ro retract. Visually confirm that the step is fully extended prior to exiting the vehicle.

BE SAFE - LOOK BEFORE YOU LEAP!

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If the entry step fails to operate:
- Verify that the entry step switch is on.
- A magnetic door jam switch is used to control step operation. Use a separate magnet to apply a "trigger" to the door jam switch. Rotate test magnet to align polarity field.

WARNING:
If the motorhome is driven with the step in the extended position, damage could occur to both the step and the motorhome.

CAUTION:
Keep fingers, clothing and other hardware away from moving components.

Maintenance

The steps are equipped with self-lubricating bushings in the drive assembly and step joints and require no maintenance. If in extreme weather conditions and lubrication is deemed necessary a silicon based grease or spray can be used on the bushings.

INSPECTION:
Clean and inspect step more frequently in adverse weather conditions. Mud, snow, road salts and sand could quickly break down lubricant and corrode painted surfaces.

WARNING:
Step repairs should be performed by a qualified technician. Failure of the step to extend can result in serious injuries.

GRAB HANDLE

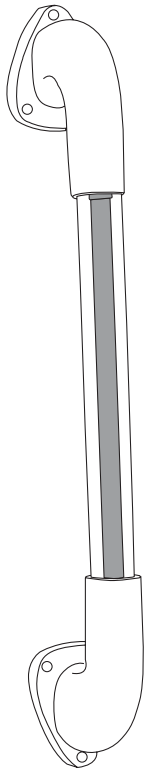
The grab handle is used to aid in entering and exiting the motorhome.

Cleaning the Handle:

- Clean the acrylic grab handle using mild soap and water only!

What Not To Use:

- Do not use alcohol based glass cleaners as these solutions adversely affect acrylic material causing stress cracks leading to eventual failure of the grab handle.



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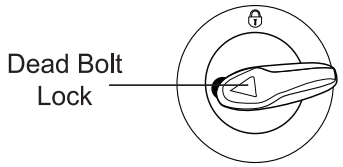
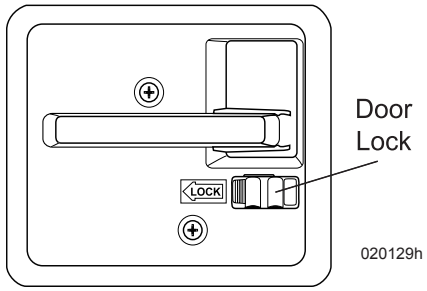
ENTRY DOOR

The door uses two separate locks for safety and security. One locking system is the door lock and the other is a dead bolt. The door lock incorporates a primary and secondary latching system to ensure safety.





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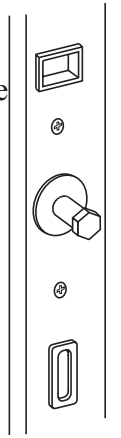
Adjusting the Entry Door Latch:

- Determine which bolt needs adjustment.
- Slowly close the entry door, observing the latch and strike bolt alignment. Do not attempt to latch if the alignment is off. If the alignment is correct, allow the latch to catch in the first (primary) position only.
- The latch should move to the second position with only slight pressure applied to the entry door. Upper and lower latches should be evenly timed. Press on the entry door to check for further movement.
- The entry handle should operate with little effort to open the entry door. Excess pressure indicates the bolts are set too far back.
- With a box wrench or socket, loosen the movable strike bolt. Adjust in small increments. Tighten the bolt firmly after making adjustments. Bolts should have slight up and down movement for vibration control in travel.



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- Test the operation of the dead bolt lock to ensure proper functions.
- Spray silicone on a 1" sponge paint brush then brush door gasket to eliminate squeaks during travel.

CAUTION:
When operating the entry door, ensure the dead bolt latch is fully unlocked prior to closing. Damage to the dead bolt and/or entry door can result.

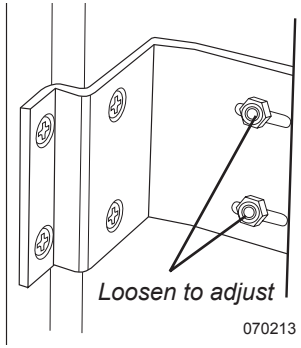
Changing Screen Door Glass:

- The screen slider is Tuffak®. The slider can be bowed for removal and replacement.
- Replace with new Tuffak and reverse the procedure.

Adjusting the Screen Door:

- The steel hinge has slots to allow movement.
- Loosen the fasteners on the hinge side of the screen door: two on the top and two on the bottom.

- The hinge should fit tightly to the trim of the door when the screen door is latched to the door and the door is open.



SLIDEOUT OPERATION

Slideout room operation uses safety features to prevent mechanical damage or physical harm. Slideout room(s) will not operate until all safety requirements are met. To prevent damage to cabinet doors or the slide room, secure all cabinet doors in the closed position prior to room activation. Interior door(s) may require being fully open or fully closed for adequate clearance.

Slideout Operation Requirements:

- Ignition key is off.
- Park brake is applied.
- House battery cutoff switch is on.
- House batteries are charged.
- Lock bar is removed.
- Hydraulic jacks are retracted.

Extending & Retracting Slide Rooms

CAUTION:
The motorhome must be supported by the suspension whether extending or retracting any slideout room. Do not operate the slideout room when supported by hydraulic jacks. Damage to the slideout room, mechanism or seals can occur.

To Extend or Retract Slide Rooms:

- Retract hydraulic jacks (If applicable).
- Start the engine.
- Move the driver and passenger seat forward.

MOVE CAB SEAT FORWARD BEFORE ACTIVATING SLIDE-OUT ROOM

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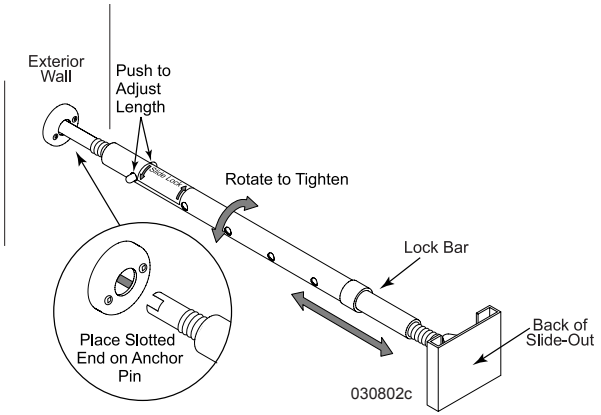
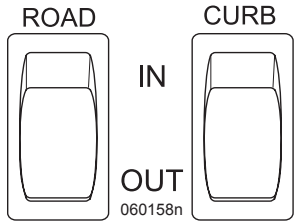
- Clean the floor of dirt or grit that could result in damage during operation.
- Confirm there is enough clearance inside/outside the motorhome for the room to extend/retract.
- Allow at least five feet of clearance to extend the slideout.
- Turn off the engine. Ensure the park brake is applied.
- If applicable, remove any locking bars.



- Confirm the house batteries are fully charged.
- Open a window or vent to equalize pressure during slideout operation.
- Ensure people, pets and objects are clear of the slideout room path.
- Firmly latch all cabinet doors and close drawers. Damage to the doors, drawers and fascia can occur.
- Locate the slideout room control switch. Press and hold the slideout room switch to the desired (In or Out) position.



Switches are located on systems control panel

- Release the switch to stop room movement at any time. The drive motor will not automatically stop at the end of room travel. The switch must be released. A change in motor sound indicates full extension/retraction.

CAUTION:
Firmly latch all cabinet doors adjacent to the slideout before extending or retracting the rooms. Damage to doors or the fascia may occur.

CAUTION:
Do not leave the slide room extended during severe weather. Conditions such as high winds or heavy rain may cause damage. Rain water can pool on the slide room awning, adding weight and causing the awning to sag. Retract the room in small increments to allow water run off.

CAUTION:
Extensive damage could occur to the slide room and awning when extending the slideout room in snow, sleet, ice or freezing rain conditions. In such conditions, if the slide room is extended, clear the awning and ensure free movement prior to operating the slideout room.

CAUTION:
Clean the floor before retracting the slide room. Dirt and grit trapped under the slide room can scratch and damage the floor. Never move the motorhome with the slideout room extended.

CAUTION:
Do not use petroleum based products on the slide seal. Petroleum based products can damage the paint and will cause premature aging of the rubber seal.

WARNING:
The outside area must be clear of obstruction that can restrict slide room operation. Ensure there are five or more feet of clear space outside the slide room prior to extending the room or damage to the slide, motorhome or property can occur. Ensure there is sufficient clearance inside the motorhome prior to retracting. Clear the area of people and pets.

CAUTION:
Continuous operation of the slideout room can drain the batteries and overheat the motor.

CAUTION:
If a problem with the slideout occurs, contact a qualified technician.

Lock Bar

The lock bar is a manual locking device to help retain the slideout room in the in position.

CAUTION:
Remove locking bar prior to extending slideout.

Troubleshooting

If the slideout room does not operate, a safety feature may be engaged to prevent room operation.

If the slideout room does not respond from the switch, check the following safety requirements:

- Ignition key is off.
- The park brake is applied.
- House batteries are charged.
- House battery cutoff switch is on.
- The lock bar is removed.
- The hydraulic leveling jacks are retracted.

Manual Override – In-Wall System

While it is recommended to diagnose and repair the problem so the in-wall slideout system operates as intended, conditions may require the slideout room be retracted manually. The in-wall system uses a 12 Volt DC motor located at the top of each slideout assembly. Gears mesh with the upper and lower racks that are connected by a drive shaft. A control module monitors the revolution of each motor to ensure synchronous room movement. Unplugging each motor from the control module will allow the motors to rotate providing there is not mechanical interference or damage to the gears and racks.

NOTE:
Several people may be required to push the slideout room to the retracted position.

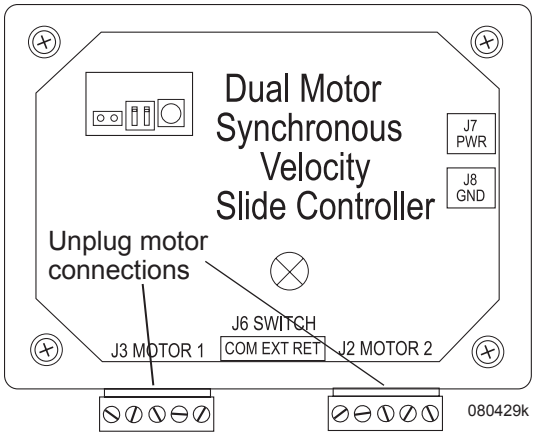
Manually Retract the Slideout Room:

- For safety, turn off the battery cutoff switch.
- Locate the slideout room control module.
- Noting plug locations, unplug (do not unscrew terminal connections) the J3 Motor 1 and J2 Motor 2 plugs from the socket of the slideout room control module. This will allow the motors to rotate.
- Using synchronous movements, push the slideout room inwards until the slideout room is fully retracted.

- Plug terminal connectors J3 Motor 1 and J2 Motor 2 back into the slideout room control module. This will prevent room movement until the slideout system can be repaired.

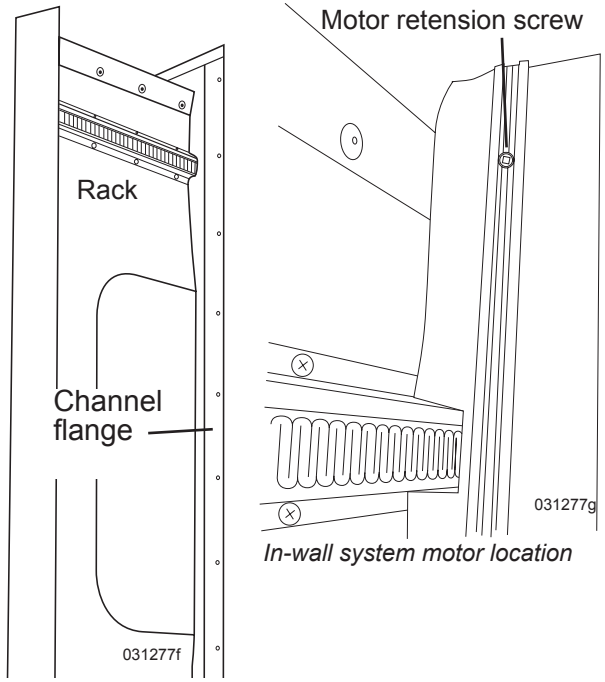
WARNING:
To avoid injury do not place fingers near edges of the slideout room!

CAUTION:
Do not drive the motorhome with the slideout room partially or fully extended. Structural damage to the slideout room and/or motorhome can occur.



Slideout controller located in bay compartment

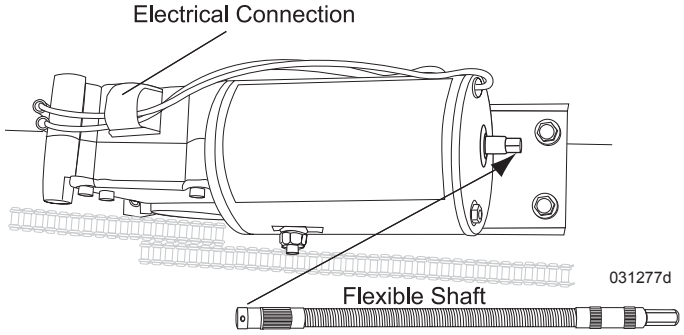
If the motor, gear or rack is damaged, the slideout mechanism and/or slideout room will need to be removed to gain access to the motor and hardware. The motor is located inside the channel flange at the top of the hardware. Support underside of slideout and unbolt channel flange to access motor.



In-wall system motor location

Manual Override - Cable System

- Turn off both the battery and house disconnect switches.
- Locate the bedroom slide-out motor. The motor is located near the ceiling of the slideout. Remove the trim.
- Disconnect the slideout motor electrical plug to remove 12 Volt DC power from the slide-out motor. The plug can be located by following wires that run from the motor to the plug.



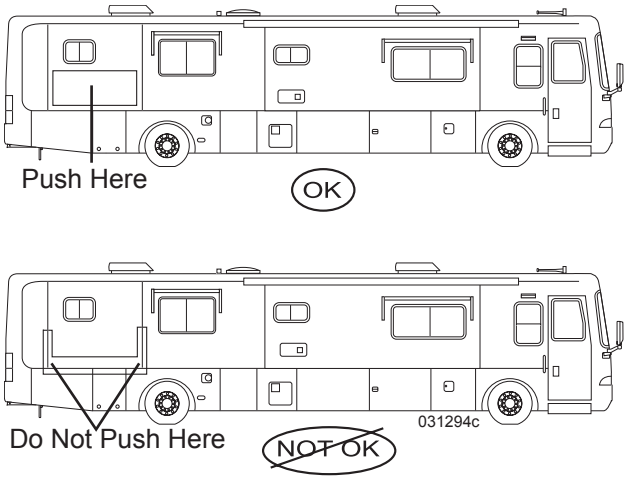
- Attach the flexible shaft to the fitting on the end of the slideout motor.
- Attach a socket and ratchet or drill to the other end of the flexible shaft and reverse the direction. Over-torquing can cause severe damage.
- Turn in proper direction to move the room. If the cables tighten and the motor is difficult to turn Reverse the direction. Over-torquing can cause severe damage.
- Take the motorhome to an authorized repair center.

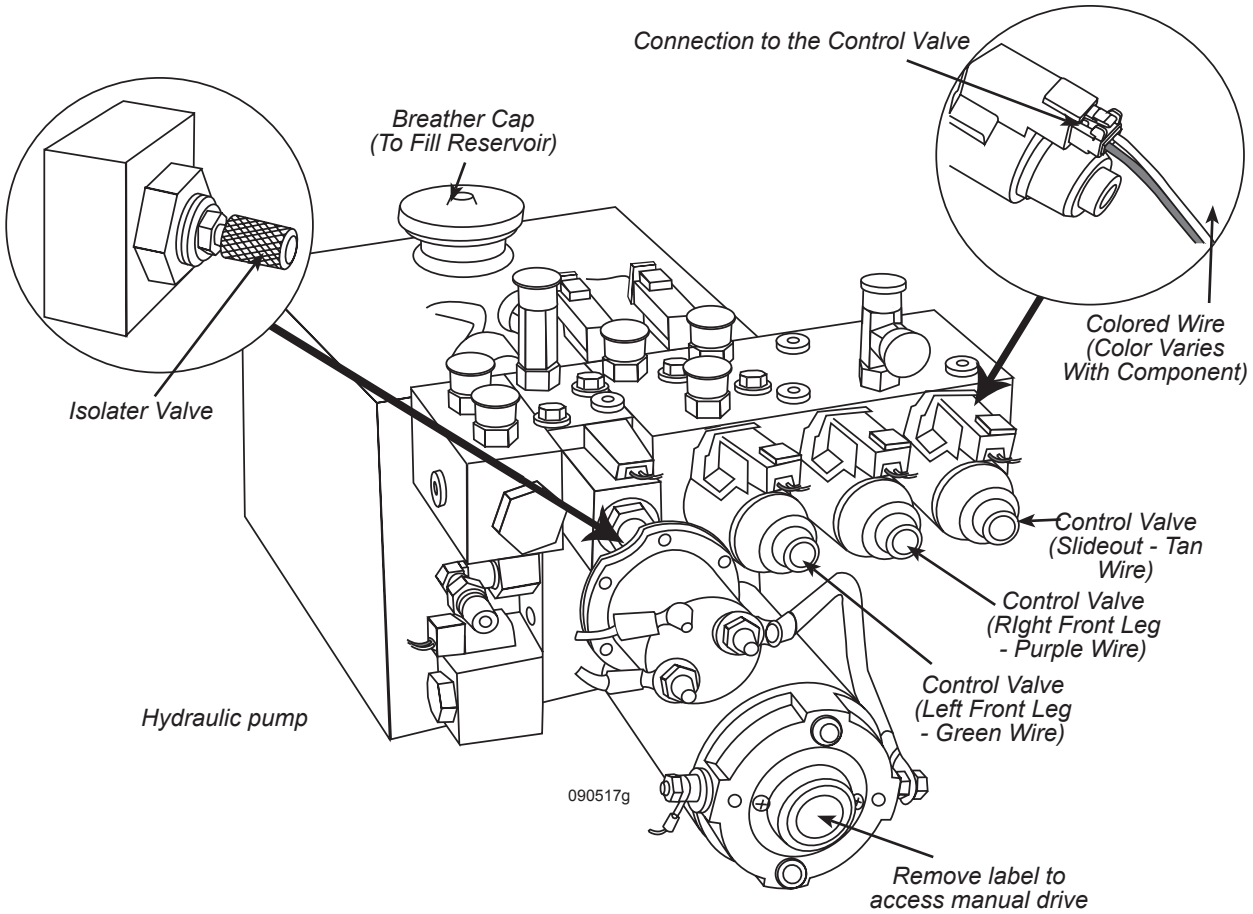
Broken Cable:

It is recommended to call an authorized repair center for roadside assistance if the cable breaks. If this is not possible, the slideout must be manually pushed in. When pushing use extreme care and safety. Take extra precautions from getting fingers pinched. Avoid getting fingers near edge of slide wall or around wall edge. Push slideout from the back. Do not wrap hands and fingers around edge of slideout. Keep fingers away from frayed or broken cables. Frayed wire is sharp and can cut. Cables can also jam then whip free causing serious injury or death.

Manual Procedure:

- Have several people push the room to the closed position.
- Once the slideout is in position, place a blocking device between the slideout and exterior wall to prevent the room from extending during travel. Take the motorhome to an authorized repair center.





Manual Override – Hydraulic System

If a problem exists, the slideout will have to be retracted manually. There are a number of key components on the hydraulic pump. The pump is located in a roadside compartment. Refer to the illustration for these components:

- Connection to the control valve
- Control valve
- Manual drive access located under the protective label.

If there is a problem with the slideout not retracting follow these steps.

CAUTION:
Do not run the hydraulic motor for an extended, continuous period of time. Do not continue to run the hydraulic motor if the slideout does not retract. Damage to the motor can occur.

WARNING:
The hydraulic motor can be extremely hot. Use extreme safety when accessing and working on the motor. Hot metal can result in serious burn injuries.

Control Valve:

Each control valve operates a specific slideout. The control valve (specific slideout) is identified by a colored wire on top of the control valve:

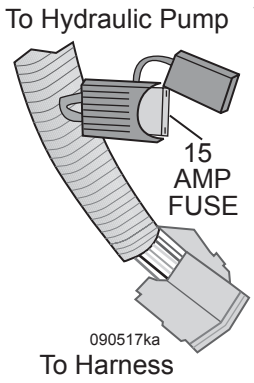
- **Tan Wire** – living room slideout.
- **Orange Wire** – kitchen slideout.

If Pump Runs:

- Access the hydraulic pump.
- Ensure that the connection to the control valve is plugged in. If it is loose properly secure the connection.
- Locate slideout control valve on pump by finding the appropriate colored wire (tan or orange) on top of the control valve.
- Using an Allen wrench insert it into control valve and turn clockwise (IN).
- Go inside motorhome and press the slideout retract button. This will retract slideout(s).

- Using an Allen wrench turn control valve on hydraulic pump counterclockwise.
- Take the motorhome to an authorized repair center.

If Pump Does Not Run:



- Check the 15 Amp inline fuse located with the leveling system wiring approximately 16” from the hydraulic pump.
- Locate slideout control valve on pump by finding the appropriate colored wire (tan or orange) on top of the control valve.
- Using an Allen wrench insert it into control valve and turn clockwise (IN).
- Remove the protective label on the hydraulic pump. This will access the manual drive coupler.
- Attach a standard hex bit into a drill, cordless or standard.
- Insert the hex bit into the coupler found under the protective label.
- Run drill counterclockwise to retract.
- Using an Allen wrench turn control valve on hydraulic pump counterclockwise.
- Take the motorhome to an authorized repair center.

AWNINGS

Slideout Cover

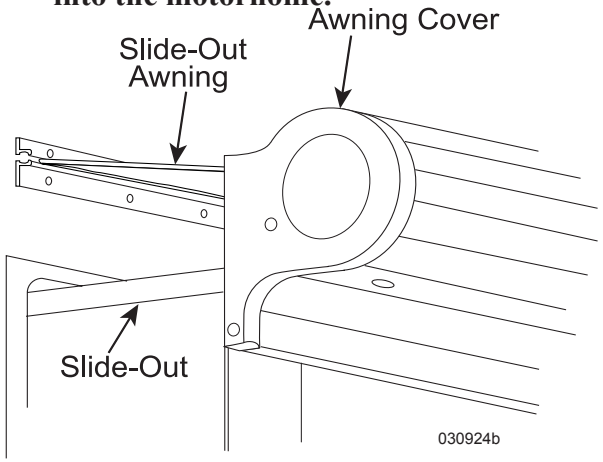
The slideout cover automatically reacts to slideout direction. A fixed edge of the slideout cover is installed into an awning rail, mounted just above the slideout. A spring-loaded roller with special brackets mounts to the slideout. In a hard rain the cover helps prevent water from penetrating the seal of the slideout. The slideout cover will automatically reach full extension when the slideout room is fully extended. The slideout cover automatically rolls up into the travel position when the slideout room is completely retracted.

INSPECTION

When retracting the slideout, stop the room approximately halfway. Confirm that the fabric is properly rolling before fully retracting the slideout.

CAUTION

The slideout room and slideout awning should be retracted before heavy wind, rain or snow to prevent damage to the awning or motorhome. Wind can drive rain under the slideout awning and into the motorhome.



CAUTION

At least five feet of clearance is needed between the side of the motorhome and any objects, such as trees or fences, to allow the slideout room and slideout awning to fully extend.

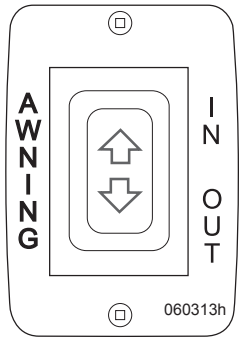
Rain Water

Rain water can pool on the slide-out awning. The added weight will cause the awning to sag. Upon retracting the room, material can become caught in between the top of slide room and the opening in the motorhome. It will be necessary to retract the room in small increments and allow the water time to run off.

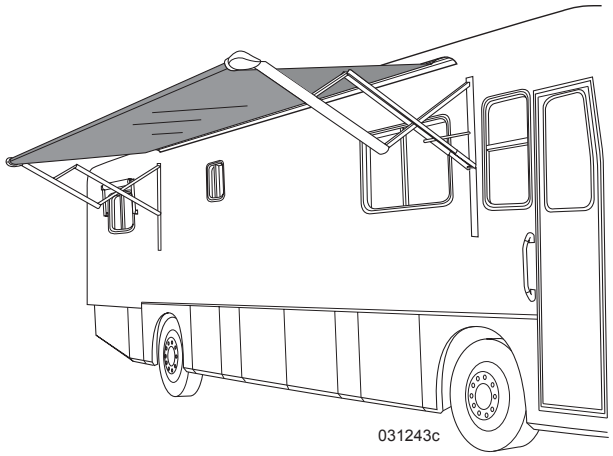
Patio Awning - Electric

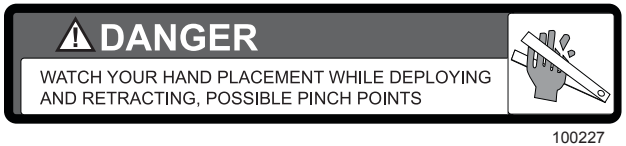
The Travel’r awning operates on 12 Volt DC. The awning requires 10' of lateral side clearance.

To Operate:



- Turn the ignition switch off.
- Check for sufficient clearance before extending the awning.
- Battery cutoff switch is on.
- Push and hold the awning switch to Out. Release the switch at any time to stop movement.
- Push and hold the awning switch to In to retract the awning. Release the switch at any time to stop movement





If the awning fails to operate:

- Ensure ignition is off.
- Check the 15 amp circuit breaker in the front distribution panel.

INFORMATION:
See the awning OEM manual for detailed operation instructions.

Awning Care & Cleaning

On a monthly basis, loosen hardened dirt and remove dust from the awning with a dry, medium bristle brush. Thoroughly rinse both the top and bottom with a garden hose. A high-quality fabric cleaner may be used to help maintain appearance. Carefully follow the instructions on cleaning products. Metal surfaces should be cleaned with soapy water and thoroughly rinsed. Allow the awning to thoroughly air dry while extended. Awning maintenance products can be found at RV supply stores.

Carefree Awning:

Acrylic Awnings - Wash both sides of the awning with a mild soap (dish soap) and lukewarm water. Do not use detergents. If necessary, reapply the solution to keep fabric saturated. Rinse the awning thoroughly. Contact *Carefree of Colorado* for removal of stubborn stains.

Polyweave and Vinyl Awning - Mildew will not form on the awning material itself, but may form on the dust accumulated on the canopy. A quality vinyl cleaner, such as *Carefree Awning Magic*, will help keep the awning looking new. Be sure to follow the instructions on the container.

Leaks:

It is normal for slight leakage to occur through the fabric where water is allowed to accumulate. If water drips through the needle holes in the stitching, use a commercial seam sealer that is available in canvas and trailer supply stores. Paraffin wax may also be applied to the top of the seams. As the awning "weathers" these holes will normally seal themselves.

Soap or chemical residue can "wet" the fabric so that it appears unable to repel water. Rinse the fabric thoroughly and test to see if it is water repellent after it dries. If leakage continues after washing and thoroughly rinsing, please contact *Carefree of Colorado*.

Storm Precautions

The warranty does not cover damage caused by acts of nature; therefore, steps should be taken to prevent damage from occurring due to wind, rain or storms. Retract the awning in inclement weather conditions or when leaving the motorhome unattended. Should the awning need to be retracted while the fabric is wet, extend as soon as possible to allow complete drying.

INFORMATION:
Water weighs 8.33 pounds per gallon. The awning was not designed to withstand the 500 to 700 pounds of water that could accumulate on the canvas.

LEVELING SYSTEM (LIPPERT)

The leveling system is used to stabilize the motorhome when parked. A leveling control panel operates the leveling system. The leveling system hydraulic pump also operates the front roadside and curbside (if applicable) slideout rooms.

CAUTION:
Do not use a single jack to level the motorhome. Ensure all jacks are in contact with the surface when leveling. Using a single jack to level can apply excess torsion twist to the chassis frame. Damage to the motorhome and related components can result.

CAUTION:
Do not use the leveling system to elevate any wheel position. Do not use the leveling system to change tires.

WARNING:
Do not access the underside of the motorhome when the leveling system is turned on or operating. Serious personal injury or death can occur.

Safety Features:

The leveling system has safety features that prevent a jack from extending during travel. The control panel will not activate until these safety features are in place:

- The engine is running.
- Transmission is in neutral.
- Park brake is applied.

Warning Features:

- Lights on the control panel will flash and alarm will sound if a jack is extended, the ignition is turned on and park brake released.
- Excess Angle indicator illuminates if a site is excessively off level that it requires a jack to hyperextend or if leveling could apply excess torsion twist to the chassis frame.
- Should the Jacks Down alarm activate momentarily when driving over rough roads and corners, this could indicate the fluid level in the reservoir is low.

Control Panel:

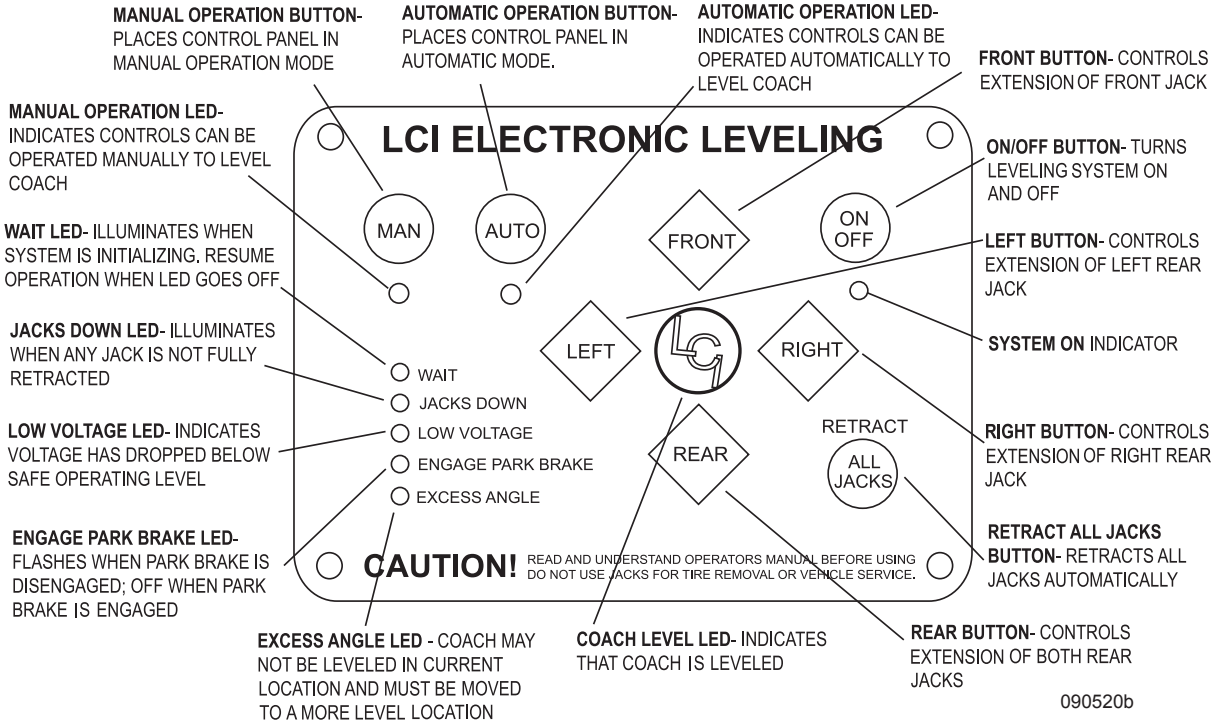
The control panel includes an On/Off button, 4-position jack extend buttons, an Auto (automatic) button, a Man (manual) button, and an All Jacks retract button.

CAUTION:
Do not move the motorhome while jack(s) are extended or in contact with the ground. Damage to jacks and/or jack mounts can occur.

Prior to Leveling

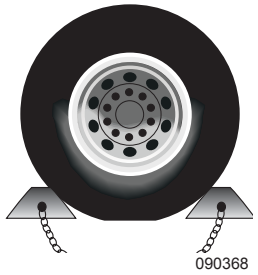
Before lowering the suspension, survey the area around and under the motorhome for obstructions that can damage the motorhome or undercarriage components. Damage to the mud flap can occur if located over a raised area.

- Clear all debris and obstructions of jack landing points. Landing points must be flat and stable enough to support the weight without giving way.
- Ensure people and pets are clear of the motorhome and surrounding area during leveling system operation.



- Do not expose hands or other parts of the body near hydraulic leaks. The hydraulic system operates at high pressure. Hydraulic leaks can cut and inject hydraulic fluid causing serious injury.

CAUTION:
Surfaces such as hot asphalt, gravel or dirt may not be stable enough to support the weight. Place thick plywood under the jack pads to help disperse weight. Place a wheel chock at the opposite corner to help prevent the motorhome from rolling if blocks are placed under a jack to gain additional height.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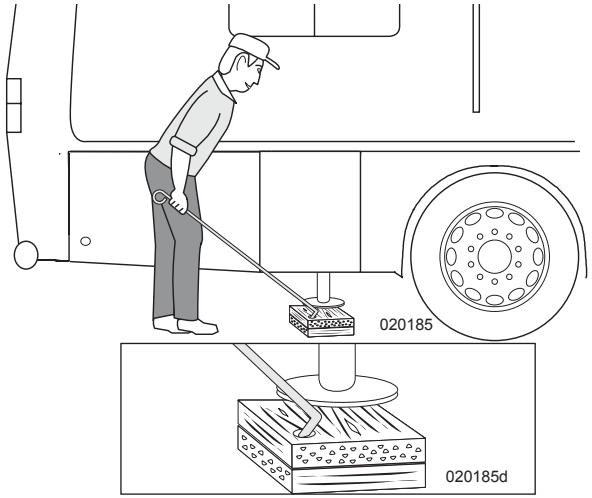
NOTE:
If additional height or surface support is needed, construct a 1' x 1' wooden block made from two pieces of ¾" plywood for a total thickness of 1½". Drill a hole in corner and use the awning wand to slide the wooden block under the jack pad.



Automatic Leveling

- Extend slideout rooms only when the motorhome is supported by the suspension. See ***"Slideout Operation"*** in this section.
- Park on a solid, reasonably level surface.
- Apply the park brake.
- Place transmission in neutral.
- The engine must be running for the leveling system to operate properly.

Please follow these tips
each time you operate your leveling system for optimum performance:

1. Start your motorhome's engine and leave it running.

2. Be sure your batteries are fully charged.

3. Turn off all lights and other electrical elements during operation.

4. Minimize movement inside the coach when you are in auto leveling mode.

If you have questions or need assistance,
please contact Lippert Customer Service at 1-866-524-7821

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- Press the On/Off button to turn the system on. If the Excess Angle light illuminates, another site must be selected before the leveling system will operate.
- Be sure all people and pets are clear of the motorhome and surrounding area.
- Press and release the Auto button. The system will begin automatic leveling.

NOTE:
The leveling system is sensitive to movement during automatic leveling. The system may determine an inaccurate state of level if movement is not restricted during the automatic leveling cycle.

- The LCI logo will illuminate when the automatic leveling cycle is complete.
- Press the On/Off button to turn the system off.
- Shut off the engine.

Manual Leveling

- Extend slideout rooms only when the motorhome is supported by the suspension. See ***"Slideout Operation"*** in this section.

WARNING:
The Excess Slope feature is disabled in manual mode. Do not apply excess torsion twist when leveling. Damage to the motorhome and related components will result.

NOTE:
When manually leveling, level front to rear first. After the motorhome is level front to rear, level the motorhome left to right.

- Park on a solid, reasonably level surface.
- Apply the park brake.
- Place transmission in neutral and shut the engine off.
- The engine must be running for the leveling system to operate properly.

- Press the On/Off button on control pad.
- Press and hold the Man (Manual) button for approximately five seconds.
- Press the Front jack button until front jack contacts the ground.
- Push the Rear button until rear jacks contact the ground.
- The right and left buttons are used to level the motorhome side to side. Pressing the Left button will extend the left rear jack. Pressing the Right button will extend right rear jack.
- Repeat steps as necessary to obtain level.
- Turn the control panel off when level is achieved.
- Shut off the engine.

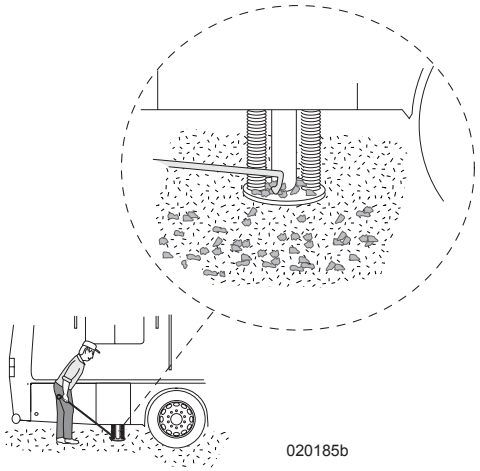
Jack Retract Procedure

Retract the slideout rooms only when the motorhome is supported by the suspension. See ***"Slideout Operation"*** in this section.

- Start the engine.
- Ensure the park brake is set.
- The transmission is in Neutral.
- Press the On/Off button turn the system on.
- Press the All Jacks retract button. The jacks will automatically return to fully retracted position.
- The Jacks Down light will go out when all jacks have retracted.
- Push the On/Off button to turn system off.

NOTE:
The All Jacks retract button must be pressed and held if the system is set to manual mode. With the system set to Auto mode, momentarily press All Jacks retract. The jacks will fully retract.

WARNING:
Visually ensure all jacks have fully retracted prior to moving the motorhome. Remove any debris that may be on the jack pad.

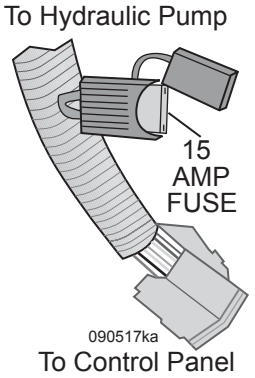


Low Voltage Light:

- If the Low Voltage light is flashing, leveling system voltage is low. Start the engine.
- If the Low Voltage light is solid, turn the ignition off then start the engine to reset the system.

Jacks Fail to Extend or Retract

- The engine is running.
- Ensure the park brake is set.
- The transmission is in neutral.
- If the control panel does not operate, check the 15 Amp inline fuse located with the leveling system wiring approximately 16" from the hydraulic pump.



NOTE:
The hydraulic pump has an internal circuit breaker to protect against overheating. If the pump is used repeatedly in a short period, the breaker will trip and reset automatically in 5 to 30 minutes.

Safety Shutoff:

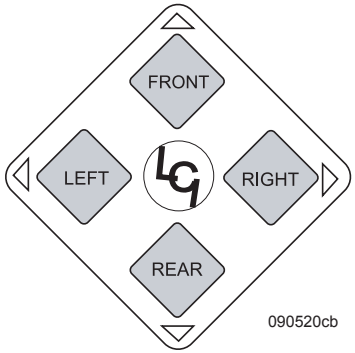
- The control panel will turn off automatically when the system has been inactive for four minutes.
- To reset the system, the ignition must be turned off then back on then press the On/Off button.

Control Pad Lockup

The control pad may "lockup" (latched error) indicated by all error modes flashing on the control panel. The control pad will not respond to commands until a control pad "reset" has been performed.

To Reset the Control Pad:

- Simultaneously press all 4 control (Front, Rear, Left and Right) function buttons.



Drive-Away Protection

If the park brake is released while the engine is running and the jacks are extended, all control panel indicator lights will flash and the alarm will sound. The system will automatically begin retracting the jacks until all jacks are fully retracted or the parking brake is set.

Maintenance

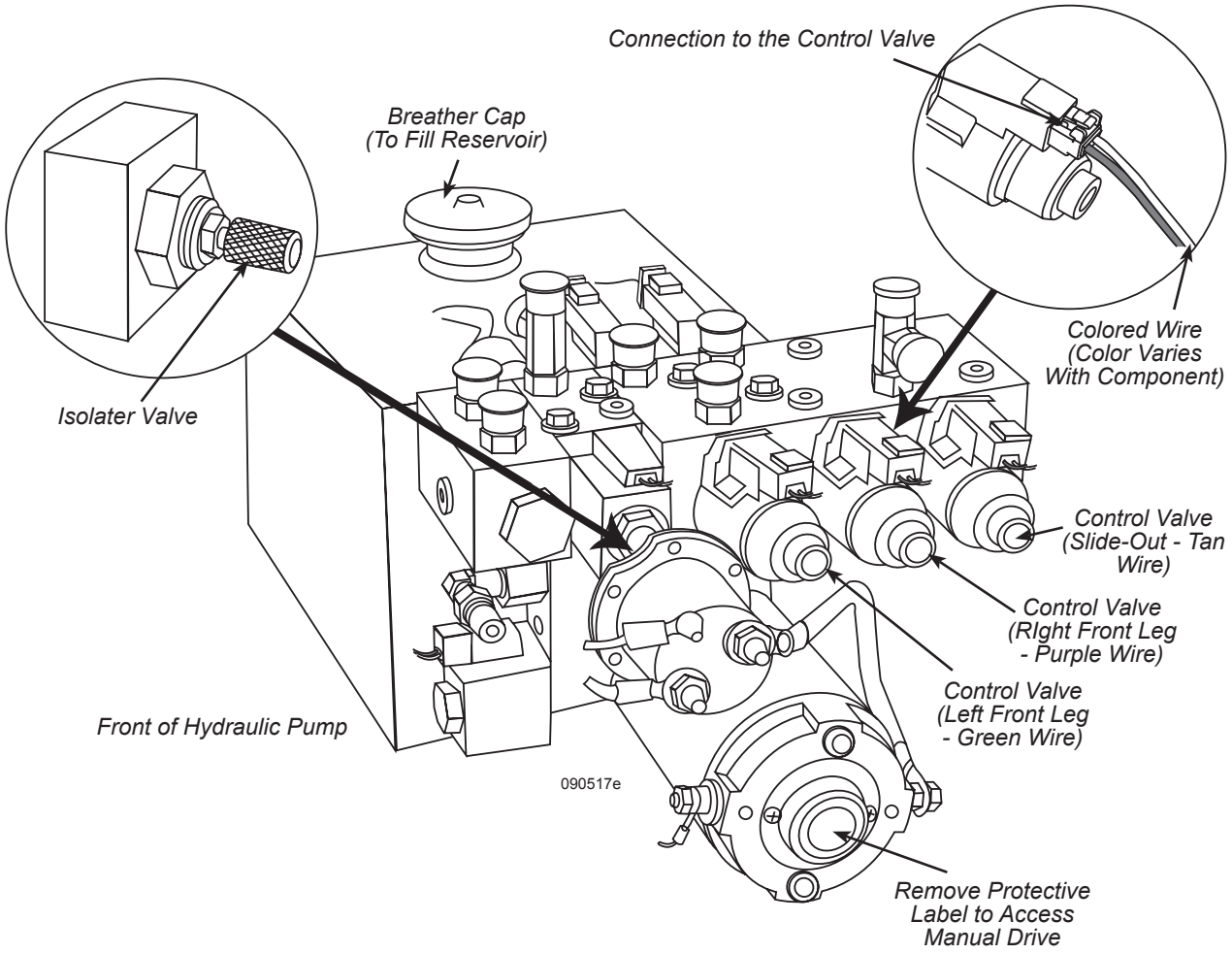
- For protection, it is recommended to use silicone spray on exposed jack rods every seven days.
- If the motorhome is located in a salty environment, it is recommended to spray the rods every 2 to 3 days.
- Remove dirt and road debris from the jacks as needed.
- Do not use grease on the rod as this will attract dirt which can damage seals.

Checking/Adding Hydraulic Fluid

- The system uses Dexron/Mercon Type A automatic transmission fluid.

WARNING
USE ONLY
DEXRON III OR MERCON V
ATF FOR THIS PUMP
031333

- Check the fluid level monthly. Fill reservoir within ½" of reservoir spout.
- Chock a wheel fore and aft for safety.
- Retract all jacks and slideout rooms. Filling the reservoir with jacks extended will cause the reservoir to overflow when jacks are retracted.
- Make sure breather cap is free of contamination before removing, replacing or installing. Do not allow any contamination into reservoir during fill process.
- Replace the breather cap.



- Change fluid in reservoir every 36 months. It is not necessary to empty the entire system of fluid. Change only the fluid in the reservoir.

INFORMATION:
In colder temperatures (less than 10° F.) the jacks may extend and retract slowly due to increased viscosity.

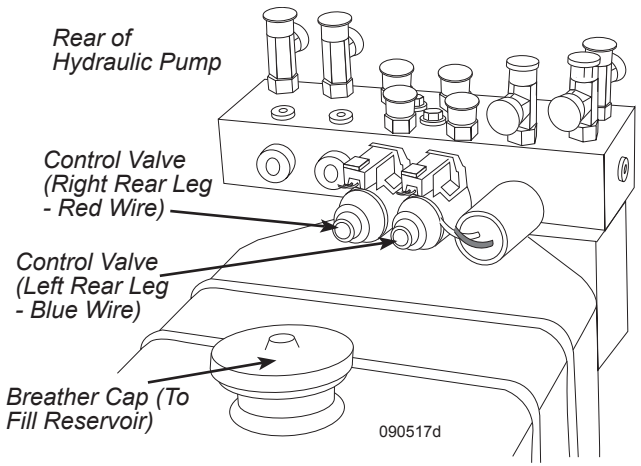
Electrical Connections:

- Inspect and clean all hydraulic pump electrical connections every 12 months. If corrosion is evident, spray with WD-40 or equivalent.

Manual Override

Check the following items before attempting to manually retract the jacks.

- Engine is running.
- Transmission is in neutral.
- Park brake is applied.
- 15 Amp inline fuse next to hydraulic pump tests good.



If after verifying these conditions and the jacks will not retract, the jacks can be retracted manually. It will be necessary to access the hydraulic pump and control valves.

CAUTION:
Do not continue to run the hydraulic motor if the jacks do not retract. Damage to the motor can occur.

Control Valve Identification:

Each control valve operates a designated jack identified by the color of wire to the control valve:

- Green wire is the front jack.
- Red wire is the right rear jack.
- Blue wire is the left rear jack.

NOTE:
Jack control valve location in the manifold will vary slightly depending on number of slideout rooms operated by the hydraulic system.

Manually Retracting the Jacks:

- Turn off disconnect switches to chassis and house batteries.
- Locate respective control valve per corresponding jack.
- Insert 1/8” Allen wrench into control valve and turn inwards (clockwise).

NOTE:
Some control valves have a knurled knob instead of an Allen socket.

- Access manual drive coupler on motor located beneath label or plug.
- Attach a standard hex bit into an angle drill.
- Insert bit into drive motor coupler.
- Run drill counterclockwise to retract.
- When the jack is retracted, turn control valve(s) outward (counterclockwise) to lock jack in up position.
- Turn on both chassis and house disconnect switches.
- Take the motorhome to an authorized repair center.

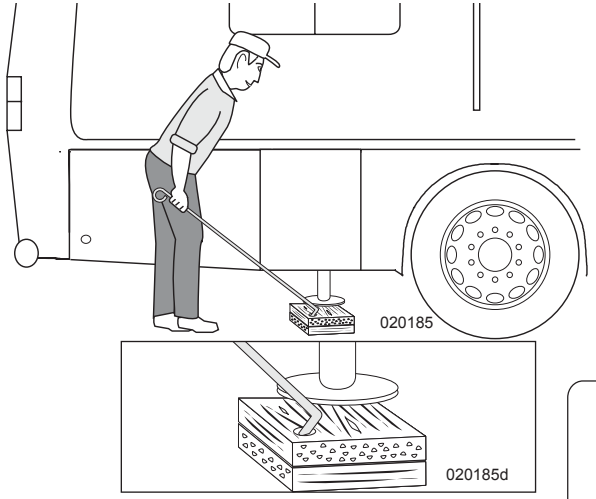
LEVELING SYSTEM (EQUALIZER)

A control panel located on the dash operates the leveling system. The leveling system has safety features such as a "Jacks Down" light and an alarm that sounds if the engine is started and transmission placed in gear with the jacks extended.

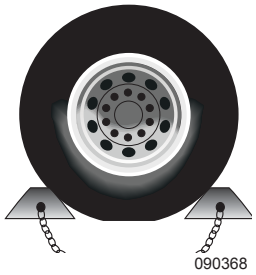
CAUTION:
Before leveling the motorhome, survey the area around and under the motorhome to ensure potential jack contact points are clear of obstructions, debris and depressions.

CAUTION:
The hydraulic jack system is designed to reduce sight selection problems and stabilize the motorhome when parked. No single jack should be used solely to level the motorhome. Using an improper leveling process can result in applying excess torsion stress/twist to the chassis, frame and body, resulting in damage to the windshield and/or entry door malfunction. The leveling jacks are not designed for changing tires. This can cause problems with the suspension system, frame alignment and damage to the windshields. Never use the jacks to elevate any wheel position off the ground.

CAUTION:
Hot asphalt, gravel or dirt may not support the weight that is placed on the hydraulic jack pads. Place thick plywood under the jack pads to help disperse the weight.



CAUTION:
If blocking up a rear jack pad to gain added clearance, place a wheel chock at the opposite set of rear wheels to prevent the motorhome from rolling.

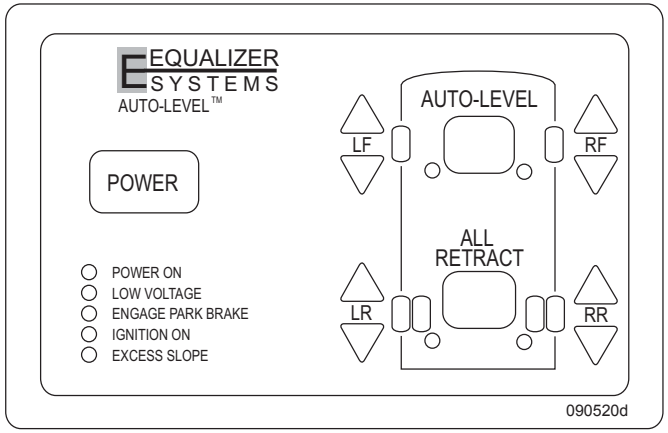


WARNING:
Never access the underside of the motorhome when jacks are operating. Serious personal injury may occur.

WARNING:
Never use the leveling system to lift any wheel position off the ground! Serious damage to the motorhome, personal injury or death can occur.

Leveling System Safety Features:
The leveling system has safety features to prevent a jack from extending during travel. The control panel will not activate until these safety features are in place.

- Ignition key is off.
- Transmission is in Park.
- Parking brake is applied.



Control panel configuration may vary

Warning Features Include:
- Flashing lights on the control panel and an alarm that sounds when a jack is extended.

WARNING:
Keep all people and pets clear of the motorhome during the leveling procedure. Never expose hands or other parts of the body near hydraulic leaks. Hydraulic lines are under high pressure. Oil leaks may cut and penetrate the skin causing serious injury.

Automatic Leveling

- Select a level site if possible. Excessive slopes may prevent the control panel from operating. The “Excess Slope” indicator will illuminate is the slope is too great (approximately 3º). Select another site.
- Place the gear selector in Park.
- Apply the parking brake.
- Turn the ignition Off.
- Press the Power button on the control panel. The Power On LED will illuminate.
- Press the Auto Level button to begin leveling.
- A series of beeps will indicate leveling is complete
- The control panel will enter sleep mode in 5 minutes.

CAUTION:
It is important to remain stationary (no movement) when Auto Leveling. Excess movement may cause the system to level incorrectly. If this occurs, retract the jacks and start the leveling procedure again.

Manual Leveling

- Select a level site if possible. Excessive slopes may prevent the control panel from operating. The “Excess Slope” indicator will illuminate is the slope is too great (approximately 3º). Select another site.
- Place the gear selector in Park.
- Apply the parking brake.
- Turn the ignition Off.
- Press the Power button on the control panel. The Power On LED will illuminate.
- Press and hold both Front Down buttons until the front jacks contact the ground.
- Press and hold both Rear Down buttons until the rear jacks contact the ground.
- Press a corresponding Down button (Front or Rear) to level the motorhome. Example: If bubble is towards front of motorhome, press a Rear Down button to raise rear of coach.
- Once the motorhome is level, press the Power button to turn system off.

INFORMATION:
Level the motorhome Front to Rear first. After the motorhome is leveled Front to Rear, then level the motorhome Side to Side.

CAUTION:
Do not move the motorhome while jacks are in contact with the ground or extended. Damage to the jacks may occur.

Retracting the Jacks

- Press the Power button on control pad.
- Press the All Retract button. The pump motor will run while the jacks are retracting.
- Jacks are retracted when the jack down LED indicators are not illuminated.
- Press the Power button to turn system off.

WARNING:
Always perform a visual inspection of the jacks to make sure they are fully retracted prior to moving the motorhome.

Maintenance

Jack Rod Maintenance:

- If jacks are down for long periods, it is recommended to spray exposed leveling jack rods with a silicone lubricant every seven days for protection.
- If the motorhome is located in a salty environment, it is recommended to spray the rods every 2 to 3 days.
- Remove dirt and road debris from the jacks as needed.
- Operate leveling system once or twice a week to keep seals and internal moving parts lubricated.
- If squeaks are heard apply a coat of lightweight oil or silicone lubricant spray to jack rod then remove excess so dirt and debris does not build up.
- Never use grease on the jack rod.

Checking/Adding Hydraulic Fluid:
The hydraulic leveling pump is located in an exterior compartment.

- Chock a wheel fore and aft for safety.
- Check fluid level with jacks fully retracted.
- Inspect fluid level each month. Level should be within ½ inch of spout lip.
- Make sure breather cap is free of contamination before removing breather cap.
- Fill reservoir with *Dexron III* automatic transmission fluid (ATF).
- Do not allow any contamination into reservoir during fill process. Fill the system within ½ inch from the spout lip.
- Replace the breather cap.

WARNING:
The hydraulic motor can be extremely hot. Use extreme safety when accessing and working on the motor. Hot metal can result in serious burn injuries.

NOTE:
In colder temperatures (less than 10° F) the jacks may extend and retract slowly due to the fluid's molecular nature. For cold weather operation, fluid specially formulated for low temperatures may be desirable.

WARNING:
Do not work on the hydraulic pump unless the both the house and chassis battery disconnect switches are off.

Troubleshooting

The Auto Level feature may need to be recalibrated if the system fails to properly level the motorhome.

To Reset Level:
- Level the motorhome using the manual leveling procedure. Turn control panel off.
- Press and hold the Auto Level button then press the Power button.
- Wait for the control panel to sound a series of 5-6 beeps then release the Auto Level.
- The system is now calibrated to the new level setting.

If jacks fail to extend or retract:
- Apply the park brake
- Turn the ignition off.
- Place the transmission in Park.
- If jacks still do not operate, check leveling system fuses and circuit breakers.

NOTE:
The hydraulic pump is equipped with an internal thermal breaker for protection against overheating. If the pump is used repeatedly in a short period of time the breaker will trip and then reset automatically in 5 to 30 minutes.

Jacks Fail to Retract

There are a number of key components on the hydraulic pump.

Refer to the illustration for these components:

- Electrical connections to the control valve.
- Control valve.
- Manual drive access located under protective cap.

If the jacks fail to retract follow these steps:

Determine if Hydraulic Pump is Running:
- If pump is not operating, check fuses.
- Check wiring connection at control valves.

CAUTION:
Never run the hydraulic motor for an extended, continuous period of time. Damage to the motor can occur.

CAUTION:
Do not continue to run the hydraulic motor if the jack(s) do not retract. Damage to the motor could occur.

WARNING:
The hydraulic motor can be extremely hot. Use extreme safety when accessing and working on the motor. Hot metal can result in serious burn injuries.

WARNING:
Do not work on the hydraulic pump unless the both the house and chassis battery disconnect switches are off.

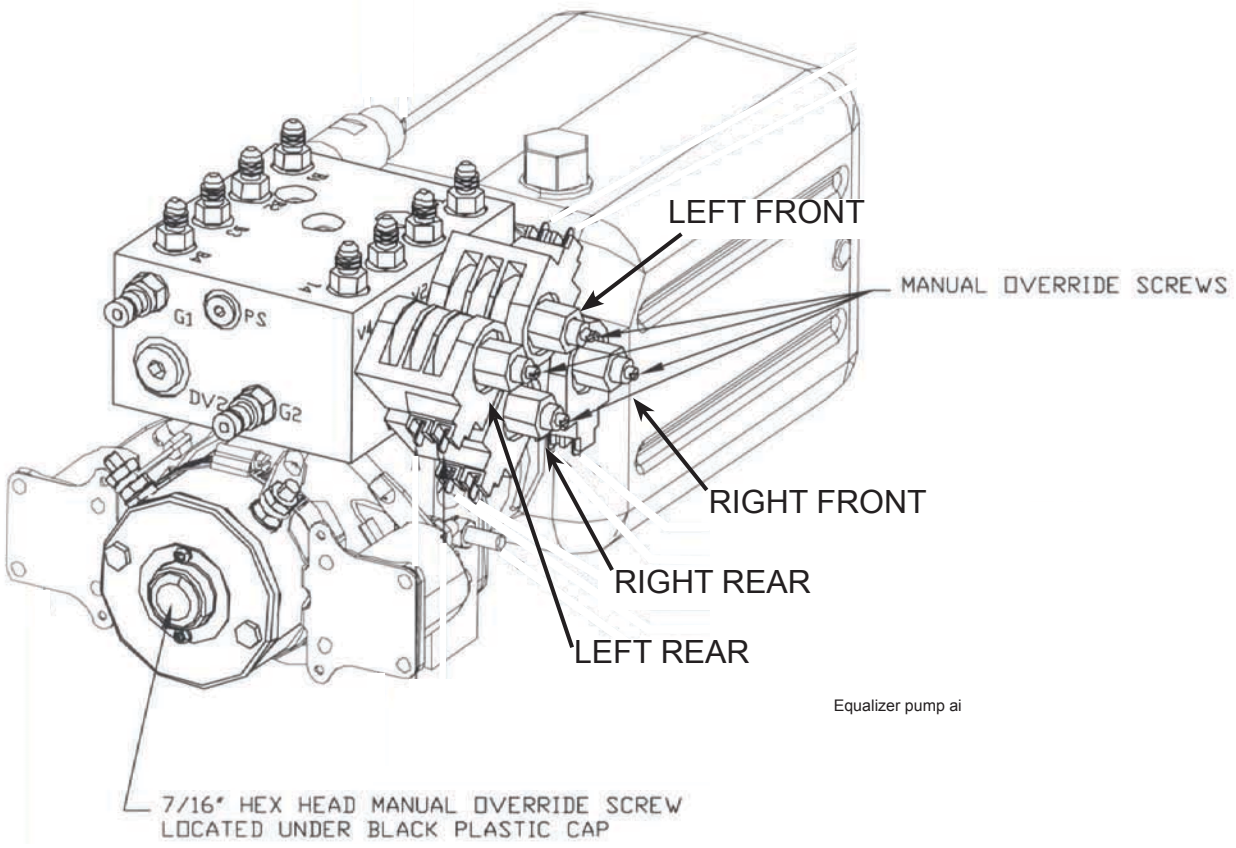
Manual Override

It may be necessary to manually retract the jacks. Note corresponding location of control valve and jack.

- Disconnect both the house and chassis disconnect switches.
- Access the hydraulic pump.
- Ensure that the appropriate connection to the control valve(s) is plugged in. If loose properly secure the connection.
- Locate control valve on pump in relation to jack position. Using a small screwdriver, rotate Manual Override Screw inward (clockwise) until screw lightly seats.
- Remove the protective cap on the hydraulic pump to access the manual drive coupler.
- Attach a standard hex bit into a drill.

NOTE:
Drill must be capable of 2000 RPM to create sufficient hydraulic pressure.

- Insert the hex bit into motor coupler.
- Run drill counterclockwise to retract.
- Once jack is retracted, return Manual Override Screw to out (counterclockwise) position to hold jack in retracted position.
- Turn on both the house and chassis disconnect switches.
- Take the motorhome to an authorized repair center.



Manual override for Equalizer pump

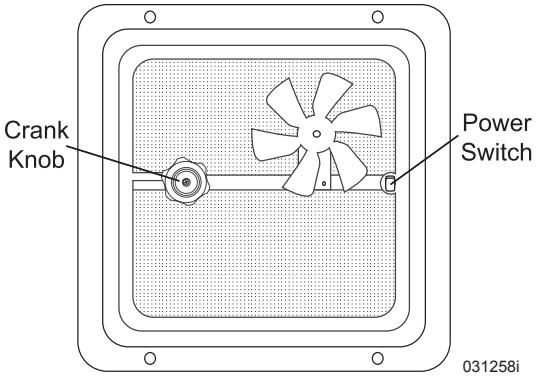
FANS
Power Roof Vent

The vent is opened or closed by turning the crank knob in the desired direction. The vent is for ventilation only, it is not designed to cool the motorhome.

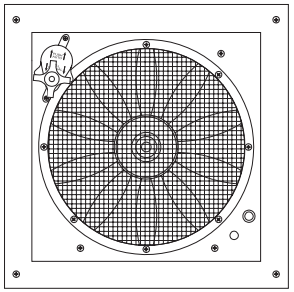
Fan Operation:

- Battery disconnect switch must be on.
- Battery switch, by entry door, must be on.
- Fan is activated by pushing the vent power switch on.
- Vent must be opened before using the fan.

CAUTION:
Do not leave any vent cover open while the motorhome is in motion, stored or unattended for extended periods of time. High winds or other unusual conditions or obstructions may damage and prevent closing. Leakage could result, causing serious damage.



FANS
Automatic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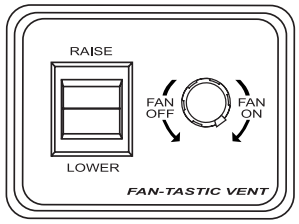


031205d

A wall rheostat controls the automatic vent and power of the fan. The system operates from 12 Volt DC power.

Fan Operation:

- House batteries must be on.
- Turn on the battery cut-off switch.
- Push the vent cover knob to the Automatic position.

NOTE:
Push the knob in for automatic. Pull the knob out for manual.

- Use the wall switch to raise the vent cover. The vent cover will open approximately 2" before the fan will run.
- Turn power knob clockwise to turn fan on. The power knob also adjusts fan speed.

NOTE:
To override the automatic setting, pull the vent cover knob out to the manual position and close vent. The fan blade will stop spinning when the vent is closed.

WARNING:
Do not hold switch after the motor has stopped. This can damage to the automatic lift system.

NOTE:
The safety switch will not allow the fan motor to operate until the vent is open approximately 2" or more.

Tips:

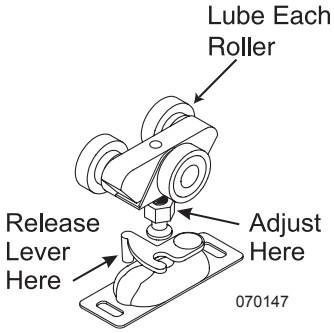
- Operate the fans to reduce condensation. Condensation occurs naturally from fluctuations in interior and exterior temperatures, humidity and dew point changes. Steam from cooking and shower use are other sources of condensation.
- If the fan fails to operate, check for a blown fuse either in the house distribution fuse panel or the 4 Amp fuse on the fan.
- Slightly open windows on the shaded side of the motorhome to create a draft. Maximum airflow is achieved between an open window and the vent.

NOTE:
Do not leave the fan switch in the active mode while the motorhome is stored or unattended for extended periods. High winds, unusual conditions or obstructions may prevent the fan cover from fully closing, resulting in leakage and serious damage.

DOOR - SLIDING

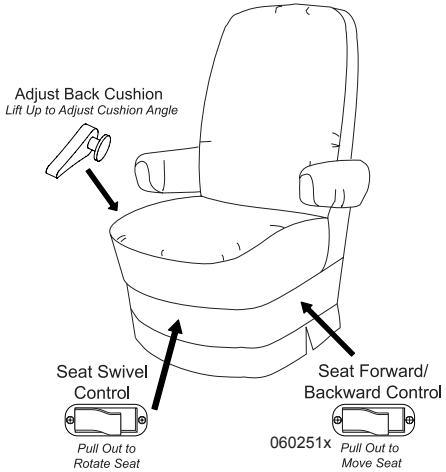
The sliding pocket door utilizes two rollers at the top of each door. The sliding door may eventually require adjustment. Turn adjusting screw upward or downward as necessary to align door. To remove pocket door, rotate lever outward to release the latches.

LUBE:
The pocket door rollers should be lubed with just a small drop of oil once a year to help increase the life of the rollers and improve sliding.



SEAT CONTROLS

The Pilot and Co-Pilot seats are adjustable to provide maximum comfort. Seats must be locked in the forward facing direction while traveling.



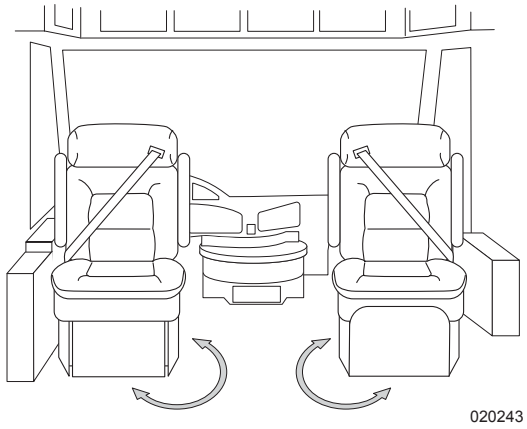
Location and type of seat conrols will vary

SWIVEL SEATS

Swivel Seat Operation:

- To swivel, pull out on the swivel control lever.
- When rotating the driver seat, put the steering wheel in the upright position.
- Move the seat forward, then pull the swivel lever out and rotate to the desired position.

WARNING:
Seats must be locked in the forward facing position while the motorhome in transit.

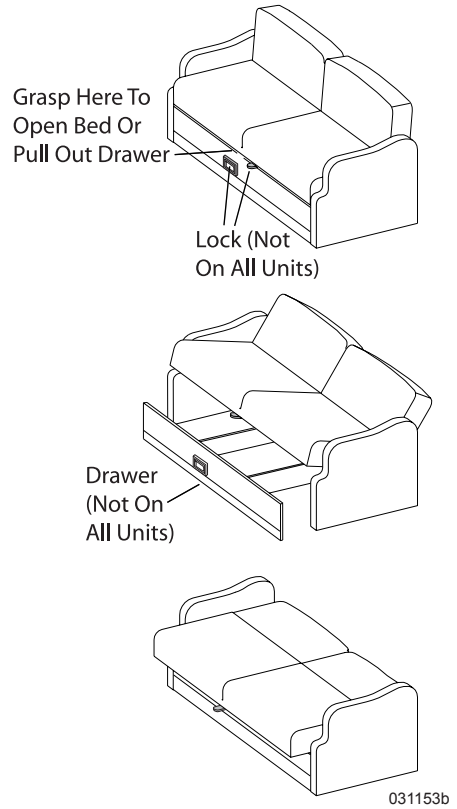


SOFA
Easy Bed Sofa

The sofa converts easily into a bed. Clear the area of obstruction.

Sofa to Sleeper:

- If applicable, slide the lever forward to release the locking mechanism.
- Raise the sofa seat base until seat base and backrest form a “V” shape by lifting up from the center of sofa just below the seat cushions.
- Push down on seat base until the seat base and backrest are flat.



Sleeper to Sofa:

- Lift the seat base up until seat and back rest are in a “V” shape.
- Push down on seat base.

WARNING:
Do not use the sofa for transporting infants or children that require safety seats or booster seats.

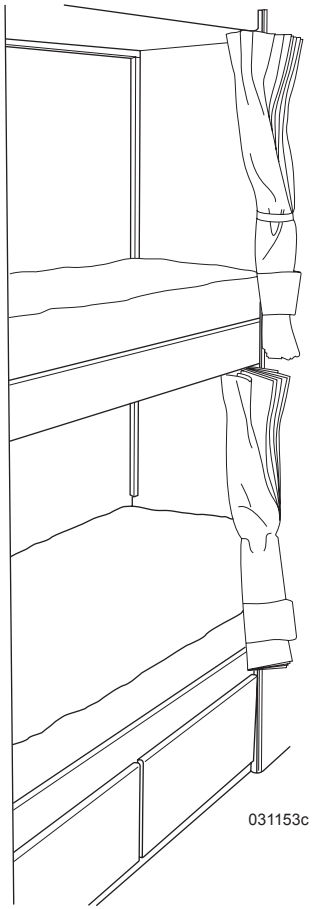
BEDS

Bunk Beds (Optional)

Depending on floor plan, hallway bunk beds with bottom drawers are available for the motorhome. Always use extreme care and safety when entering or exiting a lower or upper bed.

CAUTION:
Do not exceed the maximum sleeping capacity of 250 lbs. for each bunk.

WARNING:
The bunks beds are not designed for occupancy while the motorhome is in motion.



250 Lbs. Max.
Sleeping Capacity
#03213227

080427n

Hide-A-Bed (Optional)

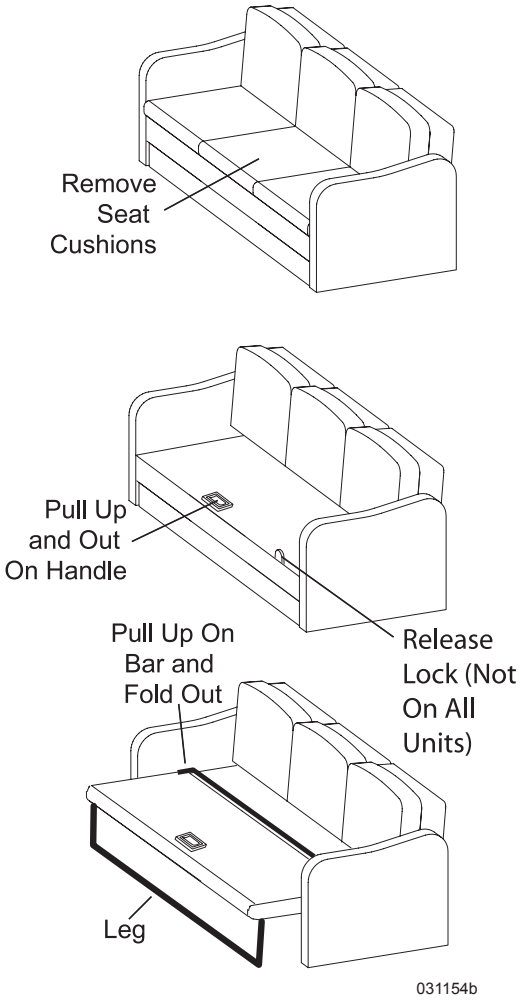
The sofa hide-a-bed will convert easily into a bed. Clear the area of obstruction and debris.

Sofa to Sleeper:

- Remove the three seat cushions to access the hide-a-bed. The seat cushions should be stored safely until the bed is converted back to a sofa.
- If applicable, release the lock on the right side of metal bar, grasp the front metal bar and lift up pulling out on the bar slightly until the leg of the bed is firmly resting on the floor.
- When the legs of the bed are firmly on the floor there will be another lifting bar exposed to complete the conversion process.
- Grasping and opening the lifting bar will open the bed fully. The bed is now ready for linen.

Sleeper to Sofa:

- Remove all bedding from the hide-a-bed.
- Grasp the foot of the hide-a-bed in the center using the metal lifting bar.
- Fold over the bottom portion of the bed that will form the seat.
- Lift the front portion of the lifting bar to raise and lower the hide-a-bed back into the sofa base.
- Replace the seat cushions.



DINETTE

Free Standing Dinette

The free standing dinette comes with two standing chairs and two folding chairs.

To Extend/Retract Table:

- To extend, pull out on table until it locks.
- To retract, push in on table until it locks.

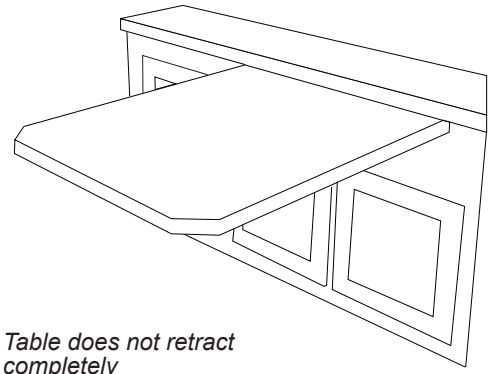


Table does not retract completely

031273

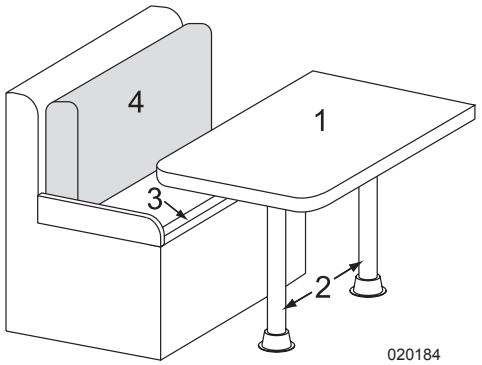
WARNING:
Only forward facing booth dinette seats equipped with seat belts are designed for occupancy while the motorhome is in motion. Do not occupy dining chairs while the motorhome is in motion. To avoid injury in case of a crash or sudden stop, chairs should be stored in an enclosed area or secured with tie down straps.

Booth Dinette (Optional)

The booth dinette converts quickly into a bed.

Booth to Sleeper:

1. Remove the tabletop from the leg supports and set aside.
2. Remove the leg supports from the base and store.
3. Slide the tabletop between the booth benches allowing it to rest on the guide rail.
4. Lay both seat cushions and back cushions together to form a mattress.

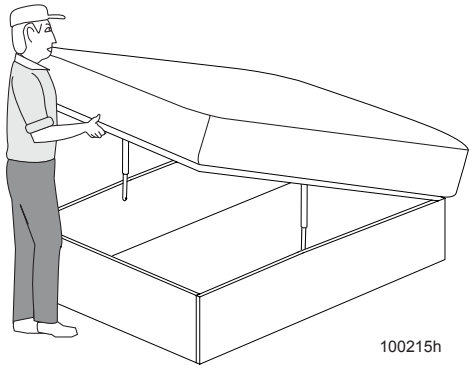


020184

WARNING:
Only forward facing booth dinette seats equipped with seat belts are designed for occupancy while the motorhome is in motion. Do Not occupy booth dinette (if not equipped with safety belts) or the dining chairs, while the motorhome is in motion. To avoid injury in case of a crash or sudden stop, chairs must be stored in an enclosed area or secured with tie down straps while the motorhome is in motion.

STORAGE - UNDER BED

To use the storage compartment located under the bed, lift up the bed by the front edge of the mattress platform. Gas struts hold the mattress and platform open.



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CAUTION:
Do not overstress gas struts by rapidly opening or closing the bed access cover, as this action can damage the struts or mounts. In extreme cold, gas struts may not hold the mattress platform in the open position.

LADDER - REAR

The rear ladder allows access to the roof. Use care when climbing the ladder. Access to the roof should be limited to cleaning and sealing purposes only.

NOTE:
Maximum weight capacity for the ladder is 300 lbs.

DASH RADIO

The dash radio includes an AM/FM tuner, CD player, Weather Band, iPod and USB connections and is Sirius satellite radio capable.

Operation Requirements:

- Turn on the battery disconnect switch.
- Turn on the radio.

Dash radio 031356i

INFORMATION:
Only the most common connections and features are described. The system is comprehensive. It is recommended to refer to the dash radio OEM manual for detailed operating instructions and information.

To Set the Clock:

- Press and hold the PTY/CAT/MENU button to enter the system menu.
- Rotate the Tune/Enter knob to select the clock. Press the Tune/Enter knob to enter the clock menu.
- Select either 12 or 24 hour format.
- Rotate the Tune/Enter knob to set hours.
- Press the Tune/Enter knob to set minutes.
- Rotate the Tune/Enter knob to set minutes.
- Momentarily press the PTY/CAT/MENU button to exit the system menu.

To Play the Radio:

- Press the On/Off button to turn the radio on.
- Press the Mode button until Tuner displays.
- Press the Band button to select AM or FM.
- Rotate the Tune/Enter knob to increase or decrease frequency.
- Press and hold one of the preset buttons (1-6) to store the station in memory.
- Adjust Volume to desired level.

To Play a CD:

- Insert a CD.
- The menu will change and the disc will load and play automatically.
- Adjust Volume to desired level.

To Play Weather Band:

- Press the WB (weather band) button.
- Rotate the Tune/Enter knob to select 1 of 7 weather band channels.
- Adjust Volume knob to desired level.

USB Port:

- Insert a USB device or connect an iPod (cable not provided) to the USB port.
- The radio will automatically switch modes.

NOTE:
Not all MP3 players may be compatible. If not, use the stereo jack ("Aux In") input. The radio will automatically switch modes to play back from this input when a USB device is connected. Depending on the source material, the radio may display track title and file type information.

Aux In/iPod (Stereo Jack):

- Connect a cable with a 1/8" stereo plug (male) on both ends from an auxiliary device (such as an MP3 player headphone jack or a laptop computer speaker/headphone output) to the "Aux In" input. This will give audio reproduction through the dash stereo.
- Set the auxiliary device to a mid-range volume level and adjust volume at the dash stereo for best results.
- Source information may not display on the radio screen (such as song title, artist, etc.).

SATELLITE RADIO (OPTIONAL)

A Sirius satellite tuner and special antenna is included with the satellite radio option. The special antenna will receive the satellite radio signal and the tuner will decode and play Sirius satellite radio. The dash radio LCD screen is used as the display. A satellite radio subscription is required (not included) that will allow the tuner to decode the satellite radio transmission.

INFORMATION:
Refer to the Sirius OEM manual for operating instructions.

NOTE:
A Sirius satellite tuner, special antenna and additional cabling will have to be installed to play satellite radio through the dash radio if the motorhome was not originally ordered with the satellite radio option.

Satellite Radio Subscription

Satellite radio subscription can be ordered over the internet @ siriusxm.com or by telephone at 888-539-7474. The satellite tuner's 12-digit identification number is required to subscribe. The tuner ID number is located on the tuner or can be displayed through the dash radio.

To Display the Tuner ID:

- Enter Sirius satellite radio mode in the dash radio using the Menu button.
- Use the Seek up or Seek down button to display channel 000.
- The radio will display the 12-digit Sirius identification number (SID).

To Play Satellite Radio

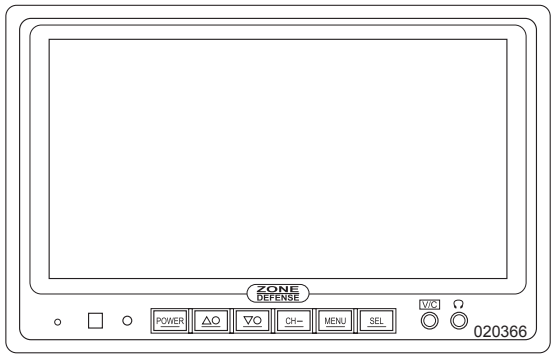
- Repeatedly press the Mode button until the Sirius tuner displays.
- Press the Band button to select station presets SR1, SR2 or SR3 or rotate Tune/Enter to select a channel.

INFORMATION:
Subscription is not provided. For information regarding subscriptions and service coverage areas, contact Siriusxm.

Sirius® Satellite Radio
1-888-539-7474
www.siriusxm.com

GPS NAVIGATION (OPTIONAL)

The Garmin navigation system is viewed through the rear view monitor. The Garmin remote control is used to navigate and program the navigation system. The navigation system provides detailed street maps, points of interest such as restaurants, hotels, gas stations, trip computer and turn-by-turn directions via voice guidance. The GPS receiver is loaded with a majority of street maps for North America. Maps can be viewed from different perspectives: 3-D, top-down, track-up, or north-up view. A SD card slot is located on the side of the Garmin receiver. This is used to update the unit with new maps as they become available.



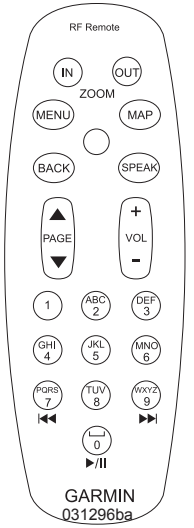
GPS navigation select channel 4

CAUTION:
For safety, only perform GPS operations when the motorhome is parked.

INFORMATION:
The system is comprehensive. Refer to the OEM Garmin manual for all features and programming instructions. Further information is available at www.garmin.com

To Display Navigation

- Turn on the battery cutoff switch.
- Turn on the monitor.
- Press Channel up or down to select channel 4 Navigation.
- Use the Garmin remote to accept the Navigation system warning.
- Use the Garmin remote to navigate and program the navigation system.



Garmin remote control

TV ENTERTAINMENT COMPONENTS

The following paragraphs will discuss the operations and various components that make up the entertainment center.

INFORMATION:
It is recommended to become familiar with individual components. Refer to the respective component's OEM manual for detailed instructions.

NOTE:
All components of the entertainment system require 120 Volts AC to operate. Hook to shore power or start the generator. Turn on the battery disconnect switch to supply power to the roof antenna.

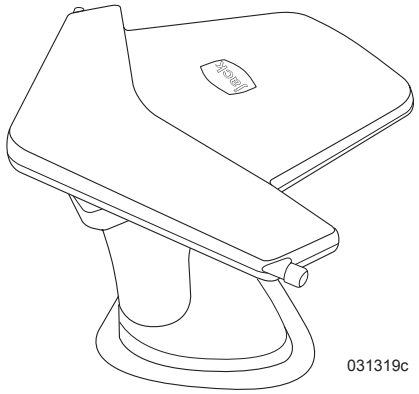
Television (Front) Lockout Feature

The ignition switch controls the outlet for the front TV, allowing the front TV to operate only when the ignition is off.

TV Antenna

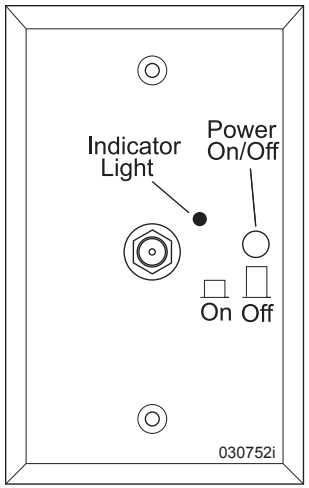
The television (TV) antenna with built-in electronics use 12 Volts DC to "boost" signal strength. Directional control, amplifier and attenuator are located on the antenna base. The Antenna Select switch selects either roof antenna or shore cable if available.

Directional control and the attenuator provide the best possible picture for most situations depending on location. Certain reception conditions may occur where amplification can degrade picture quality.

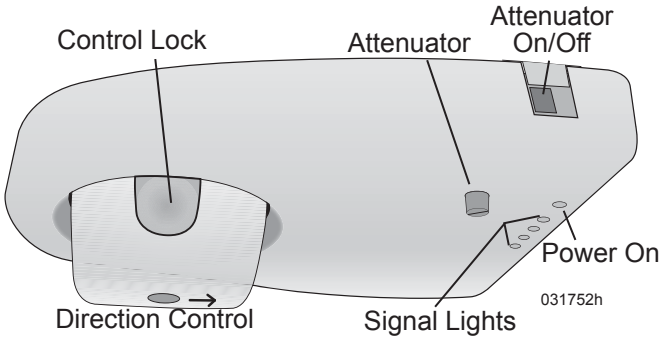


To Use the Roof Antenna:

- Turn on Antenna Select switch.
- Turn on antenna attenuator.
- Rotate attenuator switch fully clockwise.
- Press inwards on lock to directional control then rotate antenna until maximum number of signal strength lights illuminate.



Antenna select switch



- Rotate attenuator counterclockwise until maximum number of signal strength lights illuminate.
- Rotate antenna until strongest signal indicator flickers then adjust attenuator counterclockwise until maximum number of signal strength lights illuminate.
- Antenna direction and attenuator is now set for the best possible reception.

NOTE:
The Antenna Select switch must be on to power the attenuator and signal strength lights.

NOTE:
Rotation control stops allow the antenna to rotate 360º.

NOTE:
Rotate direction control knob with arrow pointing rearward for travel.

To Use Shore Cable:

- Turn the Antenna Select switch off.
- Make the cable connection to the shore cable port located in the roadside bay.

Front TV Operation

NOTE:
Due to options in entertainment equipment and floor plans, operation of entertainment components may vary.

- Hook to shore power, start the generator or turn on the inverter.
- Ensure house batteries are fully charged.
- Use the battery cutoff switch to turn on interior house power.
- Ignition key must be in the off position.

To Watch TV from the Antenna:

- Turn the antenna select button on.
- Turn on the TV. Repeatedly press the TV Input button to select TV (channel or tuner).
- Select desired channel.
- Adjust volume on TV to desired sound level.

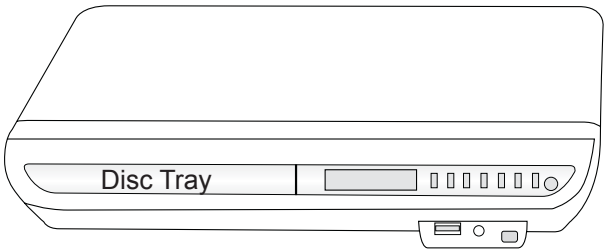
INFORMATION:
To receive local channels, the television Input must be set to Cable (also called Tuner or Air by some manufacturers). Repeatedly press the Input button until Cable is selected. In addition, an automatic channel search can be initiated to scan available channels in area. Refer to television OEM manual for further information.

To Watch TV from Shore Cable:

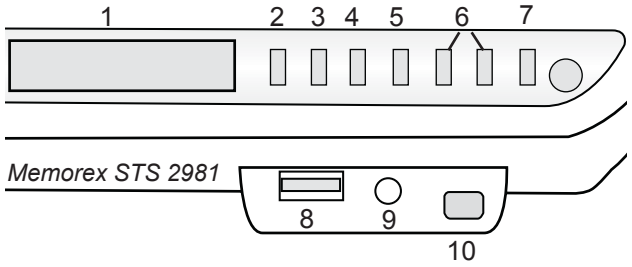
- Connect a cable from the park service to the Cable port.
- Turn off the antenna select button.
- Turn on the TV. Repeatedly press the TV Input button until TV (channel or tuner) displays.
- Select desired channel on TV.
- Adjust volume on TV to the desired level.

To Watch TV from the DVD Player (Option):

- Press On/Standby to turn DVD player on.
- Press Open/Close to open DVD tray.
- Place DVD into tray. Close tray. DVD will load and play automatically.
- Repeatedly press the Input button on the TV until DVD appears on the TV.



Home theater system 031193p



1	LCD Screen
2	Open/Close
3	Play
4	Stop
5	Function/Select
6	Volume Up/Dn
7	Standby/On
8	USB Port
9	Aux In
10	Power On/Off

Bedroom TV Operation

To Watch TV from the Antenna:

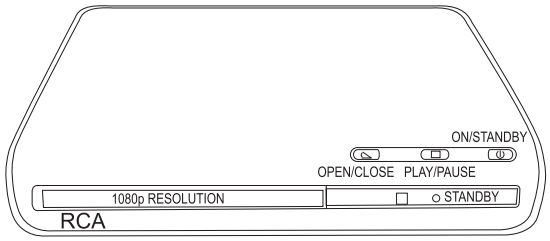
- Turn on the antenna select button.
- Turn on the TV. Repeatedly press the TV Input until Cable is selected.
- Select desired channel.
- Adjust volume on TV to the desired level.

To Watch TV from a Shore Cable:

- Connect a cable from the park service to the Cable port.
- Turn off the antenna select button.
- Turn on the TV. Repeatedly press the TV Input button until TV (channel or tuner) displays.
- Select desired channel on TV.
- Adjust volume on TV to the desired level.

To Watch TV from the DVD Player (Option):

- Press On/Standby to turn DVD player on.
- Press Open/Close to open DVD tray.
- Place DVD into tray. Close tray. DVD will load and play automatically.
- Repeatedly press the Input button on the TV until DVD appears on the TV.



Optional bedroomDVD player 031193h

EXTERIOR ENTERTAINMENT (OPTIONAL)

The exterior entertainment has a LCD television and combination radio/DVD player located in a curbside bay compartment.

To Operate Any Component:
Entertainment components require 120 Volt AC from shore power, generator, or the inverter.

- Ensure house batteries are charged.
- Battery cutoff switch must be on.

To Watch TV from Antenna/Shore Cable:

- Turn on the TV.
- Press the Input button until a channel number displays (tuner).
- Select either Roof Antenna (On) or Shore Cable (Off) on the Antenna Select switch.
- Select desired channel.

SATELLITE PRE-WIRE

The motorhome is pre-wired with coaxial cables for a roof mounted satellite dish. The cables are located behind the driver's side forward halogen light. A satellite receiver connection plate located in the entertainment cabinet is included as part of the satellite prewire.

NOTE:
A satellite receiver is not included.

Satellite Connection - Living Room:

Roof LNB #1:
This port is used to hookup a standard definition roof mount satellite dish. Composite Video/Audio ports connect to an input on the TV. Connect the satellite receiver output to these ports.

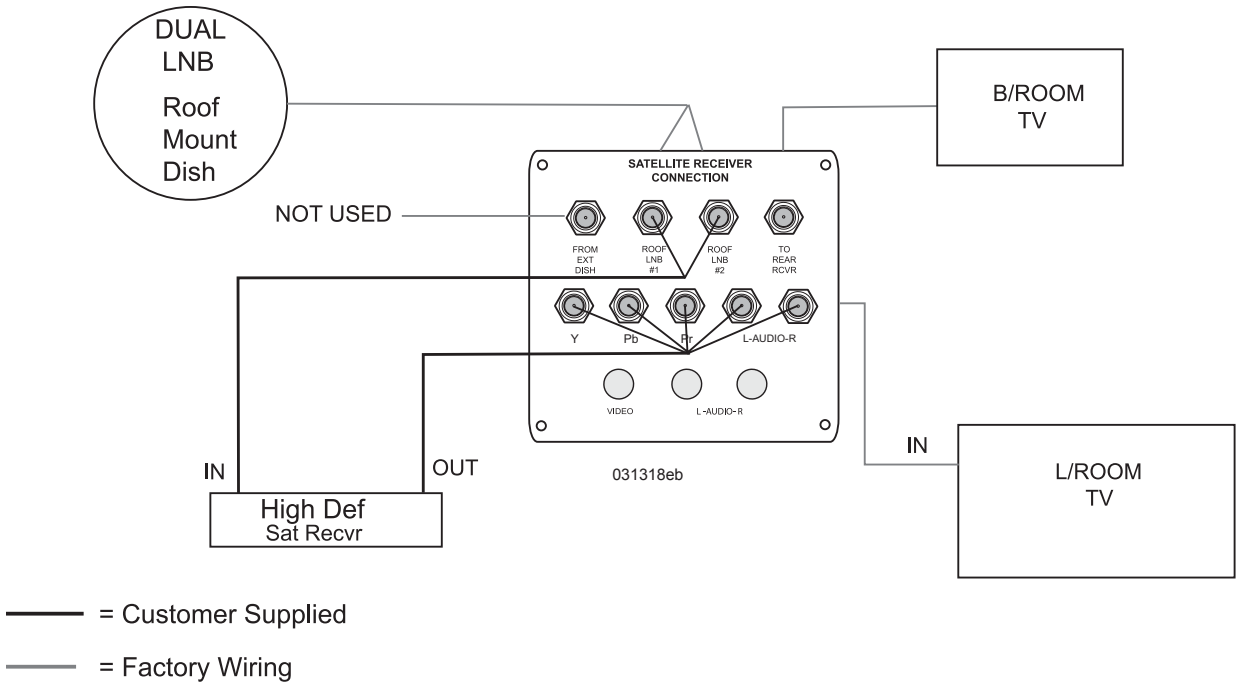
Roof LNB #2:
This port is used in conjunction with Roof LNB #1 to hookup a high-definition roof mount satellite dish. Component video ports and RCA audio ports connect to inputs on the TV. Connect a high-definition satellite dish to these ports.

To Rear Receiver:
This port provides a cable to the bedroom TV entertainment cabinet.

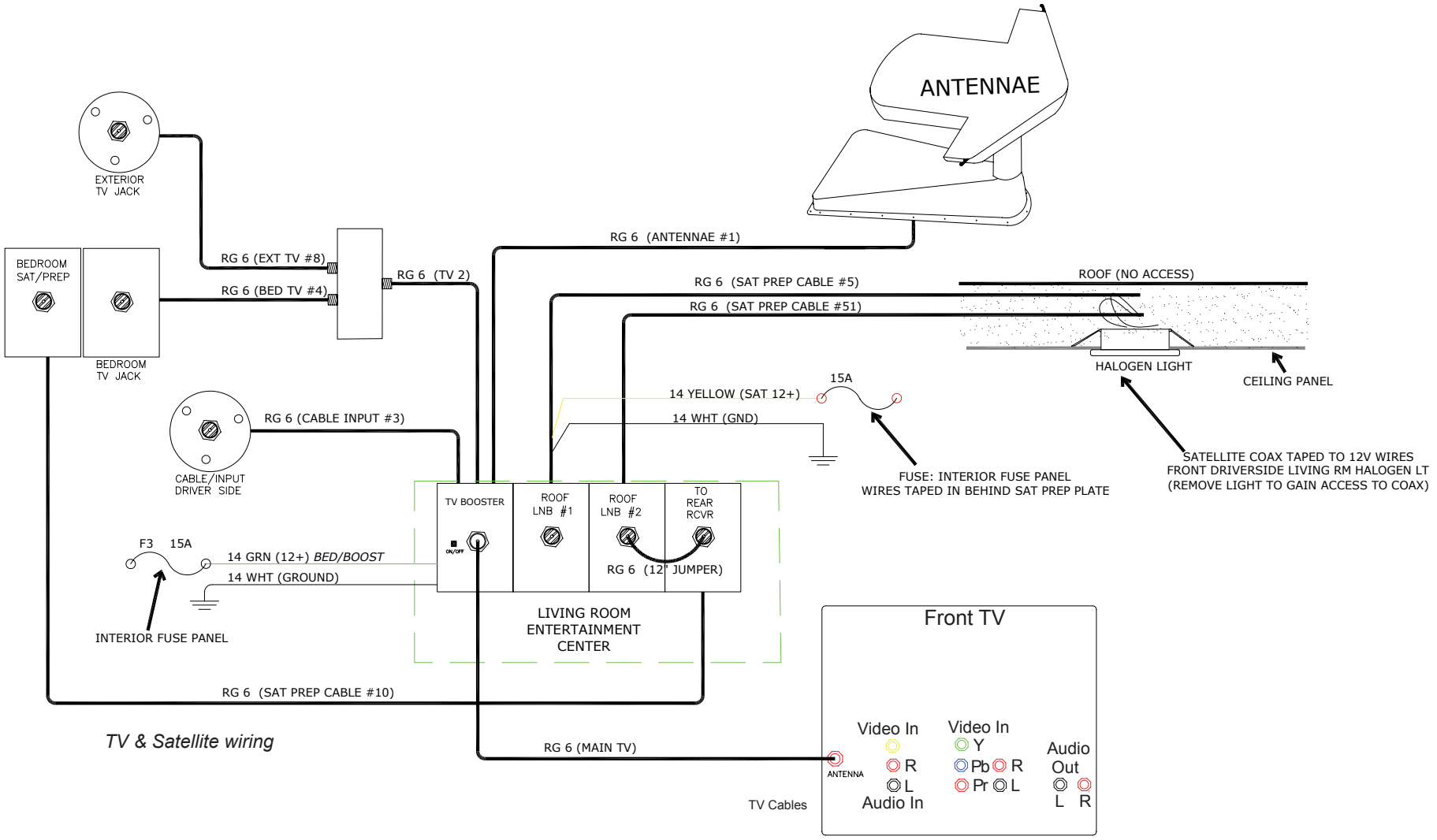
Y, Pb, Pr, L-Audio-R:
Component video ports hooked to inputs on the TV. Connect a high-definition satellite receiver (or game console) to these ports.

Video L- Audio-R:
Composite (RCA) ports hooked to inputs on the TV. Connect a standard definition satellite receiver (or game console) to these ports.

NOTE:
There are a number of ways satellite reception can be obtained dependent upon: types of satellite dishes, equipment hardware, standard definition, high-definition and DVR receivers, satellite subscription providers etc. Due to available possibilities, only the most probable receiver installation diagram is provided. Additional hardware and cabling can be required when installing satellite equipment.



TV & SATELLITE COAX WIRING



TV & Satellite wiring

COMMAND CENTRAL

1. **Electrical Management System (Optional):** Interface and control for the EMS system. See Section 8 for further information.

2. **Bat Heat (Option):** Turns on tank heat pads for fresh water tank and holding tanks.

3. **Systems Monitor Panel:** Pressing the individual buttons displays the status of the black and grey holding tanks, fresh water tank and propane tank. Also displays status of battery.

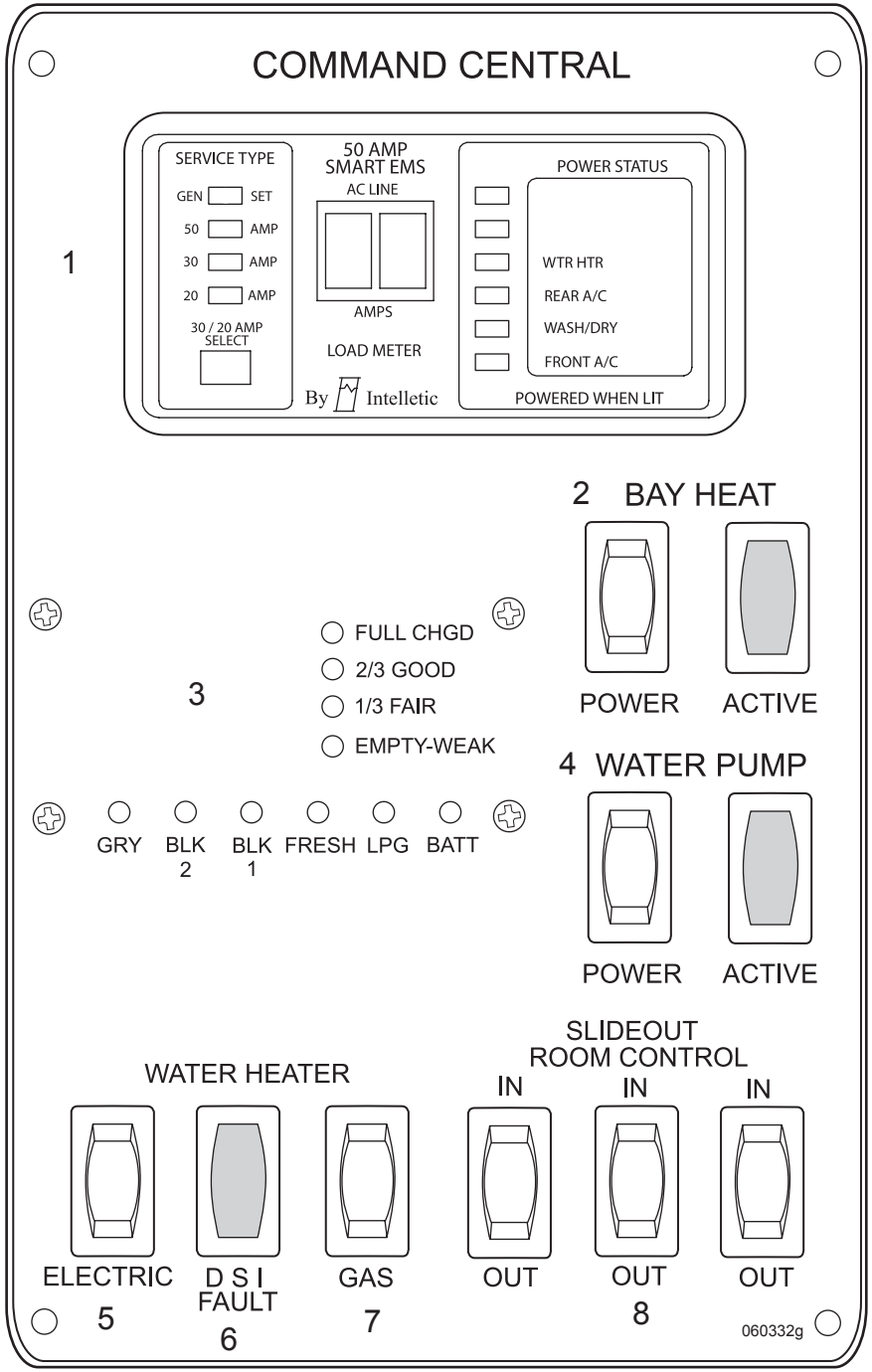
4. **Water Pump Switch:** Turns the water pump on and off.

5. **Water Heater Switch Electric:** Operates the water heater with 120 Volts.

6. **DSI Fault:** Illuminates if the water heater burner fails to light.

7. **Water Heater Switch Gas:** Operates the water heater with Propane.

8. **Slideout Room Control:** Extends and retracts slideout rooms.



Notes

Water Systems

Section 6

WATER SYSTEMS - INTRODUCTION

This section contains information about the water system. Optional water equipment will also be discussed, so not all information may be applicable to each motorhome. Some equipment may be standard on certain floorplans and optional on other floorplans. Further information, other than what is found in this section, is located in the OEM manuals in the owner information box.

Water Consumption:

If new to a self-contained motorhome, habits must be adjusted otherwise water does not last long. For example, less water can be used for showering if the shower is turned off while soaping down, then turned back on to rinse. Plenty of water will be available to meet personal needs once habits are adjusted.

Plumbing Overview:

The motorhome plumbing system can be operated independantly of shore service. The plumbing system holding tanks include a fresh water tank, a grey water (liquid waste) tank and a black water (solid waste) tank. Sinks, shower and optional washer drain into the grey tank, and the toilet drains into the black tank. An onboard water pump will supply all faucets and toilets with water from the fresh tank. Close monitoring of the holding tanks is necessary when not connected to shore service.

Water Service Center:

The motorhome plumbing system can be attached to shore services (city water and sewer) at the roadside water service center. The service center includes a 4-way water valve, city water connection and the grey and black tank valves and drains. If shore services are available, the shore water supply (city water) can be used to pressurize the water system and the onboard water pump can be turned off. The grey and black tanks share a common termination drain. A sewer hose can be attached from the drain to the shore sewer facility. It is recommended to leave the black tank drain valve closed and the grey tank drain valve open when hooked to shore services to avoid a clogged sewer hose. Drain and flush the black tank(s) after dumping and/or prior to departure.

Fresh Water System:

The fresh water system consists of a fresh water tank, water pump, pressure regulator, water filter, city/fresh water connection and a water hose for potable use only. Proper care of the hose is necessary. After each use, drain the water hose and coil the hose neatly. Attach the ends together to keep dirt, debris and insects out of the hose.

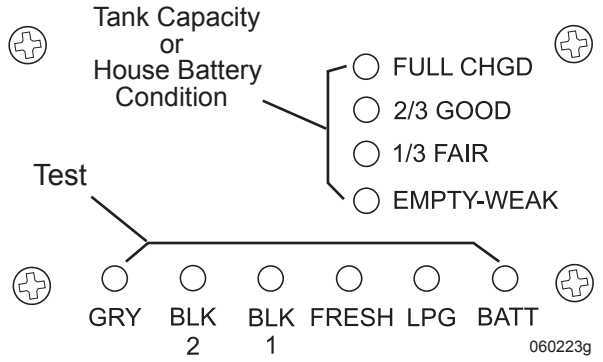
Waste Water System:

The waste water system consists of a liquid waste holding tank (grey water), sewage holding tank (black water), flush system, toilet, sewer hose and drains.

WARNING:
Water is electrically conductive. Do not use any electrically powered item or electrical outlet that may be exposed to a water source. Such use can result in a serious shock, causing injury or death.

WATER TANKS
Measurements

The monitor panel will aid in managing the fresh water and waste storage tanks. The monitor panel is located on the Command Central panel located in the hallway area. Press the corresponding switch to test the level of a storage tank



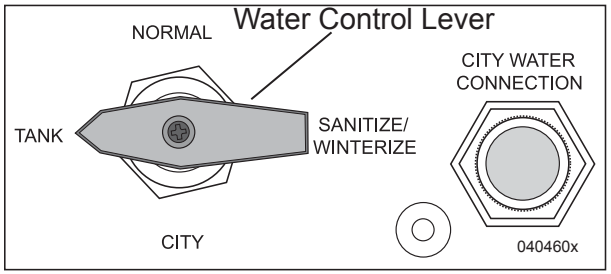
Located on Command Central

FRESH WATER
Tank Fill

When connecting the motorhome to fresh water or when filling the fresh water tank, use a hose manufactured and labeled for "potable" water. This ensures the hose and hose fittings are safe for drinking water. It is recommended to install a water pressure regulator at the water source to protect the potable hose and plumbing system from excess pressure.

WARNING:
Hose and hose fittings not manufactured for potable water can contain unsafe levels of lead. It is highly recommended to use only fresh water supply hoses manufactured for potable water use.

- Connect the pressure regulator to the water source.
- Connect the potable hose to the regulator then to the City Water Connection located in the water service center.
- Set the water control lever to the Tank position.



Located in water service center

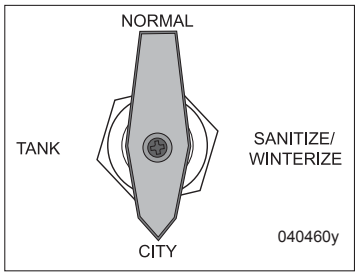
- Turn on the water.
- Periodically press the Test switch on the monitor panel to gauge fill rate. Do not leave the motorhome unattended while filling the fresh water tank.
- The tank is nearing full when the light marked "Full" illuminates. When the tank is completely full, water will flow out an overflow tube under the motorhome.
- Turn off the water supply.
- Disconnect the potable hose. Remove pressure regulator. Store the hose with both ends connected to prevent debris from entering the hose.

CAUTION:
It is recommended to place a pressure regulator at the water source to protect the potable water system from over-pressurization. Some water sources have high water pressure, particularly in mountainous regions. High water pressure is anything over 55 psi (pounds per square inch). Excessive water pressure may cause leaks in water lines and/or damage the water heater. Excess pressure can cause the water hose to swell and burst.

City Water Hook-Up

When connecting the motorhome to city water, use a hose manufactured and labeled for potable water to ensure the hose is safe for drinking water. It is recommended to install a pressure regulator at the water source to protect the potable hose and the plumbing system from excess pressure.

- Connect the pressure regulator to the water source.
- Connect the potable hose to the regulator then to the City Water Connection located in the water service center.
- Set the water control lever to the City position.

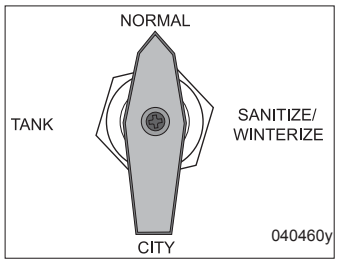


- Turn on the water.
- Slowly open each faucet (cold then hot), one at a time, to purge trapped air.

Water Pump

The water pump draws water from the fresh water tank and pressurizes the fresh water system. The water pump is self-priming, operating on demand as water is used.

To Operate the Water Pump:
- Fill the fresh water tank.
- Set water control lever to the Normal (water pump) position.



- Turn on the battery cut-off switch.
- Turn on the water pump from the Command Central panel or water service center.
- Slowly open each faucet (cold then hot), one at a time, to purge trapped air.

WARNING:
Do not continue water pump operation if the fresh water tank is empty. Damage to the water pump or electrical supply system may result.

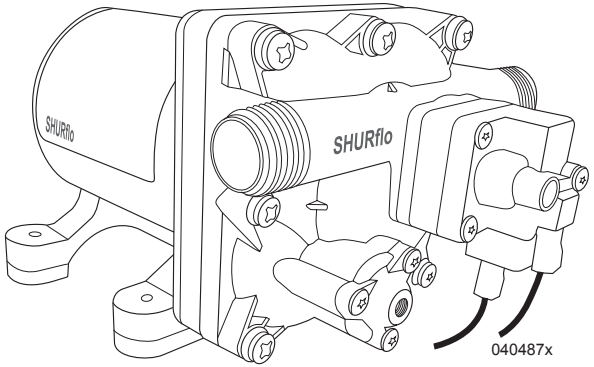
WARNING:
Before leaving the motorhome for extended periods of time (overnight or longer) the city water source and water pump must be turned off. The manufacturer is not responsible for damage caused from neglect.

WATER PUMP

The water pump pressurizes the fresh water system when not connected to city water. The water pump is self-priming, operating on demand as water is used. The water pump is located in the water service center.

To Operate the Water Pump:
- Battery cut-off switch must be on.

WARNING:
Before leaving the motorhome for extended periods of time (i.e. overnight or longer) the city water source and water pump must be turned off. The manufacturer is not responsible for damage caused from neglect.



Water pump

Water Pump Switches are Located:
- The convenience center (command central).
- Water service center.

To Turn the Water Pump On or Off:
- Press the water water pump switch. The indicator lamp illuminates when the water pump is turned on.

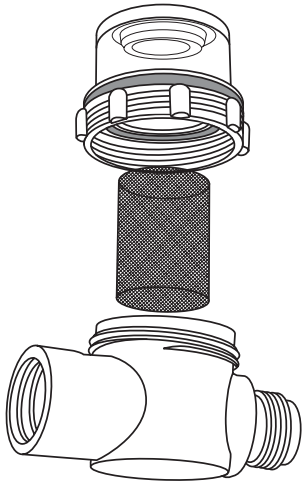
WARNING:
Do not continue water pump operation if the fresh water holding tank is empty. Damage to the water pump or electrical supply system may result.

Water Pump Troubleshooting

Vibration, induced by road conditions, can cause the plumbing fittings and/or pump hardware to loosen. Check the water pump system for components that may have jarred loose especially after removal from storage as freeze damage may have occurred.

Water pump will not start or blows the fuse:
- Check the electrical connections, fuse or breaker, main switch and ground connection.
- Is voltage present at the pressure switch on the pump? If voltage is present, the pressure switch may be faulty. As a test, temporarily bypass the pressure switch.
- Check the charging system for correct voltage and good ground.
- Check for an open or grounded circuit or motor.
- Check for a seized or locked diaphragm assembly (water frozen).

Water pump will not prime or sputters (No discharge/motor runs):
- Check the pump inlet strainer for clogs and debris.
- Check the tank for water or air collected in the water heater.



Water pump inlet screen: *Clean every two months.*

- Check the inlet tubing and plumbing to see if it is sucking in air at plumbing connections (vacuum leak).
- Check for proper voltage with the pump operating.
- Check the pump housing for cracks or loose drive assembly screws.

Water pump will not shut-off or continues to run when the faucet is closed:

- Check the city water/fresh tank fill handle is fully set to one position or the other.
- Check the output (pressure) side plumbing for leaks and inspect for a leaky toilet or valves.

Water pump is noisy or rough in operation:

- Check for plumbing that may have vibrated loose.
- Does the mounting surface multiply noise (flexible)?
- Check for mounting feet that are loose or compressed too tight.
- Look for loose pump head to motor screws.

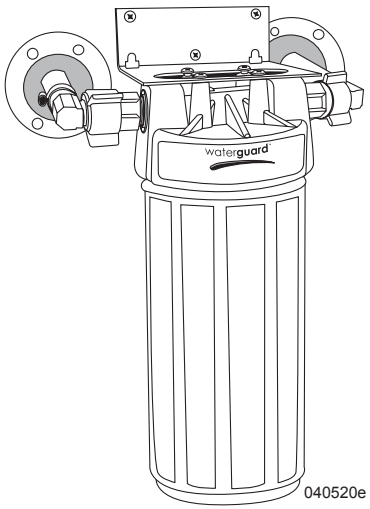
Water pump is rapid cycling:

- Look for restrictive water flow in the faucets or shower heads.

WATER FILTER

A whole house water filter is located in the water service center. Change the water filter after 1,000 gallons of use or sooner if water flow is noticeably reduced.

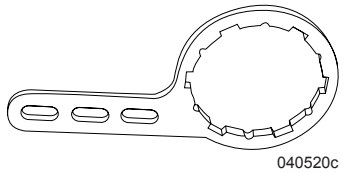
INFORMATION:
For specific water filter information, cautions and additional filter replacements consult the water filter OEM instructions or contact Shurflo Customer Service at 1-800-854-3218.



CAUTION:
Protect filter from freezing or damage to the system could occur.

Filter Removal:

- Turn off the water supply and the water pump.
- Open faucets to bleed off pressure.
- Unscrew the filter bowl using the bowl wrench.



Water filter removal wrench

- Check O-ring for damage and lubricate if necessary. O-ring should be replaced every third cartridge change to ensure proper sealing.
- Remove the old cartridge and discard.
- Empty any remaining water in the bowl.

Filter Installation:

- Insert new cartridge into filter bowl.
- Screw filter bowl back onto head and hand tighten securely.
- Turn on water pump or city water.
- Thoroughly flush and purge air from the system by opening faucets and running the water.
- Check for leaks.

Filter Replacement: RV-10C1

INFORMATION:
Replacement filter number is accurate at time of printing. Confirm replacement filter number before ordering or obtaining a replacement.

To Winterize:
- Winterize the motorhome.
- Unscrew the filter bowl using the bowl wrench.
- Remove the old cartridge and discard.
- Screw filter bowl back onto filter head and follow instructions in ***"Winterization"***.

To De-Winterize:
- Insert new cartridge into filter bowl.
- Screw filter bowl back onto head and hand-tighten securely.
- Turn on water pump or city water.
- Thoroughly purge air from the system by opening faucets and running the water.
- Check for leaks.

CAUTION:
O-ring must be properly seated in the groove of the bowl housing or a water leak could occur.

DISINFECTING FRESH WATER

Disinfecting the water system with household bleach (superchlorination) protects against bacteriological or viral contamination. A separate water pump or water source will be required to push the solution into the fresh water tank. The onboard water pump will be used to pump the solution from the tank throughout the plumbing system. If a separate water pump is not available, pour a sufficient amount of bleach (see Preparing the Solution) into the potable hose then connect to a city water source to push the bleach into the fresh water tank so that final concentration in the tank is about 50 PPM.

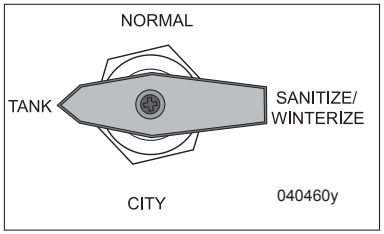
Disinfect the fresh water system:
- If the motorhome is new.
- If the motorhome has been in storage.
- Every three months during use.

Preparing the Solution:

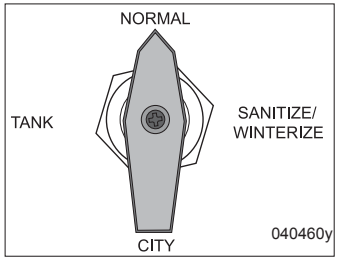
Prepare a household chlorine bleach solution of 1 gallon water to ¼ cup of chlorine bleach. Use 1 gallon of solution for every 15 gallons of tank capacity. This mixture puts a 50 ppm (parts per million) residual in the water system and acts as a quick-kill dosage for harmful bacteria, viruses and slime-forming organisms. Concentrations higher than 50 ppm may damage the water lines and/or tanks.

INFORMATION:
Household bleach is 5.25% Sodium Hypochlorite. Higher concentration will increase PPM ratio.

Disinfecting
- Drain the fresh water tank.
- Close the water heater bypass valves. This ensures that none of the solution enters the water heater. If applicable, refer to the water heater OEM manual for instruction on flushing the water heater.
- Obtain an auxiliary water pump or pour bleach into the potable hose.
- Connect the potable hose to a city water source or place hose into the prepared solution.
- Connect hose to the City Water Connection in the water service center.
- Place the water control lever to the Tank position.

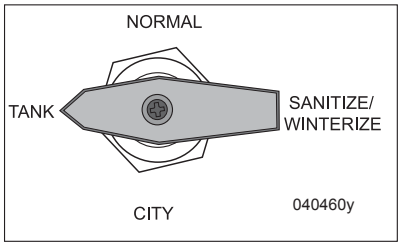


- Turn on the water to push solution into the tank or turn on the separate water pump to dispense solution into the fresh water tank.
- Once solution is in the fresh water tank, turn the water control lever to the Normal (water pump) position.



- Turn on the onboard water pump.
- Open each faucet (hot and cold) in sequence until a distinct chlorine bleach odor is present. Do not forget the shower and outside faucets.
- Turn off all faucets and allow the system to stand for 4 hours.

Rinsing
- Connect the potable hose with regulator to a city water source then connect to the City Water Connection in the water service center.
- Set the water control lever to the Tank position.

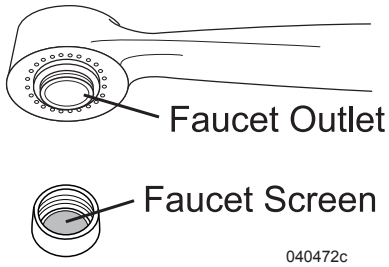


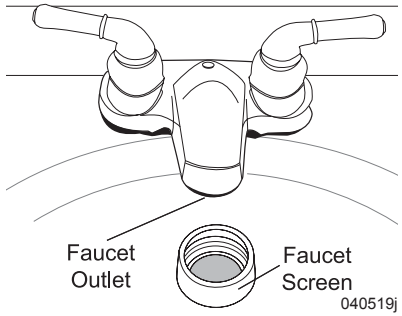
- Fill the fresh water tank with fresh water. Drain the tank and refill with fresh water to rinse solution.
- Set water control lever to the City position.
- Open each faucet (hot and cold) until the chlorine smell is no longer detectable in the water system.
- Turn water control lever to the Normal (water pump) position. Turn on water pump and open a faucet to clear pump of disinfecting solution.

TIP:
Ensure the solution is purged of the fresh water system as excess residue can damage fresh water system components. This may require several flushes of the tank and fresh water system.

FAUCET SCREENS

Fresh water sources will vary by location. Build up of lime deposits, or debris on the faucet screen, will restrict or plug the flow of water coming from the faucets. Should the flow of water reduce, the filter screen in the faucet head may be clogged.





Maintenance:
- All faucet screens should be checked and cleaned every two weeks of use.
- Faucet screens are normally located on the outlet side of the faucet and held in place with a threaded collar.
- Remove screen from faucet.
- Clean screen using a small soft brush and de-liming solution.
- Reinstall screen and check water flow.

WASTE WATER SYSTEMS
Proper Waste Disposal

Dumping raw sewage from toilet holding tanks, except at authorized dumping stations, is universally prohibited. Most National, State and private parks have either a central dump facility or campsite hook-up for sewage. Many modern rest areas along the interstate now have dump stations available. Woodall's Campground Directory, Trailer Life's RV Campgrounds and Services Directory, Rand McNally's Campground and Trailer Park Guide, Good Sam Park Director (Good Sam Club) and other similar publications list dumping stations. Some major oil companies also offer dump facilities at select stations.

Do Not Put in Waste Holding Tanks

- Do not use strong or full strength detergents to deodorize and disinfect. Only use odor controlling chemicals specifically made for holding tanks.
- Do not use automotive antifreeze, ammonia, alcohol or acetone in holding tanks. These products will dissolve plastic.
- Do not use standard household tissue that remains in one piece. Paper designed specifically for holding tanks is available at most RV supply stores. Facial tissue is thicker, softer and stronger than rapidly dissolving tissue. White toilet paper dissolves faster than colored. To test how well the tissue dissolves, immerse one tissue square into a jar of water. Shake the jar five times to determine how the tissue disintegrates.

- Do not dispose of table scraps or cooking grease into the tanks. They can clog pipes or damage termination valve seals.

CAUTION:
Do not dispose of sanitary supplies or other non-dissolving items into the system. Facial tissue, wet strength tissue, paper towels or an excessive amount of toilet tissue can create clogging in the holding tank system.

CAUTION:
Do not use any products that contain petroleum distillate or ammonia in place of RV odor controlling chemicals. Petroleum distillate or ammonia will damage the ABS plastic holding tanks and seals.

What to Put in Holding Tanks

Grey Water Tank:

The grey water waste tank stores the sink, shower and clothes washer (if equipped) drain water. A reduced mixture of chemicals may help to control odor in the grey tank.

Ensure that there is enough liquid in the holding tanks prior to dumping the waste holding tanks to provide a smooth flow through the valve, termination drain and sewer hose. Empty the waste holding tanks weekly to prevent stagnation and overfilling.

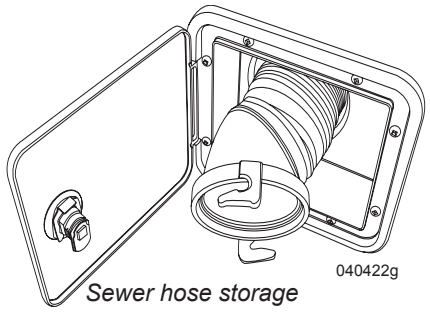
Black Water Tank:

To help prevent buildup, pre-treat the sewage holding tank with a few gallons of water and an odor-control chemical (available at most RV supply stores). First, add approximately three gallons of water to the holding tank. Next, add the chemicals, in accordance with the manufacturer instructions. Pour mixture through toilet to the holding tank. Be careful not to spill the chemical on hands, clothing, toilet bowl or carpet. Hot weather conditions may require adjusting the amount of chemical used to control odor. Repeat the chemical pre-charge each time the black tank is cycled.

WARNING:
Most chemical mixtures for holding tank odor control are poisonous. Follow the product manufacturer's directions and warnings when using holding tank additive. Do not use products that contain petroleum distillate or ammonia in place of RV odor controlling chemical. Petroleum distillate or ammonia will damage the ABS plastic holding tanks and seals.

Waste Drain Hose

A flexible three-inch sewer hose attaches between the common termination drain and the shore sewer facility. Sewer hoses usually come in 10 and 20 foot lengths.



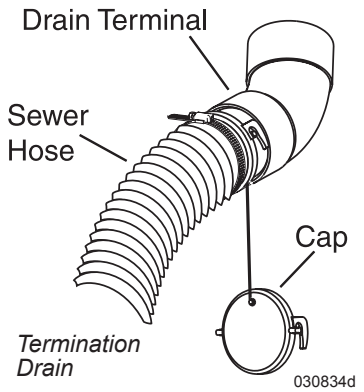
Sewer hose storage

The shore fitting for the sewer hose may be a three or four-inch, male or female thread pipe; or a four-inch pipe with no threads, covered by a metal plate. Different style of adapters are available to fit most configurations. Hose ladders may also be purchased to support the hose.

It is important that the hose remains secure. Always tighten clamps and restraining devices before use. Lay the sewer hose inline between the termination drain and the shore fitting. Restrain the hose to prevent movement during use. Wear protective and/or disposable gloves when handling the sewer hose.

To Attach the Sewer Hose:

- Remove sewer hose from storage.
- Remove termination cap. Align coupler tangs with termination tabs. Twist coupler clockwise 90º locking coupler to termination drain.
- Unscrew access port and feed the sewer hose through the opening.
- Attach other end of hose to shore sewer facility. Restrain hose to prevent movement during use.
- Open the liquid waste drain (grey water) valve.

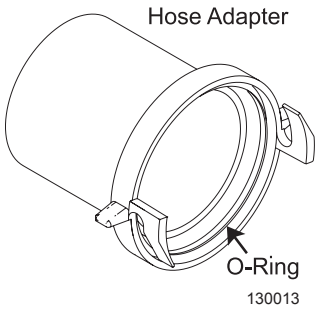


The solid waste drain (black water) valve remains closed until the tank is full or until time of departure to help prevent clogging. Use the outside faucet or shower attachment for washing or rinsing the sewer hose after dumping the black tank.

NOTE:
Use care when connecting the sewer hose adapter to the termination drain in cold weather.

NOTE:
Close the grey water valve 24 hours prior to departing to allow the tank to fill with liquid to help in the dumping process.

LUBE:
Periodically lubricate the O-ring on the sewer hose adapter with silicone spray.

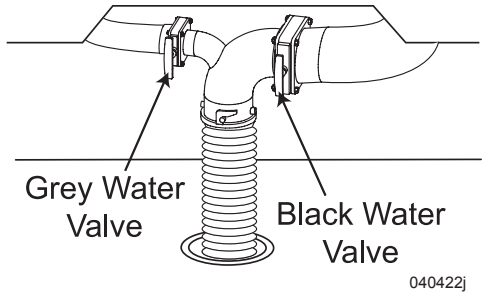


Draining the Tanks

The waste holding tanks should be full or nearly full prior to draining to help evacuate the tanks more efficiently.

To Drain the Tanks:

1. Attach sewer hose to termination drain and shore facility.



2. Prepare to dump the solid waste (black) tank first. Close the liquid waste drain (grey) valve.
3. Fill the grey tank to at least 50% by running water in the shower or sinks. Use the tank monitor panel to observe tank fluid levels. When the grey tank is 50% full, stop filling the tank.
4. Secure the drain hose to prevent movement. Open the solid waste drain (black) valve. Allow the black tank to drain.
5. Flush the black tank using the Tank Flush fitting in the water service center. Flush the tank for approximately 2-3 minutes.
6. When complete, close the black water valve.
7. Open the grey water valve. The water in the grey tank will flush remaining solids from the sewer hose. With the grey water valve open, run two gallons of water down any drain to flush grey tank. The grey valve remains open until the next drain cycle, or time of departure.

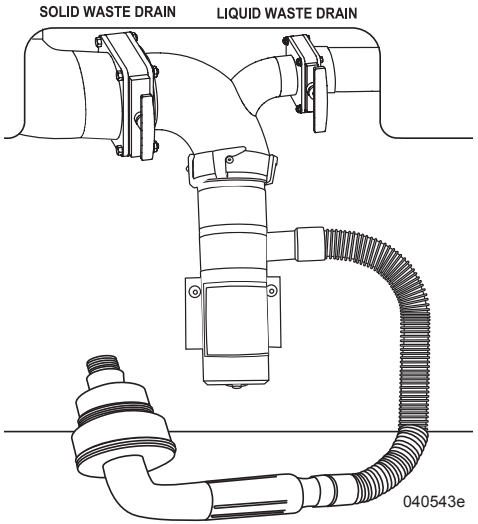
Preparing for Travel:

1. Close solid waste (black) and liquid waste (grey) valves.
2. Undo restraining devices from the sewer hose. Disconnect the sewer hose from the termination drain by rotating the fitting counterclockwise 90º.
3. Raise the sewer hose and using hand over hand method working the sewer hose towards the shore fitting.
4. Rinse the sewer hose with outside facility and repeat the hose drain process.
5. Remove the sewer hose from shore fitting.
6. Store the sewer hose.
7. Secure the termination cap to the termination drain (required by law in some states).
8. If desired, add chemicals to the tanks to control odor. Follow the directions given by the manufacturer of the chemical.

NOTE:
Dump the black tank and grey tank before driving.

WASTE PUMP (OPTIONAL)

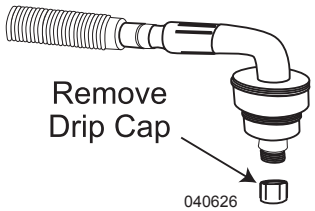
The waste pump (Sani-Con II system) is a macerating pump. The system comes with a 1” outlet hose and termination adapter to connect to the sewage termination outlet. It is recommended to wear protective gloves and appropriate clothes when using the waste pump. The house battery cutoff switch must be on for the waste pump to operate.



WARNING:
Never flush personal hygiene products, cigarette butts, paper towels, table scraps, grease, any toilet tissue that remains in one piece or solid objects that can damage the waste pump.

WARNING:
Do not leave the waste pump unattended while in use. Do not allow the pump to run dry. Damage to the pump impeller will result.

- Remove termination drain outlet cap (see illustration).



- Secure the waste pump to the termination drain outlet by aligning hose coupler tangs with termination tabs.
- Twist waste pump clockwise to lock pump to termination outlet.
- Insert discharge nozzle into sewer connection (dump station). The discharge nozzle will fit 3” and 4” threaded and non-threaded sewer connections. Ensure discharge nozzle is firmly and securely in place prior to operation.

ATTENTION

This R.V. is equipped with an R.V. Sani-Con Waste management device. In order to assure trouble free service with this device, it is imperative that no foreign object enter the commode. Items that include, but are not limited to, personal hygiene products, cigarette butts, paper towel, etc. are considered foreign. Introduction of these or any other products considered to be of foreign nature will void the manufacturer’s warranty. 100220

- Verify pump operation by opening the grey water valve then momentarily (less than one second) turn on and off the waste pump switch. Close grey water valve. If pump does not operate, check the fuse in the front distribution panel.
- Open the black tank valve.
- Turn on the waste pump switch.
- Allow the black tank to empty.
- Turn off the waste pump when the black tank is empty. Close the black tank valve.
- Open the grey tank valve.
- Turn on the waste pump. Allow the grey tank to empty.
- Turn off the waste pump when the grey tank is empty. Close the grey tank valve.

Using the Black Tank Flush:

NOTE:
Empty the holding tanks before operating the black tank flush system.

CAUTION:
Never operate the flush system unattended. Flooding may occur. Use the flush system each time the tanks are cycled to prevent clogging of the spray nozzle.

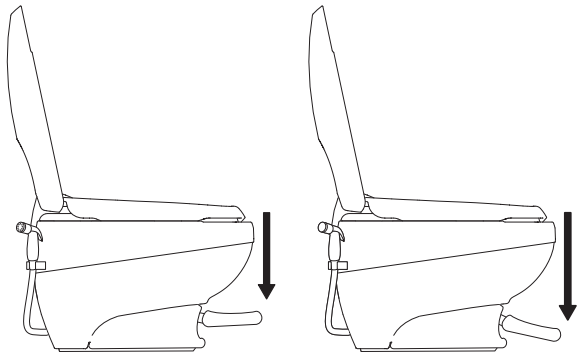
- Connect a non-potable water hose with pressure regulator to a water source. Connect the other end of the hose to the Tank Flush fitting in water service center.
- Open the black tank valve if closed.
- Turn on the water and flush the black tank for approximately 2-3 minutes. Do not leave the system unattended during operation.
- While flushing the tank, turn on the waste pump to help flush impeller and housing then turn off the waste pump.
- Turn the water off after flushing the tank. If desired, close black tank valve then add water to the black tank through the toilet then cycle the black tank again otherwise disconnect and stow the non-potable hose and pressure regulator.
- Close the black tank drain valve.
- Use hand over hand method to clear liquid from discharge hose.
- Secure the drip cap (required by law in some states) then stow discharge hose for travel.
- If desired, add chemicals to the holding tanks to control odor. Follow the chemical manufacturer's directions.

TOILET
Pedal Flush

The toilet uses water from either the fresh water tank or a city water supply. The water pump must be on or connected to city water. The toilet flushes directly into the sewage holding tank (black water).

CAUTION:
To prevent accumulation of solids below toilet, add several gallons of water to the holding tank before use. Most chemical mixtures for holding tank odor control are poisonous. Follow the product manufacturer's directions and warnings when using any holding tank additive.

NOTE:
Do not dispose of sanitary supplies or other non-dissolving items into the toilet. Facial tissue, wet strength tissue, paper towels or an excess toilet tissue can clog the tank or termination valve.

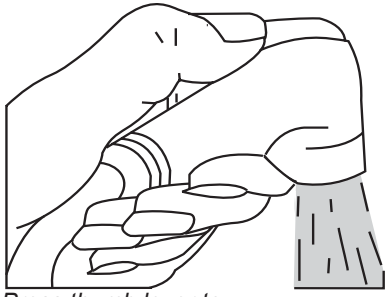


Pedal Flush 040467

- To add water to the toilet before using, press and hold the pedal halfway until the desired water level is reached. Generally, more water is required only when flushing solids.
- To flush the toilet, push and hold the lever all the way down.

Water flow pressures vary. Therefore, holding the flush lever down for several seconds may be required. Release the flush lever, allowing it to snap back, ensuring a positive seal around the flush ball. A small amount of water should remain in bowl.

- To operate the hand sprayer, step on foot pedal then press thumb lever on the sprayer. Direct water into the bowl.



Press thumb lever to spray 040397

Leak between closet flange and toilet: Confirm that flange screws are snug. Do not over-tighten screws. If leak continues, remove toilet and check flange height. Adjust the flange height to 7/16" above floor, if necessary. Replace flange seal if damaged.

Poor flush: Flush should be obtained within two to three seconds. If a problem persists, adjust the water level. If problems continue, the water pressure or flow rate may be low. Remove the water supply line and check flow rate. Flow rate should be at least ten quarts (9.5 liters) per minute. Water pressure should not be below 25 psi.

Bowl will not hold water: Check for and remove any foreign material from blade seal track. If blade seal is worn, replace.

Electric Flush

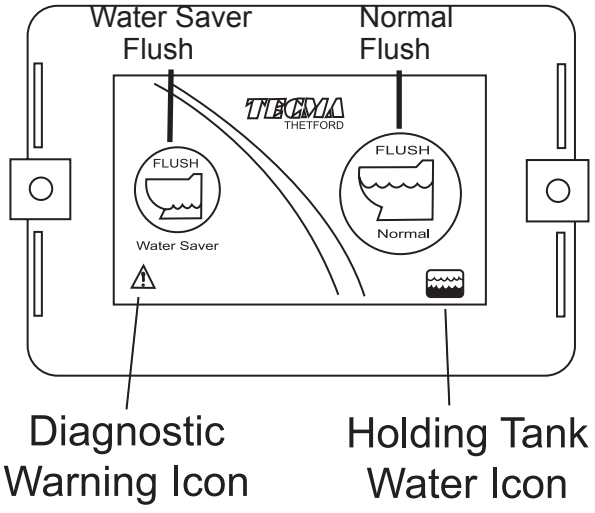
The toilet is an electric macerating toilet. To avoid damage, flush only organic material and toilet paper. The house battery cut-off switch must be on for the toilet to operate.

CAUTION:
To prevent accumulation of solids, add several gallons of water to the holding tank before use. Most chemical mixtures for holding tank odor control are poisonous. Follow the product manufacturer's directions and warnings when using any holding tank additive.

NOTE:
Do not dispose of sanitary supplies or other non-dissolving items into the toilet. Facial tissue, wet strength tissue, paper towels or an excess toilet tissue can clog the tank or termination valve.

Water Saver Flush:
- Press and release left button. This mode is recommended for flushing liquids and small amounts of toilet paper only.

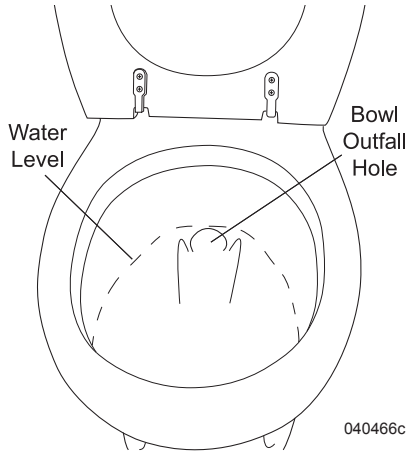
Normal Flush:
- Press and release right button. This mode is recommended for flushing solids and toilet paper.



Empty Bowl:
- Press both buttons simultaneously and release. This empties the bowl and leaves it dry for travel.
- Press either button once to add water, run motor, and return to normal use.

Programming the Water Level:
The water level in the bowl can be programmed to different levels. The minimum recommended level is ½" above the bowl outfall hole. After changing water sources such as city water to the water pump, the water level may need to be adjusted.

- Press both buttons on the toilet control panel and hold.
- LEDs will flash indicating the toilet is in program mode.
- Release buttons to set the level of standing water in the bowl.



Holding Tank Level Sensors:

The toilet system has tank level sensors mounted on the outside of the black tank. On the toilet control panel is a water icon located in the bottom right corner.

Water Icon Not Lit:
- Toilet system is off, in sleep mode or not receiving power.

Water Icon Lighted Green:
- Toilet system is on and the holding tank is between empty and half full.

Water Icon Lighted Yellow:
- Toilet system is on and the holding tank is at least half full.

Water Icon Lighted Red:
- Toilet system is on and the holding tank is full.

Full Tank Lockout:
- To prevent overfill or flooding, the toilet will not flush when the system senses a full tank. This occurs when the Water Icon is red.

Emergency Override:
If the tank is full (Water Icon is red) and an emergency flush is needed, do the following:
- Press and hold either flush button for 6 seconds to flush toilet.

WARNING:
The LED warning icon will flash when the black tank is full. Flushing may cause tank overflow and potential flooding.

LED Sleep Mode:
To save power consumption when not in use, an automatic LED sleep mode is programmed on this control panel.

If the toilet is not used for 8 hours, the keypad LED lights will go out. Press any button to activate the keypad.

Cleaning

Clean the toilet bowl with a mild bathroom cleaner. Do not use chlorine or caustic chemicals, such as drain opening types, as they will damage the seals. Clean out the system by flushing several gallons of fresh water through with a small amount (half cup or less) of dry laundry detergent. Add odor control deodorant, in the amount specified for the holding tank capacity, after cleaning and every few days during use.

POISON:
Most chemical mixtures for holding tank odor control are poisonous. Follow the product manufacturer's directions and warnings when using any holding tank additive.

Maintenance

To find leaks, check behind or under toilet. Use four or five sheets of toilet tissue and wipe all the water line connections. Start at the top of the unit and work downward. The tissue will change texture when .

NOTE:
Before storing the motorhome, the toilet must be flushed repeatedly to remove any solids that may have accumulated.

CAUTION:
If the motorhome is in storage for six months, spray silicone on the toilet valve and work it back and forth. Perform this maintenance monthly (silicone will evaporate in about 30 days). Do not use a petroleum-based lubricant, damage to the seals will occur.

Toilet Shut-Off Valve:
A shut-off valve is located behind the toilet. In the event of an emergency the water line that leads into the toilet can be shut off.

Troubleshooting

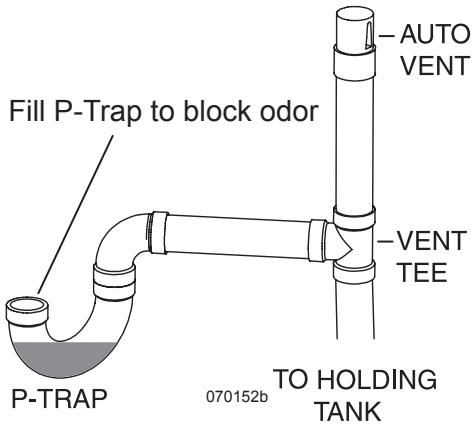
- The toilet uses an automatic reset circuit breaker located behind the 12 Volt fuse panel above the Pilot seat.

Winterization

The toilet must be winterized to avoid freeze damage. Press both buttons until water is purged from macerator pump. Add 3 pints antifreeze to bowl then press then flush to ensure macerator and discharge line is winterized.

DRAIN TRAPS & AUTO VENTS

Sinks, shower and clothes washer (if equipped) drains incorporate a water trap (P-Trap) and auto vents to prevent waste water holding tank odor from entering the motorhome.



Drain Traps:

P-Traps are usually within 54" of a vent tee and must contain water to block odors. During storage water can evaporate and allow odor into motorhome. If odor is detected, run water into sinks, shower and clothes washer (if equipped) to fill P-Traps.

Auto Vents:

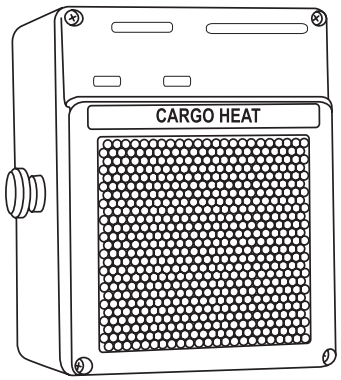
The auto vent is designed to assist in the smooth flow of water in the drain without creating a vacuum. If stuck in the open position the auto vent can allow grey odors to enter the motorhome. Some auto vents can double as “clean outs” in the event the line needs to be snaked out.

COLD WEATHER CONDITIONS

Tank Heat (Optional)

Extended use in below freezing (32° F./0° C.) weather will require operation of the furnace to protect the interior plumbing system from freeze damage. Below floor level, exposed drains and water lines can quickly freeze. To help prevent freeze damage to the holding tanks, heating pads controlled by the Tank Heat switch, are located under the grey, black and fresh water tanks. A heater is installed in the water service center to help prevent freezing.

If the motorhome is not in use when freezing temperatures can occur, it will be necessary to winterize the motorhome to prevent freeze damage. While the interior is heated through use of the furnace, plumbing located below floor level is not heated therefore exposed to potential freeze damage.



12 Volt Bay Heater

030981c

CAUTION:
Freeze damage is not covered under warranty.

Tank Heat Operation:

A 12 Volt DC heating pad is located under each holding tank and a heater is located in the water service center. Turn the Tank Heat switch on when cool or freezing temperatures may occur. The Tank Heat indicator lamp will activate when the Tank Heat switch is turned on. The system is active whenever the Tank Heat switch is on.

Requirement for Operation:

- House battery cutoff switch must be on.
- Turn on the 12 Volt Tank Heat switch on the Command Central panel.

NOTE:
Each heating pad is rated approximately 6.6 Amps each. The heater in the water service center can draw up to 25 amps. House battery power can be quickly consumed. It is recommended to hook to shore power when using the tank heaters.

Cold Weather Storage

If the motorhome is stored where freezing temperatures may occur, it is best to Winterize the motorhome to limit the possibility of freeze damage to the plumbing system.

CAUTION:
Freeze damage is not covered under warranty.

CAUTION:
Equipment and appliances that use water should be drained and stored in accordance with the OEM recommendation for winterization. Refer to the specific OEM manual for winterization recommendations and instructions.

WINTERIZATION

Water, plumbing and sewer systems require winterization when the motorhome is placed in storage. The recommended method of winterizing the motorhome is using air pressure to remove liquids that may freeze and cause damage to the various systems and appliances. The lines can then be left empty or filled with an FDA approved RV antifreeze. When plumbing lines are drained, antifreeze is not necessary, and the decision to use antifreeze is left to the motorhome operator.

Using Air Pressure

This process will require an air compressor and air pressure regulator to protect the potable water system from over-pressurization. Hardware stores will have the fittings necessary to connect an air hose to the potable water system. Limit air pressure to a maximum of 40 PSI. Higher pressure can damage the potable water system.

CAUTION:
It is recommended that a qualified RV service technician familiar with motorhomes, such as an authorized dealer, perform the winterization procedure.

WARNING:
Freeze damage is not covered under warranty.

POISON:
Use only non-toxic FDA approved RV antifreeze.

1. Empty the holding tanks.
2. Remove water filter bowl. Discard filter cartridge and empty remaining water. Screw filter bowl (without cartridge) onto filter head. The filter bowl will need to be emptied again as air purges water from the system.
3. Drain the fresh water tank.
4. Open the cold and hot water low point drain valves.

WARNING:
Ensure the water is not hot when opening the low point drain valves.

5. Turn on the water pump for approximately 60 seconds to clear the pump of water.
6. If applicable, disconnect water line to icemaker.
7. Close cold and hot water low point drain valves.
8. Open the temperature/pressure relief valve to vent water heater. Remove water heater drain plug to allow water heater to drain. Close temperature/pressure relief valve when water has finished draining. Place water heater bypass valves to the Bypass position.
9. Connect air hose with regulator to the City Water Connection.
10. Place water control lever to the City position.
11. Set regulator to 40 PSI and turn on the air supply.
12. Open all faucets (hot and cold), including outside faucet, one at a time until water has purged.
13. Hold toilet mechanism open (flush toilet) until water has purged.
14. Open cold and hot water low point drain valves to purge any remaining water.
15. Shut off the air supply and disconnect the air hose.
16. One gallon of FDA approved RV antifreeze is needed to protect various water drain lines. Pour 1 pint into the kitchen drain and 1 pint into the bath shower drain. Pour 2 pints into the bath sink drain. This will protect the P-traps with some of the antifreeze going into grey tank to protect the drain valve. Open the toilet bowl valve. Pour another 3 pints into the toilet, letting the antifreeze run into the black tank to protect the valve located there.

CAUTION:
Some appliances, such as the ice maker, require special winterizing instructions not covered in this section. Refer to the specific appliance OEM manual for instructions and recommendations.

CAUTION:
Clean up antifreeze spills immediately to prevent permanent staining.

18. Use a soft cloth to wipe out the sinks and shower to protect the surfaces from antifreeze stains.
19. Leave hot and cold water low point drain valves open.

Using Non-Toxic Antifreeze

Approximately five to eight gallons of FDA approved RV antifreeze will be required to winterize the motorhome.

CAUTION:
It is recommended that a qualified RV service technician perform this procedure.

POISON:
Use only non-toxic FDA Approved RV antifreeze that is specifically made for potable water systems. Never use ethylene glycol based automobile antifreeze. If ingested, automobile antifreeze can cause blindness, deafness or death.

CAUTION:
Ensure the fresh water tank is drained of water as antifreeze will not enter the fresh water tank.

WARNING:
Freeze damage is not covered under warranty.

1. Empty the holding tanks.
2. Remove water filter bowl. Discard filter cartridge and empty remaining water. Screw filter bowl (without cartridge) onto filter head.
3. Drain the fresh water tank.
4. Open the cold and hot water low point drain valves.
5. Turn on the water pump for approximately 60 seconds to clear pump of water.
6. If applicable, disconnect water line to icemaker.
7. Close cold and hot low point drain valves.
8. Open the temperature/pressure relief valve to vent water heater. Remove water heater drain plug to allow water heater to drain. Close temperature/pressure relief valve when water has finished draining. Place water heater bypass valves to the Bypass position.
9. Place water control lever to the Sanitize/Winterize position.
10. Connect a short hose from the RV approved antifreeze to the City Water Connection.
11. Turn on the water pump.
12. Open all faucets (cold and hot) one at a time until antifreeze appears.
13. Hold the toilet flush mechanism open (flush toilet) until antifreeze appears.
14. Turn water pump off.
15. Use a soft cloth to wipe out the sinks and shower to protect surface from antifreeze stains.

CAUTION:
Some appliances, such as an ice maker in the refrigerator, require special winterizing instructions not covered in this section. Refer to the specific appliance OEM manual for instructions and recommendations.

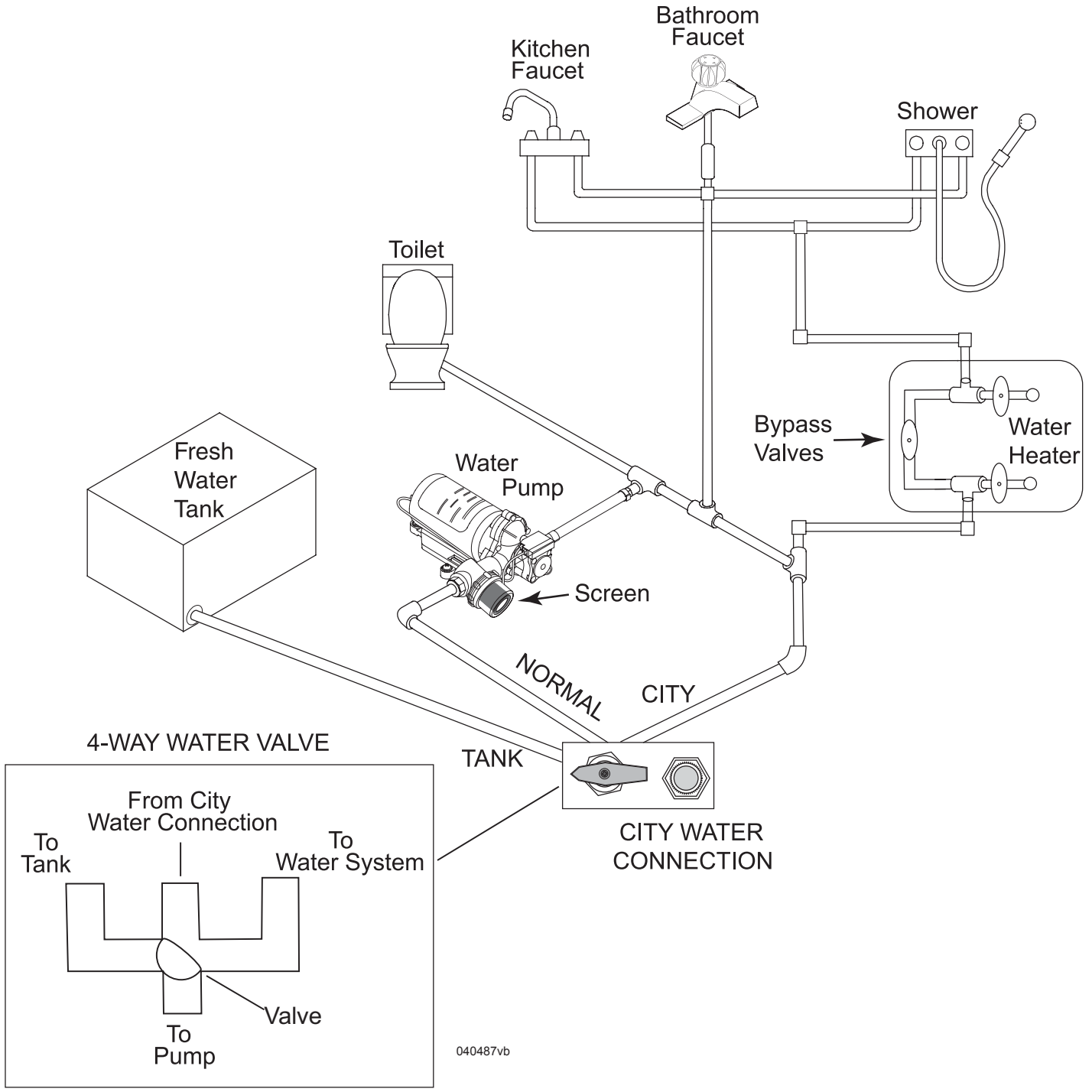
NOTE:
Wipe up antifreeze to prevent permanent staining.

De-Winterization

1. Open the fresh water tank drain valve, cold and hot low point drain valves. Allow any antifreeze solution to drain.
2. Fill fresh water tank with water.
3. Turn water heater bypass valves to the Normal flow position.
4. Turn on the water pump.
4. Open all faucets (cold and hot) one at a time, until clear water is present.
6. If applicable, cycle ice maker several times until fresh water is present.

CAUTION:
Discard the first two trays of ice from the icemaker. They may contain contaminants.

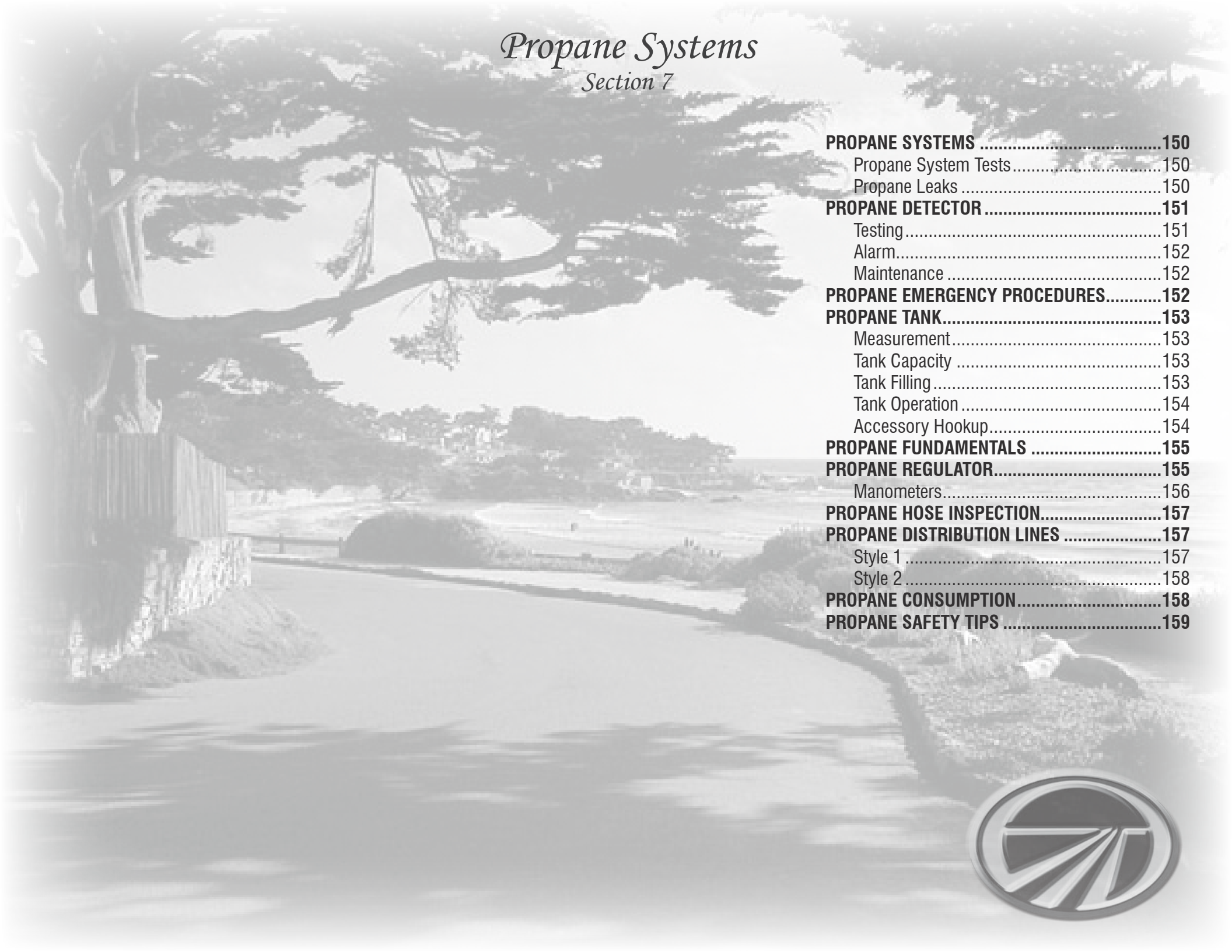
WATER SYSTEM DIAGRAM



Notes

Propane Systems

Section 7



PROPANE SYSTEMS

This section contains safety information and operating instructions of the propane gas system and related equipment. More detailed information with CAUTION or WARNING instructions for various equipment, other than items within this section, can be found in the OEM manuals in the owner's information box.

NOTE:
Some appliance displays and appliance manuals may refer to LP-Gas as a fuel source; however, the actual fuel source used and required for these appliances is propane. The phrase "LP-Gas" is synonymous with not only propane, but butane and propane/butane mixtures. Since propane is the actual fuel required, the term "Propane" will be used throughout this manual except for references to third party appliances (such as the refrigerator) that include the term "LP-Gas" on their displays or other literature.

Propane Overview:

The propane tank contains liquid propane under high pressure. As fuel is used, the liquid vaporizes to a gas and passes through the primary tank valve to a regulator that reduces pressure. Low-pressure gas is then distributed to components through a manifold system.

When removed from storage, propane appliances may have trouble igniting or staying lit. Ignition problems upon storage removal are commonly caused by air in the manifold system or incorrect gas pressure. **DO NOT** attempt to adjust the propane regulator. Adjustments must be made by a dealer or authorized service personnel with the proper equipment. In higher elevations or extreme cold weather (10° F./-12° C or lower) a shortage of propane may be experienced. If propane is going to be used in higher elevations or cold climates for a long period of time, have an authorized service person adjust the propane regulator for these conditions.

Propane System Tests

Have the propane system tested by an authorized dealer or service center at least once a year and before every extended trip. The test will include checking the pressure regulator for functionality and the propane system checked for leaks. Although the manufacturer and the dealer test the system carefully for leakage, vibrations during travel can loosen fittings.

WARNING:
When storing portable propane tanks that are not connected to a propane system, install an approved plug in the tank outlet hole to prevent leaks. Do not store or transport empty propane tanks, portable tanks, gasoline or other flammable liquids in the interior area of the motorhome. Keep open flame and spark producing materials away from the propane area. Shut off all appliances and the primary propane tank valve when the motorhome is in storage. If this warning is ignored, a fire or explosion could result.

Propane Leaks

Leaks, identified by the odor of rotten eggs or smell of sulfur, can be found by applying a propane leak detecting solution on all connections. **Do not** use a match, open flame or use any spark producing device or appliance to test for leaks. Leaks can usually be repaired by tightening the fittings. If not, turn off the primary gas valve at the tank. Hand-tighten the primary valve only. Do not use a wrench or pliers as over-tightening can damage the valve seat. If a leak is suspected, for safety, it is highly recommended to have the leak repaired at an authorized dealer or qualified service center.

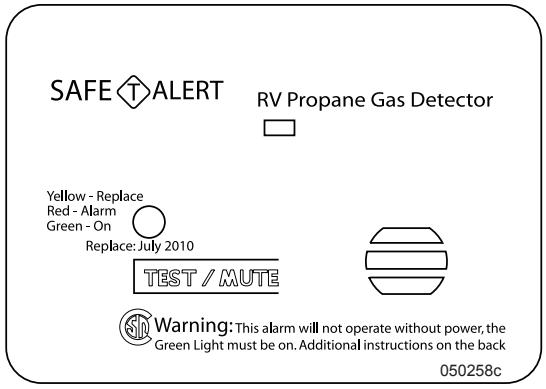
WARNING:
Propane is highly volatile and extremely explosive. Do not use matches or open flame to test for leaks. Use only approved propane leak testing solution for leak detection. Unapproved solutions can damage copper tubing and brass fittings. All fittings tested should be thoroughly rinsed and dried after testing. For continued operational safety and integrity of the propane system, only qualified service personnel should perform maintenance or repairs to the propane system.

NOTE:
It may be illegal to travel in some States and Canadian provinces with the primary propane valve open. Failure to comply with these State and Canadian province requirements may result in fines and/or pose a safety hazard.

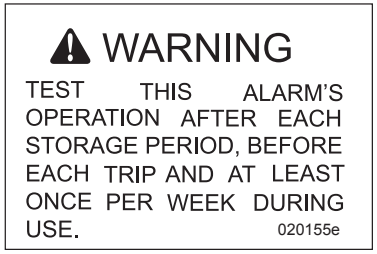
PROPANE DETECTOR

The propane detector is required safety equipment in recreational vehicles. American National Standards Institute (ANSI) 1192 ***- Fire & Life Safety, 6.4.8, Propane Detectors states:*** *"All recreational vehicles equipped with a propane appliance and electrical system shall be equipped with a propane detector listed as suitable for use in recreational vehicles under the requirements of UL 1484 and installed according to the terms of its listing".*

The propane detector is also sensitive to other fumes such as; hair spray, which may contain butane as the propellant. Butane, like propane, is heavier than air and will settle to floor level. Sulfated batteries (rotten egg odor) can also cause the detector to alarm.



Typical propane detector



About Propane Leaks:

Propane is heavier than air and generally will settle to the lowest point. Propane leaking from a pipe or fitting will concentrate at the leak and float downwards. Propane escaping from a cooktop burner will concentrate around the burner, cooktop and adjoining counter space and is highly combustible. This concentration of gas can exist for an extended period before the gas reaches the detector's location and sounds an alarm.

NOTE:
The propane detector indicates the presence of propane only at its sensor. Combustible levels of propane may be present in other areas. The detector is intended for detection of propane only.

The propane detector is not designed to detect other types of gas. However, some products may cause the detector to alarm, such as; alcohol, liquor, methane, kerosene, gasoline, deodorants, colognes, propellant used in spray cans and cleaning solvents. In some cases, vapors from glue and adhesive used in manufacturing the motorhome can cause the detector to alarm for several months after the date of manufacture. If it is determined that the detector has false alarmed because of the above mentioned nuisance gases, press the Test/Reset button to reset the detector. Ventilate the motorhome with fresh air. Take precautions to ensure one of these cases has not masked an actual propane leak.

The propane detector draws less current than one instrument panel lamp and will detect propane until the battery is discharged to approximately 7.0 Volts DC.

The detector may not operate properly at extreme low voltage. The detector will not operate if power is disconnected or if power is interrupted. The propane detector has a self-check circuit running at all times while the detector is powered. In the event that the circuitry fails, a failure alarm will sound and the LED will flash red and green.

CAUTION:
Ensure the Propane and CO detector storage switch on the front distribution panel is on. This will provide power to the detectors.

Propane Detector Operation:

When the detector is first powered, the LED will flash yellow for three minutes as the detector is stabilizing. At the end of the startup cycle, the LED will turn green indicating full operation. The detector will sound if an unsafe level of propane is present.

CAUTION:
The detector will not alarm to propane during the three minute startup cycle.

Testing

Press the Test/Mute switch any time during the warm up cycle or while in normal operation. The LED will turn red and an alarm will sound. Release the switch. Do not use any other method to test the detector.

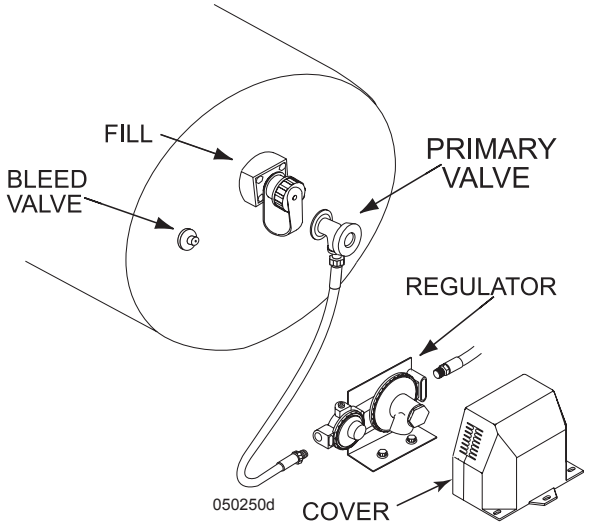
WARNING:
Test the operation of the detector after the motorhome has been in storage, before each trip and at least once per week during use.

Alarm

The red LED will flash and the alarm will sound whenever dangerous levels of propane or natural gas are detected. The detector will continue to alarm until the gas clears or the Test/Mute switch is pressed.

Alarm Procedures:

1. Turn off all propane appliances (cooktop/oven, water heater, furnace and refrigerator), extinguish all flames and smoking material. Evacuate immediately. Leave doors and windows open.
2. Turn off the primary valve on propane tank.
3. Determine and repair the source of the leak. If necessary, contact a qualified professional for service.



WARNING:
Do not operate any electric switch. This can produce a spark and ignite the gas. Do not re-enter until the problem is corrected.

POTENTIAL SOURCES OF PROPANE LEAKS	
◆Cooktop Burners ◆Oven ◆Refrigerator ◆Water Heater ◆Furnace	◆Defective Propane Connection ◆Defective Regulator ◆Portable Propane Operated Appliances/Accessories

Alarm Mute:

Press the Test/Mute switch when the detector is in alarm.

1. The red LED will continue to flash and the alarm will beep every 30 seconds until the gas level has dropped to a safe level.
2. The LED will flash green until the end of the Mute cycle.
3. If dangerous gas levels return before the end of the Mute cycle, the alarm will beep four times and return to phase 1.
4. After two minutes the detector will return to normal operation (solid green) or re-sound the alarm if dangerous levels of gas are present.

Fault Alarm:

Should the microprocessor sense a fault in the detector, the alarm will sound twice every 15 seconds. The LED will alternately flash red to green and the Test/Mute switch will not respond to any command. The detector must be repaired or replaced.

Maintenance

1. Vacuum the detector cover weekly (more frequently in dusty locations) using the soft brush attachment of a vacuum.
2. Do not spray cleaning agents or waxes directly on the front panel. This can damage the sensor, cause an alarm or cause a detector malfunction.

PROPANE EMERGENCY PROCEDURES

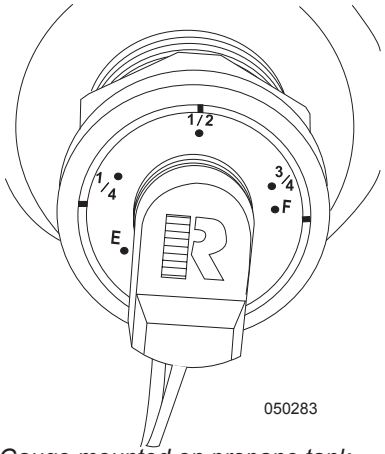
If a propane smell is detected (a rotten egg or sulfur smell) at any time, perform the following steps immediately:

- Shut off propane appliances.
- Manually turn off the primary shut-off valve at the propane tank.
- **Do not** operate any electric switch. This can emit a spark and ignite the gas.
- Open windows and doors.
- Evacuate the motorhome. Stay clear of the surrounding area.
- Keep all ignition sources out of the area.
- Contact a qualified service technician to find the source and repair the propane leak.

WARNING:
A fire or explosion from ignited propane or propane fumes can cause serious injury or death.

PROPANE TANK
Measurement

The motorhome is equipped with a monitor panel to aid in managing the propane tank. Press the Test switch to monitor the tank level. Colored lights represent the tank levels.



Gauge mounted on propane tank

Tank Capacity

Propane Tank Capacity
*20.2 Gallons
**Actual filled propane capacity is 80% of listing due to safety shut-off required on tank.*

NOTE:
This chart reflects product specifications available at the time of printing.

NOTE:
Propane tank capacity is estimated based upon calculations provided by the tank manufacturer and represents approximate capacity. The actual "usable capacity" may be greater or less than the estimated capacity. Actual full liquid capacity is 80% of full tank capacity.

Tank Filling

Woodall's Campground and Trailer Guide, and other similar publications, list refueling stations. Many travel parks sell propane. Before filling the propane tank, shut off pilot lights, appliances and igniters to prevent a fire or explosion. Have a trained service person fill the propane tank.

WARNING:
Before entering a refueling station, turn off all pilot lights and propane operated appliances. Most propane appliances are vented to the outside. Fuel vapors can enter an appliance vent that is parked close to a gasoline pump and ignite the vapor, resulting in an explosion or fire.

⚠ DANGER

ALL PILOT LIGHTS, APPLIANCES AND THEIR IGNITORS (SEE OPERATING INSTRUCTIONS) SHALL BE TURNED OFF BEFORE REFUELING OF MOTOR FUEL TANKS AND/OR PROPANE CONTAINERS. FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ WARNING

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

⚠ CAUTION

THIS PROPANE PIPING SYSTEM IS DESIGNED FOR USE WITH PROPANE ONLY. DO NOT CONNECT NATURAL GAS TO THIS SYSTEM.
Securely cap inlet when not connected for use. After turning on propane, except after normal cylinder replacement, test propane piping and connections to appliances for leakage with soapy water or bubble solution. Do not use products that contain ammonia or chlorine.

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WARNING:
Extinguish all sources of heat, sparks, flames and smoking materials within a 50' radius during the fueling process.

The tank must be filled to the proper level to allow for expansion. An over-filled tank may cause the tank safety valve to release pressure emitting a strong rotten egg odor near the tank and/or a hissing noise.

WARNING:
Small amounts of propane will escape and evaporate during the fueling process. Protect bare skin. Instant freezing will occur if exposed to propane.

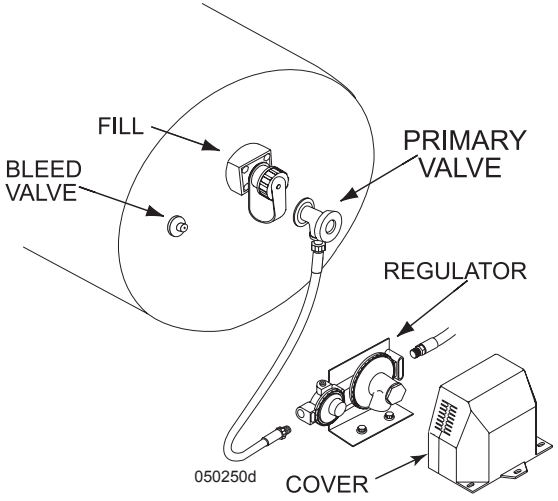
Propane exists in both liquid and vapor forms inside the tank. Full liquid capacity of propane in the tank is approximately 80% of actual liquid tank capacity. The remaining 20% of tank capacity is space for propane in the form of vapor (gas). The propane capacity indication on the monitor panel is calibrated to indicate full when actual liquid level of propane in the tank is 80% of tank capacity.

Pressure inside the tank varies with the temperature of the liquid. All propane tanks are required to have a safety pressure relief valve to vent excess pressure.

NOTE:
If the tank is new and being filled for the first time, inform the service technician to purge any air from the tank prior to filling. Mixing propane with non-flammable gas will cause ignition problems and unreliable operation of propane appliances.

Tank Operation

- Manually open the primary shut-off valve located on the propane tank when operating appliances.
- Turn off the primary shut-off valve on the propane tank when the tank is being filled, during travel and while in storage.
- The primary valve is designed to be shut off by hand. Do not use a wrench or pliers as this will over-tighten the valve. Over-tightening may permanently damage the valve seat and not allow the primary valve to completely shut off the flow of propane.

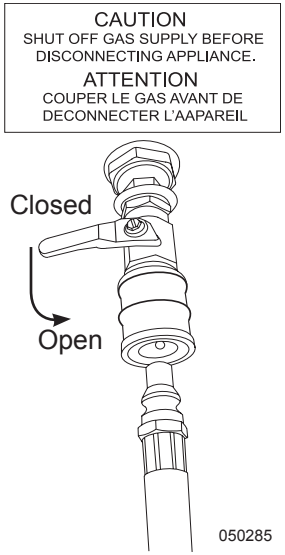


CAUTION:
In some States and Canadian provinces, it may be illegal to drive the motorhome while primary valve on the propane tank is open.

Accessory Hookup

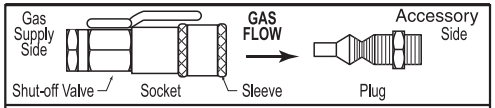
An auxiliary remote propane hookup is for external propane accessories and to be used for external components only. For safety, use only approved propane quick disconnect fittings and flexible hose to connect external accessories to the remote hookup.

INSPECTION:
Check for leaks on all connections each time the remote propane is used. If a leak is detected, turn off the primary shut-off valve on the propane tank. Contact a qualified service center for the necessary repairs.



Propane quick disconnect located in curbside bay

QUICK DISCONNECT FITTING



NOTE:
COUPLING TO BE INSTALLED BY A QUALIFIED AGENCY AS DEFINED IN THE NATIONAL FUEL GAS CODE (NFPA 54)

INSTALLATION INSTRUCTIONS

1) INSTALL SOCKET WITH SHUT-OFF V ALVE ON THE GAS SUPPLY SIDE
2) INSTALL PLUG ON THE ACCESSORY SIDE
3) LEAK TEST USING SOAPY WATER SOLUTION

OPERATING INSTRUCTIONS

TO CONNECT:

1) CLOSE SHUT-OFF VALVE
2) PULL SOCKET SLEEVE BACK
3) INSERT PLUG; RELEASE SLEEVE
4) PUSH PLUG INTO SOCKET UNTIL SLEEVE SNAPS FORWARD
5) OPEN SHUT-OFF
6) LEAK TEST USING SOAPY WATER SOLUTION

TO DISCONNECT:

1) CLOSE SHUT-OFF VALVE
2) TO RELEASE PLUG, PULL SLEEVE BACK AWAY FROM PLUG; PULL OUT PLUG
3) INSERT PLUG; RELEASE SLEEVE
4) LEAK TEST USING SOAPY WATER SOLUTION

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PROPANE FUNDAMENTALS

NOTE:
The propane fundamentals information is not a complete guide for the use of propane tanks or appliances. In cold climates keep propane level above 50% to keep vaporization of propane at the highest level.

#Capacity	Gallon Capacity	BTU Capacity
5	1.18	107,909
10	2.36	215,807
11	2.59	237,387
20	4.72	431,613
30	7.08	647,420
40	9.43	863,226

The above capacities allow for 20% vapor space on each cylinder. Data taken from the National Fire Prevention Association (NFPA). Pamphlet #58-1998.

PROPANE STATISTICS	
Pounds Per Gallon	4.24
Specific Gravity of Gas	1.50
Specific Gravity of Liquid	.504
Cubic Feet Gas Per Gallon of Liquid	36.38
Cubic Feet Gas Per Pound	8.66
BTUs Per Gallon	91,502
BTUs Per Gallon	21,548
Dew Point in Degrees Fahrenheit	-44˚ F
Vapor Pressure at 0˚ F	31
Vapor Pressure at 70˚ F	127
Vapor Pressure at 100˚ F	196
Vapor Pressure at 110˚ F	230
Flash Point	842˚ F

CONVERSIONS

Gallons to Liters (1 Gallon = 3.785 Liters)
Fahrenheit to Celsius (F - 32º ÷ 1.8 = C)
11 in Water Column = 6 1/4 ozs. per sq. in. pressure.
27.7 in. Water Column = 1 lb. per sq. in. pressure.

BASIC FACTS ABOUT PROPANE

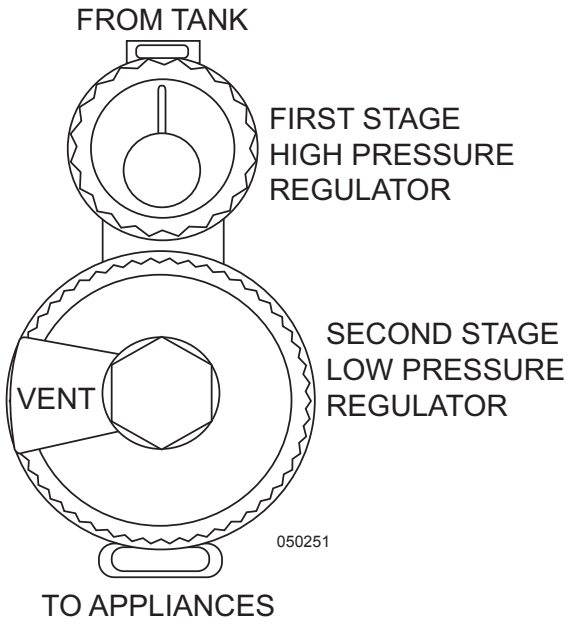
- Propane detectors are a federal requirement on all propane equipped recreation vehicles.
- Propane is a by-product produced by refining oil.
- Odor is added to propane after the refining process.
- Each liquid gallon of propane produces 91,502 BTUs (British Thermal Units).
- Temperature affects pressure of propane. Internal tank pressure can exceed 200 psi.
- Tanks or valves contain pressure relief valves. The relief valve opens at 125% above tank rating.
- Propane stops vaporizing at -44˚ F.
- Standard propane operating pressure is 11" of Water Column or approximately 6 ¼ ounces per square inch.
- An inch of Water Column is a measurement of applied pressure to one side of a U-Tube ½ filled with water at sea level. The amount of pressure required to raise the water level 11", represents 11" of Water Column.

PROPANE REGULATOR

Propane is compressed into liquid form in the tank. Only the vapor (gas) is used during combustion by an appliance. As vapor is removed from the tank, the remaining liquid will vaporize to maintain pressure that is removed during consumption. This process will continue until there is no liquid remaining in the tank.

Temperature affects the vaporizing action of the liquid. If temperature of the liquid is - 44º F, vaporization of liquid is nearly stable with tank pressure about 0 psi. If liquid temperature is 100º F., the liquid quickly vaporizes with tank pressure about 200 psi. Vapor pressure must remain relatively consistent, regardless of temperature, for the appliance heat output to remain stable. Vapor pressure regulation is performed by the regulator.

The two-stage regulator reduces vapor pressure so that vapor pressure to appliances remains relatively stable in a wide temperature range and safe for use. The first stage of the regulator reduces tank pressure to a range of 10 to 13 psig (pounds per square inch gauge). The second stage further reduces pressure to a working pressure of 0.4 psig (11 Inches of Water Column or about 6¼ ounces psi.).



A vent is installed to allow the internal diaphragm to move with changes in atmospheric pressure. It is important to keep the vent clean and clear of obstruction or corrosion. The regulator is mounted so that the vent faces downward. If the vent becomes clogged, pressure from the propane tank may cause erratic pressure regulation. If there is any corrosion, contact a qualified propane service technician.

WARNING:
Do not attempt to adjust the regulator. Adjustments require special equipment. Failure to follow these instructions may result in a fire or explosion, and can cause severe personal injury or death. Do not operate propane appliances until the propane pressure is checked and a leak down test is performed!

If the vent becomes clogged, clean it with a toothbrush. Under normal atmospheric conditions a propane regulator will not freeze, nor will the propane. Vapor passing through the regulator will expand and cool, condensing moisture in the propane. Moisture will freeze, build up and block the vent. The possibility of freeze up is greatly reduced with the two-stage regulator.

To Prevent Freeze Up:
- Ensure the propane tank is totally free of moisture prior to filling.
- Ensure the tank is not overfilled.
- Keep the valve closed when the tank is empty.

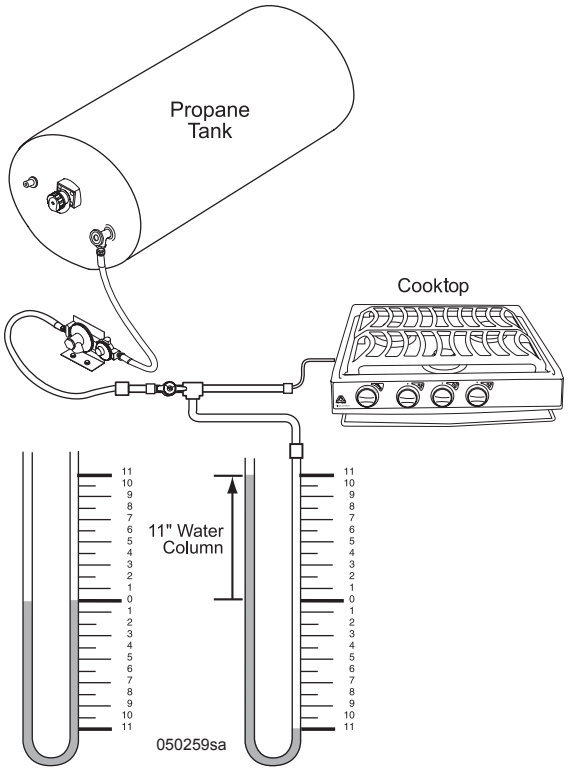
If A Freeze Up Occurs:
- Have an propane distributor purge the tank.
- If necessary, have the propane distributor inject methyl alcohol in the tank.

Damage to the regulator can occur when the tank is overfilled. The regulator is designed to receive and use vapor only. This is why the tank is filled to only 80% of its liquid capacity. The other 20% allows for vaporization of the liquid. The primary vapor valve is located in the vapor section of the tank. In an overfilled tank, liquid propane can fill the regulator. As the liquid vaporizes, moisture can freeze the diaphragm in the regulator. Tank pressure on a frozen diaphragm can rupture the diaphragm and result in erratic pressure regulation.

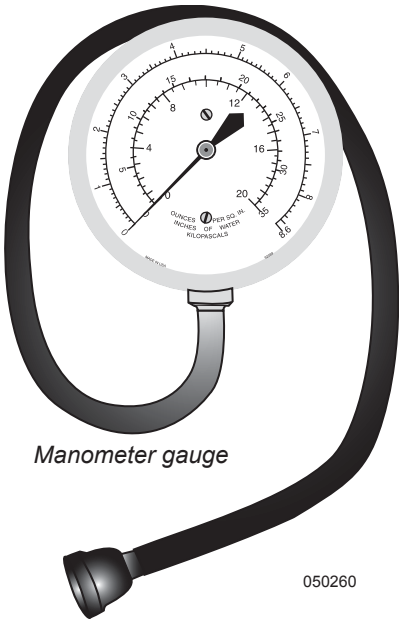
This is why it is important to have the propane pressure checked for proper pressure and accurate regulation during appliance operation. Erratic pressure regulation causes unreliable and potentially dangerous appliance operation and negatively affects performance of refrigerator.

Manometers

The manometer is the best way to accurately determine propane pressure. There are two different styles of manometers: Gauge and U-tube. Propane pressure is measured in Inches of Water Column. This is the amount of pressure applied to one side of a U-shaped tube filled half way with water. The amount of pressure needed to raise the column of water 11" represents 11 Inches of Water Column.



U-Tube Testing Layout



Manometer gauge

PROPANE HOSE INSPECTION

The hose manufacturer suggests that a flexible propane supply hose undergo regular inspection. As a guideline, it is recommended that all flexible propane lines connecting the slide-out, appliances and tanks be inspected in the spring and fall of each year by a qualified RV technician.

Inspection Tips:

Hose strength is controlled by the plies of reinforcement. Damage in this area cannot be tolerated. It is important that if a damaged propane hose is found, the source of the damage be determined and corrected prior to the replacement.

Small cuts, nicks, or gouges that do not go completely through the cover are not cause for replacement of the hose. Inspection should be performed when the hose is not under pressure.

NOTE:
Pricking of the cover in the manufacture of this type of hose is common and necessary for satisfactory hose performance. Consequently, the uniformly pricked cover should not be viewed with alarm.

Cause for hose replacement:

- Damage to the textile reinforcement or wire braid; wire braid reinforced hose, which has been kinked or flattened so as to permanently deform the wire braid in the non-pressurized state.
- Blistering or loose outer cover.
- Slippage; evidenced by the misalignment of the hose and coupling and/or the scored or exposed area where slippage has occurred.

CAUTION:
Only a qualified service technician should perform repairs or component replacement.

Additional suggested maintenance:

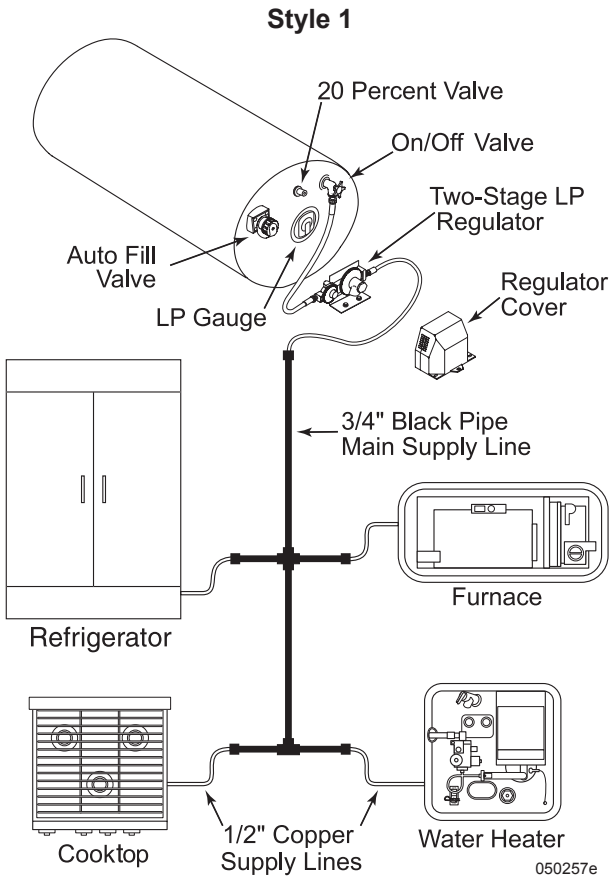
After performing extensive testing, the manufacturer of the flexible propane supply hoses has determined that the hoses be replaced every ten (10) years as failure rate may increase after this period of time. The motorhome manufacturer recommends following this guideline to assure continued safety and dependable use.

PROPANE DISTRIBUTION LINES

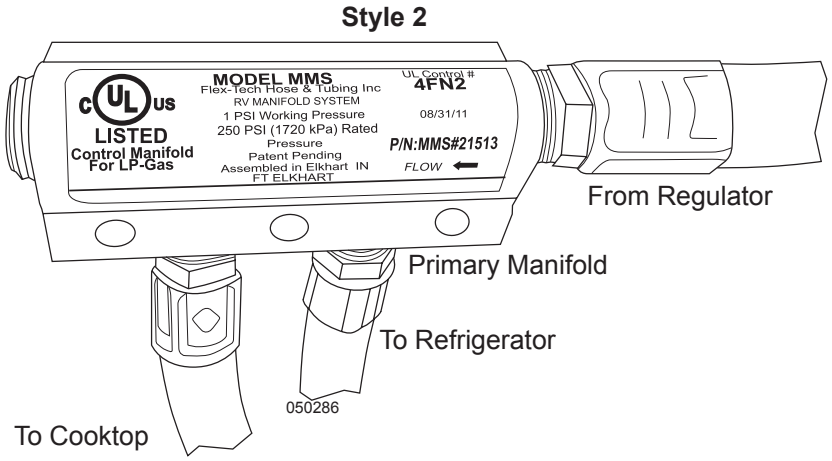
Style 1

A primary manifold black steel pipe running throughout the recreational vehicle distributes propane to secondary lines. All secondary lines leading to propane appliances are made of copper tubing with flared fittings. If any line becomes damaged, do not attempt to splice it. Always run a new line. Propane distribution work should be performed by an authorized dealer or an authorized service technician.

When removing or servicing any propane appliance, manually close the primary shut-off valves located on the propane tanks. This will prevent dangerous propane leakage that could result in an explosion and possible serious injury. If a propane leak is suspected, have the system inspected and repaired by a qualified service technician as soon as possible.



Typical propane system layout



Example of propane manifold

Style 2

A primary manifold with flexible distribution lines service the propane system. All secondary lines leading to propane appliances are made of flexible tubing. The flexible tubing lines are of one piece with no splices or connections between the primary manifold and the appliance. Should a leak develop in a flexible delivery line, the flexible distribution line is replaced as a component. For safety and system integrity, it is recommended that propane distribution work be performed by an authorized dealer or an authorized service technician. Follow the recommended guide lines as outlined in Propane Hose Inspection in this section.

INSPECTION:
Inspect the rubber flexible lines twice a year for abrasions, tears, kinks or other signs of damage.

If a propane leak is suspected, have the system inspected and repaired by a qualified service technician as soon as possible.

PROPANE CONSUMPTION

Each gallon of propane produces 91,502 BTUs of heat. One 27 gallon tank produces two million BTU's. Total consumption depends on the rate of usage by each appliance and the operating time. The water heater and furnace typically uses the most propane.

Determine Fuel Consumption:
To determine approximately how many hours an appliance will operate on one gallon of propane, use the following formula:

- Propane appliances are rated in Input BTU (British Thermal Units). The rating is usually stamped or printed on a tag affixed to the appliance. For example: the Input rating of the appliance is 10,000 BTUs.
- One gallon of propane produces 91,502 BTUs.
- Divide the amount of BTUs of one gallon of propane (91,502) by the rating on the appliance in this example 10,000. Net continuous operation time for one gallon of propane for this appliance would be approximately 9.2 hours.

The above formula can be useful when trying to determine the approximate length of time a tank of propane will last. Generally, propane appliances do not continuously operate. An example would be the typical cycling of the refrigerator.

Determining How Long a Tank of Propane Will Last:

- Combine the BTU input totals of all appliances and the approximate length of time these appliances operate per day.
- Multiply the number of liquid gallons in the propane tank by 91,502.
- Divide the total of BTUs of the propane tank by the total number of BTUs the appliances consume, equals the approximate number of hours of operation before refueling.

Typical Appliance BTU Ratings

Cooktop
Large - 9,500 BTU
Small - 6,500 BTU

Water Heater
10,000 BTU

Furnace
35K BTU - 33'-36'

PROPANE SAFETY TIPS

Propane is one of the safest and most reliable fuels available on the market when handled properly. Propane, however, does have a great explosive potential if handled improperly. Danger is minimized by becoming familiar with and following a few safety precautions and by learning how to properly operate propane appliances. Use of propane requires the responsibility to enforce extra safety measures.

The motorhome is equipped with many propane operated appliances because it is a convenient and efficient source of fuel. Propane appliances must be operated and maintained in accordance with the product manufacturer's instructions.

The National Propane Gas Association (NPGA) has a special service program offered called GAS® (Gas Appliance System) Check. The GAS® Check program is aimed at educating users about the convenience of propane with safety and peace of mind. For information on the NPGA Gas® Check program, call 1-202-466-7200 or visit www.npga.org.

Maintenance and Safety Tips for the Propane Refrigerator and Furnace:

- Have the refrigerator and furnace systems inspected annually by an authorized service center.
- Have the venting system checked for blockage before using the refrigerator or furnace for the first time each season. Insects may have built nests that will obstruct flow.
- At the first indication of incomplete combustion (yellow flame instead of a blue flame or soot is present) contact a service technician. Improper combustion can cause carbon monoxide buildup, which is potentially fatal.

Maintenance and Safety Tips for the Propane Cooktop:

- Burner flame should be a blue color, which indicates complete combustion. If not, have the cooktop serviced by a qualified technician.
- Do not cover the oven bottom with foil. Air circulation can be restricted.
- Do not use propane cooktop or ovens for heating purposes.
- Ensure children understand never to turn or play with the knobs of the cooktop.

Maintenance and Safety Tips for the Propane Water Heater:

- Have the water heater venting system inspected annually or before first use of the season.
- Keep flammable substances away from the water heater. Do not store items close to it as this may block the airflow the water heater needs to operate completely.
- At the first indication of incomplete combustion (yellow flame instead of a blue flame or soot is present) call a service technician immediately. Improper combustion can cause carbon monoxide buildup, which is potentially fatal.

Notes

House Electrical

Section 8

HOUSE ELECTRICAL - INTRODUCTION

This section contains information, guidelines and procedures on the operation of the house electrical system. Refer to the OEM manuals included in the Owner's Information File box for respective, in-depth, individual component operating instructions.

General Overview:

The motorhome can utilize various sources of electrical power: shore power connection, generator, inverter (optional), chassis batteries and house batteries. All of these electrical power sources, while independent of each other, can be combined in a variety of ways to provide a highly efficient electrical operating system. Two types of electrical systems are used: 120/240 Volt AC and 12 Volt DC.

The motorhome 120/240 Volt AC system can be operated from three different power sources: shore power, on-board generator or the inverter. Shore power is the most efficient and should be used whenever possible. The generator can be used when shore power is unavailable. The inverter supplies silent AC power by using the house batteries of the motorhome, sending AC power to selected appliances and outlets. However, inverter AC power output is limited and should be used sparingly to conserve house battery power. Two different sources supply the main AC circuit breaker panel with power: the shore power cord or the on-board generator. The transfer switch automatically selects between shore power and generator power.

WARNING:
The electrical system is engineered and tested for safety. Circuit breakers and fuses protect the electrical circuits from overloading. When planning modifications or additions to the electrical system, ensure safety of the electrical system. Please note that any modifications may void the warranty.

WARNING:
Water is electrically conductive. DO NOT use any electrically powered item or outlet that may be exposed to a water source. Such use can result in a serious shock causing injury or death.

12 Volt DC System:

The motorhome has two 12 Volt DC systems: chassis and house. These two systems, for the most part, are isolated from each other. The house system does not operate engine functions; the engine system does not operate house functions. However, within the two systems there are some inner connections. For example: While the motorhome is driven, the alternator on the engine will supply charge voltage to the house batteries. Conversely, while the motorhome is plugged into shore power, or the generator is running, the chassis batteries are being charged.

Chassis and House System:

The chassis and house systems have their own sets of batteries. The chassis batteries supplies 12 Volt DC power to the chassis manufacturer's fuse boxes. The fuse boxes contain mostly engine system circuits and wiring such as headlights, taillights, dashboard functions, gauges, etc.

The house batteries supply power to the front distribution panel and interior fuse panel. The panels contains fuses for the house, interior lighting and appliances. Become familiar with these panels and the items they operate.

Maintenance:

It is important to keep the 12 Volt DC systems in good working order as many of these systems use electronics. These systems, with their incorporated electronics, are voltage sensitive. Some items can be damaged if the DC voltage is not maintained within the designed specifications.

Why Batteries are Important:

A majority of the lighting and appliances are designed to operate from 12 Volt DC (direct current) power. This is why the batteries play such an important role in the function of the motorhome. There are exceptions with appliances such as the microwave or television; however, indirectly they still operate from 12 Volt DC power, as they can be operated from the inverter. The chassis functions (engine, transmission, dash air, etc.) are also 12 Volt DC.

Shore Power:

The motorhome is equipped with a shore power cord to connect the motorhome to outside electrical services. Shore power service is the most efficient source of electrical power. Generally, shore power is either 30 Amp 120 Volt AC or 50 Amp 120/240 Volt AC. Electrical adapters may be necessary to allow a proper and safe connection to the electrical service supply when this type of power source is not available.

NOTE:
When 50 Amp shore service is not available, care must be used when operating the appliances and using the outlets to avoid overloading the shore power service.

Generator:

The generator can be selected for use when shore power is unavailable. The maximum amount of generator output power, measured in watts, is calculated at an elevation of 500 ft. above sea level. This figure decreases slightly at higher altitude. Ambient temperature also effects total maximum output. The amount of AC electrical load applied to the generator determines fuel consumption.

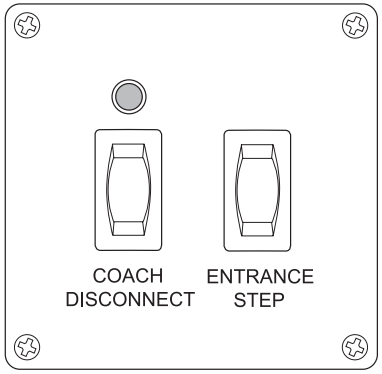
Inverter (Optional):

The inverter is an auxiliary 120 Volt AC power source that inverts 12 Volt DC house battery power to 120 Volts AC. This device has limited AC power output, measured in watts, and operates only the front and rear televisions and entertainment system. When dry camping, the inverter may be used power the entertainment system.

BATTERY CUTOFF

The battery cutoff switch (Coach Disconnect) is located inside next to the entry door. This switch controls the 12 Volt DC power to the house fuse panels. When the switch is activated, power is supplied to all the interior DC lighting and DC operated appliances. Some appliances require both DC and AC power to operate, such as the roof air conditioner.

This switch is helpful when dry camping to conserve house battery power. Refrigerator operation is unaffected by the operation of this switch.



NOTE:
The switch is labeled Coach Disconnect and the term is synonymous with Battery Cutoff.

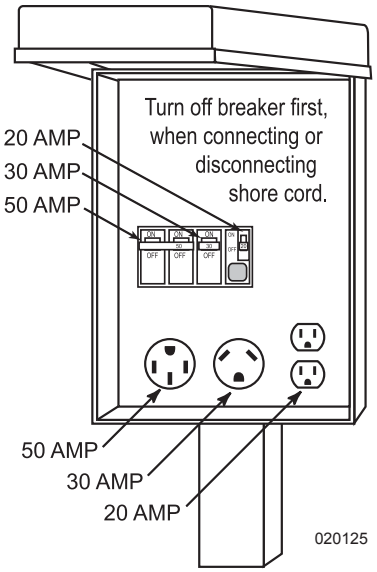
CAUTION:
To avoid flash damage to electrical contacts, turn off the interior lighting before activating the battery cut-off switch.

SHORE POWER HOOKUP

Power Requirement 50 Amp:

The power requirement for the motorhome is 50 Amp 240 Volt AC single phase. If 50 Amp shore power service is available, connect the supplied shore power cord to shore power.

The motorhome can be operated from 30 Amp 120 Volt AC but with limited capacity. If less than 50 Amp service is available, electrical adapters will be required and power consumption in total must be reduced to avoid tripping the shore power breaker.



Typical shore power outlets

CAUTION:
Do not remove cover from the shore power supply to troubleshoot electricity to the motorhome. Serious personal injury or death can occur. Inform the park manager if there is no power to the motorhome. It is the responsibility of the park to troubleshoot and repair the power supply.

While there are several onboard appliances, additional appliances such as a coffee maker or hair dryer increase power consumption. Power consumption of appliances is generally rated in watts. Watts can be converted to amps using the following formula; Watts divided by Volts equals Amps.

Refer to the load charts as a guide to approximate power consumption in total.

ONBOARD APPLIANCES			
DEVICE	AC LOAD	DEVICE	AC LOAD
Microwave	7.1 A Mic 9.2 A Conv	Residential Refrigerator	8.3 A
Water Heater	12.5 A	Central Vacuum	10 A
Roof A/C	15 A (ea)	Fireplace	11 A
Inverter	Up To 10 A	Propane Refrigerator	3.6 A

Approximate amperage of onboard appliances

REMOTE APPLIANCES			
DEVICE	AC LOAD	DEVICE	AC LOAD
Blender	3.3 A	Coffee Maker	10 A
Computer	2.5 A	Color TV	1.25 A
Drill	4.2 A	Hair Dryer	8.3 A
Hot Plate	15 A	Iron	8.3 A

Approximate amperage of typical remote appliances

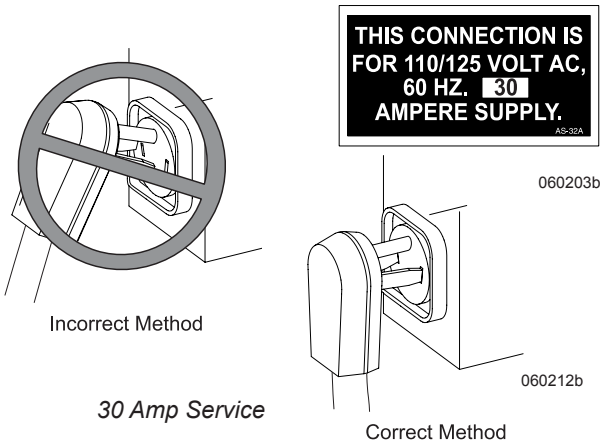
NOTE:
If shore power is less than what is rated for the motorhome electrical adapters will be required and power consumption must be reduced to avoid tripping the shore power breaker.

CAUTION:
Avoid flash damage to the electrical system contacts by turning off all appliances before connecting to shore power, starting the generator or using the inverter.

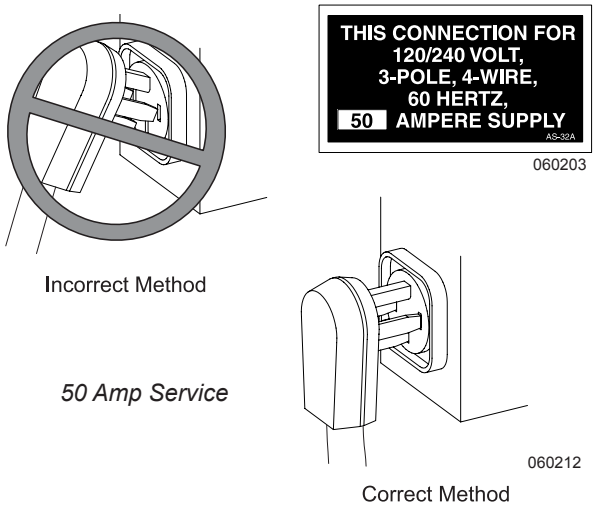
WARNING:
Keep fingers away from metal contacts of the shore plug. Do not stand in water when making electrical connections. Serious electrical shock and personal injury can occur. To avoid the risk of an electrical shock, turn off the circuit breaker for the shore power outlet before connecting to shore power.

Plugging in the Shore Cord:

- The shore cord is located in a rear roadside compartment.
- Unscrew the deck plate and extend a sufficient amount of cable through the deck plate to reach the power supply.
- Make sure all appliances are turned off.
- Check shore power amperage. If the shore power amperage does not match the shore cord (30 or 50 amp), install the proper adapter on the shore cord.
- Always turn **off** the shore power breaker at the power supply before connecting or disconnecting the shore cord. This will prevent an accidental shock or flashing of electrical contacts.
- Align cord end with socket terminals. Firmly push the plug all the way into socket until the plug is firmly seated into socket.
- After the connection is made, turn on the shore power breaker. The transfer switch should make an audible click.
- Depending on shore power amperage, appliances may need to be operated in sequence to avoid tripping the shore breaker.



30 Amp Service



50 Amp Service

Disconnecting the Shore Cord:

- Turn off all AC appliances.
- Turn off the shore power breaker. This will prevent accidental shock and flashing of electrical contacts when disconnecting.
- Without touching electrical contacts, carefully work plug out and away from socket.
- Straighten, clean and stow the cord in the compartment.

Maintenance:

Kinks may form in the shore power cord. Routinely extend the cord full length and straighten the cord.

Power Supply:

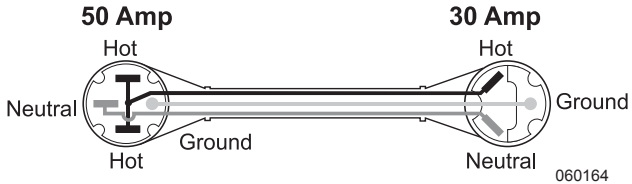
There is a considerable amount of difference in electrical power between 30 amp and 50 amp shore power.

- The continuous amount of current through a breaker or fuse is 80% of its rated capacity.

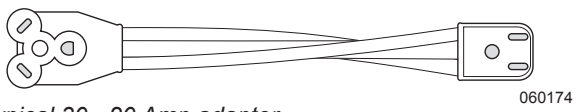
- 50 Amp 240 Volt AC shore power service consists of two power supply conductors, a neutral and a safety ground. The 50 Amp breaker simultaneously limits each power supply conductor to no more than a short-term maximum of 50 Amps for each conductor. The 50 Amp 240 Volt service actually provides 80 continuous amps.
- Use care when hooked to anything less than 50 Amp shore service. Shore power service less than 50 Amps consists of one power supply conductor, a neutral and a safety ground. 30 Amp shore service is limited to 24 continuous amps.
- 20 Amp shore service is limited to 16 continuous amps.

Electrical Adapters:

Different types of electrical adapters are designed to suit a variety of different needs. Only UL approved adapters should be used. The most common adapter is a 50-30 Amp adapter. This type of connector adapts the 50 Amp shore cord to a 30 Amp shore power outlet. Always install the adapter to the cord prior to making the connection to the outlet.



Typical 50-30 Amp adapter



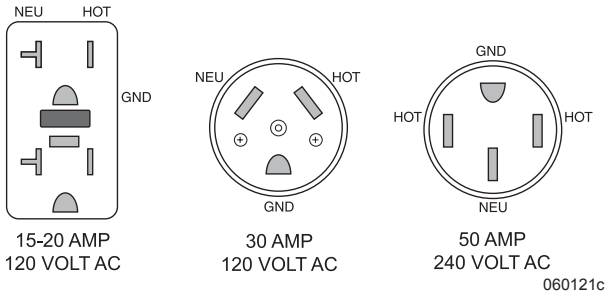
Typical 30 - 20 Amp adapter

Another common adapter is a 30 to 20 Amp adapter. This type of connector adapts the 30 Amp shore cord to a 20 Amp shore power outlet.

CAUTION:
If shore power service is limited to 15 or 20 amps, use of light duty extension cords and electrical adapters will create a voltage loss through the cord and at each electrical connection. Line voltage loss and the resistance at each electrical connection can be a hazardous combination. Damage to sensitive electronic equipment may result!

WARNING:
Avoid the risk of electrical shock or component damage by disconnecting from shore power during electrical storm activity. Use the inverter or start the generator if AC power is needed.

NOTE:
Three types of shore power outlets most commonly used are shown in the illustration.

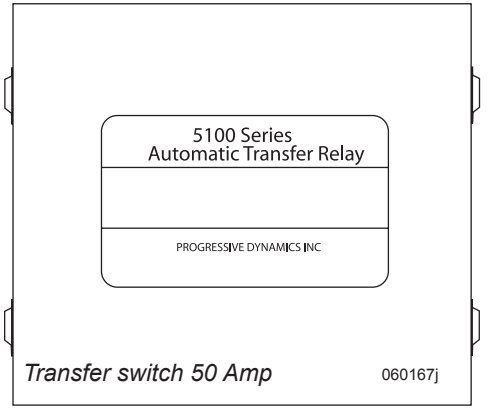


WARNING:
Before working on the electrical system, disconnect from shore power and turn off the inverter. Disconnect the negative 12 Volt DC battery cables at the batteries. Remove rings, metal watchbands and other metal jewelry before working around batteries and connectors. Use caution when working with metal tools. If the tool contacts a battery terminal or metal connected to it, a short circuit could occur causing personal injury, explosion or fire.

TRANSFER SWITCH

The transfer switch will automatically select and transfer AC power from either shore power or generator power to the load center (AC breaker panel).

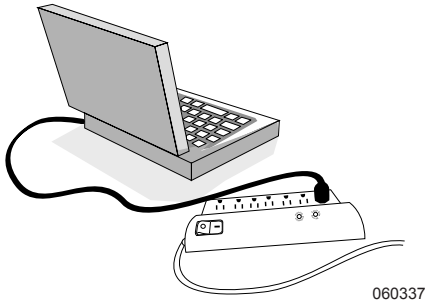
In the event both shore power and generator power are available, the transfer switch will select generator power over shore power. When generator power is available, there is an approximate 30 second delay before the transfer switch will connect to the generator. This allows time for the generator to stablize output voltage before being connected to an electrical load.



Transfer switch 50 Amp

Once the generator is shut off, the transfer switch will connect to shore power after a two second delay. Protect voltage sensitive electronic equipment such as laptops by plugging these items into a separate surge protection device.

CAUTION:
The transfer switch does not have a surge protection or high/low voltage cutout.



Use a surge protector to protect sensitive equipment.

NOTE:
The electrical contacts of the shore cord are not electrically energized when the generator is operating,

NOTE:
To help prevent damage to electrical contacts inside the transfer switch, discontinue appliance operation and turn off auxiliary electrical loads such as a coffee pot before connecting/ disconnecting to shore power or starting/ stopping the generator.

GENERATOR - 120 VOLT AC

Depending on options, the generator is either 4.0 KW or 5.5 KW. The generator is located in a curbside compartment. The generator can be started from the following locations:

- Generator remote switch on the dash.
- Generator control panel located on the generator.

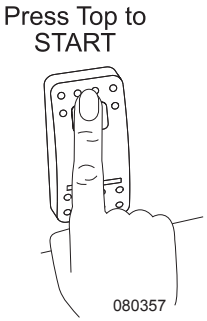
INFORMATION:
Refer to the generator OEM manual for detailed operating instructions and information.

Starting the Generator

Prior to starting the generator, perform a general inspection including oil and coolant levels. Keep a maintenance log on number of hours of operation since the last service. Perform any service or maintenance that may be due.

Before Starting the Generator:
- Clear people and pets from potential of an electrical shock and any moving parts.
- All appliances and other large AC electrical loads should be turned off prior to starting the generator.

Push and hold the control switch to Start. Release the switch when the generator starts.



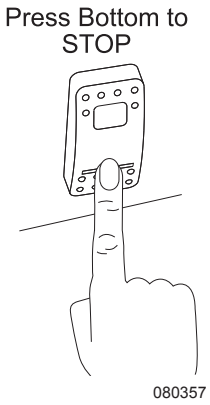
WARNING:
Excessive cranking can overheat and damage the starter motor. Do not crank the engine more than 30 seconds at any one time. Wait at least two minutes before resuming. If the generator fails to start refer to the generator OEM manual.

WARNING:
Position the dash air conditioner vent control to the Off position to prevent exhaust gases from entering the motorhome while parked. Engine exhaust contains Carbon Monoxide, which is poisonous and can cause unconsciousness and/or death. Inspect the exhaust system before starting the generator. Do not block the exhaust pipe or park the motorhome where exhaust gases may accumulate outside, underneath, or inside the motorhome or nearby vehicles. Operate the generator only when there is a safe dispersion of exhaust. Monitor outside conditions to ensure the exhaust continues to disperse safely.

WARNING:
When parked near potentially combustible sources of ignition such as grass, be sure that hot exhaust gases or the exhaust pipe does not contact the grass or other combustible material as it can result in a fire.

CAUTION:
Exhaust extensions add weight to the generator exhaust system. Exhaust piping or manifold damage can result, allowing Carbon Monoxide to accumulate or leak into the motorhome.

Stopping the Generator



Turn off appliances and disconnect other AC loads being used. Allow the generator to run unloaded for at least one minute before shutdown to allow the engine to cool.

Momentarily push the control switch to the Stop position. Release the switch.

NOTE:
The generator requires only a momentary stop signal.

Powering the Equipment

The generator powers the air conditioners, appliances and electrical outlets of the motorhome. The number of electrical appliances that can be operated at any given time depends upon how much power is available from the generator.

If the generator is electrically "overloaded" or a short circuit causes "over-current," either the generator will shut down or the circuit breaker will trip. If power consumption, in total, exceeds the generator power output, compensation for temperature and elevation may be necessary. Operate appliances in sequence, rather than all at the same time.

NOTE:
The generator may shut down when loaded nearly to full power and an air conditioner (or other large motor load) cycles on. Briefly during start up, an electric motor can draw up to three times the rated power. For this reason it may be necessary to operate some appliances in sequence when air conditioners or other large motor loads are on.

Compensation for temperature and elevation may also be necessary. The generator's maximum output is rated at 500 ft. above sea level. The generator will lose approximately 3.5% of its rated power for every 1000 ft. increase in elevation. High and low temperatures can also affect generator output. Power decreases 1% for every 10º F. above 85º F. Counteract these effects by operating appliances in sequence rather than at the same time.

INFORMATION:
The generator may shut down for reasons other than an overload. If a blink code appears on the control switch, refer to the OEM manual to obtain an explanation for the code.

Generator Fuel

Fuel for the generator comes from the main fuel tank. Due to infrequent operation, fuel can become stale or possibly contaminated. Any contamination or degradation of fuel from storage or infrequent use will negatively affect generator operation and cause the generator AC output to be inconsistent which can damage appliances.

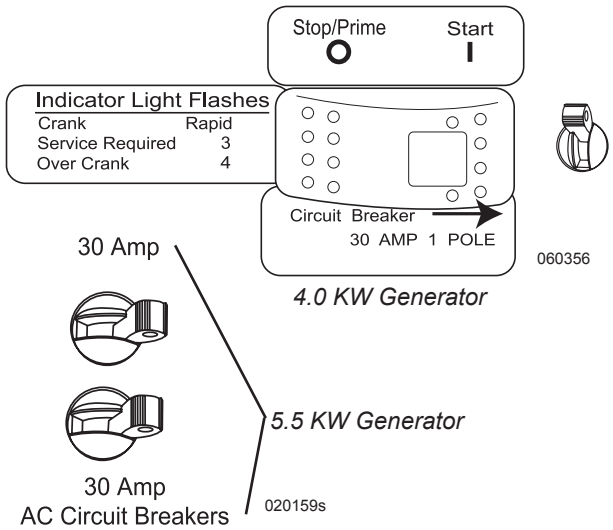
Average Fuel Consumption	4,000 Watts (gal./hrs.)	5,500 Watts (gal./hrs.)
No Load	.3	.3
Half Load	.5	.6
Full Load	.7	.9

CAUTION:
The motorhome manufacturer does not cover damage to the generator caused by fuel contamination, or to appliances due to erratic AC voltage.

Resetting the Circuit Breaker

If a circuit breaker trips in the load center (AC breaker panel) or on the generator control panel, there may be a short circuit or too much load.

NOTE:
The generator will continue to run after a circuit breaker trips.



If a circuit breaker trips, disconnect or turn off as many loads as possible. To reset the circuit breaker, switch the circuit breaker to Off, then switch back to On to reconnect the circuit. If the circuit breaker immediately trips, there is a short in the electrical system or the circuit breaker is faulty. Call a qualified electrician. If the circuit breaker does not trip, reconnect a combination of loads that will not overload the generator or cause the circuit breaker to trip again. Remember to compensate for elevation and temperature changes when reconnecting loads.

NOTE:
An appliance or load may have a short if it causes a circuit breaker to immediately trip after being reset. Do not continue to reset the breaker. Have the problem diagnosed and corrected before resuming operation.

Generator Exercise

If use of the generator is infrequent, "exercise" the generator once a month by operating it at approximately half the maximum rated output for two hours. This "exercise" will help promote better starting, more reliable operation and longer engine life. This procedure drives off moisture, lubricates the internal engine parts, replaces the old stale fuel with a fresh supply, and also promotes removing oxides from the electrical switches and contacts.

NOTE:
Avoid short run periods of the generator. Run the generator under a load for a minimum of one-half hour.

LOAD CENTER

The main 120/240 Volt AC load center (circuit breaker panel) receives power from the transfer switch that is supplied by either shore power or the generator. Power is supplied to the 50 Amp main breaker first then power is supplied to the individual branch circuit breakers. Refer to the actual circuit assignment label for circuit breaker identification.

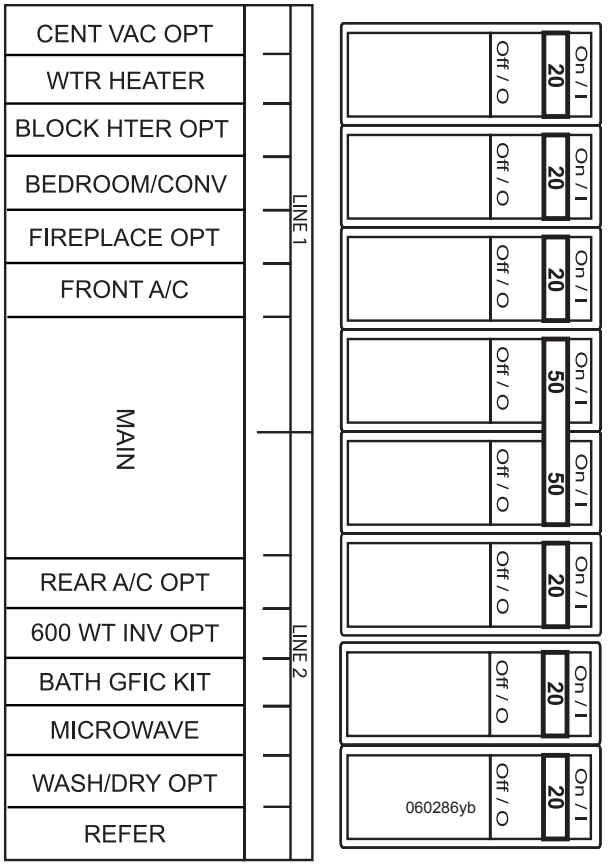
WARNING
The 120/240 Volt AC panel contains high voltage which can cause serious injury or death. Before beginning any work or testing procedures involving the electric panels, or any of the branch circuits, be sure the motorhome is unplugged from shore power and the generator is not running and the inverter is in the off position. Certain testing procedures can require the AC power to be on. Only qualified personnel or personnel with electrical backgrounds should attempt any testing procedures.

Branch circuits supply AC power to the different items or "loads." An electrical load is any item or device that uses current when supplied with an electromotive force. Should a breaker "trip" from an over-current condition, or from a shorted circuit, the load to which the breaker is supplying the power should be reviewed or disconnected to determine the cause of the trip. If no cause is found, or not readily apparent, reset the breaker by toggling the breaker to the Off position, then back to On.

Should the breaker trip again after the load is reapplied, it may indicate a fault with that particular load. Do not continue to reset the breaker until the problem is diagnosed and corrected.

50 Amp Load Center

NOTE:
Refer to the actual panel label as the label will change with options.



Exemplar label shown. Refer to actual circuit assignment label for circuit breaker identification

Circuit Breakers

The internal configuration of the circuit breaker is designed to trip when excess current causes the breaker to heat up. The trip action of the circuit breaker can occur within milliseconds. Breakers are designed to operate at a continuous load of 80% of the breaker's rated capacity. **For example:** A breaker with a 20 Amp rating will operate a continuous 16 amp load. This design leaves a small amount of working capacity within the breaker.

When an inductive load is applied, such as when an electric motor turns on, the motor starts to spin and current consumption may momentarily exceed the rated capacity of the breaker. As the electric motor comes up to operating speed, the electric motor's current consumption will decrease.

The AC current load then falls back into the breaker's rated 80% set point. This electric principle should be kept in mind when using anything other than 50 Amp shore service and using appliances with electric motors, such as air conditioners.

When using outlets, care should be considered when applying loads such as electric motors, heaters, coffee makers, toasters, hair dryers or other large current consuming loads. The current rating is usually stated on most electrical items. The current rating will either be rated in amps or watts. Current ratings stated on electrical items will change slightly with voltage fluctuations. As voltage increases, current consumption decreases. As voltage decreases, current consumption increases.

This may explain why in some instances items operated at borderline voltage to current tolerances may seem fine in one location but problematic in another.

NOTE:
To calculate watts to Amps divide the watt figure by the voltage from which the item operates from. For example: The electrical item is rated at 1370 watts. Divide that by the operating voltage of 115 Volts AC which equals 11.913 Amps. Use this formula to calculate the amount of load and compare to the available power supply.

GFCI Breakers & Outlets

A **Ground Fault Circuit Interrupter (GFCI)** can be found in two different types of applications. One type is incorporated in a breaker used in 120 Volt AC breaker panels; the other is incorporated in an outlet. The GFCI, whether it is a breaker or an outlet, offers two types of protection. One type of protection is from over-current or shorts to guard against hazardous ground fault currents that can result in injury or death. Ground fault currents are currents that flow from the "hot" or power terminal through a person to the ground. **For example:** touching a faulty appliance while making contact with an electrical ground such as a water fixture or the earth.

The GFCI offers protection against the type of shock that can result from faulty insulation, wet wiring from inside an appliance, or any device or equipment plugged in or wired to that circuit.

The ground fault portion of the outlet or breaker uses sensitive electronics inside the outlet or breaker to detect a ground fault problem. The electronics monitor the normal current of power flowing to the hot (black) wire through the load (a light bulb or appliance) and coming back on the neutral (white) wire.

If a small amount of current comes back on the safety ground wire, the electronics will trip the breaker or outlet, stopping the flow of electricity. The amount of current it takes to trip the device from a ground fault varies slightly from the different outlet or breaker manufacturer (approximately 4 to 6 milliamps or less).

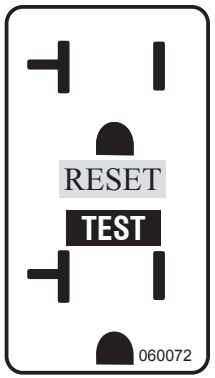
NOTE:
One milliamp is 1/1000 of one Amp.

Electrical shocks resulting from ground faults can be felt, but such a shock is considerably less than one without ground fault protection. People with medical conditions that make them susceptible to shock can still be seriously injured.

A GFCI outlet or breaker will not protect against shock from a normal current flow. **For example:** a shock from touching both metal prongs of an electrical cord or appliance while plugging it in.

WARNING:
If a breaker or outlet continually trips, do not continue to reset breaker or outlet until the problem has been identified and corrected.

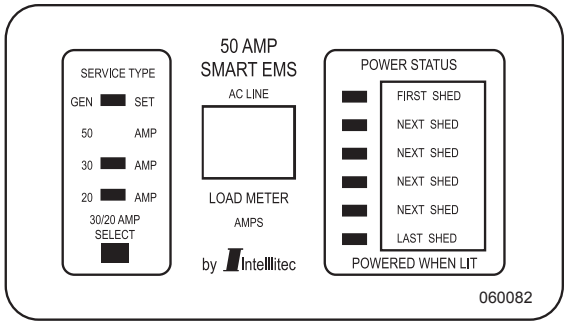
NOTE:
The ground fault outlet or breaker should be tested once a month to ensure it is operating. Press the Test button on the outlet or breaker. It should trip with an audible "click." The breaker or outlet will not trip if AC power is not present at the device. If power is present and the device will not trip, replace it before using that circuit.



120 Volt GFCI

Energy Management System (Optional)

The Energy Management System (EMS) consists of two primary components: the remote display panel and the load center. The EMS monitors overall AC current consumption while employing a system of energy management to minimize overloading (tripping) the shore power breaker.



Energy Management System panel

Energy Management:

The EMS automatically senses and determines whether the motorhome is connected to 30 Amp 120 Volt AC shore power or 50 Amp 240 Volt AC shore power or operating from the generator. Depending upon available power, the EMS controls operation of six possible loads as indicated on the remote display panel. These are typically heavier loads that can be postponed (shed) until sufficient amperage is available. When connected to 30 Amp 120 Volt shore power, the EMS attempts to keep the total current consumption to a running average of 24 Amps or less.

Operation:

When the EMS senses AC power, the system automatically powers up. When connected to 50 Amp shore power, the load meter will not indicate Amp load. When operating from the generator, the energy management feature is disabled and all control relays are closed. No loads will be shed and will be possible to overload output of generator. The load meter will display amperage consumption and the Gen Set indicator is illuminated.

When connected to 30 Amp shore power, the energy management feature will enable and shed loads as necessary to prevent overloading the shore power service. The load meter will indicate total current consumption. When connected to 20 Amp shore power, the user must select 20 Amp mode by momentarily pressing the 20/30 Amp select switch on the display panel. Initially, all relay contacts are closed and total current is monitored.

If total current should exceed available current from shore power, the system will turn off the first load (shed) in the shedding table and calculate the amount of current removed. This value is placed in memory. If current consumption remains above the current available from shore power, the system will turn off the next load in the shedding table, again calculating the amount of current removed and placing this value in memory. The system continues to turn off loads until total current falls below shore power amperage (80% sustained current consumption of shore power supply) or all controlled loads are shed. Through this process the system has "learned" the amount of current that each particular load draws. This feature compensates for differences in current draw over a range of line voltage and ambient temperature, by re-learning the load each time it is shed.

The EMS system waits until total current is lower than shore power and enough current is available (as compared with the amount in memory from the last shed load) before turning that load back on. This assures sufficient current is available to operate the load(s) reducing the likelihood of tripping the shore power breaker.

NOTE:
The 20 Amp feature is not automatically detected and the operator must manually select 20 Amp mode when connected to 20 Amp shore power.

NOTE:
There is a two minute minimum delay period after a load is shed before the load will be turned on.

Three Hour Averaging:

The RVIA (Recreational Vehicle Industry Association) in conjunction with the NEC (National Electrical Council) have established guidelines regarding the rating of electrical systems and use of energy management systems. One of these rules requires that if any energy management system is used, the average total load current for the system over a three hour period be limited to 80% of the service rating. For that reason the EMS calculates the average running current for the system and if it exceeds 80% of the service rating (shore power), the EMS sheds loads to reduce the average current below that limit.

For example, if connected to 30 Amp 120 Volt AC shore power and current consumption has been running at or above 24 Amps for three hours, the EMS will change its shedding threshold to 24 Amps and turn off loads until the 24 Amp limit is attained.

If connected to 20 Amp shore power, this will limit current consumption to 16 Amps. If current average drops below the limit, the system will restore power to loads based on their impact on the limit. A decimal point at the lower right corner of the load meter will illuminate when the EMS is in averaging mode.

Load Shed Order:

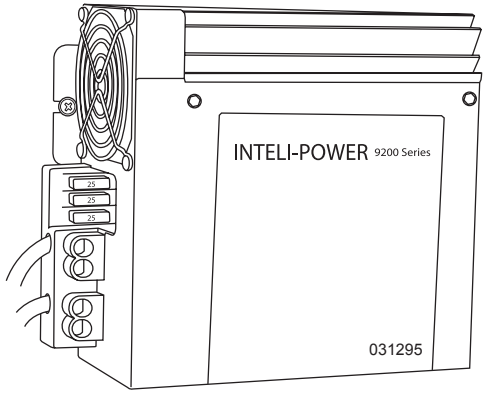
Six power status LEDs are illuminated to indicate power is available to the indicated loads. When the EMS determines current consumption in total will exceed available amperage from shore power, the system will begin to shed loads in order from top to bottom. The LED will turn off indicating the load has been shed.

Once sufficient amperage is again available, the shed loads will be turned on in order from bottom to top.

CONVERTER

The converter provides 12 Volt DC power to the lighting and appliance circuits. The converter charges and maintains the house battery. If the converter output is correct, but the battery is not charging, check the connections on the battery for corrosion. If there is no interior power, the converter fuses may be blown. If the converter has AC power and the fuses are good but there is no output from the converter, the converter may be bad. Have a qualified technician diagnose and repair the problem.

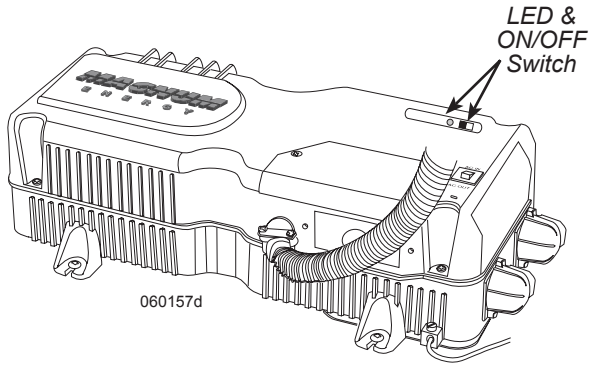
WARNING:
If a fuse blows, replace the fuse with same amperage rating and type. Installing a higher amperage fuse can damage the wiring or the item the fuse is protecting or may cause a fire. If the fuse repeatedly blows after replacing, do not continue to replace it. Have the problem diagnosed and corrected by a qualified technician.



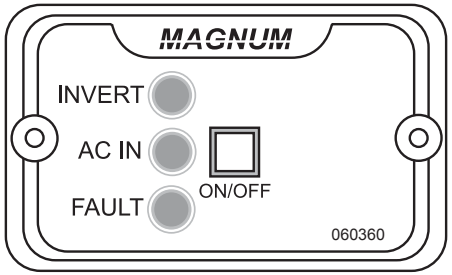
Converter - 60 Amp

INVERTER - 600 WATT (OPTIONAL)

The inverter operates the front and rear televisions and home entertainment system. The inverter can be used when shore power is not available or when unable to operate the generator. The inverter uses 12 Volts DC power from the house batteries to make 120 Volts AC power. Using the inverter quickly consumes house battery power and should be used sparingly. A remote control turns the inverter on and off. It is recommended to leave the inverter off when not in use to conserve house battery power.



600 Watt inverter



Inverter remote switch

WARNING

This electrical system is equipped with an inverter and/or Automatic Generator Starting (AGS) device. Disconnect all AC and DC power to the inverter and/or the AGS before performing any service to the electrical system. Failure to do so can result in shock causing serious injury or death

100218b

Operation

Push the On/Off button to turn the inverter on or off. The green LED will flash once per second when inverting and will glow steady when hooked to shore power or when operating the generator.

Battery voltage must be greater than 10 Volts DC for the inverter to operate. Turn off the inverter is when not in use. This will help conserve house battery power.

NOTE:
The on/off switch will not turn the LED off when hooked to shore power or operating from the generator. Should any of the following conditions occur: low battery, high battery, AC over-load, over-temperature or internal faults, the inverter will shut down and the LED will blink.

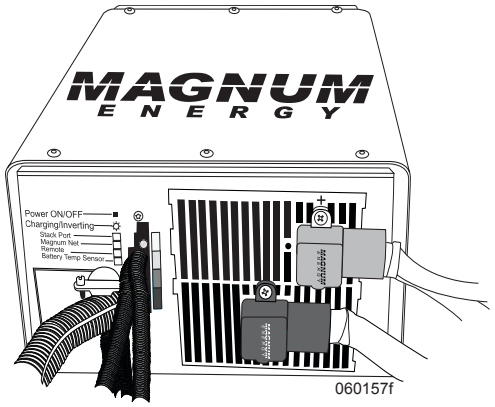
INFORMATION:
For complete operating instructions consult the inverter OEM manual or visit the manufacturer's website at www.magnumenergy.com.

INVERTER - 2000 WATT (OPTIONAL)

The 2000 watt inverter performs two functions; it changes DC battery power to AC electrical power and also converts AC power to DC to charge the house and chassis batteries when hooked to shore power or operating from the generator. The 2000 watt inverter operates the following items:

Outlets Powered by 2000 Watt Inverter	
Front TV	Rear TV
Microwave	Dinette Oultet
Refrigerator	Driver/Pass Console Outlets

Use the inverter to supply AC power when shore power is not available and the generator is not going to be used as a secondary AC power source. The inverter supplies AC power to selected outlets and appliances. Remember that using the inverter quickly consumes house battery power.



2000 watt inverter

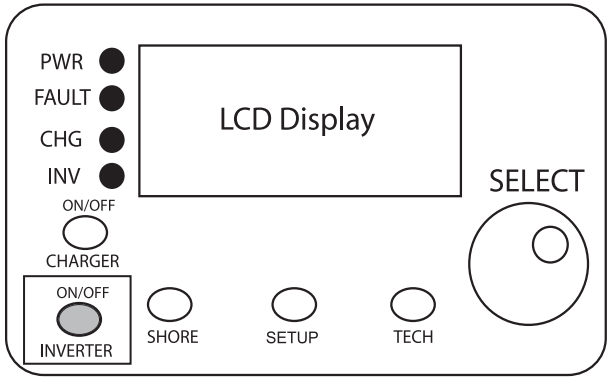
Turn off the inverter when not in use to conserve house battery power. The remote panel is used to change variable settings.

NOTE:
The inverter is a comprehensive system with many features. It is strongly recommended to read the OEM manuals

Providing AC Power with Inverter

To Turn the Inverter On:

- Turn on the battery cutoff switch.
- Press the Inverter On/Off switch on the remote panel.



Remote Panel

WARNING

This electrical system is equipped with an inverter and/or Automatic Generator Starting (AGS) device. Disconnect all AC and DC power to the inverter and/or the AGS before performing any service to the electrical system. Failure to do so can result in shock causing serious injury or death

100218b

If the inverter does not sense AC power from the generator or shore power, it will provide AC power from the house batteries to selected outlets and appliances. If the generator is started or the motorhome is connected to shore power, the inverter will automatically begin charging.

Battery Charging with Inverter

The inverter will automatically begin charging when AC power is available from either shore service or the generator. The inverter uses a three-stage charge cycle to charge the batteries. The charger may be turned off if desired.

To turn the charger on and off:

- Press the switch marked Charger On/ Off on the remote panel.

Shore Setting:

The Shore setting in the remote panel adjusts the amount of AC current the battery charger can use. If hooked to less than 50 amp service, select the proper Shore setting to help prevent combined AC loads such as the roof air conditioner and the charger from overloading limited shore power service.

To Adjust Shore Power Setting:

- Press the Shore button on inverter remote.
- Turn the Select knob on the inverter remote left or right to scroll through shore setting options.
- Press the knob to select. An arrow will appear next to the selected setting.

NOTE:
Settings 20 Amp and below limits battery charge capacity and may hamper ability to efficiently operate DC electrical loads. Remember to reset to higher amperage when available.

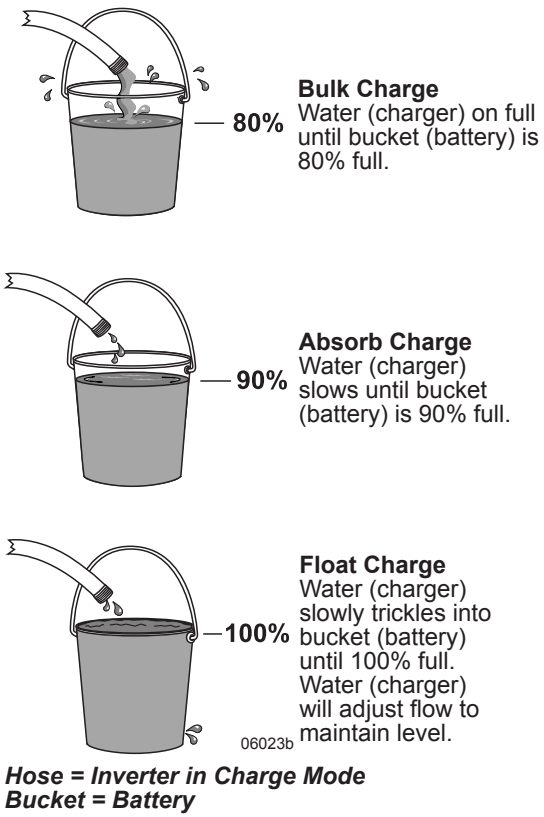
Set Shore Settings To:

Shore Setting	AC Power
50 Amp	When hooked to 50 Amp shore service.
30 Amp	When hooked to 30 Amp shore service.
20 Amp	When hooked to 20 Amp shore service.
10 Amp	Used when shore service is severly limited or experiencing shore power overload.
5 Amp	Minimum charge capacity setting. Used when shore service is severly limited or experiencing shore power overload.
Contrast	75 %

Three-stage charging cycle:

The inverter optimizes battery charge rate and charge time using a three-stage charge cycle. Each stage of the charge cycle utilizes voltage and current to charge the batteries quickly and efficiently without damaging the batteries by overcharging or insufficient undercharging. The charge profile occurs automatically when the battery bank type (LLA or AGM) and size (amp hours) is programmed through the remote.

- **Bulk Charge Cycle:** Brings the DC voltage up high, initially between 14.2 - 14.6 Volts DC. The length of time the inverter is in Bulk Charge depends the state of charge of the batteries.
- **Absorb Cycle:** Absorb Cycle voltage is the same as the bulk charge voltage, between 14.2 - 14.6 Volts DC. Length of the Absorb Cycle is a timed event determined by the inverter.
- **Float Charge Cycle:** Float Charge voltage is between 13.3 - 13.7 Volts DC. Approximately 80% of the charging cycle has been completed by this time.



Hose = Inverter in Charge Mode
Bucket = Battery

Factory Default Settings

Function	Default
Search	5 Watts
Low Battery Cutoff	11 Volts DC
Battery Bank	400 AH Std (2 House Batt) 800 AH Opt (4 House Batt)
Battery Type	Liquid Lead Acid
Charge Rate	80 %
Contrast	75 %

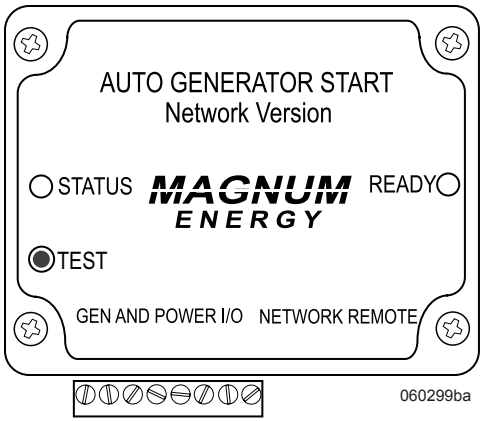
Battery Temperature Sensor

A battery temperature sensor **(BTS)** is affixed to one of the house battery terminals to measure battery temperature and send that information to the inverter. When battery temperature rises, the inverter will decrease charge voltage to prevent boiling the batteries. When battery temperature cools, the inverter will raise charge voltage.

Voltage compensation with temperature variation is necessary to keep charge voltage at optimum values. If the BTS cord is unplugged from the inverter, the inverter will use a temperature default setting of 77º F./25º C. as a reference point.

Automatic Generator Start

The automatic generator start (AGS) feature allows the inverter remote to start the generator when battery voltage or interior motorhome temperature (ATS) reaches a preset point. The AGS parameters are set at the inverter remote control. The AGS controller carries out the AGS functions.



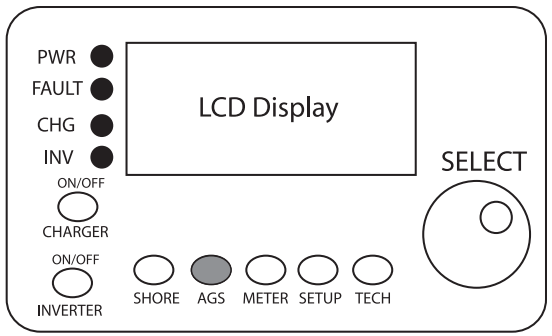
AGS controller

NOTE:
The battery disconnect switch (interior house power) must be on for the AGS/ ATS features to function.

NOTE:
Refer to the OEM manual for detailed instructions.

AGS Menu:

Press the AGS button on the remote to access the AGS menu. Rotate the Select knob to scroll through menu options and press the knob to enter a specific menu and make selections. Pressing the knob to set a function is indicated by an arrow next to the selection indicating the function is set or enabled.



Inverter remote control

Press the AGS button at any time to return to the main AGS menu. AGS Menu options are labeled 01 through 08.

01. **AGS Control:** Rotate the knob to scroll through Off, Enable, Test, or Enable w/Quiet Time.
02. **AGS Status:** View current AGS status. Indicates what feature started the generator.
03. **Run Time Hours:** Choose generator run time duration from .5 to 6 hours.
04. **Start Temp F:** Select the interior temperature for Auto Temp Start (ATS). Be sure to select External Input as an interior temperature sensor is used for this feature. Start temp range is 65°-95° F.
05. **Start Volts:** Sets voltage at which the generator starts based on house battery voltage. Settings are 10-12.2 Volts DC. Default setting is 11.0 Volts DC. If AGS is enabled, the generator will start when house battery voltage drops to 11.0 Volts DC.
06. **Set Time:** Set the 12 hour clock on the remote. The clock will need to be reset should power to the remote be disconnected.
07. **Quiet Time:** Choose from a preset list of quiet time hours during which the AGS will not allow the generator to start. This function is only active when the AGS Control (menu 1) is set to Enable w/Quiet Time.
08. **AGS Tech:** Used by service personnel for troubleshooting.

AGS Programming

The clock must be set and the AGS feature enabled before the generator will start based on voltage. The default run time is two hours. Default start voltage is 11.0 Volts DC.

Programming AGS:

1. Press the AGS button on the inverter remote.
2. Rotate knob to menu 06, Set Time.
3. Press knob to enter Set Time menu. Rotate knob to set hour of day, press to set. Press then rotate knob to set minutes, press to set. Press then rotate knob to set AM or PM, press to set.
4. Press the AGS button on the inverter remote. Rotate knob clockwise to Enable then press knob to set Enable or continue rotating to Enable w/Quiet Time. If enabled with Quiet Time, select the pre-programmed quiet time hours from AGS menu 07. The clock can also be set if Quiet Time is enabled from this menu.

The generator is now programmed to start when house battery voltage drops to 11.0 Volts DC then run for two hours. Start voltage and run time can be changed to suit needs. Remember to disable the AGS feature when performing service or placing the motorhome in storage.

WARNING:
Disable AGS when performing service or when storing the motorhome. The generator produces high voltage and combustion gases during operation. High voltage and/or combustion gases can result in severe injury or death.

ATS Programming

The clock must be set and the AGS feature enabled before Automatic Temperature Start is enabled. The default start temperature is 75° F. Default run time is two hours. If after two hours, interior temperature is above default start temperature, the generator will continue to operate for another scheduled run time.

Preset thermostat temperature for the roof air conditioner so when the generator starts, the roof air conditioner will begin cooling.

Programming ATS:

1. Press the AGS button on the inverter remote. Rotate knob to menu 04, Start Temp.
2. Press knob to enter Start Temp. Rotate knob to Ext Temp then press. The remote is now programmed to use the internal temperature sensor.
3. Rotate knob to select the desired start temperature (65°-95° F.) then press knob to select.

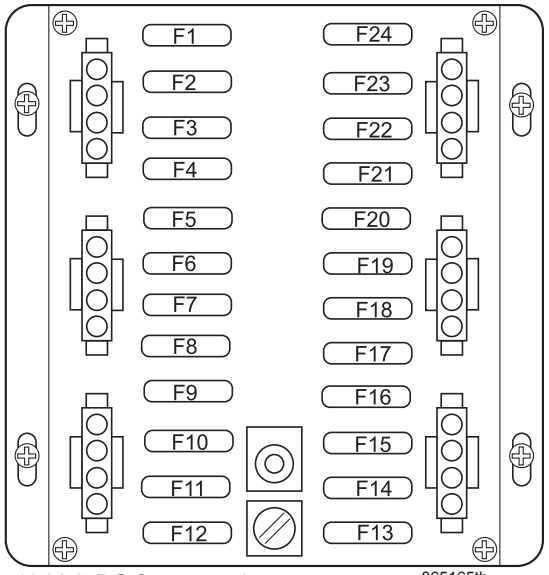
Disabling AGS/ATS

1. Press the AGS button on the inverter remote.
2. Rotate knob counterclockwise to Off then press knob.

The AGS feature is now disabled.

DISTRIBUTION PANEL - HOUSE 12 VOLT DC

The 12 Volt DC house distribution panel contains fuses that protect the electrical circuits. These fuses are a standard automotive type. Refer to the actual fuse label for circuit assisgnments as this will change with options.



12 Volt DC fuse panel

F1 Entrance Clng Lts	15 A	F24 Open	
F2 Porch Lt	15 A	F23 Open	
F3 Furnace	15A	F22 Bath 2	15A
F4 Mon Pnl/ Wt Pump	15 A	F21 Midship Lts	15A
F5 Refer	15A	F20 Bath	15A
F6 Bedroom 2	15A	F19 T/Stat/Roof AC	5A
F7 Open		F18 Pwr Vents	15A
F8 Open		F17 DSS/TV Prep	15A
F9 Open		F16 EMS Opt	7.5A
F10 Open		F15 Wall Lits	15A
F11 Open		F14 O/Head Lits	15A
F12 Open		F13 Bedroom	15A

12 VOlt DC circuit assignments. Refer to actual label for fuse identifications as assignments will change with options

FUSES & CIRCUIT BREAKERS – 12 VOLT DC

Circuit protection devices are installed to protect circuit wiring in case an over-current condition occurs. An over-current condition usually falls into one of two categories: a short circuit or overload. A short circuit is when a break or fault in the circuit allows electricity to flow directly to ground. Circuit overload is when circuit amperage or the electrical load exceeds designed operating parameters.

Several factors are considered when designing a circuit to operate an electrical load. The amperage required to operate the electrical load will determine wire size and wire insulation type. The application of the electrical load can determine whether a fuse or circuit breaker is selected.

Circuit protection devices come in a variety of shapes and ratings. Most common are the blade style plug in fuse and auto reset circuit breakers. These types of circuit protection devices are readily available from auto supply stores.

Circuit protection devices in a 12 Volt DC system are actually rated at 32 Volts DC due to voltage variances in a 12 Volt DC system. Replacement devices must use the same amperage rating and be of the same type as the original for proper circuit protection and electrical safety.

Generally a fault exists in the circuit when an over-current condition has caused a fuse to blow or circuit breaker to trip. Until the condition that caused the fault is corrected, replacing the fuse may be a temporary fix. Continually replacing the fuse or circumventing the protection device can jeopardize safety and circuit integrity.

WARNING:
Replacement fuses or circuit breakers must be of the same type and rating as the original equipment. Installing protection devices other than the original type and rating will create a safety hazard that will potentially result in circuit and/or component damage and fire.

Fuses:

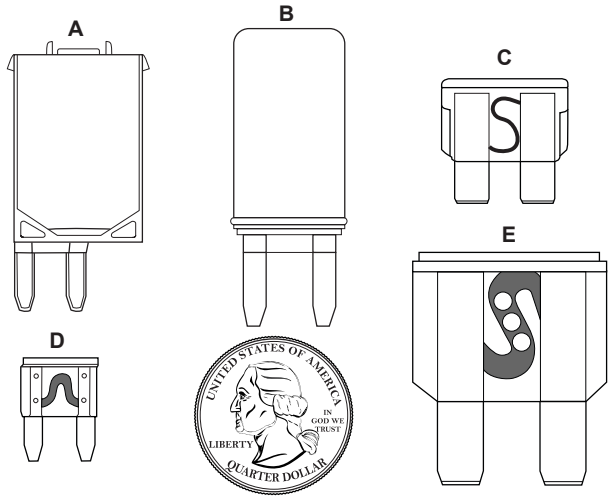
Blade fuse comes in three sizes: Mini, Standard and Maxi. Fuse color determines amperage ratings. A blown fuse indicates an over-current condition has occurred. Typically the conductor strip in the center of the fuse is broken, but not always, and is best verified by use of a 12 Volt DC test light. Located atop the blade style fuse housing are two exposed terminals. The fuse is good if the test light illuminates at both terminals. This may require the circuit be activated for power to be present at the fuse. The fuse is bad if the test light illuminates at only one terminal.

There are three types of Circuit Breakers:

Type 1 is an automatic reset type circuit breaker. This type of breaker may cause component damage under a short circuit condition. It will not damage the circuit, the installation or present a safety risk

Type 2 is an automatic reset type circuit breaker. Under a short circuit condition, this type of breaker will not cause component damage or damage to the circuit, the installation or present a safety risk.

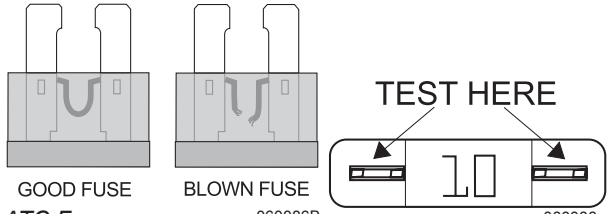
Type 3 is a manual reset circuit breaker. This type of breaker will open under a short circuit condition and must be manually reset.



Quarter is used for size comparison of fuses. 080528e

A. Manual Reset Circuit Breaker
B. Auto Reset Circuit Breaker
C. Standard Fuse
D. Mini Fuse
E. Maxi Fuse

Representation of various fuses and a circuit breaker.



ATC Fuse

BLADE FUSE GUIDE			
	Mini	Standard	Maxi
Black	1		
Gray	2	2	25
Violet	3	3	
Pink	4	4	
Tan	5	5	70
Brown	7 1/2	7 1/2	35
Red	10	10	50
Blue	15	15	60
Yellow	20	20	20
Clear	25	25	80
Green	30	30	30
Blue-Green	35		
Orange	40		40

Mini, Standard and Maxi fuse colors and amperage ratings

BATTERIES - HOUSE

House batteries are designed for use with 12 Volt DC operated lights, appliances and inverter.

Type of House Batteries:
- Liquid Lead Acid (LLA)

Deep Cycle Batteries:
Deep cycle batteries are best suited for use with 12 Volt operated lights, appliances and inverter. Deep cycle batteries are designed to have half of their capacity discharged before being recharged.

CAUTION:
Tap water contains minerals that can alter battery chemistry and ruin the battery. Use only distilled water when refilling a liquid lead acid battery.

IMPORTANT!

IMPORTANT!
This motorhome is equipped with Non-sealed Liquid Lead Acid (LLA) house batteries which require regular maintenance. Lack of maintenance will result in a shortened battery life.

NOTE:
Read your owners manual for storage, dry camping and battery maintenance.

MONACO CUSTOMER SERVICE: 1-877-4-MONACO

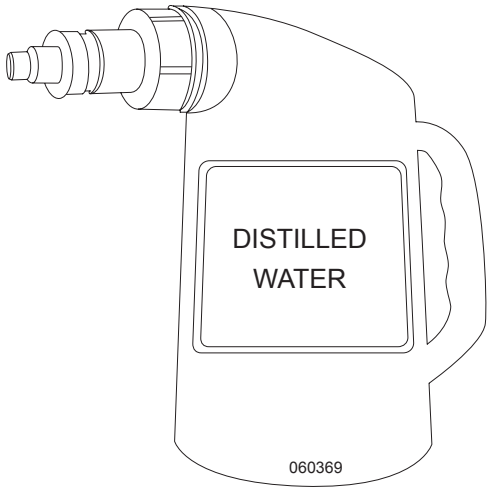
060331

CAUTION:
Petroleum based products or battery by-products can damage the paint finish. Do not allow these chemicals to get on the paint finish. If the chemicals splatter on to the painted surfaces, immediately rinse the surface using plenty of water and a mild detergent.

Battery Maintenance

Check the water level in each battery cell at least once a month. The electrolyte level should be approximately 3/8" below the well to allow room for expansion while the battery is being charged. Over-filling the battery can cause the electrolyte solution to be pushed out of the battery caps. Use only distilled water to refill the battery. A battery with a low electrolyte level will rapidly boil out the water once the plates have been exposed to air.

NOTE:
The cap on individual cells is threaded onto the battery and can be removed to inspect water level.



Example of battery filler bottle

Periodically check the batteries for corrosion and cracks. Replace vent plugs that are cracked or missing. Keep the top of the batteries clean. The accumulation of electrolyte and dirt may permit small amounts of current to flow between the terminals that can drain the battery.

Check the battery connections for tightness and corrosion. Battery cables will occasionally need the corrosion removed to clean the cable ends and battery terminals. The batteries and trays will also need to be cleaned.

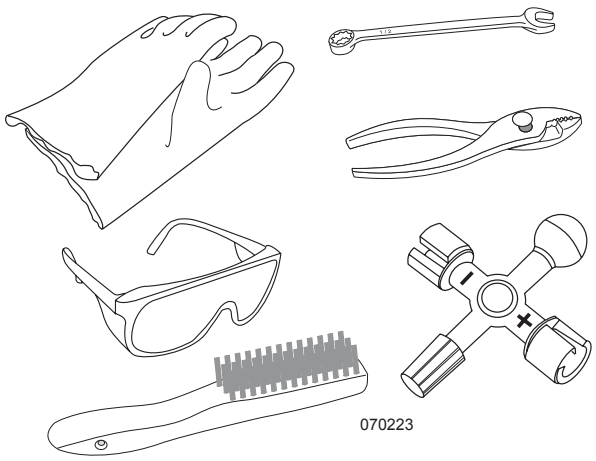
WARNING:
Liquid lead acid batteries produce hydrogen gas while charging. Do Not smoke around batteries and keep all sources of ignition or flames away from batteries. Hydrogen is an extremely flammable gas and can explode resulting in fire, personal injury, property damage or death.

WARNING:
Sulfuric acid in the batteries can cause severe injury or death. Sulfuric acid can cause permanent damage to eyes, burn skin, and eat holes in clothing. Always wear splash-proof safety goggles when working around the battery. If the battery electrolyte is splashed in the eyes, or on skin, immediately flush the affected area for 15 minutes with large quantities of clean water. In case of eye contact, seek immediate medical aid. Never add acid to a battery once the battery has been placed in service. Doing so may result in hazardous splattering of electrolyte.

Battery Tools:
A few simple hand tools are required to work on the batteries and should be kept aside for working on batteries only.

- Wear old clothes. Clothing is easily damaged when in contact with batteries.

- Wear thick rubber gloves that are solvent and thinner proof.
- Keep a ½" box-end wrench, wire brush and pair of adjustable pliers separate from other tools.



Battery Tools

Safety Precautions:

Working on batteries requires a few safety procedures:

- Never short battery terminals or cables with anything metallic to "test" batteries for power.
- Wear safety glasses. Even a small amount of corrosion or acid can be very painful and harmful to the eyes.
- When wire brushing terminals, work the brush in one direction away from you. Avoid contacting opposite polarity terminals. Avoid breathing the powder. A particle mask can be helpful.

Before removing cables or performing major maintenance procedures, draw a diagram of how the batteries fit in the tray and the relative locations of the positive and negative terminals. Draw a diagram of cable routing, polarity and how the cables attach to the batteries. Mark all cables positive and negative respectively. If availabe, take several pictures of the batteries and cables for reference. One misplaced cable can have disastrous results.

- Before removing any cables, stop all charging or discharging current.
- Unhook from shore power or stop the generator.
- If the motorhome has solar panels, remove the fuse near the battery connection or place a blanket over the top of the panels. Unhooking charge wires from the solar panel during daylight hours can damage the controller.
- Remove all rings and wristwatch to prevent short circuits. A severe burn can instantly occur.
- Open the battery compartment door and slide tray (if equipped).
- Turn off interior house power.
- Wear safety glasses and thick rubber gloves when working around batteries. Battery tools required: a wire brush, ½" box-end wrench, adjustable pliers and a box of baking soda. Prepare a baking soda/water solution. Keep paper towels handy.
- Thoroughly rinse batteries with plain water before disconnecting cables. Remove all cables large and small. Remove the batteries, if necessary.
- Wire brush cable ends and battery posts. Dip the ends of the cables in baking soda (neutralizing) solution.
- With battery caps securely in place, carefully apply solution to the terminals. Using a paper towel, dip it into the solution and wipe the top of each battery.
- **Do not** allow solution to get into any battery cell. This will neutralize acid and ruin the battery.
- Rinse cables and batteries thoroughly with clear water.
- Use the rest of solution to clean battery tray. Thoroughly rinse tray, battery area and sidewall of the motorhome with water.
- If equipped, operate the battery trays several times while simultaneously rinsing with water. Use Kwiklube spray or equivalent to lubricate the moving components.
- Install the batteries in correct order noting their relative post location.
- Install tie-downs securing the batteries into position.
- Carefully install all positive cables. Double check before making each connection to confirm they are in the correct location.
- Install the negative cables. When hooking up the ground cable going to the frame there will be a small spark indicating a momentary current draw. This is a normal process of charging the capacitors in the inverter. If there is a heavy flash STOP. Something is wrong. Double-check all wiring and battery post location for error.

- Coat terminals and posts with a protective coating to seal the connections from the gas and electrolyte.

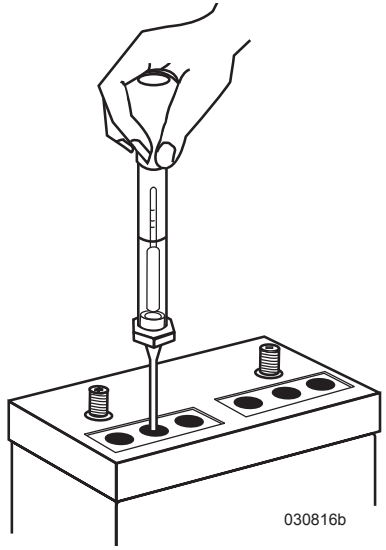
WARNING:
Liquid lead acid batteries produce hydrogen gas while charging. Hydrogen gas is highly flammable. Do Not smoke around batteries. Extinguish all flames in the area. Hydrogen gas can explode resulting in fire, personal injury, property damage or death.

Testing the Battery

Checking the Electrolyte Solution:

The most efficient way to test the batteries is check the electrolyte solution with a hydrometer. Many styles are available, from types with cylinder graduation (shown in the illustration) to types with floating balls. Hydrometers can be purchased from most auto parts stores. The hydrometer tests the battery's electrolyte solution that is measured in specific gravity. Distilled water has a specific gravity of 1,000. The hydrometer is calibrated to this mark. Pure sulfuric acid has a specific gravity reading of 1,840.

The acid is 1.84 times heavier than water. The electrolyte solution is about 64% water to 36% acid (fully charged battery). A fully charged battery at 80º F., has a specific gravity reading of 1265 per cell.

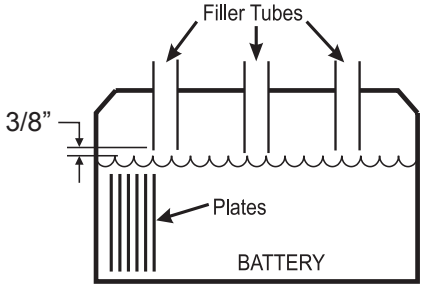


Battery hydrometer

Hydrometers with cylinder graduation are graphed and the exact state of specific gravity can be determined.

Temperature and recent battery activity (charging or discharging) affect the hydrometer readings. It is best to check the battery when it has been at rest for at least three hours, although readings taken at other times will give a ballpark figure. When using the hydrometer, draw the electrolyte solution up into the tube.

Allow the hydrometer to attain the same temperature as the electrolyte solution. Note the reading for that cell. Complete the same test for the rest of the cells on that battery bank. The hydrometer is calibrated at 80° F.



Battery State of Charge	Spec. Gravity	Voltage
100%	1.265	12.7
75%	1.225	12.4
50%	1.190	12.2
25%	1.155	12.0
Discharged	1.120	11.9 or Less

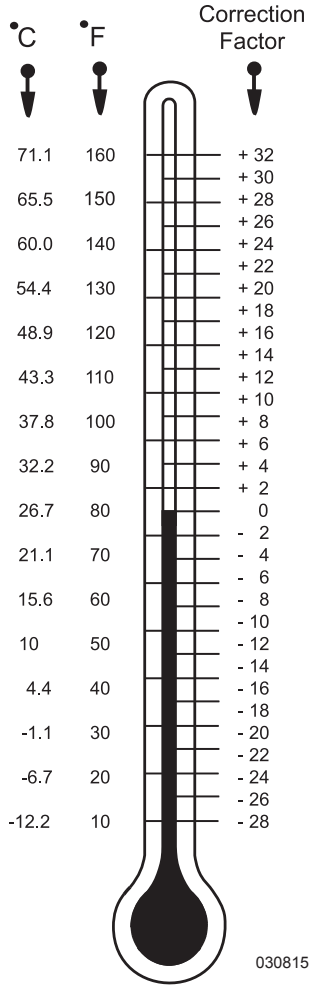
NOTE: The distilled water level in battery should be 3/8" below the filler tube. 020034

Temperature affects the hydrometer readings. The higher the electrolyte temperature, the higher the specific gravity reading. The lower the temperature, the lower the specific gravity reading. Add or subtract four points for each 10° variance from the 80° F. chart. Readings between cells should not vary more than 50 points.

If one cell in a particular battery bank being tested is at a 50% state of charge and the other cells indicate a full state of charge, charge only the low battery to see if the low cell will come up and at the same time do not over-charge the healthy cells.

If the low cell does not improve after charging, this battery can damage the rest of the battery bank and should be replaced. An accurate digital Volt meter + - .5% will also give an indicator of the battery's state of charge.

NOTE:
See the chart for temperature compensation. Liquid levels should be even between the cells of the battery being tested as it will affect the accuracy of the test.



Temperature Correction Chart

Placing a load on the Battery:

Another test that can be performed is to place a specific load on the battery for a predetermined length of time equal to that particular battery's rating.

This machine is usually an adjustable carbon pile that can vary the load being applied to the batteries while monitoring voltage to see if they will perform to their specific rated capacities.

Charge Time & Consumption Rate

Calculating Run Times:

Calculating run time figures when operating 120 Volt AC electrical items with an inverter can be exponential due to battery characteristics. Flow characteristics of electrons vary with different battery types and chemical compositions. Deep cycle batteries are generally designed to slowly release a majority of their charge capacity.

Deep cycle batteries are rated in amp hours (Ahrs) with the discharge occurring over an extended period of time before the battery is charged. Engine starting batteries are designed to quickly release large amounts of current for a short duration, without depleting battery reserves. Commercial type batteries bridge the gap of deep cycle and engine batteries. Commercial batteries release medium amounts of current over a longer period of time but they are not designed to cycle their charge capacity.

The working range of a deep cycle battery is between 50 and 100% state of charge (SOC). Deep cycle batteries should not be cycled below 50% state of charge. Discharging a deep cycle battery below 50% state of charge shortens the life of the battery.

Deep cycle batteries use an amp hour rating that is usually calculated over a 20 hour discharge interval. For example: A deep cycle battery with a rated capacity of 100 Ahrs. is designed to release current at the rate of 5 amps per hour. Multiply a 5 amp load over a 20 hour discharge period equals the rated 100 Ahr. capacity.

These discharge figures are calculated with the battery starting at 100% state of charge with the battery at 80º F. when the discharge cycle begins. However, increasing the discharge load applied to the battery from 5 amps to 10 amps on a 100 Ahr battery does not yield ten hours of discharge time. This is due to the internal reactions that occur when a battery is discharging. Actual discharge time for a 10 amp load may be closer to eight hours of discharge time. Increasing the load applied to the battery to 20 amps will not yield five hours discharge time but may be less than three hours. It might be understood as a point of diminishing return.

Calculating applied loads to an inverter to approximate run time from the battery amp hours available is not an equal trade up when voltage is inverted and amperage is calculated. When the inverter is used to operate an AC load it uses approximately eleven times the DC current needed from the battery when inverting 12 Volts DC to operate the 120 Volt AC item.

There is also a small efficiency loss of about 10% when inverting. For example: When using the inverter to operate an AC electrical item, which has a current draw rating of 2 amps, the inverter will use over 20 amps DC power from the batteries.

Determining Current Consumption:

First determine the amount of current used by an AC item. For example: The television is rated at 200 watts at 120 Volts AC. Calculate watts to amps. Divide 200 watts by the operating voltage of 120, this equals 1.6 amps. Multiply 1.6 amps AC current by a factor of ten the inverter will use, this equals 16 amps DC battery current. Add the revised 10% efficiency loss figure, this calculates to a total of 17.6 amps DC. If the battery bank capacity is rated at 500 Ahrs., actual elapsed time to the suggested 50% state of charge would net viewing time for the television at approximately 13 hours in ideal conditions.

The run time figure will vary greatly with the actual state of charge of the battery bank when the discharge process begins. Ambient temperature, combined with other working loads, such as lights and parasitic loads applied to batteries, affect run times. Calculating the exact run time is not precise due to all the variables and equations involved; however, an approximate time figure can be obtained. Proper battery maintenance and charge cycles affect battery performance.

Observe the battery condition with hydrometer and voltage readings. Use only distilled water when filling batteries. To achieve the highest quality of battery performance and longevity maintain the batteries in their proper operating range.

How long will the batteries last?

Conduct this eight-hour test to determine how long your particular battery bank will operate before dropping below 50% state of charge.

1. Before beginning the test, be sure the batteries are at 100% charge by verifying with a hydrometer or an accurate voltmeter.
2. Turn the interior house power on. Turn on three lights. Switch refrigerator operation to propane. Turn the inverter on and operate the TV for two hours. After two hours turn the TV and the inverter off.
3. After the eight-hour period, turn off the lights, refrigerator and interior house power. Allow the battery electrolyte to stabilize for at least one to three hours.

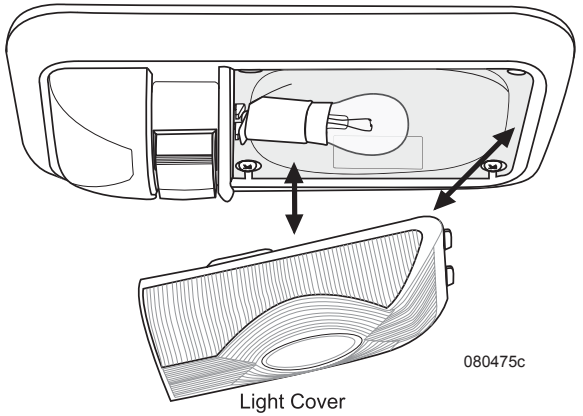
Test the batteries again with a hydrometer or voltmeter. Are the batteries above or below 50% State of Charge? This test will give an idea of how long your particular battery bank will actually last.

LIGHTS

Depending on floor plan, actual styles may differ.

To Replace a Bulb:

1. Carefully squeeze the lens cover then gently pull the cover out. The cover has tabs that lock the cover in place.
2. Using a clean cloth or piece of tissue carefully grasp the bulb and rotate to the unlock position.
3. Remove bulb from the socket.
4. The bulb replacement is 1141 12V 21CP.
5. Using a clean cloth or piece of tissue grasp the new bulb and align the prongs on the bulb with the slot on light socket.
6. Push bulb in and rotate to lock position.
7. Gently squeeze lens cover and insert tabs on cover into fixture.



INFORMATION:
Confirm replacement bulb number before ordering or obtaining a replacement.

CAUTION:
Allow bulb to cool down before replacing.

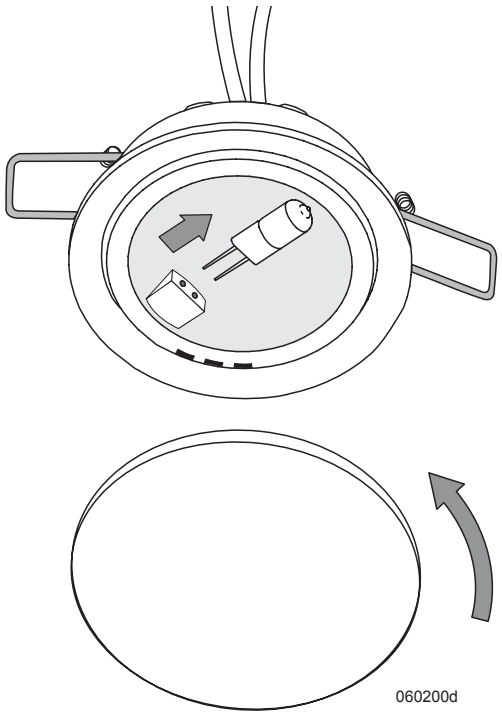
Interior Halogen

To Remove:

1. Grasp light fixture and pull down slightly then tilt fixture to one side. This will allow one spring clip to come out.

CAUTION:
Push spring clip inward with a finger as clip is being eased out. Hold clip to prevent clipping from pinching fingers.

2. Tilt fixture to other side and ease the other spring clip out.
3. Unscrew the light lens counterclockwise and remove.
4. Carefully grasp bulb and pull from socket. Replace with the same type of bulb.
5. Use a clean cloth or piece of tissue to grasp new bulb. Do not touch bulb directly as this can cause a "hot spot" and result in immediate bulb failure.
6. Align contacts of bulb with terminals in fixture base. Insert bulb until contacts are firmly seated.



To Reinstall:

7. Align tabs on light lens with slots in fixture base. Rotate lens clockwise until light lens locks into place.
8. Fold up both spring clips and insert light fixture into opening. Once in opening the spring clips will expand and lock light fixture into place.

CAUTION:
Do not touch halogen lighting while on. They can cause a burn. Do not touch replacement bulbs. Oil in the hands can cause a "hot-spot" to occur. If the bulb is touched, allow it to cool and clean the bulb with alcohol.

If Interior Halogen Lights Fail to Operate:

- Ensure battery switch (by entry door) is turned on.
- Check for blown bulb.
- Check fuse in the distribution panel.

Map Light

Operation:

Turn the map light on by pressing the On/Off switch on the map light. The map light pivots left and right to allow illumination of different areas.

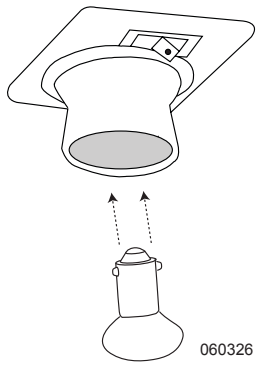
To Replace a Bulb:

1. Carefully push in on the bulb and turn counterclockwise.
2. Pull bulb from the socket.
3. Replace with a 12 Volt 12 Watt, #11391F bulb. To re-install align the two pins on the bulb with the two channels on the socket. Insert the bulb and turn clockwise.

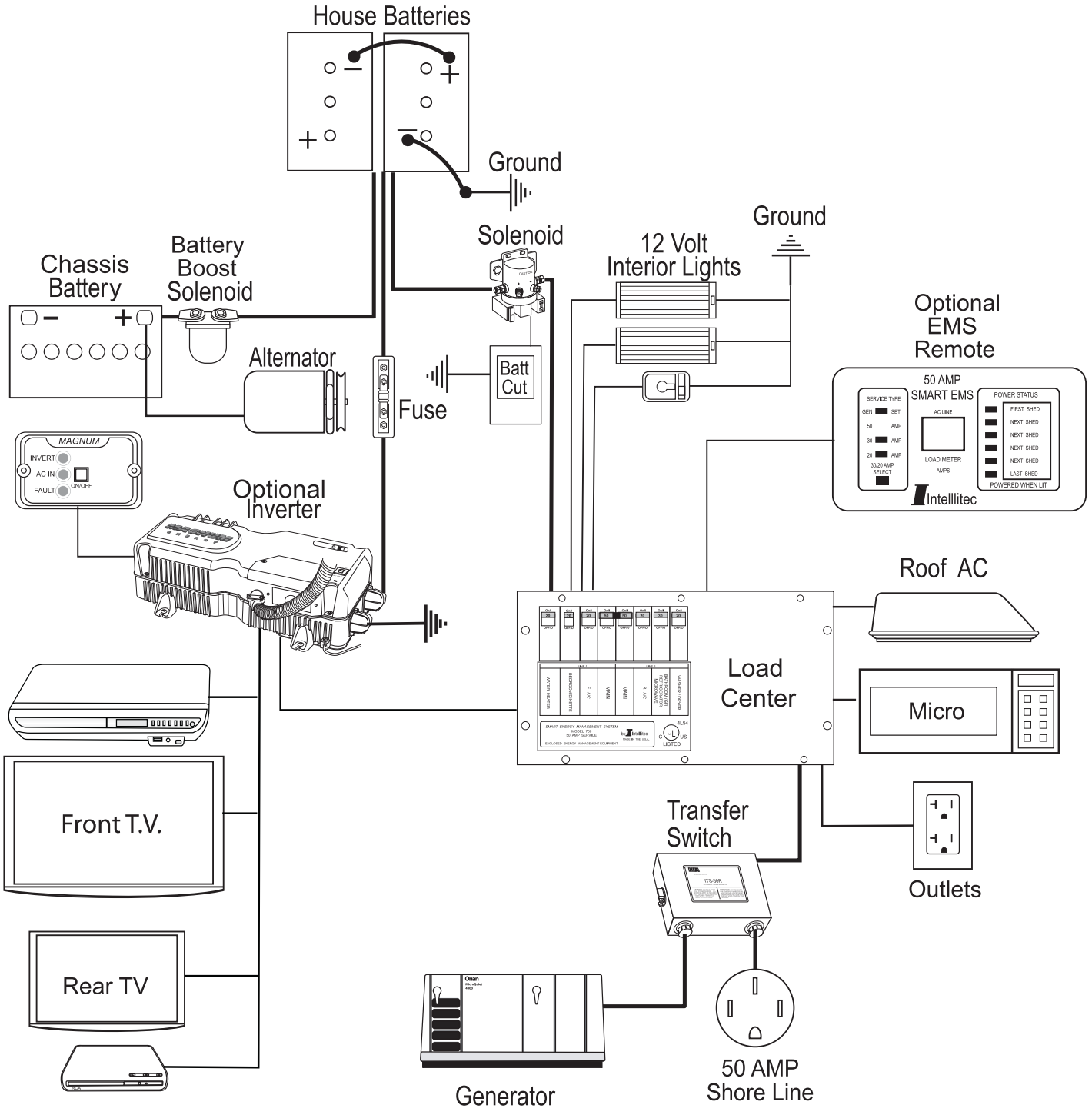
If Map Lights Fail to Operate:

- Ensure battery switch (by entry door) is turned on.
- Check fuse in distribution panel.

INFORMATION:
Confirm replacement tube number before ordering or obtaining replacement.



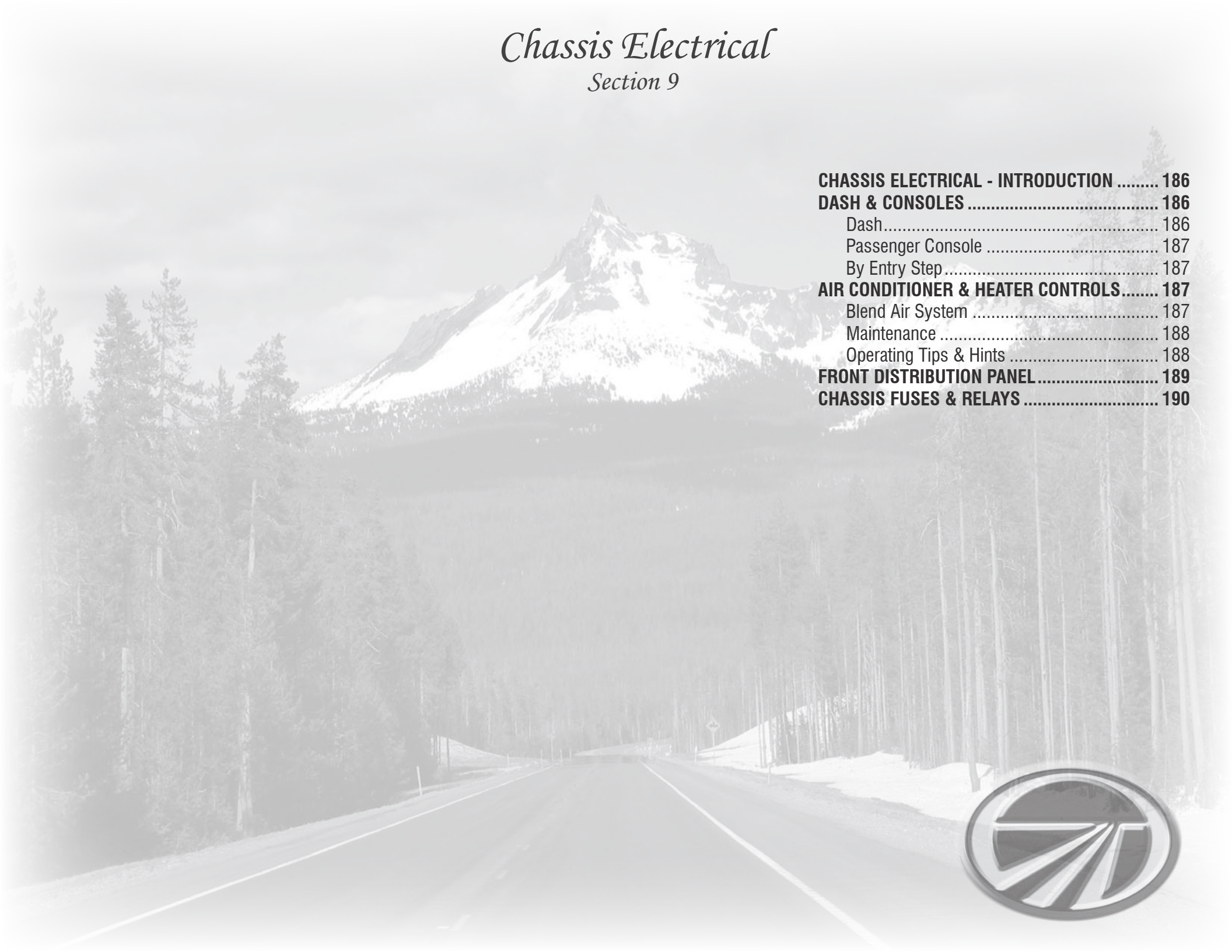
ELECTRICAL LAYOUT - TYPICAL



Notes

Chassis Electrical

Section 9



CHASSIS ELECTRICAL - INTRODUCTION

This section contains information relating to equipment installed on the chassis and/or instrument panel and dashboard other than what is installed and provided by the chassis manufacturer. Information relating to the chassis frame, drivetrain, chassis OEM wiring and instrumentation is provided in the OEM chassis manual.

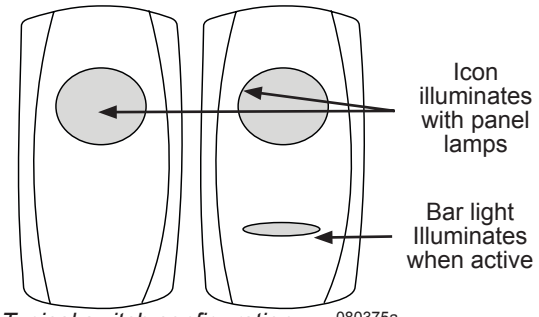
WARNING:
When welding is involved for motorhome repair or modification, only qualified, experienced technicians should weld on the chassis. Improper welding procedures and materials may weaken the assembly or result in damage that is not obvious and may not cause an immediate problem or failure. Unauthorized modifications or repairs to the chassis could result in a forfeiture of warranty coverage.

1. **Disconnect the (+) positive and (-) negative battery connection.**
2. **Cover electronic control components and wiring to protect from hot sparks.**
3. **Disconnect the terminal plugs from the engine electronic control unit. Refer to the engine OEM manual for location of engine electronic control unit.**
4. **Disconnect all the plugs from the transmission electronic control unit. Refer to engine OEM manual for location of transmission electronic control unit.**

DASH & CONSOLES

For information on how to operate dash gauges and switches not listed, consult the Ford OEM manual.

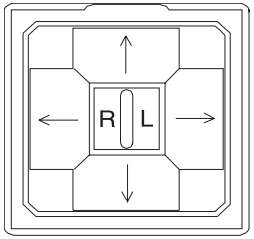
Two types of switches are used: lighted and non-lighted. The function each switch performs is printed on the switch.



Typical switch configuration. 080375a

Dash

Mirror Adjust: To adjust the rear view mirror the small selector in the middle of the switch must be placed in the desired side. The middle position is to prevent accidental bumping of the switch and changing of the mirror position. The outside mirrors have been placed so that they can be easily adjusted with the Allen wrench. After taking delivery of the new motorhome it will be necessary adjust both the driver and the passenger side mirrors.



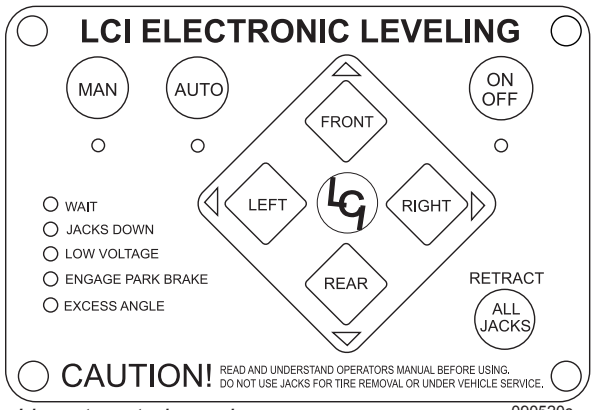
060097

Mirror Heat: Turns on the heaters in outside rear view mirrors. The mirror heaters should be used when defogging or deicing is needed. Mirror heat should not be left in the on position unless continuous fogging conditions occur.

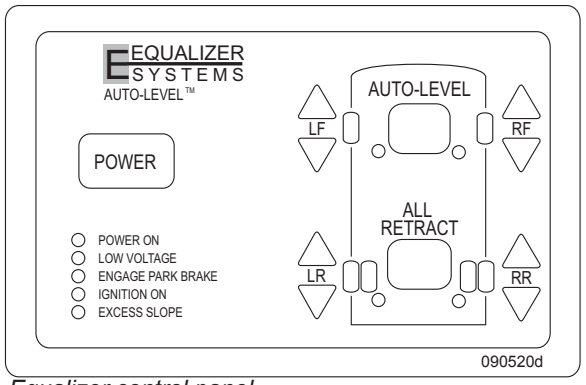
Fog Lights: Operates the fog lights with the ignition key on and the headlights in the low beam position. The fog lights will turn off when the headlights are switched to high beam.

Driver Ceiling Map Light: The battery switch (by entry door) must be on for the map light to function. Rotate the panel light dimmer switch to full brightness (up) until switch clicks.

Leveling Control Panel: The control features a multiple warning system with flashing lights and an alarm to alert of a jack down. See Section 5 ***Leveling System*** for further leveling instructions.



Lippert control panel 090520c



Equalizer control panel

Power Shade: Operates the power shade.

CAUTION:
Fully retract/raise the power shade before driving the motorhome.

Battery Boost: Use Battery Boost switch to momentarily "jump" the house batteries to the chassis batteries. See Section 2 ***Emergency Procedures*** for use of the battery boost switch.

Gen Set: Starts/Stops the generator. The generator provides 120 Volt AC when not connected to shore power.

- To Start the Generator: Press and hold the switch to Start. The light flashes rapidly indicating the preheat cycle. At the end of the preheat cycle the engine will crank and start. Release the switch after the generator has started and is operating smoothly.
- To Stop the Generator: Momentarily press the switch to Stop. It is not necessary to hold the switch until the generator has stopped.

Radio: Turns power on to the radio. The dash radio On/Off switch must also be on in order for the radio to operate.

Backup Monitor: Display used with back up and side cameras. See Section 2 ***Rear Vision System*** for operating instructions.

Passenger Console

Map Light: Turns On/Off map light on the ceiling above passenger. The battery switch (by entry door) must be on for map light to function.

By Entry Step

Storage Lights: Central switch location to turn lights On/Off within the compartment bays. Indicator light will glow when switch is activated. Storage lights must be turned On for this switch to function.

Battery: Controls the 12 Volt DC power to the interior fuse panels.

AIR CONDITIONER & HEATER CONTROLS

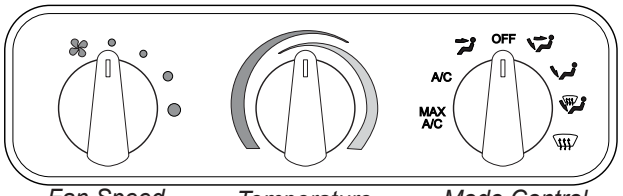
Blend Air System

The system is designed to provide heating, cooling and defrost for the pilot and co-pilot area. The system is not capable of heating or cooling the entire motorhome.

Fan Speed Switch: Controls speed of the blower motor.

Temperature Control Switch: The red zone regulates the amount of warm air in any heating mode. The blue zone regulates the amount of cool air. The blue zone is also used to regulate temperature with A/C and Max A/C functions.

Mode Control Switch: Directs air flow to points indicated.



NOTE:
The air conditioning compressor is activated when using Max A/C, A/C, Mix and Defrost.

LUBE
Activate the A/C system monthly to keep internal components of the compressor lubricated.

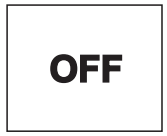
Max A/C – Recirculates interior air. Use this setting for maximum cooling. Rotate temperature control to the blue zone then select desired fan speed. In Max A/C mode, the temperature control setting will have minimal effect. Air is discharged through the dash louvers and foot louvers.

NOTE:
At the beginning of the day, initially activate the air conditioning system with engine speed at idle. This will avoid sudden high speed activation resulting in possible damage to the compressor from lack of adequate lubrication.

A/C – Uses outside air. Use this setting for cooling. Adjust fan speed and temperature to the desired comfort level. Air is discharged through the dash louvers and foot louvers.

Vent – Uses outside air. Adjust fan speed and temperature for desired comfort level. Air is discharged through the dash louvers. The A/C compressor will not activate in this mode.

Off – Use this setting to turn the system off. This will shut off the blower and prevent outside air from entering the motorhome.

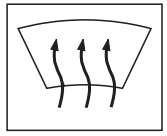


Bi-Level – Uses outside air. Adjust fan speed and temperature to the desired comfort level. Air is discharged through the dash louvers and the foot louvers. The A/C compressor will not activate in this mode.

Floor – Uses outside air. Use this setting for maximum heating. Adjust temperature and fan speed to the desired comfort level. The A/C compressor will not activate in this mode. The system may discharge a small amount of air through the dash louvers.

Mix – Uses outside air. Use this setting for floor heat and defrost. Adjust fan speed and temperature to the desired comfort level. The A/C compressor will engage in this mode to help dehumidify the air.

Defrost – Uses outside air. Use this setting for maximum defrost. Adjust fan speed and temperature to the desired comfort level. The A/C compressor will engage in this mode to help dehumidify the air.



TIP:
Air will heat faster with a slower fan speed until normal operating temperature ranges are reached.

WARNING:
In extreme weather, it may be necessary to manually remove moisture from the interior side of the windshield to maintain clarity of vision. Do Not operate the motorhome if vision is obstructed by moisture or ice on the windshield.

Maintenance

A seasonal inspection should be performed by a qualified service technician. Some items to check include:

- Inspect the inlet to the evaporator coil for lint, dirt or other foreign materials which may have been drawn into the unit. Any obstruction of the evaporator coil will impair cooling efficiency and reduce air flow.
- Clean the condenser coil of bugs, leaves, or other debris.
- Inspect compressor drive belt for wear and proper tension.

Operating Tips & Hints

Air intake and discharge temperatures are greatly affected by ambient temperatures and relative humidity. A large amount of cooling capacity is used to dehumidify as well as cool the air. After three to five minutes of A/C operations, discharged air temperature should be approximately 20º F. cooler than the fresh or recirculated air entering the A/C system.

Winter Use:
- De-ice the windshield using the defrost mode.
- Air will heat up faster with a slower fan speed until normal operating temperature ranges are reached.

Summer Use:
- Close all windows and vents to hot, humid outside air.
- Max A/C and high fan speed provides quick cool down.
- Use a lower fan speed to produce cooler air.
- Temperature control switch must be set to the blue zone for cool air.

Heat and Defrost Operation:
- Set the mode control switch to the desired position.
- Set the temperature control switch to the red zone.

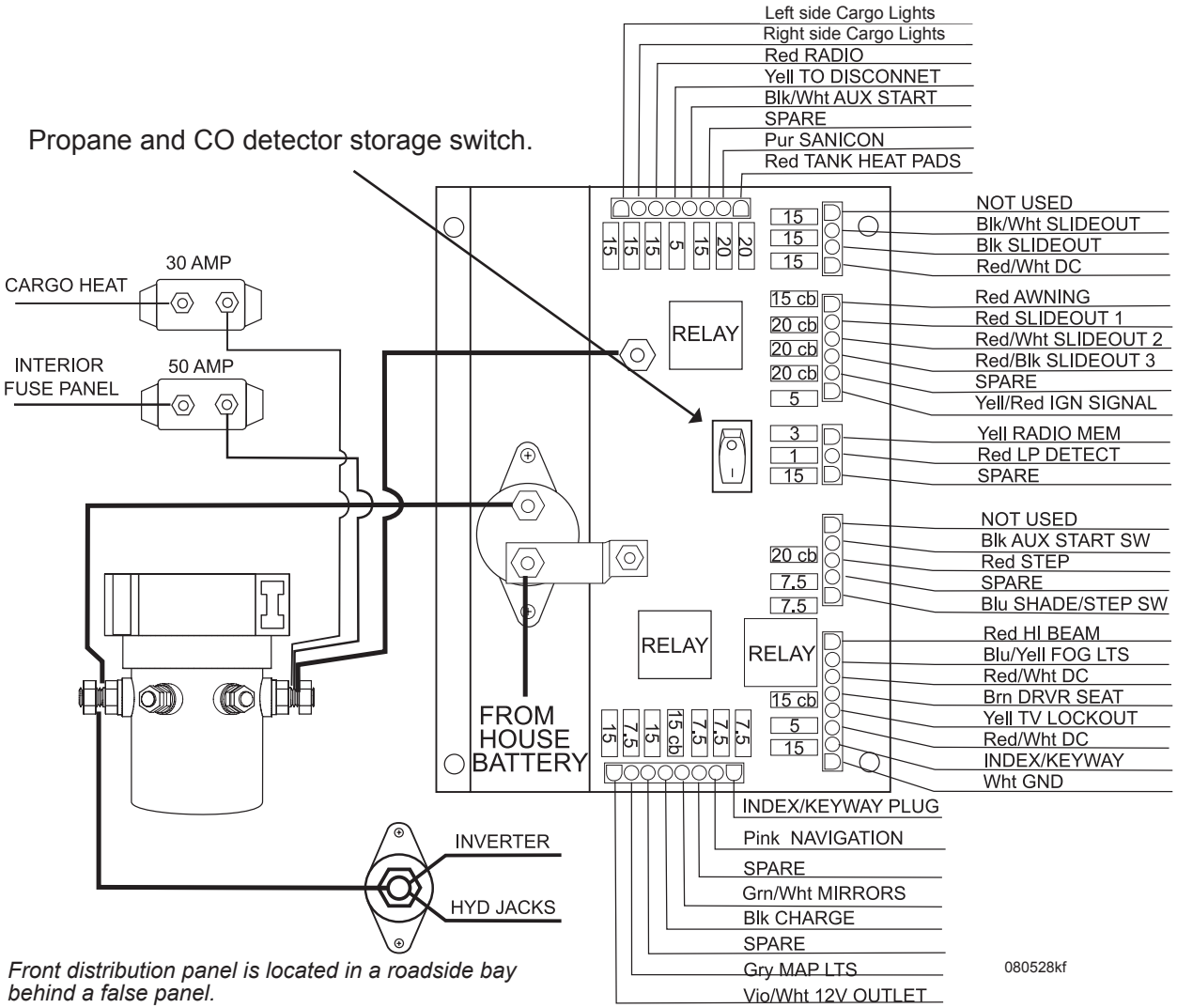
FRONT DISTRIBUTION PANEL

The front distribution panel contains fuses, self-resetting circuit breakers, solenoids and relays that operate house and chassis items in addition to the chassis manufacturer's supplied fuses and relays.

Automotive fuses and emergency flashers are located in this panel. Fuses are the standard plug-in type (ATO/ATM). When a fuse blows, the wire in middle of the plastic case will be broken. A bad or blown fuse must be replaced with a fuse of the same rating and type.

Using a fuse of a different type or rating will defeat the circuit protection provided by the fuse which could result in damage to the motorhome's electrical system. If a fuse has been replaced and it blows repeatedly, it may be an indication that a fault exists or an electronic component has failed.

It is recommended that the motorhome be taken to a qualified RV technician before any future use to diagnose and repair the problem. Circuits are identified on the fuse label located on the inside of the electrical cover.



Front distribution panel is located in a roadside bay behind a false panel.

CHASSIS FUSES & RELAYS

Shown are the chassis fuse blocks and relays that come from the chassis manufacturer. Circuit assignment tables denote fuse/relay location and their description

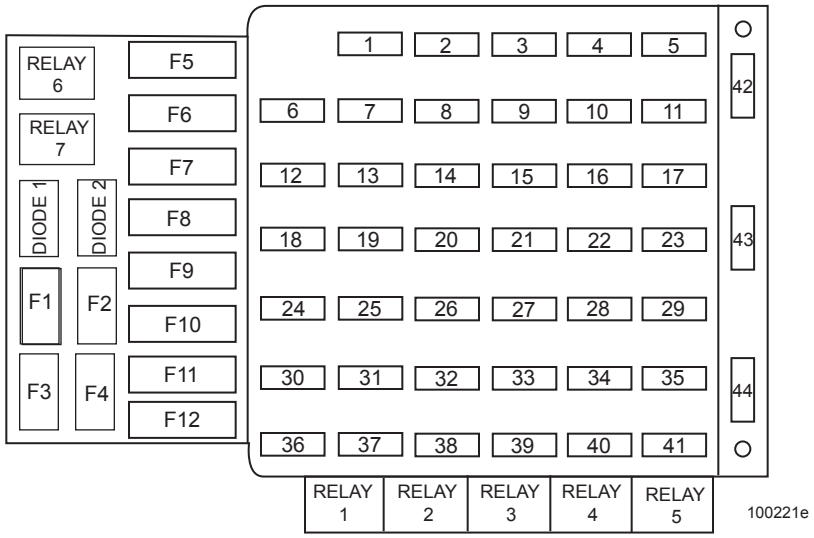
NOTE:
Refer to the chassis owners manual for further explanation of fuses, relays and the circuit assignments

NOTE:
Chassis manuals can be found at: www.fleet.ford.com/truckbbas/

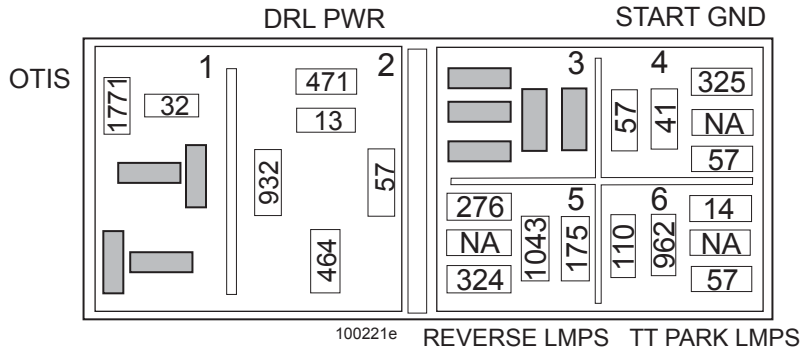
Fuse/Relay Location	Fuse Amp Rating	Protected Circuits	Fuse/Relay Location	Fuse Amp Rating	Protected Circuits
1	20 A	T/Signal & Stop Lamps	27	-	Not Used
2	-	Not Used	28	-	Not Used
3	-	Not Used	29	-	Not Used
4	10 A	Instrument Panel	30	-	Not Used
5	10 A	Accessory Feed	31	10 A	Left Low Beam
6	-	Not Used	32	-	Not Used
7	15 A	Blower Motor Relay Coil	33	10 A	Reverse Lights
8	10 A	Brake Light Feed	34	10 A	Trailer Reverse Lamps
9	20 A	Stop Lights/Turn Signal	35	20 A	High Beam/Indicator
10	10 A	Instrument Panel Memory	36	-	Not Used
11	30 A	Wiper Module	37	-	Not Used
12	-	Not Used	38	10 A	Run Feed
13	10 A	Anti-Lock Brakes	39	-	Not Used
14	10 A	Warning Chime Module	40	-	Not Used
15	15 A	Left Turn Signal	41	10 A	Instrument Illumination
16	20 A	Battery Accessory	42	-	Not Used
17	5 A	Radio	43	-	Not Used
18	-	Not Used	44	-	Not Used
19	5 A	Daytime Running Lights	Relay 1	-	Trailer R/Turn
20	-	Not Used	Relay 2	-	Trailer L/Turn
21	15 A	Right Turn Signal	Relay 3	-	R/Turn
22	20 A	Trailer Turn Signal	Relay 4	-	L/Turn
23	10 A	Cluster Run/Acc	Relay 5	-	Not Used
24	-	Not Used	Relay 6	-	DRL/Park Brake
25	10 A	Right Low Beam	Relay 7	-	DRL On/Off
26	10 A	Brake Shift I/Lock Actuator	Diode 1		Brake Trans Interlock
			Diode 2	-	Brake Trans Interlock

Fuse Panel circuit assignments

Fuse Panel



Diode/Relay Module



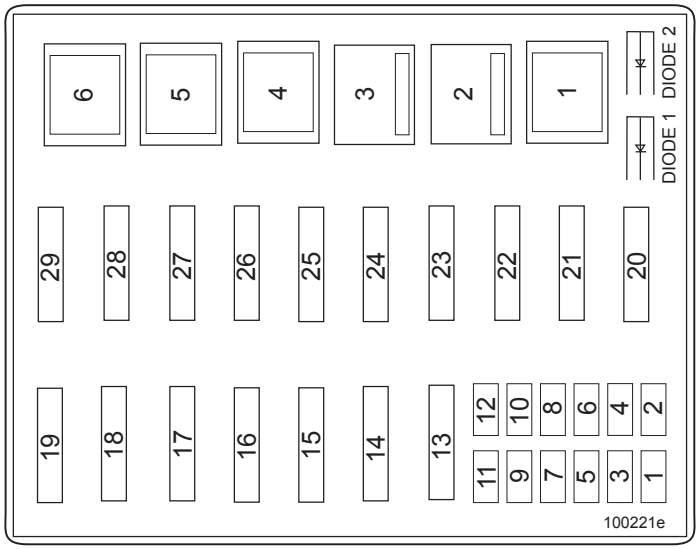
Relay Location	Description
1	One Touch Integrated Start (ATO Diode)
2	Not Used
3	Not Used
4	Daytime Running Lamps (DRL) Power Relay
5	Not Used
6	Reverse Lamps Relay
7	Starter Ground Relay
8	Trailer Tow Parking Lamps Relay

Diode/Relay Module circuit assignments

Fuse/Relay Location	Fuse Amp Rating	Protected Circuits	Fuse/Relay Location	Fuse Amp Rating	Protected Circuits
1	5A*	Power Brake Module	20	30A**	PCM Coil
2	10A*	A/C Compressor Clutch	21	20A**	Fuel Pump, Fuel Injectors
3	20A*	A/C Clutch Coil/Eng Electronics	22	20A**	Diag connect, Cig Lighter
4	5A*	Powertrain Control Module	23	40A**	Blower Motor Feed
5	5A*	Powertrain Control Module	24	50A**	IP Batt Feed
6	20A*	IP Dimmer Warning Chime	25	40A**	Ign Sw Feed
7	20A*	Ign Coils Radio Cap	26	40A**	Ign Sw Feed
8	-	Not Used	27	30A**	Multifunction Sw
9	10A*	Starter Relay Coil	28	30A**	Start Solenoid
10	20A*	Daytime Running Lts (DRL)	29	40A** or 60A**	ABS, Power Brake
11	20A*	Fuel Pump Relay Coil PCM	Relay 1	-	A/C Clutch Relay
12	25A*	Trailer Tow BU Lamp	Relay 2	-	Fuel Pump Relay
13	30A**	Electric Trailer Brake Feed	Relay 3	-	Horn Relay
14	60A**	IP Battery Feed	Relay 4	-	Starter Relay
15	20A**	Trailer Tow Park Lts	Relay 5	-	Blower Motor Relay
16	40A** or 60A**	ABS Module	Relay 6	-	PCM Relay
17	20A**	Horn	Diode 1		Fuel Pump Diode
18	20A**	Trans Indicator Tow Haul sw	Diode 2		A/C Clutch Diode
19	-	Not Used	* Mini Fuses **Maxi Fuses		

Power distribution box circuit assignments

Power Distribution Box



Chassis

Section 10

CHASSIS - INTRODUCTION

This section contains information regarding the motorhome chassis. Optional equipment may be discussed, so not all information will be applicable to the motorhome.

GENERAL MAINTENANCE
Fuel Lines & Hoses

NOTE:
For complete maintenance and operating instructions on all systems consult the Ford OEM manual included in the Warranty Information File box.

Maintenance of hoses is an important step in ensuring efficient, economical and safe operation of the engine and related equipment. Check hoses for fuel leaks. Engine performance and auxiliary equipment is dependent upon the ability of flexible hoses to transfer lubricating air, coolant and fuel.

INSPECTION:
Check hoses as part of the pre-start inspection. Inspect fittings, clamps and ties. Ensure hoses are not touching shafts, couplings or heated surfaces, including exhaust manifolds, sharp edges or other obvious hazardous areas. Vibration from the engine and road can move or fatigue clamps and ties. To ensure continued proper support, inspect fasteners frequently and tighten or replace them as necessary.

CHASSIS - UNDER HOOD
Ford Chassis

Engine Oil - Check oil level when engine is off and cool. Oil should be within crosshatched area on dipstick. Do not overfill. Refer to the engine OEM manual for the proper weight of oil.

Automatic Transmission Fluid - Check when engine is running at normal operating temperature. Fluid should be within crosshatched area of dipstick. Refer to the engine OEM manual for recommended automatic transmission fluid.

Power Steering Fluid - Check when engine is off and cold. Fluid level on dipstick should be between arrows in Full/Cold range.

Engine Coolant Reservoir - Level with Cold Fill Range when cold.

NOTE:
If the coolant system runs dry, the Fail Safe Cooling System will shut down half of the cylinders (alternating) and the Service Engine Soon warning light (see instrument panel) illuminates. If the temperature rises too high, engine automatically shuts off to help prevent further damage. Service cooling system as soon as possible. Cooling fan clutch will increase engine noise when engaged. This is normal. Refer to OEM manual for details.

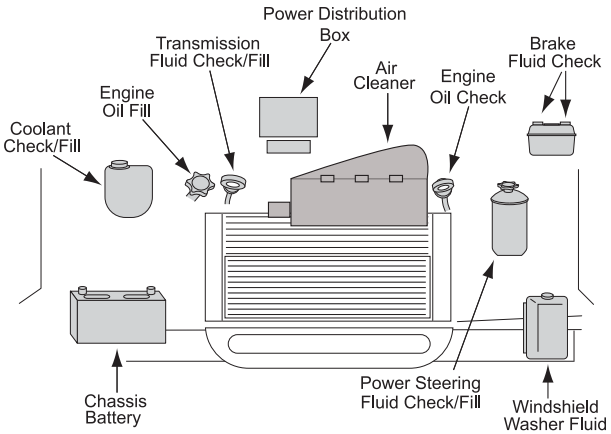
WARNING:
Remove coolant cap only when safe and engine is cool. Use only recommended engine coolant.

CAUTION:
Do not mix different types of antifreeze.

Brake Fluid Reservoir - Clean filler cap before removing. Check the engine OEM manual for correct fluid type or check the brake fluid reservoir for information stamped in the cap. Use only new fluid from a sealed container.

Windshield Washer Reservoir - Fill with windshield washer fluid.

INFORMATION:
Use only the recommended fluids as specified by the engine OEM manual.



Ford Engine Compartment 090522

SPECIFICATIONS

Tank Capacities

Tank Capacities (Approx. Gallons)	
Water Heater	10 gal
Grey Water	33’ SFS - 54 gal 33’ SFD - 40 gal 34’ SBD - 55 gal 36’ SFD - 40 gal
Black Water	33’ SFS - 45 gal 33’ SFD - 40 gal 34’ SBD - 42 gal 36’ SFD - 40 gal
Fresh Water	80 gal
Propane*	20.2 gal

**Actual filled Propane Tank Capacity is 80% of listing due to safety shutoff required on tank.*

NOTE:
All tank capacities are estimated based upon calculations provided by the tank manufacturers and represent approximate capacities. The actual “usable capacity” may be greater or less than the estimated capacities.

Chassis Weight Ratings

NOTE:
These ratings reflect product specifications available at the time of printing. Floor plans introduced afterwards will not be reflected. All other information contained throughout the manual will still apply.

33’-36”	
GVWR	22,000 lbs
GCWR	26,000 lbs
GAWR (Front)	8,000 lbs
GAWR (Rear)	15,000 lbs

The hitch receiver is rated at 5,000 lbs. Do not exceed the GVWR, GCWR or the rating of the hitch receiver.

Engine Specifications

FORD	
Engine Type	Ford V10 Gas Fuel Injection
Engine Size	6.8L V10
Cubic Inch Displacement	415 Cu In
Tire Size	22,000 lb 235/80R 22.5G
Fuel Tank	80 Gallon
Alternator	130 Amp
Rear Axle Ratio	5.38:1 22,000 lb

House Battery Specifications

House Batteries	AH (20 HR)	RC Min 25 Amp@80°F
12 Volt SRM-24 (Standard) (2 each)	168	240
6 Volt UL16HC (Optional) (4 each w/residential refer)	840	1880

SRM 24 Hours at Ampere Load		
5 AMPS	15 AMPS	25 AMPS
33	9.2	4.6
Batteries connected in Parallel		

UL 16HC Approximate Hours of Ampere Load				
10 AMPS	25 AMPS	50 AMPS	75 AMPS	100 AMPS
27.9	4.9	1.9	1.3	.9
Batteries connected in Series/Parallel				

Battery State of Charge vs Voltage/Specific Gravity			
Voltage	Specific Gravity	State of Charge	Depth of Discharge
12.65	1.265	100%	0%
12.45	1.225	75%	25%
12.25	1.190	60%	50%
12.05	1.145	25%	75%
11.90	1.100	0%	100%

Voltage Reading: Battery at rest for at least one hour.

MAINTENANCE RECORDS

After scheduled services are performed, record the date, odometer reading and who performed the service. Any additional information can be added on the following pages. In addition, retain all maintenance receipts.

LUBRICATION SERVICE RECORD

KEY TO SERVICES

A – Lubrication & Inspection
A1 – Motor Oil & Filter Change
A2 – Transmission Oil Change
A3 – Drive Axle Oil Change
A4 – Wheel Bearing Service
B – Prescribed Service
C -- Prescribed Service
D -- Prescribed Service
E – Prescribed Service

MILEAGE	SERVICES									JOB PERFORMED	
	A	A1	A2	A3	A4	B	C	D	E	DATE	BY
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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30											

WEIGHT RECORD SHEET

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

DATE: ____________________

PLACE: ____________________

FRONT: __________ + __________ = __________
LEFT RIGHT TOTAL

REAR: __________ + __________ = __________
LEFT RIGHT TOTAL

= __________
TOTAL GROSS VEHICLE WEIGHT

BATTERY RECORD						
MAKE	TYPE	DATE INSTALLED	REPAIRS	DATE REPLACED	SERVICE	
					MONTHS	MILES

TIRE RECORD							
MAKE	TYPE	PLY	DATE INSTALLED	REPAIRS	DATE REPLACED	SERVICE	
						MONTHS	MILES

A

B

C

D

E

F

G

H,I,J,K

L,M,N,O

P,Q

R

S

T,U,V

W,X,Y,Z