2022 OWNERS MANUAL Class A DIESEL

Part Number: L90-0300-74

fleetwoodrv.com

FLEETWOOD RV

FLEETWOOD RV

REV GROUP

Owner Relations (800) 322-8216
Parts (800) 509-3417

FleetwoodRV.com

OUR VERY OWN FLEETWOOD RV
MOTORHOME SERVICE CENTERS

At Fleetwood RV, we strive to deliver peace-of-mind at every turn. Our devotion to customer service starts with our trusted dealer network and spans to our own staff of motorhome service professionals at REV Recreation Group's regional Service & Repair. The motorhome service centers are strategically located throughout the United States to provide you convenient service wherever the road takes you.

Below, you'll find the closest motorhome service center, as well as a list of the other centers. Please visit www.fleetwoodrv.com/motorhome-service-centers to schedule a Service Appointment.

East & West Coast
REV RV Service & Repair

800-509-3417

RV OWNERCARE

Limited one-year/15,000-mile coach warranty and three-year/45,000-mile structural warranty, whichever occurs first, and it is fully transferable for the first 12 months. RV OWNERCARE is one of the RV industry's most comprehensive programs and includes systems, appliances, components and construction, with no deductible and no service charge.

Chassis Warranty provided by Freightliner Custom Chassis Corporation.

FLEETWOOD RV

Owner's Manual

CLASS A DIESEL 2022

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IMPORTANT - PLEASE READ: Product information, photography and illustrations included in this manual were as accurate as possible at the time of publication. Materials, design, and specifications are subject to change without notice. Fleetwood RV has designed its recreational vehicles for a variety of customer uses. Each vehicle features optimal seating, sleeping, storage, and fluid capacities. The user is responsible for selecting the proper combination of loads (i.e. occupants, equipment, fluids, cargo, etc.) to ensure that the vehicle's weight capacities are not exceeded.

Manufacturing brands of REV Recreation Group, Inc. include: American Coach, Fleetwood RV, and Holiday Rambler.

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.

If you purchased this motorhome used, and are not the original owner please go to: **https://www.fleetwood.com/change-of-ownership** to update our warranty information.

General Information

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⚠ **WARNING:** Operating, servicing and maintaining a passenger vehicle or off-road vehicle can expose you to chemicals such as, engine exhaust, carbon monoxide, phthalates and lead, that which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle

General Information

SECTION ONE

WARRANTY INFORMATION FILE

In addition to this Owner's Manual, a Warranty Information File Box can be found in the motorhome. This box contains valuable documents about the motorhome's systems and equipment. Many of the component manufacturer warranty registration cards can be found in the box. They will need to be filled out and mailed. Carefully reading and understanding of all the information in this box will help in the safe operation, maintenance and troubleshooting of the systems and equipment.

At the time of the writing of this manual all the information was current and up to date as possible. Throughout the year changes in components, appliances and possible changes in how the systems operate may change. These changes are due to upgrades of components, software upgrades, change in suppliers offerings and mid model/year changes. Always review the warranty information file for updated information.

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 REV Recreation Group Inc. at: 1-800-322-8216.

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 REV Recreation Group Inc.

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 *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 *www.safercar.gov*.

CANADIAN CONSUMERS:

If you believe that your vehicle has a defect that could cause a crash, injury, or death, you should immediately inform Allied Recreation Group at: 1-800-322-8216 or you may call Transport Canada toll-free at: 1-800-333-0510.

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.

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.

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.

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 Technician may be necessary.

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

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.

Air Compressor: Pumps air to and builds air pressure in an air system.

Air Dryer: Cools, filters and dries the air delivered by an air compressor.

Air Governor: Controls the operation of the air compressor by constantly monitoring air pressure in the supply tank of the air system. The air governor initiates the unload cycle when the cut-out pressure is reached.

Alternating Current (AC): A current that oscillates at a specified frequency typically 60 times a second (60 Hz) in the United States and Canada. Also referred to as shore power, utility power, inverter power (if equipped), generator power, or house power.

Ampere (Amp): The measure of electron flow rate (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 which 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 or **Cold Cranking Amperage:** 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: Battery used to power the 12 Volt accessories and start the 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 at campgrounds. It is called city water because water is pulled from a central source (like in a city) and not the fresh water tank.

Compressor Load Cycle: The time during which the air compressor is building air pressure in an air system.

Compressor Unload Cycle: The time during which the air compressor is idling and is not building air pressure in an air system.

Curbside: This refers to the side of the motorhome that 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.

Cut-In Pressure: The pressure level in the air system supply tank that triggers the compressor load cycle.

Cut-Out Pressure: The pressure level in the air system supply tank which triggers the compressor unload cycle.

Cycle: A battery discharge and subsequent recharge equals one cycle.

Desiccant: A granular substance that has a high affinity for water and is used to retain moisture from the air stream flowing through the air dryer cartridge.

DC Electricity: Direct current also known as battery power.

Direct Current (DC): Type of current that travels in one direction. This type of current can be stored in a battery bank.

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. Also called a "P-Trap."

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.

Drying Cycle: The time during which the air dryer cools, filters and removes moisture from the air delivered by the air compressor. The drying cycle begins and ends the same as the compressor load cycle.

General Information

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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 exit window located in the motorhome. Egress windows are 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, the shower and the washer-dryer (if equipped) go into this tank.

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

HVAC: Heating, Ventilation and Air Conditioning.

LED (Light Emitting Diode): Indicator light.

Liquid Lead Acid Battery (LLA): A type of battery that uses liquid as an electrolyte. This type of battery requires periodic maintenance such as cleaning the connections and checking the electrolyte level.

Low Point Drain: The lowest point in the plumbing. Drains are placed here so water will drain out of the lower end of the motorhome. 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: I = V/R or V = I*R. If any two of the three values are known, the third value can be calculated by using the above formula.

Potable Water: Water that is safe for human consumption.

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.

Purge: The initial blast of air (decompression) from the air dryer purge valve at the beginning of the air compressor.

Purge Cycle: The time during which he air dryer is undergoing purge and regeneration. This cycle starts at the beginning of the compressor unload cycle and normally ends well before the beginning of the compressor load cycle.

Regeneration: The reverse flow of air through the air dryer and out the purge valve that begins immediately after the purge and lasts normally 10 to 15 seconds. This reverse flow of air, from the air system and through the air dryer, removes moisture from the desiccant cartridge and prepares the air dryer for the next compressor load cycle.

Roadside: The side of the motorhome that faces the road while parked. Often called the off-door side or the driver side.

SCA: Term for Supplemental Coolant Additive. Chemical added to coolant for diesel engines to help prevent cylinder liner pitting and internal corrosion.

Shore Line: The electrical cord that connects the motorhome to AC electrical supply.

Stinger: An arm attachment on a tow truck that is used to lift the motorhome slightly for towing.

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.

Wet Cell Battery: A type of battery that uses liquid as an electrolyte. This type of battery requires periodic maintenance to clean the connections and check the electrolyte level.

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For Motorhomes Manufactured By REV Recreation Group, Inc., sold in the United States and Canada

COVERAGE PROVIDED

This warranty covers vehicles manufactured by REV Recreation Group and sold in the United States and Canada. Your new motorhome is warranted under normal use to be free from manufacturing defects in material or workmanship when first sold by an authorized REV Recreation Group Dealership. For purposes of this warranty, "defect" means a failure of the material or workmanship to conform to the manufacturer's specifications and tolerances.

This warranty covers the first retail purchaser and all authorized transferee's during the warranty period. The warranty begins on the date of original retail delivery/sale or the date the motorhome is first placed into service as a rental, commercial or demonstrator unit (whichever occurs first) the "Start Date" and extends for the following periods:

1. For non-structural defects, one (1) year from the Start Date or until the motorhome reaches 15,000 total miles as determined by the mileage shown on the odometer, whichever occurs first ANY ACTION FOR BREACH OF THIS LIMITED WARRANTY MUST BE COMMENCED NO MORE THAN NINETY (90) DAYS AFTER THE EXPIRATION OF THE RELEVANT PERIOD.
2. For structural defects, three (3) years from the Start Date or until the motorhome reaches 45,000 total miles as determined by the mileage shown on the odometer, whichever occurs first. Structural defects are defined only as the motorhome's roof structure, sub-floor structure, and Vacubond® walls. ANY ACTION FOR BREACH OF THIS LIMITED WARRANTY MUST BE COMMENCED NO MORE THAN NINETY (90) DAYS AFTER THE EXPIRATION OF THE RELEVANT PERIOD.

Unless prohibited by law, repairs or replacements do not extend the time when you must commence an action for breach of warranty and shall not extend the warranty coverage period.

WHAT IS NOT COVERED BY THIS WARRANTY

This warranty does not cover:

1. The automotive chassis system (including the chassis and drive train), tires and batteries, all of which are covered by the separate warranties of the respective manufacturers of these components.
2. Components, systems, appliances or parts expressly warranted by their respective manufacturer.
3. Defects or performance failures caused by or related to:
   a. Abuse, misuse, negligence or accident;
   b. Failure to comply with instructions contained in the Owner's Information Warranty Packet or failure to perform other routine maintenance;
   c. Alteration or modification of the motorhome;
   d. Environmental conditions (salt, hail, chemicals in the atmosphere, etc.);
   e. Normal deterioration due to wear or exposure, such as sealants, fading or discoloration of exterior surfaces or fiberglass, or soft goods, such as fabrics, drapes, upholstery, screen, cushions, mattresses and carpet wear;
   f. Motorhomes on which the odometer reading has been altered;
   g. Normal maintenance and service items, such as light bulbs, fuses, sealants, lubricants, etc.;
   h. Appearance imperfections, dulling, yellowing, chalking, flaking, peeling or fading of paint, defacing, dents, scratches, chips on any surface or fabric, graphics, exterior materials, or upholstery that may have occurred prior to delivery and are normally corrected during the delivery inspection process at the manufacturing plant or at the dealership;
   i. The cost of transportation in connection with warranty claims, including but not limited to reimbursement for mileage or expenses incurred traveling to or from such repair or replacement location;

Limited One-Year Warranty

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j. REV Recreation Group SHALL NOT BE LIABLE FOR ANY (1) INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO ANY CLAIMS FOR PROPERTY DAMAGE, LOSS OF USE, LOSS OF VALUE, LOSS OF INCOME, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, BUS FARES, VEHICLE RENTAL, FUEL, INCIDENTAL CHARGES SUCH AS TELEPHONE CALLS OR HOTEL BILLS, (2) ANY OTHER PROPERTY DAMAGE CAUSED OR ALLEGED TO BE CAUSED BY MOLD, CONDENSATION OR MOISTURE, MILDEW, RUST, FUNGUS, DRY ROT OR ANY MICROBIAL MATTER, OR (3) LEGAL FEES OR EXPENSES;

k. Premature deterioration and accelerated wear and tear on motorhomes used for full-time living accommodations;

l. Motorhomes used for commercial or business purposes;

m. Motorhomes that are not originally sold by an authorized REV Recreation Group dealership, i.e., sold at auction, wholesale, repossession, salvaged or sold in an otherwise distressed condition;

n. Motorhomes sold or used outside of the United States or Canada;

o. Items that are working as designed but that you are unhappy with;

p. Service work performed by a dealer, which is generally covered by dealer's own service warranty.

REV Recreation Group reserves the right to make changes in design or improvements to its products or parts without obligation to make or install such changes in any previously built product.

Installations or modifications to the motorhome are not covered by this warranty. Any other company that assembles, installs, modifies or up-fits your motorhome or any of the parts, components, systems or appliances will be solely responsible for those goods or services.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

LIMITATIONS

ANY IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THIS WRITTEN WARRANTY.

Some states do not allow restrictions on how long an implied warranty lasts, so this limitation may not apply to you.

The manufacturer is not responsible for any undertaking, representation or warranty made by any dealer or other person beyond those expressly set forth in this warranty. There is no warranty of any kind made by REV Recreation Group beyond the limited warranty contained in this document.

YOUR RIGHTS UNDER STATE LAW

This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.

LEGAL REMEDIES AND DISPUTE RESOLUTION

Any claim or controversy arising out of or relating to this limited warranty, or beach thereof, shall be settled by arbitration administered by the American Arbitration Association in Milwaukee, Wisconsin in accordance with the Commercial Arbitration Rules of the American Arbitration Association. The laws of the State of Indiana shall be applied in any arbitration proceedings, without regard to principles of conflict of law. Each party shall bear its own costs, fees and expenses of arbitration. The arbitrator(s) determination and the basis for that determination shall be in writing and shall include an explanation of the basis for the determination. The determination of the arbitrator(s) shall be final and binding and judgment upon such determination may be entered in any court having jurisdiction. The arbitration proceedings and arbitration award shall be maintained by the parties as strictly confidential, except as otherwise required by court order or as is necessary to confirm, vacate, or enforce the award and for disclosure in confidence to the parties' respective attorneys, tax advisors, or senior management personnel.

DEALER'S OBLIGATIONS

At the time of sale of your new recreation vehicle, your dealer is expected to:

- Deliver your motorhome in the best condition possible. Your vehicle must pass the dealer's detailed pre-delivery inspection, including all systems tests. If the dealer identifies any issues during the pre-delivery inspection, the dealer is obligated to repair or replace any parts necessary to correct the identified defects in material or workmanship. As a part of the pre-delivery inspection procedure, the dealer is responsible for road-testing the motorhome, noting and correcting any steering problems and setting correct tire pressures before delivery. REV Recreation Group will not be responsible for front end alignment after this pre-delivery inspection has been performed.
- Provide orientation for use of the motorhome, its systems, components, and operation.
- Make minor adjustments to your vehicle (such as adjustments to the interior or exterior doors, cabinet latches, TV antenna control, etc.) and make those minor adjustments for a period of 90 days after delivery. Thereafter, such adjustments are your responsibility as part of regular and proper maintenance, unless the adjustment is required as a direct result of repair or replacement of a defective part that is covered under this warranty.
- Request that you read all warranty information and explain any provision not clearly understood.
- Ensure that you receive your Owner's Information Warranty Packet. Your dealer can assist you in completing the OEM warranty registration card and locate any required component model or serial numbers.
- Chassis registration will be completed by your selling dealer at the time of purchase.

OWNER'S RESPONSIBILITY

It is important that you read and understand all instructions and precautions before operating the recreational vehicle. Even if you are an experienced owner, we encourage you to thoroughly read this Owner's Information Warranty Packet. Familiarize yourself with this limited warranty as there are components and appliances that are excluded or warranted separately by their individual manufacturer's limited warranty. As the owner, you are responsible for regular and proper maintenance as described in the Owner's Information Warranty Packet. Regular and proper maintenance will help prevent conditions arising from neglect that are not covered by the limited warranty. For example, dulling and fading of exterior paint can be increased by prolonged exposure to extreme sunlight, air pollutants, and excessive moisture. Regular monthly washing and polishing of exterior surfaces is the best insurance against surface deterioration such as fading, yellowing, or chalking. It is your responsibility and obligation to return your vehicle to your dealer for repairs and services.

WARRANTY SERVICE PROCEDURES

To help ensure you receive the level of service you expect and deserve, here are some suggestions we would like to make.

If you need warranty service or warranty information, please see the booklets and other documents included in your Owner's Information Warranty Packet. For warranty service, you should return your motorhome to the selling dealer. If that is not possible, you may contact any other authorized REV Recreation Group motorhome dealer. The REV Recreation Group Owner Relations department can help you find a dealer in your area. If you have any questions about the warranty or what it does or does not cover, or need assistance finding an authorized dealer, please contact REV Recreation Group Owner Relations at the following address or phone number:

REV Recreation Group
Owner Relations
P.O. Box 1007
Decatur, IN 46733
1-800-322-8216

Limited One-Year Warranty

SECTION TWO

NOTIFICATION

REV Recreation Group has empowered its dealers to make warranty and repair decisions. To obtain warranty service, you must (1) notify an authorized dealer and send written notice to REV Recreation Group within the applicable warranty period and (2) within thirty (30) days of discovery of a defect in material or workmanship. You will have up to thirty (30) days after expiration of the warranty period to notify an authorized dealer and REV Recreation Group of a defect that occurred during the warranty period. If you submit a claim after the expiration of the warranty period, you will need to provide proof acceptable to REV Recreation Group to demonstrate that the defect occurred during the applicable warranty period.

The manufacturer's written notice should be mailed to:

REV Recreation Group
Owner Relations
P.O. Box 1007
Decatur, IN 46733

SERVICE

If you are having warranty work performed, be sure you have your vehicle information available to speed up your service. Provide your dealer with a written list of the motorhome problems or the specific repairs needed. Keep a maintenance log of your vehicle's service history as this can be helpful when diagnosing and addressing the current issue. If you had work done that is not in your maintenance log, let the service advisor know. It is important that you provide any vehicle repair history to the dealer's service personnel so they can better understand the problem and assist you.

If you have a long list of service items that need attention and you need your motorhome quickly, discuss the situation with the service advisor, listing the items in order of priority. This will help the service department manage its time and will help get you back on the road as quickly as possible. If required work is not covered under the warranty, your dealer's service department can help you with getting the correct service.

UNSATISFACTORY SERVICE

Once the work is complete, inspect the service or repair job when you pick up your vehicle. Notify the dealer's service personnel immediately of any dissatisfaction. Discuss any warranty related problems directly with the manager or owner of the dealership, giving them an opportunity to help the service department resolve the matter for you. We sincerely believe that your dealer and the factory representative will be able to solve any problem that might arise. If, for some reason, a problem is not handled to your satisfaction, we are here to help.

If the dealer is unwilling or unable to resolve the issue in a timely manner, immediately notify REV Recreation Group by sending written notice detailing any alleged unrepaired defect, or any other dissatisfaction experienced with the motorhome. Giving the manufacturer this direct notice, and opportunity to cure, enables the manufacturer to supplement prior efforts by its authorized dealers so any ongoing problem or dissatisfaction can be resolved or addressed. In order to expedite the process when contacting us regarding an issue, please include the brand name and Unit Identification Number (U.I.N.) of your motorhome. The U.I.N. is located on the identification tag underneath the driver's side window on the exterior of your motorhome. Upon receipt of notice of a claim of unsatisfactory service, a REV Recreation Group Service Center will repair or replace any parts necessary to correct defects in material or workmanship.

The manufacturer's written notice should be mailed to:

REV Recreation Group
Owner Relations
P.O. Box 1007
Decatur, IN 46733

If you wish to call for assistance, please use this toll-free telephone number:

REV Recreation Group
Owner Relations
1-800-322-8216

Or contact us online at:

www.revgroup.com

There may be times when your motorhome will need repairs or parts while you are on the road. If an authorized repair facility is not available within 100 miles, you may use another facility. If your motorhome is repaired by a non-authorized repair facility (non-REV Recreation Group dealer), be sure to save receipts

and especially any parts that are replaced. These parts will have to be returned to your selling dealer before you can be reimbursed for their cost.

CHANGE OF OWNERSHIP

With more REV recreational vehicles than any other manufacturer* on the road today, it is important to us to stay connected with our new owners as well as those who have purchased a used motorhome. At REV Recreation Group, we are committed to offering you unmatched motorhome support! Please complete and submit the Change of Ownership Form, online or by contacting REV Recreation Group Owner Relations at 800-322-8216.

Please complete the change of ownership as soon as possible.

* Based on IHS Automotive, Polk Recreational Vehicles in Operation (RVIO) as of 7/1/13.

ORIGINAL MANUFACTURER'S CONTACT INFORMATION

If you have a problem with separately warranted items, you should contact the original manufacturer first in order to get the fastest response. Since they made it, they know best how to fix it and can give you the most efficient service. The materials in your Owner's Information Warranty Packet contain warranty information and operating instructions on the various appliances and components in your motorhome. If you do not have operating instructions for a particular appliance or component, contact your dealer. Warranty registration cards for these items should be filled out and mailed as soon as possible after you take delivery of your motorhome. When contacting any of the equipment manufacturers, always have the model and serial numbers available. Appliance identification numbers will be found on tags or plates attached to the appliance.

CHASSIS ASSISTANCE

If you have a warranty or service concern about the chassis portion of your motorhome, you may go directly to an authorized chassis dealer for service. This may save you time and effort as the chassis warranty is administered by the chassis manufacturer.

FOR CHASSIS ASSISTANCE CONTACT:

Ford Chassis Assistance 1-800-444-3311

Freightliner Customer Chassis 1-800-385-4357

Mercedes Benz USA 1-800-367-6372

OTHER MANUFACTURER CONTACTS:

Allison 1-800-252-5283

Cummins/Onan 1-800-286-6467

Whirlpool 1-866-698-2538

REPORTING SAFETY DEFECTS
UNITED STATES CONSUMERS:

If you believe that your vehicle has an alleged defect that could cause a crash, injury, or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying REV Recreation Group Owner Relations at 1-800-322-8216.

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 and remedy campaign.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); or go to www.safercar.gov or write to:

Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

You can also obtain other information about motor vehicle safety from the Vehicle Safety Hotline.

CANADIAN CONSUMERS:

If you believe that your vehicle has an alleged defect that could cause a crash, injury, or death, you should immediately inform REV Recreation Group at: 1-800-322-8216 and call Transport Canada toll-free at: 1-800-333-0510.

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Driving & Safety

SECTION THREE

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. Always be aware of these differences when traveling. The key to safely operating a motorhome is inspection. Undetected problems could cause problems on the road and may result in lost time and increased repair costs. Several states require a special license endorsement and motorhome inspection prior to registration. Know and observe the laws of the states in which the motorhome will be traveling. Laws vary from state to state. A systematic inspection conducted prior to moving the motorhome can help ensure nothing is overlooked and will assist in familiarizing the owner with the motorhome.

Perform a general 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.

FAMILIARIZE YOURSELF

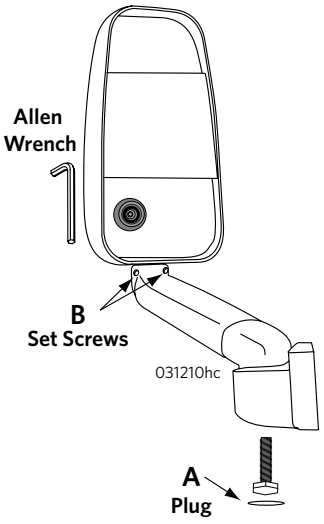
The location of the driver's seat is higher and farther to the left than most vehicles causing a different perspective of the roadway. Use the outside mirrors to gauge the center of the road and to check conditions behind the motorhome. The dashboard may include more gauges and controls than are normally 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.

Course Adjustment:

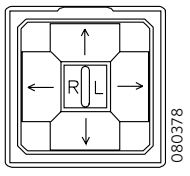
- Tools needed: 5/32" Allen wrench, flat blade screw driver and socket wrench.
- Adjust the driver seat to the travel position.
- Remove plug at the bottom of the arm.
- Use a socket wrench to loosen the bolt located at the base of the arm (point A).
- Adjust the mirror for a clear side view of the motorhome.
- 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.



- Tighten set screws once the proper adjustment is made.
- Repeat procedure for passenger side mirror.

Fine Adjustment:

- Use the mirror adjust switch to chose the left or right mirror, and then use the arrow buttons to make adjustments.



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.

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. Go to: www.safercar.gov/parents/RightSeat.htm

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 SEAT TETHERS (IF EQUIPPED)

Some child seat manufacturers recommend the use of a top anchorage (tether) strap in addition to the lap belt. Since a top anchorage (tether) strap can provide additional security to a child seat, we recommend using a tether whenever one is required or available.

The motorhome may be equipped with a child seat top anchorage (tether) strap anchorage point in the forward passenger seat location.

The anchorage hardware, if available, is located at the lower rear of the passenger or secondary seat. A small metal anchorage loop will be present which will allow the tether strap hook to engage (see Illustration 1).

Illustration 1 020355l

To use, with the seat in position, drape the tether strap over the seat back and down (see Illustration 2). Attach the tether strap hook to the tether anchorage point and tighten the strap according to the child seat manufacturer's instructions. Make sure the strap is not twisted and that the forward facing seat is always positioned upright and locked in the forward facing position when the motorhome is in motion.

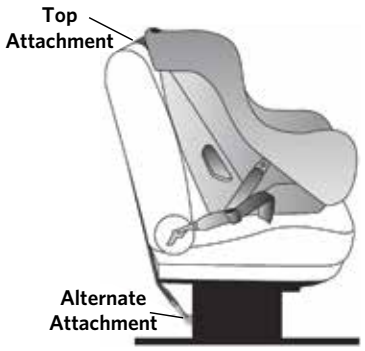


Illustration 2 020355c

Driving & Safety

SECTION THREE

4 STEPS FOR KIDS

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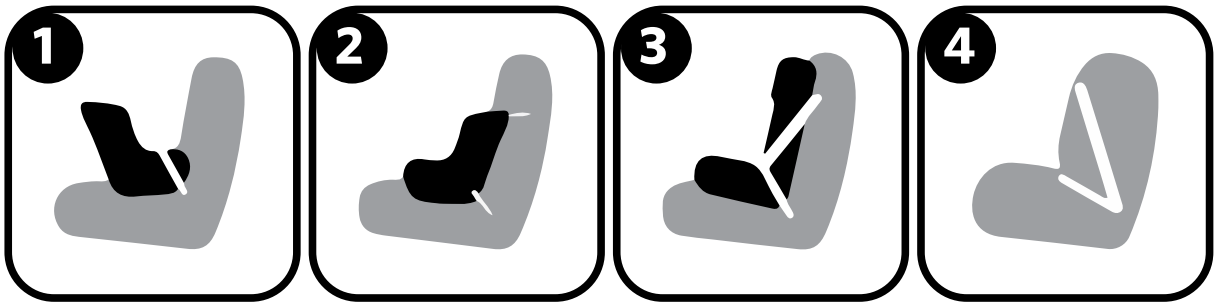


Step 1:
For the best possible protection keep infants in the back seat, in rear-facing child safety seats, as long as possible up to the height or weight limit of the particular seat. At a minimum, keep infants rear-facing until a minimum of age 1 and at least 20 pounds.

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.

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, 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**.

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.

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.

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.

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

WARNING:
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.

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.

DRIVING TIPS

CAUTION:
State laws in the United States and provincial laws in Canada vary concerning operator licensing requirements and vehicle dimensional restrictions. Check the laws in the area where you anticipate traveling.

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 engine brake and transmission in conjunction with the service brakes to help maintain a slow, safe descent. The transmission and engine will 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.

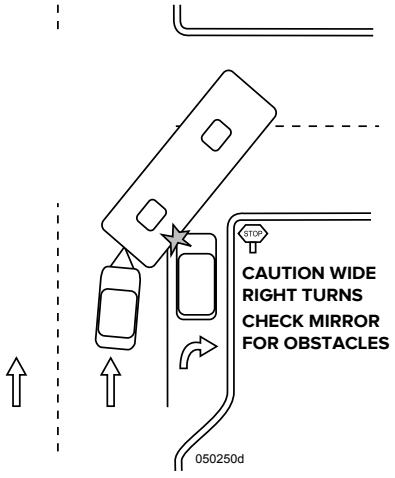
Driving Cautions:

- Avoid getting too close to the shoulder of the road. The shoulder of the road may not 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.
- 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:

Navigating a right hand turn without entering into the other lane or jumping the curb can be difficult. Here are a few tips to make a right hand turn easier:

- When approaching the turn, check the mirror to ensure the lane to the left is clear, then move over to the left.
- When making a right turn, the left rear wheel should be closer to the center line of the road or lane to create a wide angle.
- 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. Unlike gasoline engines, diesels do not necessarily produce more power by pressing further on the accelerator.

Power output from a diesel depends on the following circumstances: 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 and the turbo to cool. While these are cooling, the transmission will also cool. Continually monitor the gauges while waiting.

- **Fuel/Air Mixture:** Even though the engine is equipped with a turbocharger, there is a limit to how much air can be compressed into the combustion chamber. Conversely there is a limit to how much fuel can be injected to produce the most efficient state of combustion.
- **RPM:** Every engine has a RPM range that produces the most efficient torque curve.

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.

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 the engine brake to help maintain a slow, safe downhill speed. With the engine brake applied, road speed may still increase and the transmission may automatically shift to the next higher gear. Apply the brakes using moderately heavy pressure on the brake pedal to reduce speed then manually downshift to maintain a safe, slow speed. Do not pump the brakes. This can result in a loss of air pressure. Riding the brakes can cause the brakes to overheat. Either method can result in loss of brake effectiveness or even brake failure.

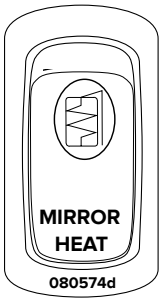
Extreme Heat/Hot Weather Conditions:

- 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.
- Air pressure in the tires decrease in cold weather. 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 or using the engine brake 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.



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 an 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.

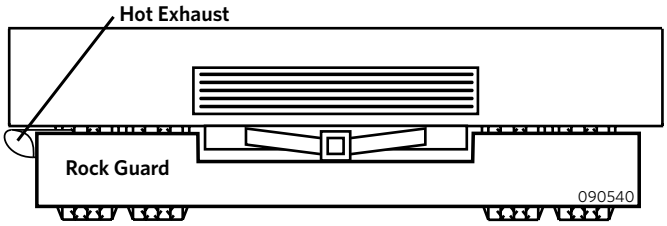
Fuel Economy:
Driving style, wind resistance, terrain, vehicle weight, and engine-driven accessories are some of the factors that affect fuel economy.

Guidelines to Help Increase Fuel Efficiency:

- When starting out, apply the throttle lightly and accelerate gradually. Avoid excess throttle and accelerating quickly.
- Check tire inflation pressure. A low tire is not only a safety hazard but also increases rolling resistance and fuel consumption. Operate the engine at a low to mid range of 1100 to 1500 RPM. The engine requires more fuel when operating at higher RPMs.
- 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. Engage the high idle feature until the engine coolant temperature gauge rises. 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.
- Excessive idling (more than 10 or 15 minutes) can potentially damage the emission system.
- Follow the maintenance schedule for the engine.
- Operate the transmission with the Mode function set to Economy whenever possible; this allows for earlier shifts and enhanced fuel economy. Shift points are also lower if the cruise power switch is on. Turn off the cruise power and set the transmission to normal mode when in mountainous terrain and congested traffic.

ROCK GUARD

A rock guard (mud flap) may be provided to help reduce damage to a towed vehicle or trailer from road debris when towing. However; the rock guard is not capable of preventing all damage to a towed vehicle from road debris. Due to emission system requirements, it may be necessary to perform a stationary regeneration of the exhaust system. Extreme caution must be used when performing stationary regeneration as elevated exhaust temperatures can "hot soak" the immediate area creating a fire hazard if nearby materials are combustible. Elevated exhaust temperature can damage the rock guard.



Stationary exhaust regeneration can damage rock guard

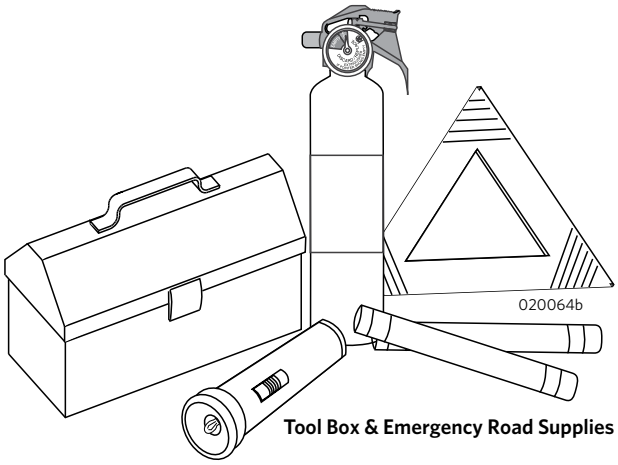
WARNING:
Damage to the rock guard from elevated exhaust temperature is not warrant-able.

TRIP PREPARATION

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

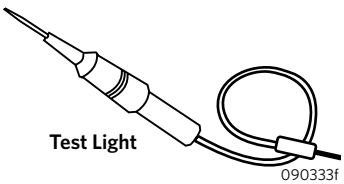
Items to Carry:

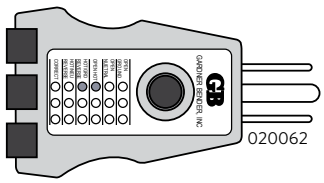
- An emergency road kit containing a flashlight, road flares, warning signs and a fire extinguisher.



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 engine accessory drive belts.





Polarity Tester

- Potable and non-potable water hoses, a water pressure regulator and various termination connectors for sewage.

Inspection:

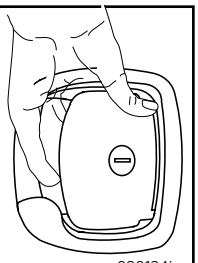
- Ensure all exterior items are stowed or secured (i.e. TV antenna, ceiling vents and windows).
- Check engine accessory drive belts, hoses, battery and engine fluid levels. Inspect the engine, transmission and generator per the OEM manuals.
- Evenly distribute and secure cargo. Store heavy items near 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 shift and damage to cargo.
- 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.

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.

TIPS:
Multi-purpose items, versatile clothing and periodic removal of unused cargo will streamline cargo storage.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HITCH

Hitch Receiver:
The hitch receiver towing capacity is listed on the hitch receiver and on the federal certification tag. 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.

When towing a trailer or car without use of an auxiliary braking device, the brakes on the motorhome must absorb the increased energy required to stop both the motorhome and the towed load. This is critical and extra awareness must be used especially on hills and mountainous terrain where sharp curves, steep grades and possibly irregular road surfaces may be encountered.

Check the motorhome Chassis Operator's/Owner's Guide/Manual for the maximum weight the motorhome can tow and stop. Extreme caution must be used especially as weight of a towed load increases.

While the motorhome has a Gross Combination Weight Rating (GCWR), stopping distances will increase if the towed load is not equipped with an auxiliary braking device.

When weighing the motorhome, add all passenger weight to the GCWR total. The motorhome must be weighed, in a fully loaded ready to travel condition which includes weight of fresh water, occupants, carry on items and any vehicle or trailer towed. Total weight must not exceed the GCWR.

NOTE:
In most cases the GCWR of the chassis and the finished motorhome are the same. In some cases, due to the equipped hitch receiver, the GCWR may be reduced. Please refer to the Federal Certification Label posted in the motorhome for the GCWR.

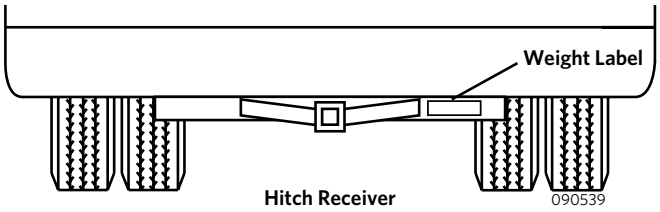
WARNING:
Most states and Canadian provinces require trailers and/or towed vehicles to have adequate auxiliary brakes and safety chains. Failure to comply with these State and Canadian province requirements may result in fines and/or pose a safety hazard, that can result in an accident.

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.

TOWING SYSTEMS

Hitch Receiver:

Tongue weight must not exceed 10% of the rated capacity when using the hitch receiver. The ratings associated with the particular hitch receiver supplied with the motorhome are noted on the federal certification weight label and on the weight label affixed to the hitch receiver.



The weight label on the hitch receiver provides the maximum trailer weight rating and the maximum tongue weight rating. It is important that these ratings not be exceeded.

It is important that towing devices attached to the hitch receiver are rated equal to or greater than the load of a towed trailer, automobile dolly, or other towed load.

Consult with your dealer or towing equipment/trailer supplier to determine the correct type of hitch head assembly, hitch ball and other towing equipment for a safe and correctly assembled towing system for the towed load.

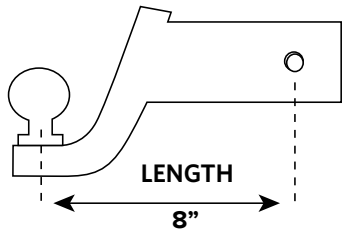
Towing literature is also available from vehicle manufacturers, the National Highway traffic Safety Administration, towing equipment manufacturers, trade associations, and publications/books about how to tow.

Ball Mount:

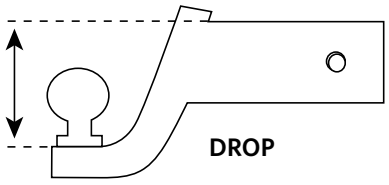
Ball mounts come in various configurations and weight limitations. There are three things to consider when selecting a ball mount: weight rating, pin to ball center length and rise/drop. The weight rating of the ball mount, tongue weight and tow weight must meet or exceed the total load weight.

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".

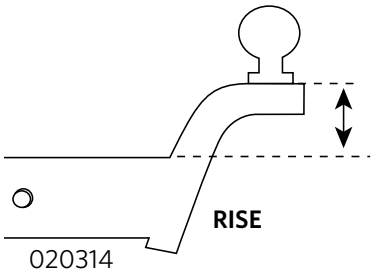
Selecting how much rise or drop a ball mount will need is relative to hitch receiver height and height of the towed load with respect to the type of towing equipment between the motorhome and towed load. When connected, the towed load or towing equipment should be level and parallel with the ball mount.



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

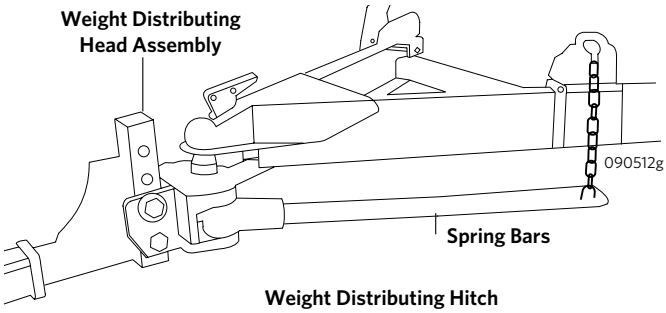


Distance from the shank to the top of the hitch ball platform



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

Weight Distributing Hitches:
A weight-distributing hitch (load-equalizing) uses spring bars attached to the trailer tongue A-frame assembly to transfer some of the trailer tongue weight to both motor home axles.



Weight Distributing Hitch

A weight-carrying hitch (ball mount) assembly does not use spring bars. All of the tongue weight of the trailer bears down on the hitch assembly that loads the motorhome rear axle(s). For this reason, the maximum load is limited when using only a ball mount.

In addition to ball mounts and weight-distributing, the hitch may also have a tow car rating. This rating will apply should a motor vehicle be towed with all four wheels down.

A major weight distributing hitch manufacturer provides the following information in their installation and operation instructions:

"...Severe bumps and badly undulating road can damage your towing vehicle, hitch, and trailer, and should be negotiated at a slow steady speed."

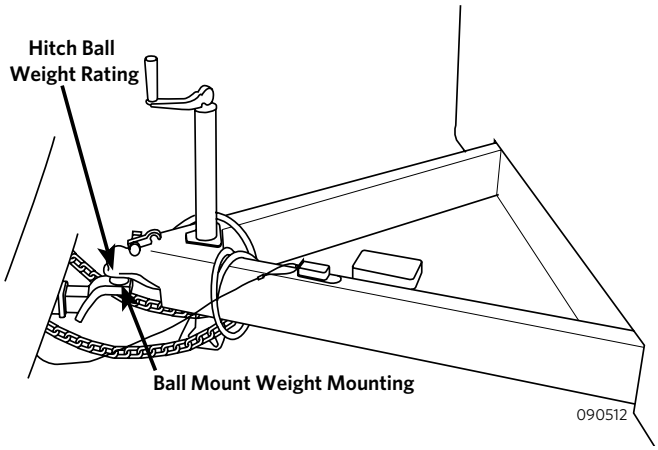
A weight-distributing hitch that has been properly adjusted for operation on relatively level road surfaces may cause the weight distribution hitch to produce enough force to bend the trailer "A" frame, hitch head assembly, hitch receiver, or motorhome frame when operated over severe bumps and badly undulating road surfaces. Contact the weight distributing hitch manufacturer for further information. Frame damage resulting from this type of operation may void portions of the warranty. Here are additional guidelines to follow:

- Do not use a load equalizing hitch if the hitch head receiver rating is below 10,000 lbs. capacity. It could cause structural damage to the motorhome frame components.
- Do not exceed Maximum Tongue Weight as listed on the Federal Certification label. Heavier tongue weights can change handling and response which can lead to an accident, and will restrict coverage under the Owner Care Warranty.
- Do not tow anything weighing more than the GTW listed on the Federal Certification label. Heavier towed loads can exceed the ability of the chassis to pull and stop the load and cause a vehicle crash, damage the motorhome structure or drive train, and restrict coverage under the Monaco RV or chassis manufacturer's warranty. Changing the trailer hitch will not increase the tow capacity of the motor home.
- Consult the Chassis Operator's/Owner's Guide/ Manual, and U.S. state and Canadian provincial laws for towing weight limits and for guidelines for installing supplemental braking systems that operate with your motor home's brakes.
- Towing equipment to consider includes a weight distribution system, a sway control system, a brake controller, and a supplemental brake control system. The weight of the towed load in comparison to the towing capacity of the motorhome should be evaluated during this consultation. Installation of tow equipment must be performed by a competent installer. Make sure the installation follow the tow equipment manufacturer's instructions.

WARNING:
Do not exceed the rated load of the motor home, or the rated load of any axle. Exceeding the GVWR, GAWR, GTW or GCWR of your motor home can cause handling problems, a vehicle crash, damage the motorhome and void the warranties.

WARNING:
Failure to understand and follow these guidelines as presented in this section could result in damage to the motorhome frame or body, could cause unstable driving and handling characteristics, and will restrict warranty coverage.

Hitch Ball:
The three most common diameters of a hitch ball are: 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 does uncouple from the hitch ball, the towing equipment will be cradled by the safety chains. Do not 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 of the towing system must be greater than the gross weight of the load being towed.

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.

Towing components are classified into weight classes to define weight capacity of towing equipment. 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.

Calculating Tow Capacity:
Several variables must be considered 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.

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	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.

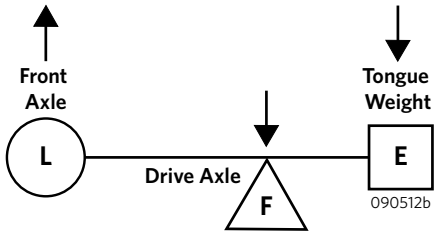
GTW = Gross Trailer Weight. Weight of trailer fully loaded.
TW = Tongue Weight. Weight pushing down on Tow Ball.
WC = Weight Carrying. Weight carrying capacity of the Ball Mount.
WD = Weight Distributing. Weight carrying capacity of a weight distributing hitch.

Towing Weight Checklist

Towed Load	Tongue Weight:	Overall:	[ ] Yes [ ] No
Towing Equipment	Ball Mount:	Hitch Ball:	[ ] Yes [ ] No
Hitch Receiver	Tongue:	Tow:	[ ] Yes [ ] No

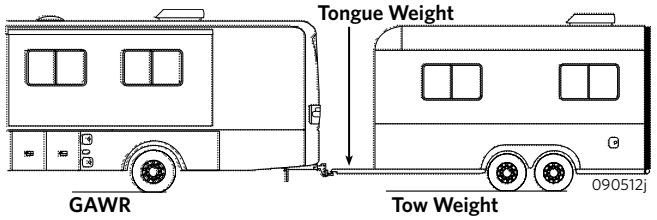
Insert Weight Ratings: Check Yes or No if within specifications.

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 tag axle or drive axle. That axle now becomes a pivot point (fulcrum).



E = Effort L = Load F = Fulcrom

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

TOWED VEHICLE REQUIREMENTS

Vehicle manufacturers produce cars and trucks that are designed to be capable of being towed with all wheels down. Use caution and note all limiting factors when selecting a vehicle to tow (aka dingy). Things to consider are battery drain on the tow vehicle electrical system with the steering wheel unlocked, could the transmission of the towed vehicle be damaged when being towed and is the tow vehicle too heavy as well as other concerns.

Before selecting a tow vehicle, consult the tow vehicle manufacturer's instructions to ensure the vehicle is approved to be towed with all four wheels down. All aftermarket products that modify the vehicle for towing should also be approved by the vehicle manufacturer.

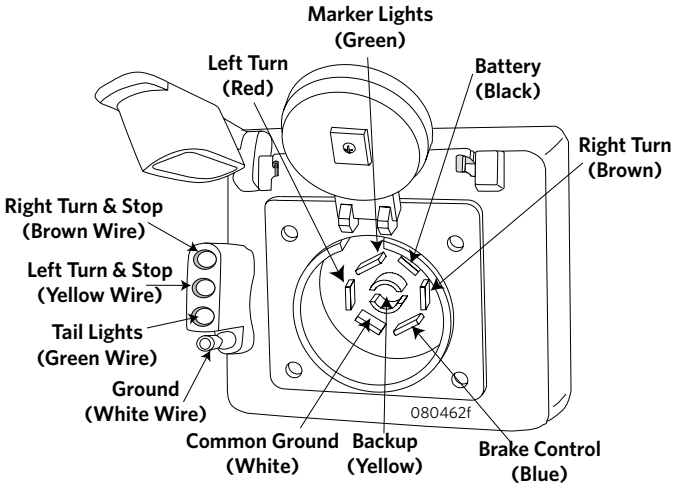
Make sure the tow vehicle weight and attaching hardware do not exceed the rating of the hitch receiver. Note the hitch receiver capacities (tongue and tow) listed on the weight tag located on the hitch receiver. Do not exceed rated maximum capacities. Make sure the weight of the motorhome with the tow vehicle do not exceed the gross combination weight rating (GCWR) of the motorhome. Make sure that tow bars and hitch equipment is rated for the weight of the tow vehicle.

In addition, the tow vehicle must be equipped with its own independent auxiliary brake system that will activate when the brakes on the motorhome are applied. State/Province regulations may require additional lighting requirements. Check with the DMV of the State and/or States (and Provinces) you will be traveling for any additional requirements.

TOW PLUG CONNECTION

Taillight Configuration:

Taillight wiring is classified either 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. When connecting a towed load with a 2-wire system to a tow vehicle with a 3-wire system, or vice versa, a converter box must be installed for correct function of brake lights and turn signals. 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 brake lights and turn signals function correctly on the motorhome and towed vehicle or trailer.



The motorhome is pre-wired from the factory with an electrical connection for towing. The connection is located near or on the hitch receiver. 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.

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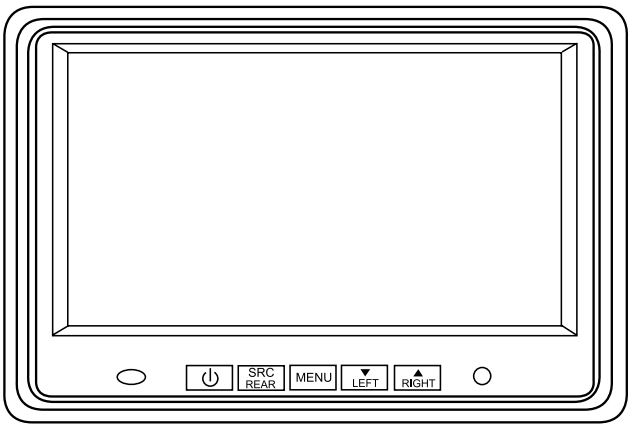
To Tow a Car or Trailer:

- 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. A flat tire on a towed vehicle can not be detected from the motorhome while driving. A flat tire is a safety hazard and may result in damage to the wheel, towed vehicle or other vehicles.

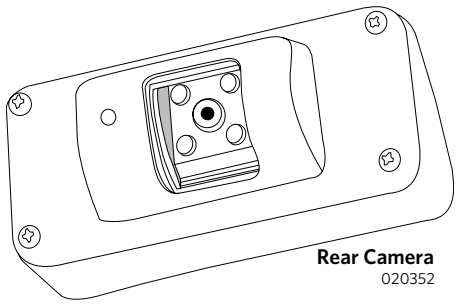
REAR VISION SYSTEM

The motorhome is equipped with a rear vision camera and two side vision cameras located in the side mirrors.



Rear View System 031256k

INFORMATION:
Refer to the OEM manual for detailed operating instructions.



Rear Camera
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The rear vision camera is designed to provide the driver with a view of the rear when backing up. The monitor will automatically display the corresponding side camera when the turn signal is activated. The monitor will default to the rear vision camera when the turn signal is canceled. The system must be powered on for use.

The ignition switch must be on to power the monitor. The Power button on the monitor turns the system on or off. Momentarily press to turn the system on. Press and hold to turn off.

Precautions:

- Do not expose the monitor to excessive heat or cold.
- The monitor is not waterproof.
- Do not use abrasive cleaning materials on monitor.
- Do not strike or drop objects on the monitor.

To Use the System When Driving:

- Turn on the ignition.
- Turn on the monitor.
- Use the buttons on the monitor to select a camera or when the turn signal is inactive, the monitor will automatically switch views.

NOTE:
The rear vision system will automatically activate when the transmission is placed in reverse.

Menu:

- Selects various adjustable features of the monitor.

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. Remain 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 backup monitor may have a one-way communication feature. Have the co-pilot or spotter "speak up" so directions can be given and followed.

The co-pilot will perform just as an 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 backing up 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.

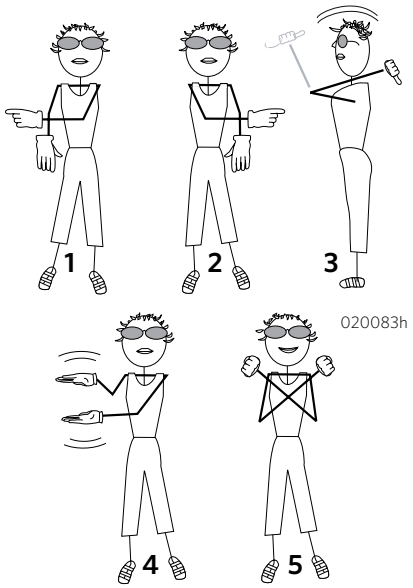
If necessary, stop backing up so the co-pilot can inspect other areas or angles of concern. The driver should receive directions only from the co-pilot.

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 their 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 jackknife 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.

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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.

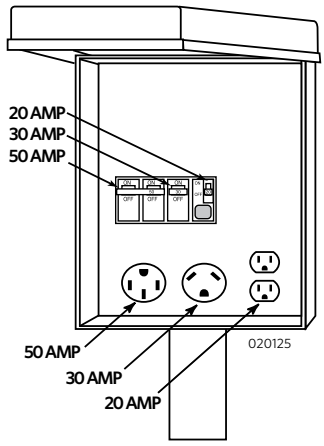
SET-UP PROCEDURES

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 slide room, 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".

2. **Hookup Utilities and Prepare Appliances for Use:**
- Open the primary propane valve on the propane tank (if equipped).
- 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 the shore power circuit breaker off prior to plugging in the shore cord.

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.

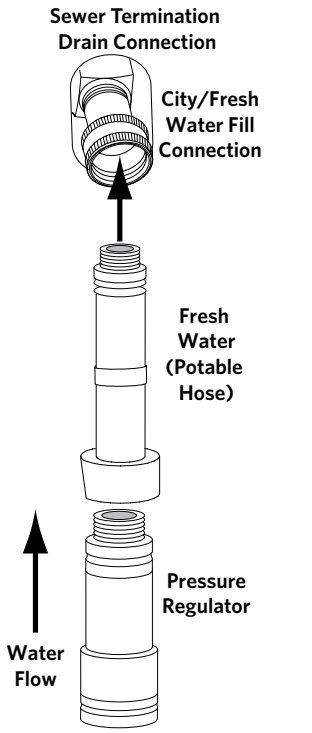


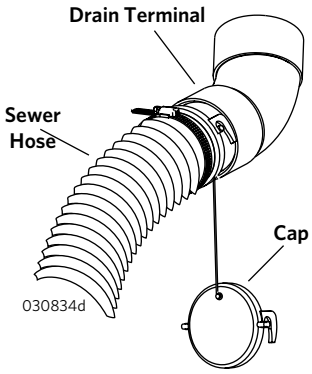
CAUTION:
Do not remove the cover from the shore power supply to troubleshoot electricity to the motorhome. Serious personal injury or death may occur. Inform the park manager if there no power to the motorhome. It is the responsibility of the facility to fix any problems with the shore power supply.

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 or an electrical fire may result.

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

- 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).
- 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

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, the fresh water tank and water heater are full and waste holding tanks are empty.

To Conserve Water and Fuel:

- Plan what is needed from the refrigerator prior to opening.
- If equipped, turn on the Aqua-Hot 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.
- 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.
- 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 when not in use. One light left on can quickly reduce battery reserves.
- Turn off interior 12 Volt DC items whenever possible.
- Turn off the antenna boost when not watching TV.
- Keep a flashlight handy for use inside the motorhome at night. 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.
- Run the generator instead of using the inverter to operate the convection microwave oven.

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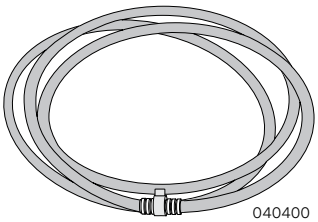
BREAKING CAMP

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. The following is a guide when preparing to break camp.

Outside Checklist:

- Disconnect the cable TV if available and connected.
- 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.



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.
- Inspect tires and wheels. Check inflation pressure on all tires.
- Secure all compartment doors.

Engine Checklist:

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

Interior Checklist:

- Retract leveling jacks (if applicable).
- Start the engine to allow the air suspension to obtain proper ride height.
- Clear the slideout room path.
- Clean the floor and move the driver and passenger seats forward.
- Retract the slideout room(s).

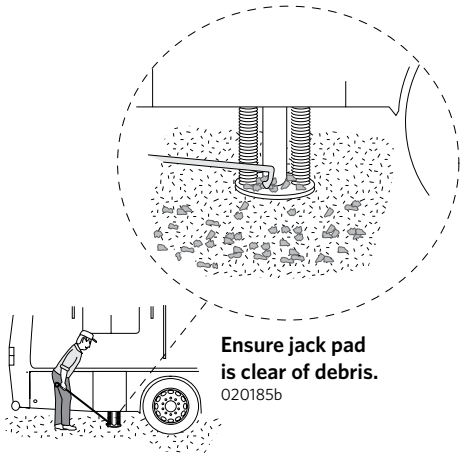
CAUTION:

To extend or retract the slideout room, the ignition must be on, the engine running and battery voltage 13.0 volts. Apply the park brake. Operate the slideout room when supported by hydraulic jacks. Damage to the slideout room, mechanism or seals can occur.

- 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:

- Secure items in storage bays to prevent shifting or damage of items.
- Look around, above and under the motorhome for obstructions. Check for debris stuck between the rear dual tires.
- Close and lock exterior compartment doors.
- Check operation of all exterior lights, headlamp, tail lamp, brake and clearance lights.
- Secure all awning and travel locks.
- Ensure the 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.
- Secure and lock the entry door for travel.
- Pull forward out of the campsite.
- Inspect site for overlooked items.



Ensure jack pad is clear of debris.
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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/farthest triangle to be 500 ft. behind the motorhome in order to safely warn approaching traffic.

Emergency Service Provider

Equipment	Provider	Emergency Number
Motorhome	Customer Support	877-466-6226
Chassis	Freightliner	800-385-4357
Engine	Cummins	800+343-7357
Transmission	Allison Transmission	800-524-2303
Towing	Owner's Advantage Program	877-211-8135

Driving & Safety

SECTION THREE

IN CASE OF FLAT TIRE

In the event of a flat tire, it is recommended to call for roadside assistance. The size and weight of the motorhome and tires requires heavy duty equipment to change the tire. A professional service technician will have the proper equipment and training to repair or replace the tire.

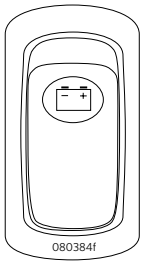
In case of sudden tire failure, avoid heavy braking as this can result in loss of control. Hold the steering wheel firmly and gradually decrease speed. Slowly move to a safe off-road place which should be a firm level spot. Turn the ignition off and turn the hazard flashers on.

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.

Aux Start Switch:



The Aux Start 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 Aux Start solenoid for an extended period can damage the solenoid.

Using the Aux Start Switch:

- With ignition key off, press and hold the Aux Start 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 Aux Start switch. Once the generator is operating, the electrical combination of the generator and the inverter will charge the batteries.
- Allow the generator to run approximately 1/2 hour before attempting to crank the engine.
- Press the Aux Start 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.

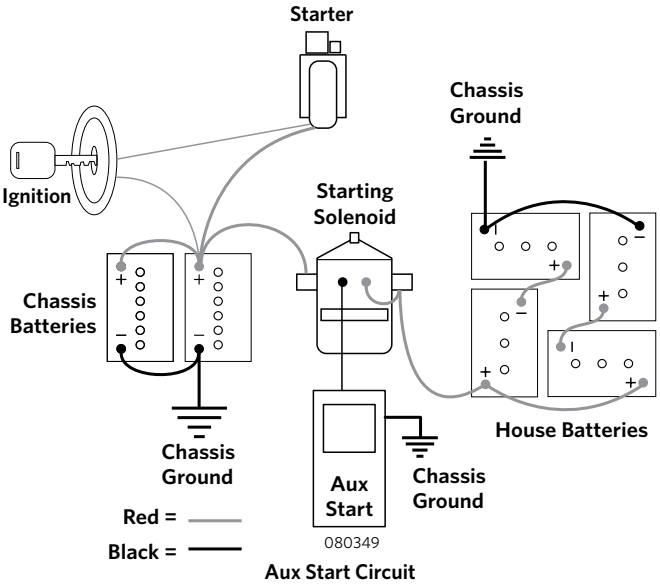
WARNING:
Do not use the towed vehicle for jump starting. The charging system of the towed vehicle does not supply the amperage necessary to jump start the motorhome. Voltage sensitive equipment on the towed vehicle can be damaged and disable the towed vehicle.

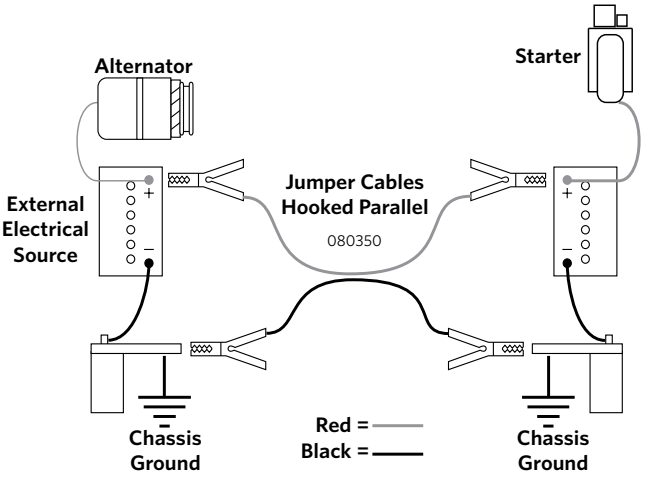
CAUTION:

A large amount of electrical current is required to jump-start an engine. The size 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.

Do not use incompatible voltage sources for jump starting.

- 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.





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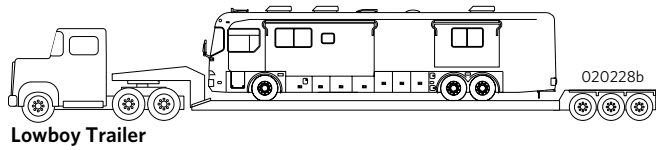
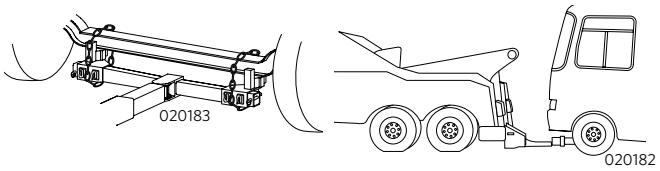
TOWING PROCEDURES

CAUTION:
Note the overall height of the motorhome being towed. 13'6" is the maximum allowable height. Damage to equipment or property may result if the maximum height is exceeded.

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.



Lowboy Trailer



Inform the tow company of the axle weights 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.

The towing company may need to locate the air nipple to release the air brakes. The air nipple is located in the generator compartment and should be used by towing personnel only. Generally, if the motorhome ever needs to be towed, use the following instructions.

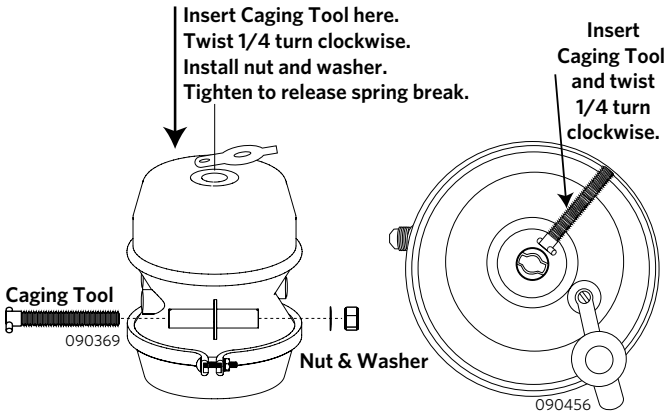
Air nipple located in the electrical compartment below driver's window.

- 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 structural member of the frame.
- 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.
- When towing a motorhome equipped with air leveling, the ignition MUST be left in the ON position. The Travel indicator lamp on the air leveling control panel must be ON to allow the air suspension to operate. An air supply must be connected from the tow vehicle to the External (Air) Charge Fitting located in the generator compartment. If the ignition system is not functioning, or if chassis voltage is below specification, the motorhome must be placed on a lowboy trailer to prevent suspension damage.

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 to prevent being damage. The manufacturer WILL NOT cover damage to the motorhome caused by a towing company.

DISABLING PARKING BRAKE

The park/emergency brakes apply to the drive axle only. The brakes can be released manually if the air system will not build sufficient air pressure to release them. This emergency procedure is to be used by trained technicians or towing personnel to move the motorhome to a safe location or repair facility.



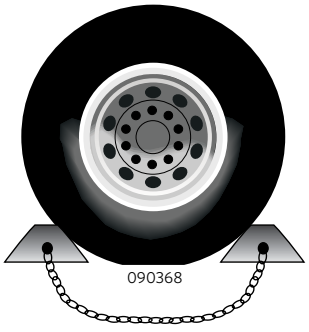
Brake Camber

Disabling Brakes:

- Place wheel chocks firmly against the wheel before performing this procedure.

WARNING:
Only trained personnel should perform this procedure. The spring inside the brake chamber is under high tension. Removal of retaining band could result in serious injury or death.

WARNING:
Failure to securely chock the wheels can result in the motorhome rolling when the spring brakes are released. Severe injury or death can occur.



Example of a properly chocked wheel.

- Open the dust cap from the center of brake chamber on the drive axle.
- Remove the caging tool from its holder and insert the tool into hole. Turn clockwise to engage. Assemble nut and washer onto caging tool. Use a wrench to tighten the nut .
- Assemble nut and washer onto caging tool. Use a wrench to tighten the nut.
- This will compress the internal spring and release the brake.
- Repeat procedure for the other side.

Enabling Brakes:

- After towing, or when air pressure is available, remove nut, washer and caging tool. Install the caging tool to its storage location and close the dust cap.
- Repeat procedure for the other side.

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 and provide stability while cornering. To obtain the maximum wear and best service from tires, it is helpful to understand their components and functions.

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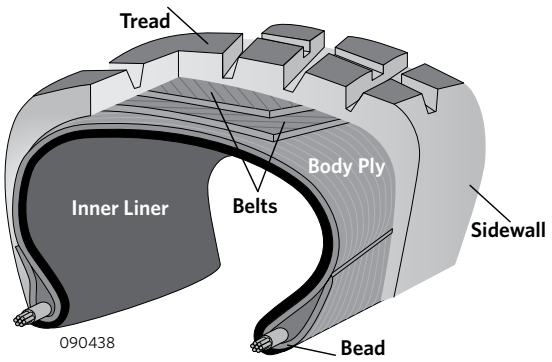
Tire Components:

- **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.

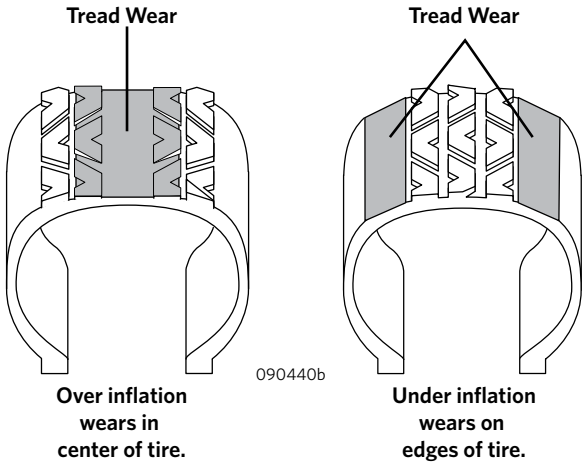
A tire that is underinflated will cause excess heat that can exceed operating limits of the tire and could result in sudden failure and fire. An underinflated tire will also cause poor handling, rapid and/or irregular tire wear and increases rolling resistance and decreases fuel economy.

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 suddenly burst upon inflation resulting in serious damage, injury or death. Aged tires are also susceptible to sidewall damage.

A tire that is overinflated will reduce the footprint/ contact patch with the road reducing traction, brake effectiveness and handling. Over inflation will also cause a harsh ride, uneven tire wear and make the tire susceptible to impact damage. Maintaining correct inflation pressure is of utmost importance for safety and reliability and should be a part of regular maintenance checks.

Under inflation 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.



Over inflation can cause:

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

Unequal Tire Pressures on the Same Axle Causes:

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

LOAD INFLATION INFORMATION

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. Inflation pressure will vary 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, the tires are inflated to the maximum pressure.

Always remember to check the brand of tire installed on your unit. The brand and inflation pressure may have changed. Consult the tire manufacturer for correct pressures.

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 over inflate or under inflate 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 Gross Axle Weight Rating (GAWR). Contact the tire manufacturer for further information concerning inflation pressure and other tire concerns.

NOTE:
The motorhome is equipped with radial tires at the time of printing. 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.

NOTE:
Tire construction determines Load Range which also determines minimum and maximum inflation pressure. Load range H has a greater weight carrying capacity than load range G. The load range is embossed into the sidewall of the tire.

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 heat generated while driving has caused inflation pressure to temporarily increase. Check tire inflation pressure every morning before driving. Use a high-quality truck tire gauge with an angle airhead to ensure access to the dual wheel positions of the drive axle.

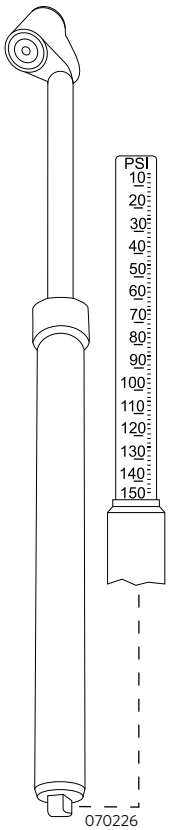
Ensure the valve cap is replaced on the stem after the inflation pressure is checked. Use valve stem caps with a positive seal to prevent air from escaping through the valve stem.

If there are extension hoses on the valve stem, make sure they are high-quality reinforced stainless steel braid. Attach hoses securely to the outer wheel to

prevent movement. 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 could result in damage to the drivetrain or create handling issues.

The motorhome may be equipped with an on-board "tire pressure monitoring" system. Individual tire pressures are displayed on the monitor when the feature is selected.

The tire pressure monitoring system is to be used for "Reference Only". To accurately determine individual tire pressure, a reliable and calibrated tire pressure gauge in good working condition should be used. The Federal Certification Label lists the proper tire inflation pressure. Follow the guidelines in this owner's manual for checking air tire pressure.



Truck Style Tire Guage

WARNING:
A slow leak may go unnoticed on one of the dual tires. Damage to the other tire can occur tire from weight overload. Tires with damaged sidewalls can burst upon inflation. A flat or nearly flat tire can also generate enough heat from friction to ignite.

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

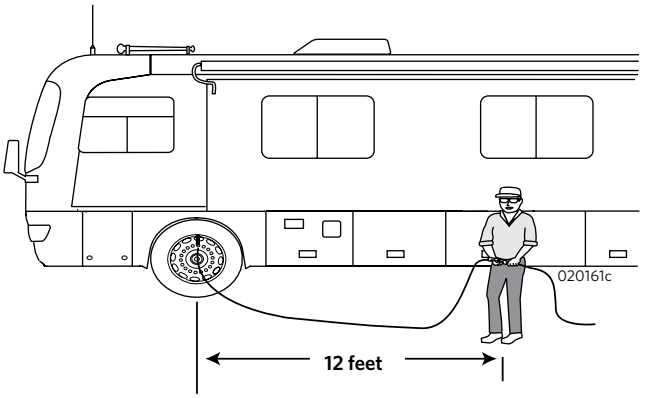
AIR PRESSURE CHECKLIST

- When checking inflation pressure, confirm the tires are cool before increasing or decreasing inflation pressure. Tires in direct sunlight will increase inflation pressure. Driving a short distance will heat the tires and raise inflation pressure.

NOTE:
It is normal for tires to heat up and inflation pressure to increase during travel. If the motorhome must be driven to get air, check and record the tire pressure first then add the proportional amount of pressure so when the tires cool, inflation pressure will be correct.

- Remove the cap from the valve stem.
- Firmly press the tire gauge onto the valve stem and record reading.
- Add air to achieve recommended inflation pressure.
- If the tire is overinflated, release air by pushing on the metal stem in the center of the valve then recheck the pressure.
- Replace the valve stem 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.

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



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

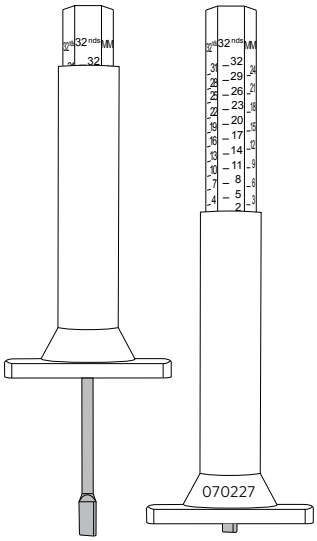
Tire rotation can increase the useful life of the tires by achieving uniform wear on all of the tires. Motorhome tires are only to be rotated side to side and never front to rear. The first tire rotation is the most important in determining which rotation pattern to use. Any unusual or unique wear patterns, 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.



Tire Groove Depth Gauge

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:
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.

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.

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.

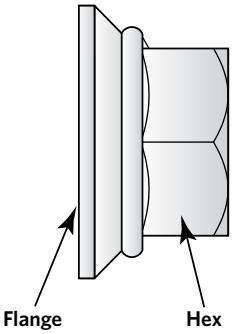
Removal from Storage:

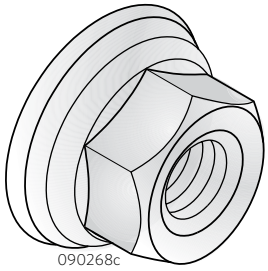
Before removing the motorhome from long-term storage thoroughly inspect each tire's tread area and air pressure. If the tires have lost air during storage, inflate them to the correct pressure.

WHEEL MOUNTING

Hub Piloted Mounting:

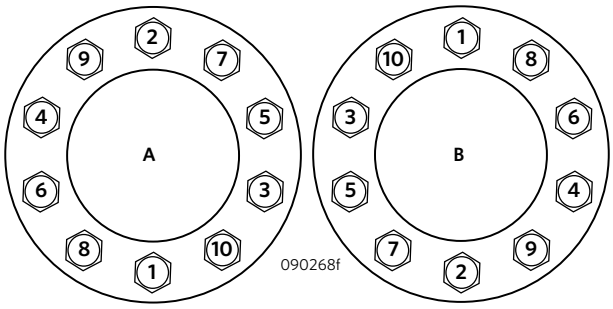
- Flange nuts generate higher clamping force. Always use grade eight studs with hub mount wheels.
- Before installing the wheels, lubricate the hub pilot pads with a drop of oil to prevent galling. Do not lubricate any other wheel or hub surface.
- For a hub with intermittent pilot pads, position a pad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





Flanged Lugnut

For used nuts: add two drops of oil between the flange and hex.



Lugnut Torque Sequence

CAUTION:

Loosen and tighten lug nuts in sequence (see illustration). Sequence tighten to 50 ft. lbs. first, then sequence tighten to 450-500 ft. lbs. Over tightening can cause distortion.

WARNING:

Check lug nut torque after 50-100 miles after a wheel has been removed.

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 sequence. When all nuts have been seated, tighten the nuts to 450-500 ft. lbs. in sequence (as in illustration).

Dual Rear Wheels:

Slide the inner dual wheel over the studs. Use caution to avoid damaging threads. Align the hand-holds for valve access and slide the outer dual wheel over the studs, again using caution to avoid damaging the stud threads.

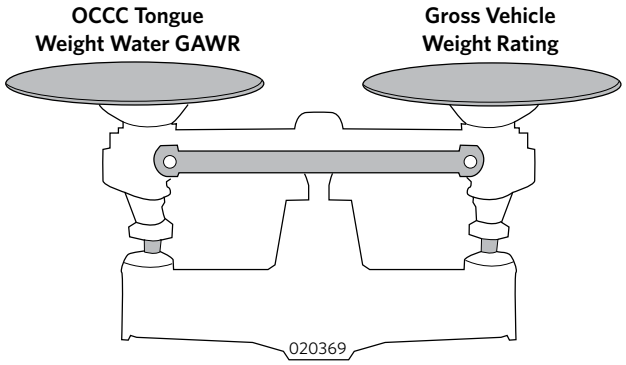
When all nuts are seated, tighten the nuts between 450-500 ft. lbs. in sequence (as in illustration). The hub mount wheels use two-piece flange cap nuts for both front and rear applications. No inner cap nuts are required.

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.

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 at the lower right.

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.

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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.

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.

FEDERAL CERTIFICATION LABEL

MFD BY: REV Recreation Group DATE: XX/XX

INCOMPLETE VEHICLE MFD BY: FREIGHTLINER CUSTOMER CHASSIS DATE: XX/XX

GVWR	XX,XXX KG	XX,XXX LB)	
FRONT GAWR:	XXXX KG (	XX,XXX LB)	
	WITH:	XX.X X X.XX	RIMS
	XXX/XX/XX.X TIRES AT:	XXX KPA COLD SINGLE	
	(	XXX PSI)	
INTERMEDIATE GAWR:	XXXX KG (	XX,XXX LB)	
	WITH:	XX.X X X.XX	RIMS
	XXX/XX/XX.X TIRES AT:	XXX KPA COLD DUAL	
	(	XX PSI)	
REAR GAWR:	XXXX KG (	XX,XXX LB)	
	WITH:	XX.X X X.SS	RIMS
	XXX/XX.X TIRES AT	XXX KPA COLD SINGLE	
	(	XXX PSI)	
GAWR COMBINED INTERMIDIATE AND REAR:	XX,XXX KG (	XX,XXX LB)	

This vehicle has been completed in accordance with the prior manufactures IVD where applicable. This vehicle conforms to all applicable Federal Motor Vehicle Safety Standards. In effect in xx/xx

V.I.N. XXXXXXXXXXXXXXXXX

TYPE VEHICLE: MULTI-PURPOSE PASSENGER VEHICLE

The tires and wheels with sizes and ratings designated above have been equipped with this vehicle by Monaco RV. Any replacement tires installed must meet the same specifications and minimun load requirements.

ALLIED RECREATION GROUP

PRODUCT: 2015 DYNASTY CLASSIC

FIN: XXXXXXXXXXX	kilograms	(pounds)
GROSS VEHICLE WEIGHT RATING (GVWR)	XX,XXX	(XX,XXX)
FACTORY WEIGHT ON XX-XX-XXXX	XX,XXX	(XX,XXX)
OCCUPANT AND CARGO CARRYING CAPACITY	X,XXX	(XX,XXX)
FULL FRESH WATER TANK: XXX GAL @ 8.3lb/gal	XXX	(X,XXX)
FULL WATER HEATER TANK: X GAL @ 8.3lb.gal	XX	(XX)
FULL PROPANE TANK (USEABLE CAPACITY) gal@4.2lb/gal	XXX	(XXX)
GROSS COMBINED WEIGHT RATING (GCWR)	XX,XXX	(XX,XXX)
MAX. GROSS TOWED WEIGHT	X,XXX	(XX,XXX)
MAX TONGUE WEIGHT	XXX	(XX,XXX)

MOTORHOME OCCUPANT AND CARGO CARRY CAPACITY

VIN: XXXXXXXXXXXXXXXXX

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED XXXX KG OR XXXX LBS

Safety belt equipped seating capacity: 4

CAUTION:

A full load of water equals xxx kg or xxx lbs of cargo @ 1 kg/L (8.3lb/gal) and the tongue weight of a towed trailer counts as cargo

CAUTION: LOAD CARRY CAPACITY REDUCED

Modifications to this vehicle have reduced the original load carrying capacity by

_____ KG OR _____ LBS

Federal Certification Label 100230h

MOTOR HOME OCCUPANT AND CARGO CARRYING CAPACITY vin xxxxxxxxxxxxxxxx
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

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.
- **LCCR (Load Carrying Capacity Reduced)** is the amount the OCCC is reduced due to vehicle weight added by the dealer between vehicle certification and first retail sale.
- **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.

Weight Limits:
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 drivetrain 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 ill 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.

Driving & Safety

SECTION THREE

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

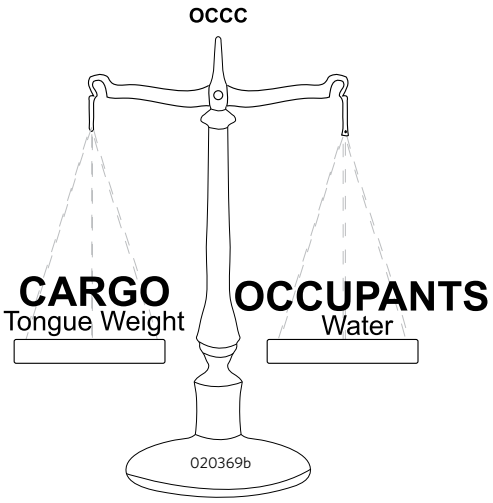
The motorhome may weigh slightly heavier on one side. The heaviest wheel position (if applicable) on a single axle will determine the inflation pressure for all tires on that axle due to weight transfer that occurs when cornering. Improperly inflated tires can result in sudden tire failure (blowout).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

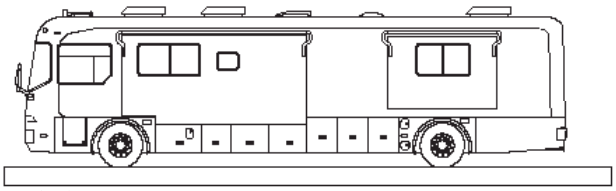
While the OCCC is a guide to the maximum allowable weight in combinations of occupants, cargo, water and tongue weight, the amount of weight in each of the categories (occupants, cargo, and water and tongue weight) can be adjusted so one can offset another or reduced entirely to gain advantage in GCWR. 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.

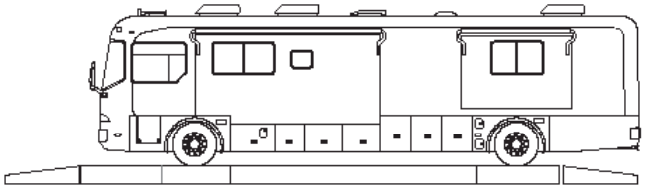
Three basic types of scales:

- A large platform scale will allow the entire motorhome to fit on the scale to read the gross vehicle weight in one scale recording.



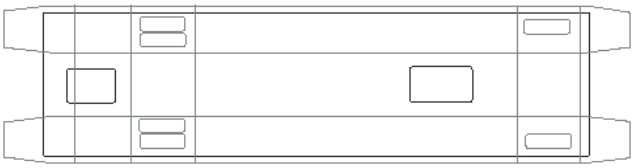
Single Platform

- A segmented platform scale is designed to weigh one axle at a time.



Segmented Platform per Axle

- A segmented platform scale per wheel position reads each wheel position at a time.



Segmented Platform (top view) per Wheel Position 100233

WEIGHING

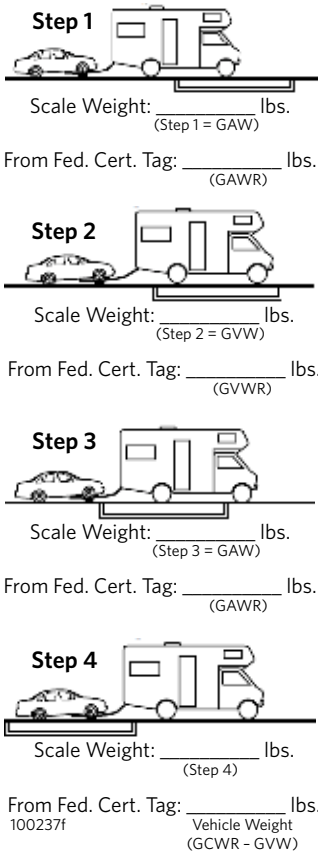
The motorhome must be weighed in a fully-loaded ready to travel condition. This includes passengers, food, clothing, fuel, water, supplies, etc. Any towed vehicle (car/pickup, boat or trailer) or item loaded on brackets on the back of the motorhome, such as bikes or motorcycles will also be included in the weighing. 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.

The following steps are suggested and are illustrated:

1. Pull onto the scale so that only the front axle is on the platform (with the end of the scale midway between the front and rear axles), and record the scaled weight.
2. Pull forward until the full unit is on the scale, and record the scaled weight.
3. Pull forward so that only the rear axle is on the scale (again with the edge of the scale midway between the front and rear axles), and record the scaled weight.
4. If a boat, trailer or other vehicle is being towed, it should be weighed and combined with the towing vehicle's GVW (Gross Vehicle Weight) to ensure the total weight does not exceed the GCWR (Gross Combined Weight Rating).

Four Point Weighing



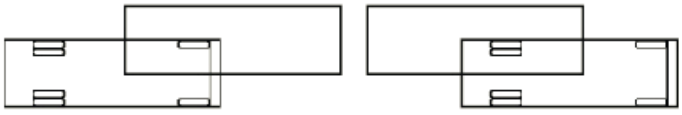
100237f

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.

To determine individual wheel position weights, it is necessary to repeat the first three steps, but this time, use only one side of the scale as shown.

To calculate the opposite side of the vehicle wheel position weight, subtract this side's weights from the weights recorded in steps 1, 2 and 3. If there is a towed vehicle, proceed to step 4 to obtain the "towed vehicle only" weight.

CAUTION:
Even though the weight of the total axle may be within the axle's rating, it may be overloaded on one side. This causes one wheel position to be overloaded; therefore, side-to-side weighing is required.



One Side Scale Weight:	_____ lbs. (Step 1S)	One Side Scale Weight:	_____ lbs. (Step 3S)
Calculate Other Side Weight:	_____ lbs. (Step 1 – 1S)	Calculate Other Side Weight:	_____ lbs. (Step 3 – 3S)
Tire Load:	_____ lbs. (See Note*)	Tire Load:	_____ lbs. (See Note*)
Inflation:	_____ psi. (See Note*)	Inflation:	_____ psi. (See Note*)

Weighing Individual Wheel Positions — Repeat procedure for other side.
100237fb

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.

The motorhome must remain as level as possible on the scale (even though an axle or side is not physically on the scale) to obtain accurate side-to-side scale readings. There must be enough space on either side of the scale to accommodate the width of the motorhome being partially off the scale. It may be necessary to use wheel ramps to get the required side to-side leveling.

If there is a difference in the weights on one side of the vehicle as compared to weights on the other side, components (tires, wheels, brakes, springs, etc.) on the heavier side could be overloaded, even though the total axle load is within the GAWR. It is important to redistribute the load to avoid component failure, as well as to improve the handling characteristics of the vehicle.

With these actual weights, it is now possible to compare them against the GAWR, GVWR, and tire capacities. These actual weights are also what will be used to determine proper tire inflations pressure. Options to help assist when weighing the motorhome include using "truck stop" scales. There is usually a small fee for this service.

Refer to the load inflation table published by the tire manufacturer to determine proper inflation pressure recommended for single and dual wheel positions. 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.

DANGERS OF OVERLOADING

Do not overload the motorhome. In addition to possible problems with tires, wheels, and air springs (air bags), there can be problems of brake failure, drivetrain failure, wheel bearing failure, etc. Moreover, an overloaded motorhome uses more fuel, is more difficult to drive, and can lead to driver fatigue. If any component should fail, it could result in vehicle damage and/or loss of control. In addition to the above dangers, there are some states that require certain motorhomes and RVs to utilize the Highway Patrol's weight scales to check for overloaded axle weights. Citations can be issued to violators.

The motor home can be loaded differently, depending on the type of trip, loading and weight patterns will change. Periodically reweigh the motor home and log the weights in this chapter. Refer to the Weight Record Sheet to help equate load distribution for future trips.

Loading Tips:

- Do not load heavy items on the bumpers.
- Secure and brace items so they won't move during travel. Generally, load heavier items lower. Make a diagram of your properly loaded motorhome and keep a log of the cargo. Then weigh the motorhome. The loading diagram, cargo log and the loaded motorhome weights will help to locate where specific items are stored, and will help speed the loading process.
- Fresh water and waste water weigh over eight pounds per gallon. Carry only as much water as needed for travel or to balance the load, and whenever practical, empty the holding tanks before traveling.
- Store emergency items in a readily accessible location. As a minimum include a fire extinguisher, tools, first aid kit, rain gear, flashlight, and highway warning devices, an electric cord with light and sturdy gloves.

WARNING:
Modification of the motorhome by addition of racks not originally equipped by the manufacturer to carry additional equipment, vehicles or cargo will reduce your warranty coverage and may cause personal injury or property damage.

WARNING:
For safety, Do Not store or carry propane containers, gasoline, or other flammable liquids inside the motorhome.

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 = _____

SUSPENSION ALIGNMENT AND TIRE BALANCE

The front suspension and steering system of this vehicle was accurately aligned at the factory before delivery to the dealership.

However, after the motorhome is fully loaded according to your personal needs, have the alignment checked and adjusted, if necessary. To help prevent uneven tire wear, check the front-end alignment periodically.

Please note that front-end alignment after retail delivery is the owner's responsibility and is not covered under the warranty.

NOTE:
Contact Freightliner Custom Chassis for alignment specifications or location of the nearest Freightliner Custom Chassis facility at 1-800-385-4357.

Driving & Safety

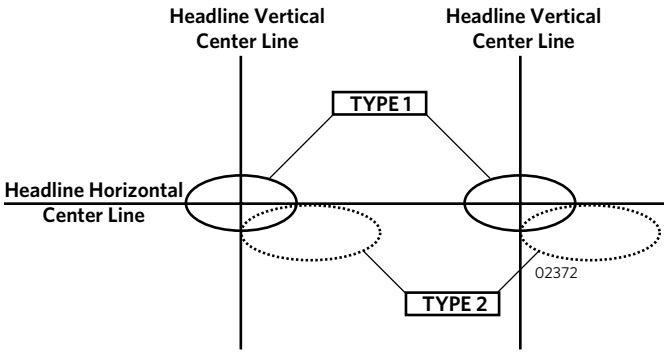
SECTION THREE

MANUAL HEADLAMP AIMING PROCEDURE

CAUTION:
The following procedure is not a substitute for having the headlamps professionally aligned by a certified headlamp alignment professional to the Society of Automobile Engineering standards. Improper headlamp alignment may result in poor visibility during reduced light conditions and may result in an accident.

1. Ensure the vehicle is loaded to "travel and camping" conditions.
2. Remove all snow, ice, dirt and other debris that may affect the ride height of the vehicle.
3. Find a flat area at least the length of the motorhome plus 7.62 meters (25 ft) with a vertical flat surface that is at least 3.0 m (10 ft) by 3.0 (10 ft) at one end (a driveway and garage door can be used).
4. Measure 7.62 m (25 ft) and position the motorhome so the headlamps are 7.62 m from the vertical flat surface and secure by placing in park or neutral and setting the parking brakes.
5. Verify the headlamp system to determine if it is a "Type 1" or "Type 2" system. A Type 1 system has a separate HI and LOW beam and uses four lamps. A Type 2 system can be identified by locating the number "2" embossed on the lens of the lamp.
6. Measure the height from the ground to the center of the low beam filament of the driver's side headlamp. Project this height in an exact straight line to the vertical surface 7.62 m away from the motorhome. Mark the height of the filament and center line on the vertical surface. This will have set up a "coordinate system" for protecting the headlamp's beam on the vertical surface.
7. Repeat step 6 for the passenger's side headlamp.
8. Turn on the headlights. Using Figure 1 below, the projected beam on the vertical surface is to be located as follows.

   A - Type 1 Headlamps: The projected beam should be centered vertically and horizontally on the vertical surface as marked in step 6 and 7.



Headlamp Adjustment

   B - Type 2 Headlamps: The top edge of the projected beam is to be even with a horizontal line parallel to a line formed by the two headlamp filament centers and to the right of the vertical center line of each headlamp.

9. If the headlamps do not meet the alignment criteria adjust the "Vertical" and/or "Horizontal" positioning as shown on the attached figure. Rotate the adjustment knobs and/or screws on the headlamp. When turning the knobs and/or screws, watch the direction in which the projected beam moves to help understand which direction on the beam moves in relation to turning each.
10. Remember, this procedure is only a guideline and is not a substitute for having headlamps professionally aligned.

SMOKE DETECTOR

Located on Ceiling

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.

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

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.

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

⚠ WARNING

TEST THIS ALARM'S OPERATION AFTER EACH STORAGE PERIOD, BEFORE EACH TRIP AND AT LEAST ONCE PER WEEK DURING USE. 020155e

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.

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.

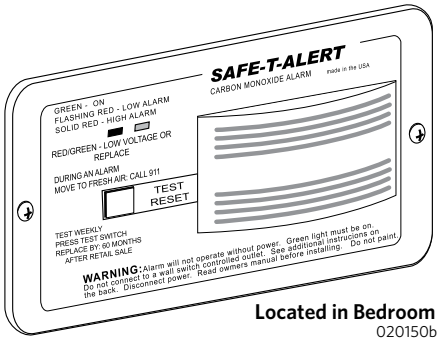
TROUBLESHOOTING

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



Located in Bedroom
020150b

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."

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, cardio respiratory 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.

CO Detector may be in combination with LP leak detector. If equipped with LP.

INFORMATION:
Refer to the CO Detector OEM Manual for detailed information and maintenance information.

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 etc. 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 illuminate, 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:

- Normal operation is indicated by a green light and no alarm. The CO detector has power and is sensing for the presence of CO gas.
- Flashing red indicates a low CO gas presence accompanied by four beeps then off for five seconds. This indicates the CO detector has detected at least 60 ppm of CO gas. The alarm can be silenced and reset by pressing the Test/Reset button.
- Steady red indicates CO gas levels over 100 ppm. The alarm will sound continuously until the Test/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 the 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 gas:

- 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 operation of the Carbon Monoxide detector after removing the motorhome from storage, before each trip and at least once a week during use.

Test by holding the Test/Reset button 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.

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 and 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.

Driving & Safety

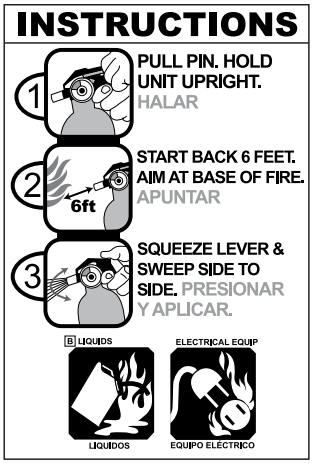
SECTION THREE

FIRE EXTINGUISHER

A fire extinguisher is located near the entry 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.

Use the PASS method:

- **P**ull the pin. Hold extinguisher upright.
- **A**im at the base (bottom) of the fire and stand six feet away.
- **S**queeze the lever to discharge the agent.
- **S**weep the spray side to side until fire is totally extinguished.



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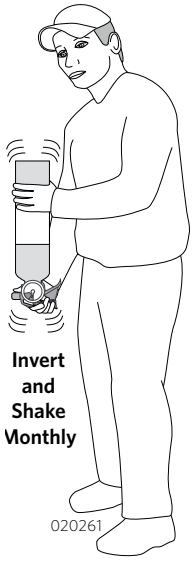
MAINTENANCE

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.

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.



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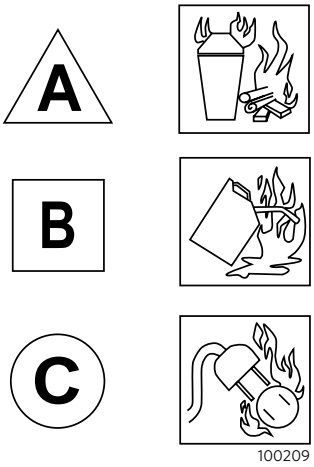
WARNING:
Road vibration will cause extinguisher powder to compact and may cause extinguisher malfunction. Invert and shake extinguisher monthly.

Classes of Fire:



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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.

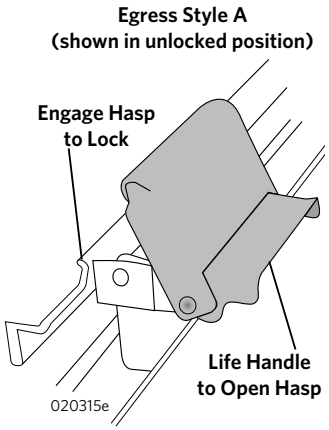
ESCAPE (EGRESS) WINDOW

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

080427m

To Operate:

- To open, lift handles and push window outward.
- To lock, pull window closed.
- Engage hasp with window trim.
- Lower lock handle. Hinges along the outside window top identify the Egress window on the motorhome exterior.



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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.

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Interior & Exterior Care

SECTION FOUR

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 recreational vehicle 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 finish. Care should be used when washing the recreational vehicle. Use only mild soap or (preferred) specifically designed automotive shampoo. Do not use abrasive cleansers or laundry detergents as these will scratch the clear coat and leave a soap film. Use a soft cotton cloth or specially designed microfiber and/or wool washing mitt when washing the paint finish. Do not use a brush as it can scratch the surface and damage the clear coat. Remove most of the accumulated dirt and road wash behind wheel openings and the rear of the recreational vehicle before washing. If build up is excessive, run water over a soft cotton cloth while gently wiping the surface in a downward direction. This will help float away the build up from the clear coat. Avoid using back and forth or circular motions when washing away build up as this can trap particulates and scratch the clear coat leaving a haze and swirl marks that will require a professional to repair.

After removing the heavy build up then wash the recreational vehicle. Start washing at the top working towards the bottom. If possible, wash the recreational vehicle in a shaded area when the exterior is not hot to the touch.

If necessary, turn the recreational vehicle around to keep the area being washed in the shade. Keep the surface wet and try not to allow the washing solution to dry before rinsing. Use plenty of water when rinsing the surface to remove all washing 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

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
- **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.

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- **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 and Service 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 automotive paint store.

NOTE:
All special paint schemes require contacting the manufacturer 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.

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.

BRIGHT METAL

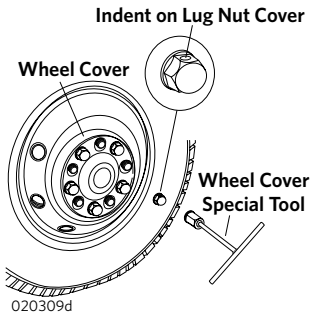
All chrome and stainless steel should be washed and cleaned each time the motorhome is washed. Use only automotive approved non-abrasive cleaners and polishes on exterior bright work. Do not use rubbing compounds. Do not use abrasive cleaners or compounds to clean the mirrors.

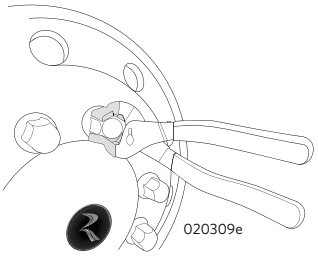
WHEEL COVERS

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.





Lug Cap Removal Tool (not provided)

- 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.

Interior & Exterior Care

SECTION FOUR

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 uses self-leveling 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

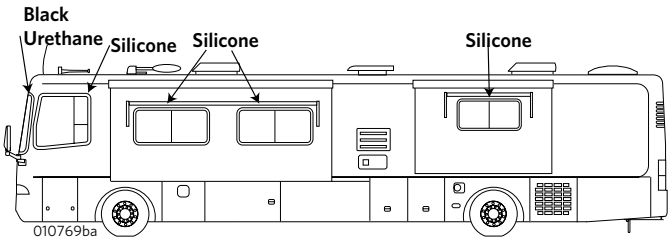
Roof: Dicor "Self Leveling"

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 1/2".



Typical Side View

Exterior Attachments: Sikaflex 221, SIA 477 and Locktite 5510

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: Expanding Spray Foam

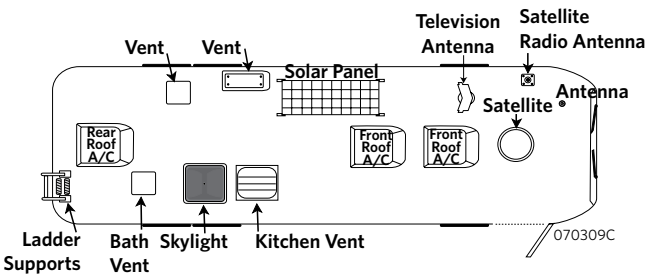
This product is used as a sealant where a hole has been made for items such as water lines or wires that are coming through a floor or bulkhead opening. Consult manufacturer data for application and safety instructions.

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.

Installing the windshield is a 3-step process using the following materials:

- Sika Primer 206
- Sika Aktivator
- Sika Adhesive 255FC



Typical Roof Layout

(Inspect each item for sealant integrity. Acryl-R is used as a roof sealant.)

Interior & Exterior Care

SECTION FOUR

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.

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 J*ohnson 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 over spray 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.

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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.

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.

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Use the solution specified in order from 1-8 until stain is removed	Dry Cleaning Fluid	Nail Polish Remover	Detergent Solution	Warm Water	Vinegar Solution	Ammonia Solution	Stain Removal Kit	Call Professional	Permanent Change
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	*

Use the solution specified in order from 1-8 until stain is removed	Dry Cleaning Fluid	Nail Polish Remover	Detergent Solution	Warm Water	Vinegar Solution	Ammonia Solution	Stain Removal Kit	Call Professional	Permanent Change
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.

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 (IF EQUIPPED)

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

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

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 a small amount of solution in an inconspicuous area to determine product suitability.

These recommendations have been included as recommendations only — consult a tile installation professional in the event additional information is needed or the process is not applicable. Cementitious grout is porous and will absorb moisture and stain. To reduce staining of the grout, many owners choose to seal the grout. Quality grout sealers provide better stain protection. If epoxy grout is used, it is virtually as stain proof as the tile.

Removing stains from cementitious grout is similar to removing stains from clothing. The same cleaners used on clothes to get out a stain should also work on grout.

Keep in mind grout is based primarily of cement and sand. Sand, like glass, is unaffected chemically by most cleaners. Cement is not; rather it is alkaline based and is dissolved by acids. As baking soda and vinegar react, so do grout and vinegar.

Accordingly, it is better to clean grout with an alkaline cleaner (*Spic N' Span*, *Mr. Clean,* etc.) than an acid based cleaner. There are also specially designed tile and grout cleaners available at most tile retailers.

There are also cleaners with enzymes that attack stains similar to enzyme pre-soaks for laundry. The same cleaner that works on the grout generally will work well on the tile. In fact, since the tile is usually easy to clean, the tile can often be cleaned with water.

Grout can absorb soap as well as a stains. Do not clean with oil or wax based cleaners such as *Murphy's Oil Soap*, *Pine Sol,* etc. These products will leave a waxy or oily film in the grout.

Even good alkaline cleaners, if not properly rinsed, will leave a sticky soap film. A sticky soap film attracts dirt.

Properly clean ceramic tile (without any sticky soap film) will stay clean longer as tile does not tend to hold an electrostatic charge which can attract some kinds of dirt.

The best way to clean grout is to apply the cleaner then use a wet/dry vacuum (shop vac) to pick up the solution. This lifts the dirt out of the joint. Apply rinse water and vacuum the rinse water. Vacuuming helps remove remaining soap film.

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.

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CAUTION:
Sealants can contain petroleum distillate. Open windows, vents and doors o 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.

As a last resort for tough stains, tile professionals may attempt to remove very stubborn stains with an acid such as straight vinegar or a stronger acid. This will dissolve the top layer of grout so the stain is no longer attached to anything. Acid washing is not recommended by grout manufacturers as this can destroy the grout to the point the area will need to be re-grouted. Also, extreme care should be used when handling any acids.

If unable to get the grout clean through conventional methods, try steam. Some stains that do not respond to conventional cleaners will come clean when subjected to pressurized steam.

If the stain remains after treatment, a tile professional may elect to cut out the stained grout and regrout. This is possible although care must be taken to not damage or loosen the tile. Generally, it is not possible to grout directly over the old grout without cutting the old grout out. The same contaminants that made the old grout dirty may prevent new grout from adhering properly.

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. 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.

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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 over spray.

> **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.

> **CAUTION:**
> Do not cut directly on the laminate 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.

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.

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

WINDOWS

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.

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

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 1/4 oz. clear liquid soap to 8 oz. water.

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.

Interior & Exterior Care

SECTION FOUR

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.

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 diesel tank and around the diesel 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 1/4" hole in the plastic. Place the trap in the area where fruit flies are present.

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.

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.

Interior & Exterior Care

SECTION FOUR

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.
- 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.
- Disable Auto Genstart
- Retract and secure all awnings.
- 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 AC power is not available, turn both the house and chassis battery disconnect switches off.
- If available, leave the motorhome hooked to shore power. Leave both the house and chassis battery disconnect switches on.
- 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.

If AC power is not available in storage area:

- Retract slide rooms. Do not store the motorhome with slideout rooms extended.
- Shut off all appliances.
- 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.
- Disable Auto Genstart.
- 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.

If AC power is available:

The house and chassis battery disconnect switches should remain on. The inverter will charge both the house and chassis battery banks. 30 Amp shore power service will be more than adequate.

Surfaces to park/store the motorhome on:

- 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.

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

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

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.

Interior & Exterior Care

SECTION FOUR

- 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 under inflation.
- 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. Diesel fuel is an organic material that can develop microbial growth (black algae). Fuel stabilizers may be added to control microbe growth and 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.

LUBE:

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

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.
- **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:** Diesel fuel tank should be full of fuel.

Appliances

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APPLIANCES — INTRODUCTION

This section covers operation and care of various appliances such as: the refrigerator, cooktop, microwave, roof air conditioner and optional appliances. The appliances operate on AC or DC current or a combination of both.

Refer to the OEM manuals for detailed operating instructions, features and routine maintenance.

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:
Do not store flammable liquids such as lighter fluid, gasoline or propane in the outside refrigerator compartment.

REFRIGERATOR — RESIDENTIAL

The refrigerator operates from shore power, the generator or from the inverter. The freezer door may be equipped with water and ice cube dispensers. Ice can be dispensed as crushed or cubed.

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

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

Refrigerator Operation from Inverter While Traveling:

Turn the inverter and refrigerator on. The electrical combination of the alternator on the engine 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 shorepower 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.

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.

NOTE:
Please refer to your OEM manual included in your Owner's Packet.

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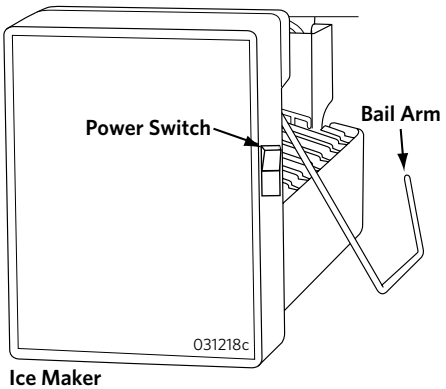
CAUTION:
Keep the fresh food compartment temperature at or below 40º F. to reduce the possibility of food spoilage. Place a separate thermometer inside the freezer or fresh food compartment to accurately monitor temperature.



Ice Maker

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 (If Equipped):
Press this button to select water from the dispenser.

ICEMAKER (If Equipped):
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.
- Lower the bail arm to turn the icemaker on. Raise the bail arm to turn the icemaker off.

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.

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.

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.

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

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 (If Equipped):
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.

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.

Operation:
- Hook to city water or turn on the water pump.
- Lower the bail arm to turn the icemaker on. Raise the bail arm to turn the icemaker off.
- Turn the icemaker off before travel to prevent water from spilling during transit.

WATER FILTER

The refrigerator may be equipped with a water filter for the ice and water dispenser. Refer to refrigerator OEM manual for maintenance of water filter.

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

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

TIPS:

- 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.

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.

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MICROWAVE

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.

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 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 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 Microwave 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 microwave oven due to the high rate of battery consumption.

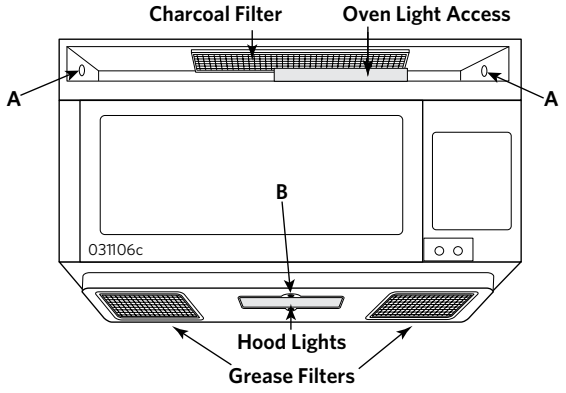
NOTE:
The microwave oven is for food preparation only. Do not use the convection microwave oven to dry clothes, newspapers, shoes or other items.

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

CAUTION:
Long-term use of the inverter to power the microwave oven while in transit will damage the alternator. Start the generator to power the microwave oven while in transit.

CARE & CLEANING

The exterior of the 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 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 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.

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.

- Replace light cover, louver and mounting screws.

Hood Light:
- Remove power to the 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.

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

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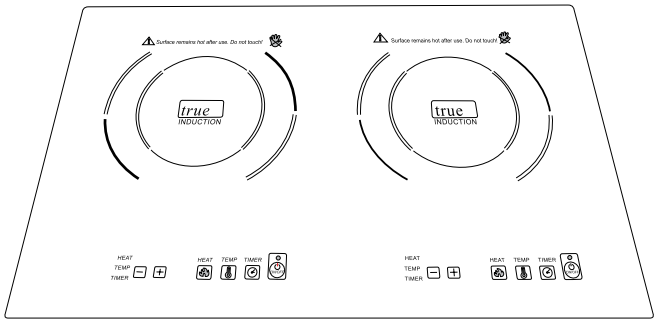


Induction Cooktop 031274k

- 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 outside oven 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 inside the oven, 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.

WARNING:
Use only cookware that is magnetic. Place only cookware on the cooktop. Avoid placing flatware or other magnetic items on the cooktop as these can become immediately hot resulting a burn.

NOTE:
Refer to the OEM cooktop manual for further information about cookware.

CAUTION:
While only cookware is heated during operation, the cooktop surface can be warm/hot to the touch due to heat transfer by the cookware to the cooktop. A burn can still occur.

CLEANING
Use only water and soft cotton cloth or microfiber cloth. Mild dish soap can be used if needed. Excess water during cleaning is not recommended as water can enter and damage the cooktop.

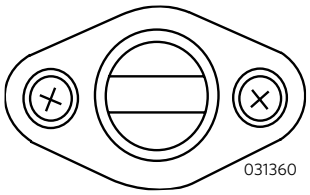
3 A/C Setup	Zone 1	Zone 2	Zone 3
Cool	Living Room A/C	Living Room A/C	Bedroom A/C
Heat	Living Room	Living Room	Bedroom

2 A/C Setup	Zone 1	Zone 2
Cool	Living Room A/C	Bedroom A/C
Heat	Living Room	Bedroom

NOTE:
Do not select conflicting modes of operation. One zone cannot be on Cool while another zone is set to Heat.

NOTE:
The motorhome will not heat or cool faster by selecting a very high or very low temperature setting.

COOKTOP — ELECTRIC



Remote Temperature Sensor

The electric cooktop operates from 120 Volts AC supplied from either shore power or the generator. The cooktop operates through induction of a magnetic field to the cookware. Cookware of iron, stainless steel and copper are acceptable. Aluminum cookware is not recommended but cookware with an aluminum-clad bottom to stainless can work but with reduced results compared to iron cookware. Glass cookware will not work. A test of acceptable cookware is if a magnet will adhere to the cookware. Heating of cookware is relatively fast with temperature changes occurring quickly similar to gas (propane) cooktops.

While the cooktop has two elements, power level 10 is the maximum amount of power available to operate one or both elements. If both elements are active, the maximum power level is shared to a multiple of 10. One element can be set to 6 while maximum power available for the other element would be 4 as an example.

NOTE:
Due to the electrical load shed feature incorporated in the load center, the air conditioning system may be disabled when hooked to limited shore power service. Refer to the Load Center in Section 8 for more information.

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.

NOTE:
The compressor will engage approximately two minutes after blower motor activation to prevent accidental compressor operation against high pressure.

NOTE:
Fan speed is not adjustable in heat pump mode.

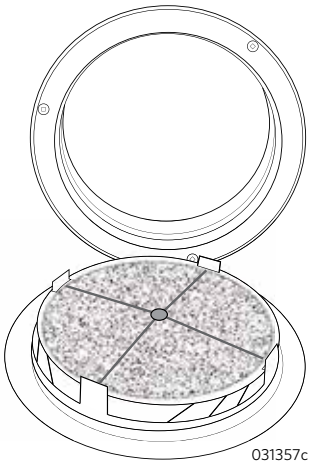
Appliances

SECTION FIVE

NOTE:
The roof air conditioner will not operate in heat pump mode with ambient temperature of approximately 41° F. The furnace will become the primary heat source. If zone temperature and temperature set point is greater than 5º, the furnace will become the primary heat source until temperature disparity is less than 5º.

To Operate the Cooktop:

- Hook to shore power or start the generator.
- Place only cookware onto the area indicated on the cooktop.
- Turn on the cooktop. The default setting is 5.
- Adjust power to the desired level.
- Turn off the cooktop when finished.



Return Intake Vent

Cooking temperature is selected by using either the Temp(erature) or Heat feature. The Timer feature can be set in 5 minute intervals up to 150 minutes.

For safety, the cooktop will automatically shut off a few minutes after cookware is removed from the cooktop or after 3 hours of continuous operation.

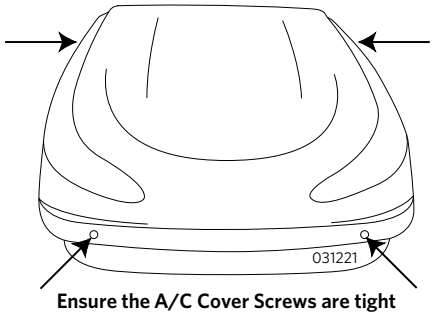
AIR CONDITIONING — ROOF

THERMOSTAT

Thermostat control is via Multiplex Control. See OEM Manual for Multiplex System.

Remote Temperature Sensor

Remote temperature sensors are located throughout the motorhome to ensure accurate temperature control.



Ensure the A/C Cover Screws are tight when the roof is accessed.

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.

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.

NOTE:
Antifreeze is propylene glycol based boiler antifreeze. Do not mix or substitute with automotive antifreeze.

NOTE:
The Aqua-Hot must be turned on to supply heat. Select either diesel or electric (or both) mode of operation.

AIR CONDITIONER MAINTENANCE

Return Air Filters:

Frequently clean the return air filters. The filters are located behind the return air vent cover.

To Remove Vent Covers:

- There are 2-6" return intake vent covers per roof A/C.
- Pull down on intake filter cover.
- Spread tabs apart to remove filter retainer.

> **WARNING:**
> Carbon Monoxide hazard! Do not operate the diesel burner when the motorhome is located inside a building or in confined areas where exhaust gases may not disperse adequately. Lethal levels of Carbon Monoxide can accumulate.

To Clean the Return Air Filters:

- Wash filters in warm soapy water. Do not use solvents.
- Rinse filters thoroughly with fresh water. Allow to thoroughly dry.
- Install filters and snap intake vent covers in place.

Mounting Bolts:

The roof air conditioners are secured to the roof using a "top-down" method. Silicone sealant is applied upon initial installation in conjunction with a closed cell foam gasket. It is recommended to annually check torque of the securing fasteners. This will require removal of the exterior cover.

Zone 1	Zone 2	Zone 3
Living Room	Bedroom/ Bathroom	Water Center/ Water Tanks

Zone Chart

> **NOTE:**
> A separate thermostat is used to set temperature of Zone 3. See Bay Thermostat for instructions.

> **NOTE:**
> Do not set the thermostat to conflicting modes of operation such as setting one zone to Cool with another zone is set to Heat. Operating mode in any zone must be set to heat (or off) for the Aqua-Hot and thermostat to function properly.

AC Cover Screws:

When periodically inspecting the condition of roof sealant, it is recommended to remove the AC cover to check the torque of the fasteners that secure the AC unit to the roof. Replace the AC cover when finished. Periodically check torque of the fasteners securing the cover to the base.

AQUA-HOT (IF EQUIPPED)

The Aqua-Hot appliance is a water heater and furnace combined. A diesel fired burner and/or two AC elements (used separately or in tandem) heat a 50/50 solution of Propylene Glycol antifreeze and water to approximately 190º F.

The heated antifreeze solution circulates through heat exchangers to provide interior heat. Potable water is heated by the Aqua-Hot for domestic use. The Aqua-Hot also has an engine preheat feature for easier starting in cold temperatures. The Aqua-Hot control switches are located in the galley area and the engine pre-heat switch is located at the dash.

Diesel Burner:

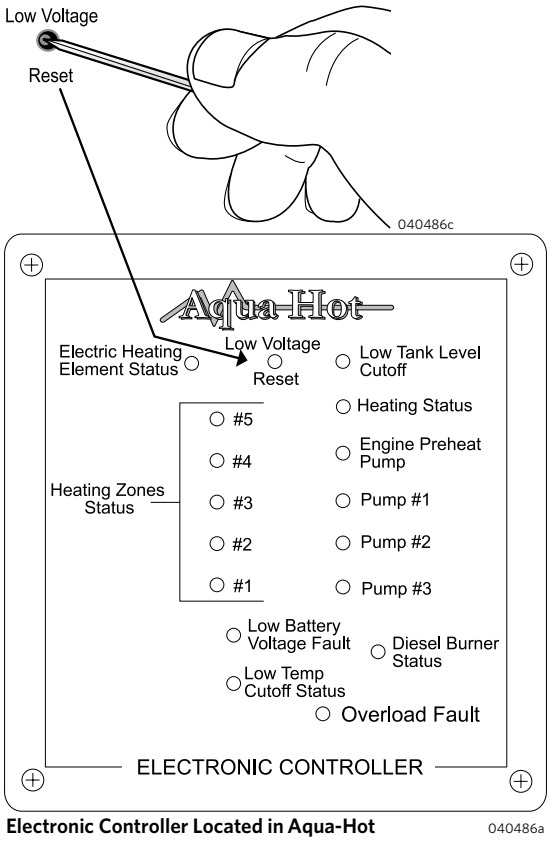
The Aqua-Hot consumes approximately .4 gallons of diesel fuel per hour of continuous burner operation. Recovery rate is faster when operating on diesel versus AC electric operation. To heat the Aqua-Hot with the diesel burner, press the Diesel switch. The Active indicator will illuminate when the Aqua-Hot diesel switch is on. The burner will need to operate for approximately 20 minutes before maximum heat is available for interior heating or hot water.

AQUA-HOT OPERATION — DIESEL

- Turn on interior house power.

- Press the Aqua-Hot Burner switch.
- Press the Systems button until Heat is displayed.
- Press the thermostat Zone button repeatedly to select desired zone. Refer to Zone Chart.
- Press the thermostat Mode button repeatedly until Gas is displayed for each zone of operation.
- Set desired temperature on thermostat by pressing the Up or Down buttons.
- Repeat process for each desired zone.

Electric Heat Element:
The Aqua-Hot has a 1650 watt heating element. If shore service is limited to 30 Amps or less, it is recommended to operate the Aqua-Hot using the diesel function to avoid electrical overload of shore power. While the generator can power the electric element, it is not fuel efficient to do so.



Electronic Controller Located in Aqua-Hot 040486a

Preheat time is longer and recovery rate is slower when using the electric element. The Aqua-Hot electric switch is located on the monitor panel.

AQUA-HOT OPERATION — ELECTRIC
- Hook to shore power.
- Turn on interior house power.
- Press the Aqua-Hot electric switch. The switch will illuminate when on.
- Slide thermostat switch to Heat.

> **NOTE:**
> The Engine Assist will not provide enough heat while traveling in cold weather (below 50º F.) The diesel burner must be on for comfort heating while traveling in cold weather.

> **NOTE:**
> Comfort heating can still be used in transit if the Aqua-Hot has been winterized.

- Press the Zone button repeatedly to select desired zone. Refer to Zone Chart.
- Press the Mode button repeatedly until Gas is displayed for each zone of operation.
- Set desired temperature on thermostat by pressing the Up or Down buttons.
- Repeat process for each desired zone.

Interior Heat Exchangers:
Heat exchangers are located throughout the motorhome and in the water service center. The heat exchangers are small radiators equipped with 12 Volt DC blower motors. Depending on the zone selected for operation and temperature set point, the blower for an exchanger will operate until the temperature set point is reached or until the mode for an operating zone is turned off.

Engine Preheat:
The Aqua-Hot system has an engine preheat feature to aid engine starting in cold weather. Inside the Aqua-Hot is an engine coolant loop and pump that will circulate heated coolant through the engine.

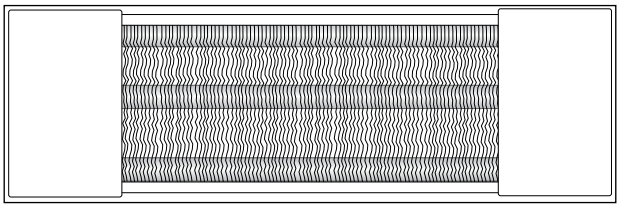
To Use Engine Preheat:

- Turn on the Aqua-Hot Diesel switch at the galley and allow the system to warm up.
- Turn on the Aqua-Hot Engine Preheat switch at the dash to activate the engine pump inside the Aqua-Hot. The time required to preheat the engine varies with ambient temperature. Allow two or three hours of engine pre-heat time.

Engine Heat Exchange System:

When traveling, the water pump on the engine circulates heated engine coolant through the Aqua-Hot. Heat transfers to the Aqua-Hot coolant through convection providing hot water. Use the thermostat to operate heat exchangers for interior heating while traveling.

To Heat the Interior While Traveling:



Typical Heat Exchanger 040646c

NOTE:
Turn the thermostat to the Off position when cleaning the exchangers.

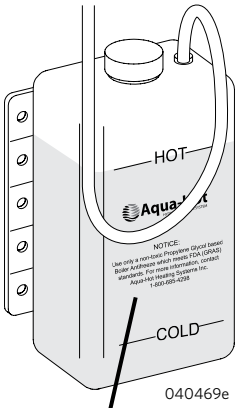
- Turn on the interior house power.
- Turn on the diesel burner.
- Set thermostat switch set to Heat.
- Repeatedly press the mode button until Gas appears.
- Select the desired Zone.
- Use the up or down buttons to set temperature.

TROUBLESHOOTING

Should the Aqua-Hot System fail to operate, complete the following checks:

1. Verify the Aqua-Hot front cover is properly installed. The Aqua-Hot will not function if the front cover is not properly installed or removed.
2. The diesel burner will not operate if fuel level is at or below 1/4 tank.
3. Ensure the coolant reservoir has an adequate supply of coolant. The reservoir is located next to the Aqua-Hot.
4. If the indicator light on the Aqua-Hot diesel switch does not illuminate, and the diesel burner is not functioning, the electronic controller may indicate a fault. Check the controller for any Red lights indicating a fault condition. If the Low Voltage Reset LED is illuminated, charge the house batteries then reset the controller by pressing the reset button or cycling the Diesel switch off then back on. Check for loose wire connections on the electronic controller terminal strips/plugs.
5. Electronic Controller Diagnostic: Green LED lights

CAUTION:
Use only non-toxic propylene glycol based coolant recommended for boiler applications. The coolant is FDA approved GRAS (Generally Recognized as Safe by the FDA). To obtain the recommended antifreeze, contact Vehicle Systems Inc. at 1-800-685-4298.



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NOTICE
Use only a non-toxic Propylene Glycol based boiler antifreeze that meets FDA (GRAS) standards. For more information, contact Aqua-Hot Heating Systems Inc. 1-800-685-4298

indicate the system is operating and functioning normally. A Red LED indicates a system fault.

6. If a fault exists, indicated by a Red LED illuminated, refer to Aqua-Hot OEM manual for further information.

BAY THERMOSTAT

An adjustable thermostat turns on the heat exchanger in the water center to help protect against freezing. Thermostat temperature can be adjusted to suit needs. It is recommended to set the exterior thermostat to about 40º F.

MAINTENANCE

NOTE:
Comfort heating can still be used during transit if the Aqua-Hot has been winterized.

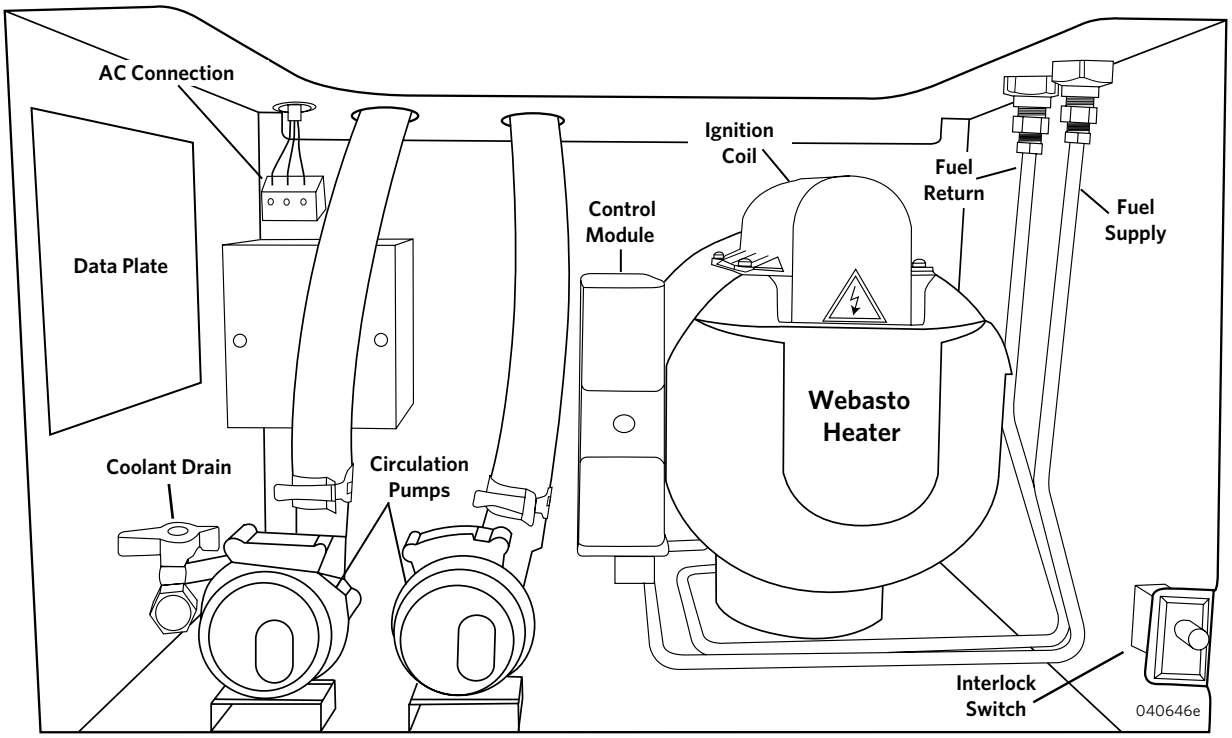
CAUTION:
Disconnect all sources of power before cleaning or servicing.

CAUTION:
If the motorhome is hooked to shore power during the winter months and the Aqua-Hot is operating on the electric element, a temporary power outage can allow the system to freeze resulting in damage.

CAUTION:
If not properly and thoroughly rinsed, bleach or other concentrated chlorine bearing chemicals can cause failure of the domestic water loop inside the Aqua-Hot.

Heat Exchanger:

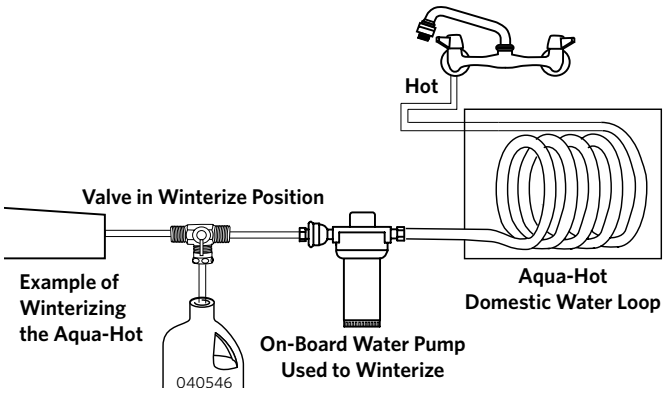
Exchangers can be clogged by pet hair and other



debris, reducing heating performance. The exchangers require a minimum semi-annual cleaning of the heating fins, blower fans and register box. Clean the area around the exchanger to reduce re-occurrence of buildup. A vacuum cleaner works well for cleaning the exchanger and surrounding area.

Cleaning the Exchanger:
Exchangers can be located under the sofa, behind cabinets or under false floors in base cabinets. Access may be limited. Use caution to not puncture coolant lines or exchanger core. Gently remove retaining screws. Set fans to the side.

Vacuum debris and hair from inside of register. Use care not to bend or disfigure fins on exchanger. Vacuum fans then wipe clean with a soft cloth or paper towel.



Reinstall fans and registers. Clean wood or metal vents in front of heat register with a soft cloth or vacuum attachment.

Coolant:
The coolant is a special "boiler type" propylene glycol base coolant. It has low silicate content with corrosion inhibitors and heat transfer compounds. This type of antifreeze provides freeze protection and excellent heat transfer for operating efficiency.

The coolant is mixed 50/50 with de-ionized water (water purified by reverse osmosis). Do not mix with automotive antifreeze as this can cause scaling and possible component failure. The coolant can be purchased directly from Vehicle Systems Inc.

Reservoir:

The coolant reservoir is located in the bay with the Aqua-Hot. Check the reservoir level monthly. The proper coolant level should be at the Full Hot level when the diesel burner has just shut off. If necessary, add coolant to the reservoir only when the Aqua-Hot has achieved operating temperature to prevent overflow when the system cools.

Aqua-Hot Fuel Filter
090483b

Disinfecting:
The tubing inside the Aqua-Hot is rated for fresh water and winterizing solutions. The Aqua-Hot domestic water loop can be disinfected periodically by flushing a disinfecting solution through the Aqua-Hot. The disinfecting solution must be thoroughly rinsed otherwise damage to the Aqua-Hot domestic water loop can occur.

NOTE:
It may be necessary to cycle the diesel burner switch on and off a few times to thoroughly purge the fuel system of air.

Appliances

SECTION FIVE

FURNACE

(IF EQUIPPED WITH PROPANE)

The furnace is 12 Volt DC Operated and uses propane as the fuel source. Electronic circuity (automatic ignition) ignites the burner. The furnace uses outside air for burner combustion.

Exhaust is expelled through the outside vent. Interior air is drawn into the furnace and blown across the internal heat exchanger. Heated air is discharged through ducted hoses to the heat registers.

OPERATION

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 the automatic ignition cycle will begin.

The furnace 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.

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 disconnect switch is on.

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.

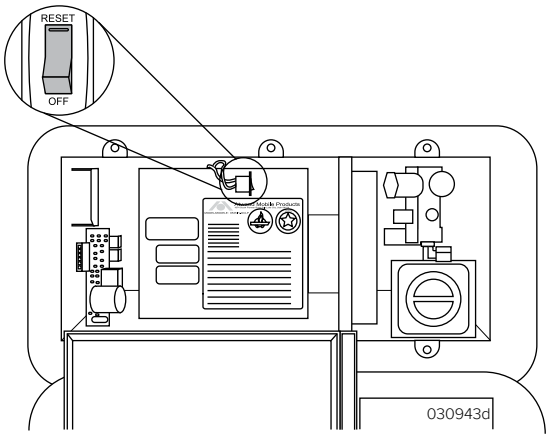
TROUBLESHOOTING

- Make sure the primary propane shutoff 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

WATER HEATER (IF EQUIPPED WITH PROPANE)

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.

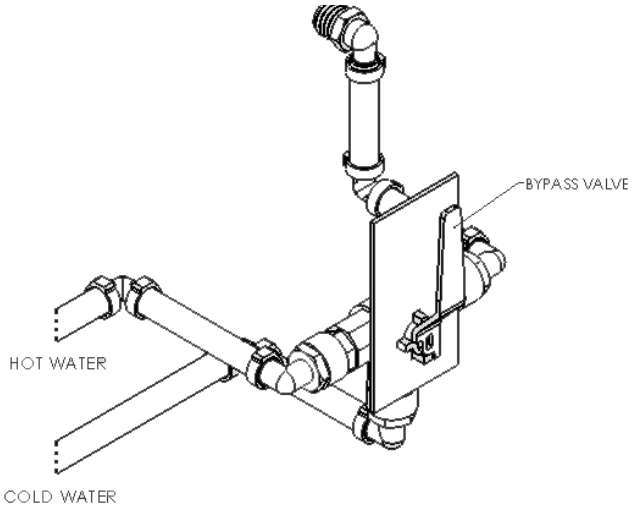
The 120 Volt AC function is most energy efficient when operated from shore power. The burner for propane operation is controlled by an automatic ignition circuit board powered by 12 Volt DC. Two thermostats control water temperature, one for 120 Volt AC and the other for propane. Thermostat temperature 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 valves (located on back of water heater) to Normal Flow by opening the Hot and Cold water valves and Closing the Bypass valve (as shown). If necessary, install the drain plug.



- 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

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.

Appliances

SECTION FIVE

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.

OPERATION (IF EQUIPPED WITH PROPANE)
The water heater uses propane and an automatic ignition system to light the main burner to heat water. The thermostats are non-adjustable.

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.

CAUTION:
Do not operate the water heater without water. Damage to the thermostats can occur.

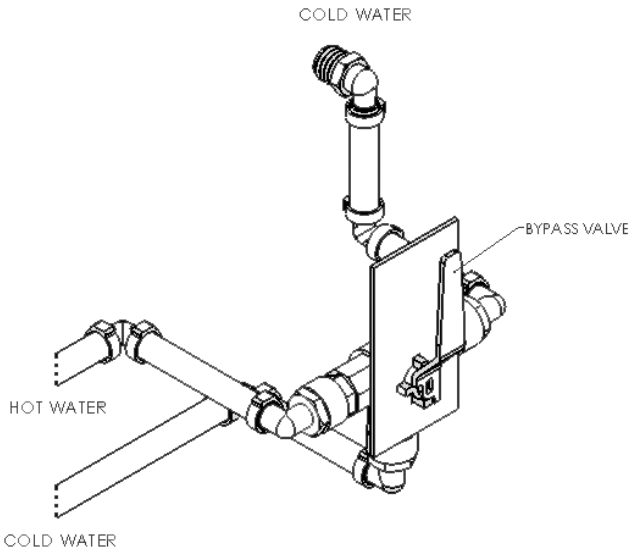
WARNING:
Before beginning any service or work on the water heater, make sure the propane is turned off and the 120 Volt AC and 120 Volt DC sources have been disconnected. Failure to do so can result in explosion, fire or injury.

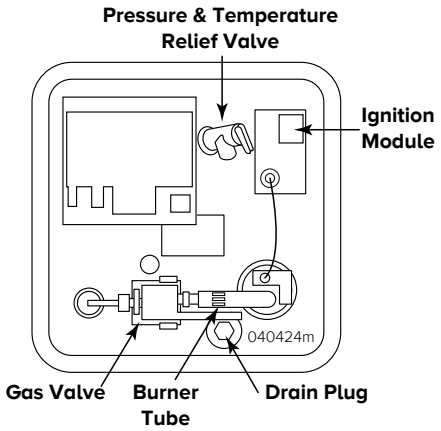
CAUTION:
It is recommended not to operate the water heater on propane while motorhome is in transit. The water heater must be off before refueling.

High Temperature Thermostat:
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.





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 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.

- 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 flow of combustion and ventilating air. The water heater drain plug and pressure relief valve are located inside.

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.

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.
- 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. Th valves can be purchased from most hardware store.

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. Check for a blown fuse in the house distribution panel.

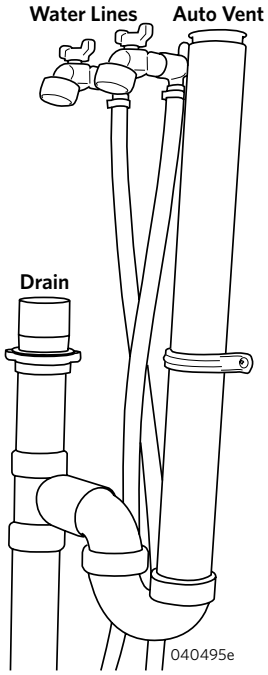
NOTE:
Be sure to refill the water heater with water before resuming operation.

- 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 PREPARED

If the motorhome was not ordered with a washer-dryer, it will have a washer-dryer preparation package installed from the factory. The washer-dryer "prep" package includes the following items:

- Color coded water supply lines. A red line for hot; a blue line for cold.
- A 1 1/2" water drain line with threaded cap, P-Trap and an automatic vent cap.
- A 120 Volt receptacle located in the compartment.



If a washer-dryer is to be installed at a later date, follow the manufacturer's installation instructions. Further instructions for safe and reliable operation:

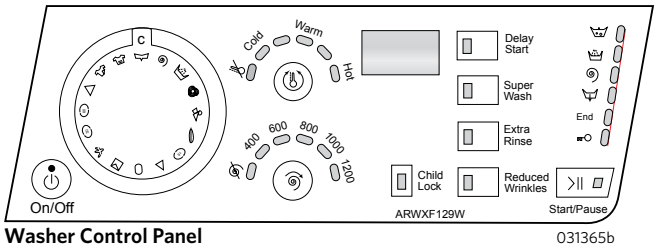
- Do not connect the clothes dryer exhaust duct to any other duct, vent or chimney.
- Do not terminate the exhaust duct beneath the motorhome.
- Use proper length fastener when attaching exhaust vent to exterior sidewall. Stainless steel fasteners are best as they will not rust.

NOTE:
Sidewall dryer vents are not part of the prep package. If a sidewall vent is to be installed, properly seal the vent to sidewall.

- If the cabinet or closet in which a washer-dryer is installed does not have vented louvered doors, the manufacturer's installation instructions may require installation of vents for sufficient circulation of air.

WASHER/DRYER STACKED (IF EQUIPPED)

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.



Washer Control Panel 031365b

TEST CYCLE

Before using the washer for the first time, or after a long period of non-use, run a test cycle. 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.

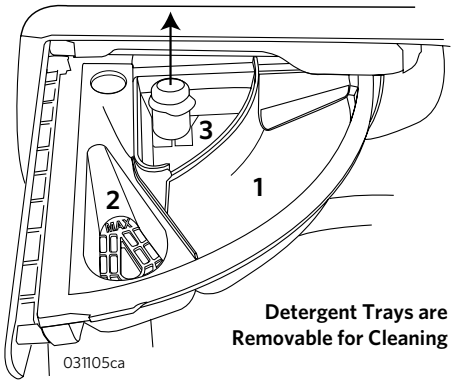
Test cycle requirements:

- 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).
- Hookup to shore power, or turn on the generator.

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.



Detergent Trays are Removable for Cleaning

Conducting a Test Cycle:

1. Add 1/2 tablespoon of detergent to the detergent chamber (#1 in illustration) of the automatic dispenser.
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.

CAUTION:
Ensure the automatic dispenser is in place before starting the washer. Do not open the automatic dispenser when the washer is running.

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.

Appliances

SECTION FIVE

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:

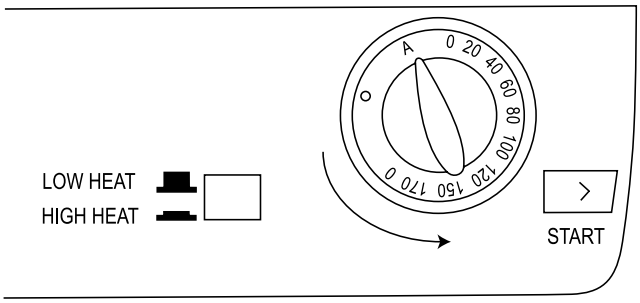
- Connect inlet hoses and turn water faucets on.
- Connect power supply.
- Add 1/2 tablespoon of detergent to the dispenser detergent compartment (#1).
- Turn cycle knob to #15, and let the washer run through the complete cycle to ensure all antifreeze is purged.

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.

NOTE:
Due to the automatic load shed feature in the load center, power to the dryer may be disabled until sufficient AC power is available. See "Load Center" Section 8 for more information.

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).

NOTE:
Timer knob rotates only counterclockwise.

3. Press the Start button to start the drying cycle.

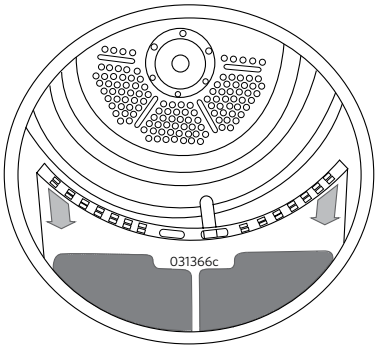
4: Open the door to stop the dryer at any time.

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.

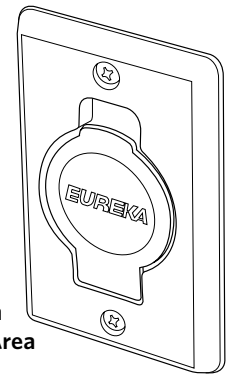
CENTRAL VACUUM

OPERATION

- Hook to shore power or start the generator.
- Lift lid on wall receptacle to start vacuum. Insert the hose.
- Connect desired attachment n hose.

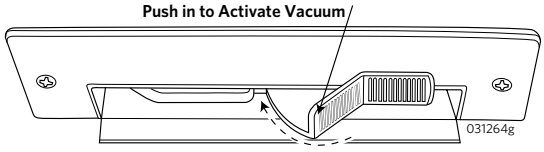
Floor Receptacle:

INFORMATION:
Refer to the vacuum OEM manual for detailed operation and maintenance.



Inlet Located in Living Room or Bathroom Area
031264f

- Push handle to open receptacle.
- Sweep debris into the receptacle.



Appliances

SECTION FIVE

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 1/2 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 3/4 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.

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.

FIREPLACE ELECTRIC (IF EQUIPPED)

The fireplace operates on 120 Volt AC supplied by shore power or the generator and produces heat using interior lamps. At initial start up or if the fireplace has not been used for a while, the fireplace may emit a slight odor caused by heating of internal parts. Follow the recommendations to reduce risk of fire, electrical shock or injury.

Recommendations:

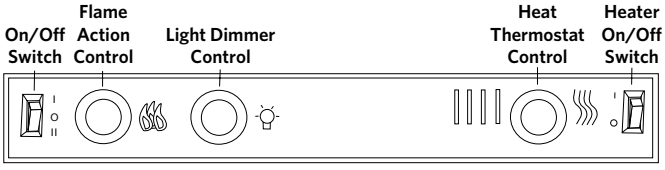
- Read all instructions prior to using the fireplace.
- The fireplace is hot while in use.
- Do not touch as surfaces are hot.
- Keep combustible materials, such as furniture, pillows, bedding, paper, cloth etc. at least 3 feet from the front of the unit.
- Do not spray or use cleaning products in the exhaust blower section of the fireplace as these can cause smoke or fire when the fireplace is turned on.
- Use caution when operating the fireplace with children or handicapped persons.
- Do not leave the fireplace unattended.
- To prevent a possible fire, do not block air intake or exhaust.
- Do not store gasoline, paint, or flammable liquids near the fireplace.
- Do not modify the fireplace. Use only as described. Any other use not recommended by the manufacturer may cause fire, electric shock or injury.
- Do not burn wood or other materials in the fireplace as there is no chimney flue.
- Do not strike fireplace glass.
- Disconnect power before cleaning or maintenance.
- Open panel to access manual controls.
- Set the On/Off switch to the (I) position to use manual controls. Position (II) is for use with a remote control (not all units).

NOTE:
To limit over current, only one of the following can be used in sequence: The front air conditioner or the optional fireplace. This is due to the automatic appliance selector.

INFORMATION:
Consult fireplace OEM manual for detailed maintenance and operating instructions.

Flame Action:

- Turn the flame action control knob to adjust flame speed.



Fireplace Controls 031312c

Light Dimmer Control:

- Turn the knob to increase or decrease brightness of flame and embers.

Heater On/Off switch:

- Supplies power to heating element when main On/Off switch is On.

Thermal Over temperature Switch:

- The fireplace is equipped with a thermostat to control room temperature. In the event the fireplace overheats, an automatic over-temperature switch will turn the fireplace off.
- The fireplace can be reset by switching the On/Off switch to off and waiting five minutes before turning the fireplace back on.

CAUTION:
Discontinue use and contact a service technician if frequently resetting the fireplace.

Light Bulb Replacement:
Light bulbs should be replaced when a section of the flame is dark or when clarity and detail diminishes. Two bulbs at the top of the opening illuminate the log exterior. Four bulbs under the log simulate flames and embers. It is recommended to replace all bulbs as a set.

- Remove the trim by pulling straight forward.
- Hold glass in place while removing retaining top clip.
- Lift glass out and store in a safe place.

WARNING:
To reduce the risk of fire or electric shock, turn off circuit breaker before maintenance or cleaning.

CAUTION:
Use care when handling the glass. Safety glass may break if bumped, struck or dropped.

NOTE:
Do not exceed 60 watts per bulb. Verify brand and size of bulb before obtaining replacements. Allow at least five minutes for bulbs to cool before touching.

TIP:
Replace all bulbs if they are close to the end of rated life.

FLOOR HEAT — TILE (IF EQUIPPED)

Heated flooring warms the tile floor. The system is not designed as the primary heat source. Due to power consumption, the system is best used when connected to 50 amp shore power.
Due to priority of the appliance selectors, floor heat in the living room and galley will operate only when the central vacuum is off. The floor heat in the bedroom will operate when the engine block heat is off. See "Appliance Selector" in Section 4.

NOTE:
The floor heat system is not designed as a primary heat source. The Aqua-Hot and/or roof A/C heat pumps are intended as primary heat sources.

To Use Floor Heat:

1. Connect to 50 amp shore power or start the generator.
2. Turn house battery cutoff switch on.
3. Turn on the floor heat thermostat. The display will show sensor temperature, set point temperature, and other information.

Controlling the Temperature:
The thermostat has several ways to control the floor warming system. See OEM Manual for Multiplex System.

Adjust the Temperature:

1. Press the down or up button and hold for 1 second. The set point temperatures should be blinking.
2. Press the down or up button again to adjust the temperature.
3. Press the Hold/Return button or wait 5 seconds and the thermostat will return to the normal operating mode, saving adjustments to memory.

The thermostat has several ways to control the floor warming system. See OEM Manual for Multiplex System.

WINTERIZE THE AQUA-HOT

The Aqua-Hot can remain on during the winter months. If the motorhome is to be winterized and stored over the winter with the Aqua-Hot turned off, the Aqua-Hot domestic water loop must be winterized with FDA approved RV antifreeze to prevent freeze damage.

FDA approved RV antifreeze must be pumped through the Aqua-Hot until the solution appears at the hot water side of a faucet. The on-board water pump can be used (see illustration) to purge water from the Aqua-Hot domestic water loop.

Refer to the Aqua-Hot owner's manual for complete winterizing instructions. If the system is operating from AC electric and a power outage occurs, extensive damage to the Aqua-Hot may occur.

ANNUAL TUNE UP

The Aqua-Hot requires an annual tune up consisting of a fuel nozzle, fuel filter replacement and a thorough cleaning of the combustion chamber. A tune up will allow service personnel to inspect for additional wear of other components.

Signs that the Aqua-Hot may need servicing are continuous white exhaust smoke, poor ignition start up or loss of heat output. When in operation, the Aqua-Hot should have a smooth, high-pitched whine. Loud growls or other abnormal noise indicates service or repair is required.

Fuel Filter Replacement:

The fuel filter is located in a curbside bay with the fuel tank. As a guideline, change the filter annually or at the first indication of heat loss. It is recommended to carry an extra filter as one tank of contaminated fuel can plug a fuel filter. Replacement filters must have a 10-micron rating.

Gar-ber Filter Number: Model #R, 10 micron.

To Replace the Filter:

- Ensure the Aqua-Hot Diesel switch at the galley is turned off.
- Spin the filter counterclockwise and remove from head. Remove old O-ring gasket.
- Install new O-ring supplied with filter. Ensure the gasket is seated in the groove around the filter canister.

INTERNAL DIAGRAM

- Apply clean lubricating oil to the new filter gasket.
- Spin filter onto head until filter makes contact then tighten an additional 3/4 of a turn. Do not over-tighten.
- Start the Aqua-Hot and check the fuel filter for leaks.

> **NOTE:**
> Refer to the OEM manual for detailed operating instructions.

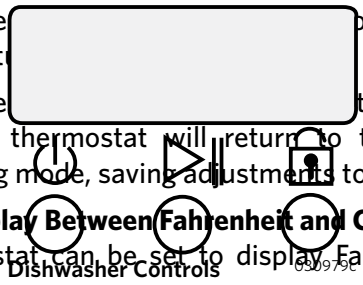
Controlling the Temperature:

Adjust the Temperature:

1. Press the down or up button and hold for 1 second. The set point temperatures should be blinking.

> **NOTE:**
> Refer to the OEM manual for complete operating instructions.

2. Press the o adjust the temperat
3. Press the t 5 seconds and the thermostat will return to the normal operating mode, saving adjustments to memory.



Dishwasher Controls 0309796

Change Display Between Fahrenheit and Celsius:

The thermostat can be set to display Fahrenheit or Celsius.

Change Display Between Fahrenheit and Celsius:

The thermostat can be set to display Fahrenheit or

Equipment

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Equipment

SECTION SIX

EQUIPMENT — INTRODUCTION

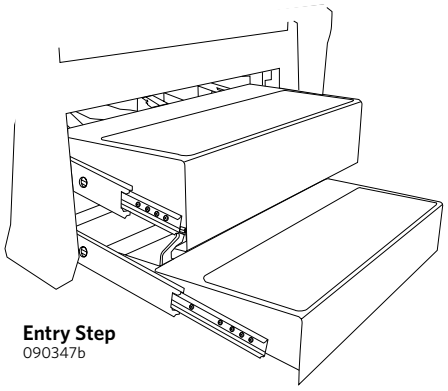
This section covers the basic operation and care of equipment found in the motorhome. More detailed information about specific equipment may be found in that particular OEM manual. Optional equipment will also be discussed in this section that may not apply to all motorhomes.

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.



Entry Step
090347b

Located at base of passenger console

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.

NOTE:
The chassis battery disconnect switch must be on for the entry step to operate.

Entry Step Operation:
With entry step switch on, the step will extend and retract when the entry door opens and closes.

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 to retract. Visually confirm that the step is fully extended prior to exiting the vehicle.

BE SAFE - LOOK BEFORE YOU LEAP! 020325

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 care when parked on side streets.

If the entry step fails to operate:

- Verify that the 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

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.

ELECTRIC STEPWELL COVER (IF EQUIPPED)

The motor home may be equipped with a electrically operated stepwell cover. The stepwell cover closes off the stepwell area when traveling. When the cover is extended, it provides a floor surface.

Stepwell Cover Operation:

1. The stepwell cover control is located on the passenger side of the overhead.
2. To extend the cover, move the control switch forward.
3. To retract the cover, move the control switch rearward.
4. The stepwell cover cannot be pushed in manually to retract. To retract the cover manually:

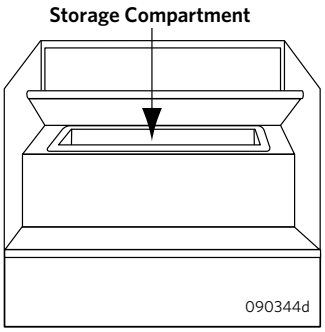
Located on passenger console

- Remove the clevis on the bottom of the stepwell. This process is slightly difficult and is best performed by an authorized dealer.

CAUTION:
When operating the stepwell cover, make sure there are no pets, shoes or other obstructions in the stepwell area. Do not operate the stepwell cover while standing in the stepwell area.

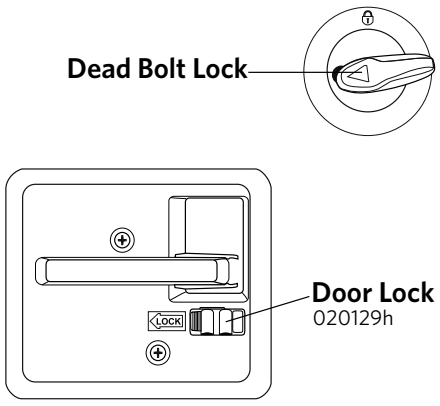
STEPWELL STORAGE (IF EQUIPPED)

The interior stepwell features a storage compartment in the upper step. This compartment is ideal for storing items such as gloves (for refueling), tire pressure gauge, flashlights or outside slippers.



ENTRY DOOR

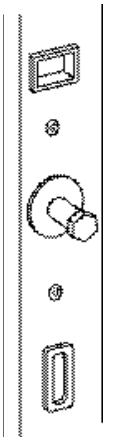
The entry door incorporates three separate seals to eliminate wind noise during travel. The door uses two separate locks for safety and security: the door handle and a dead bolt. The door handle incorporates a primary and secondary latching system used to ensure secure and safe latching. Adjustments can be made to help maintain entry door performance.



Equipment

SECTION SIX

Adjusting the Entry Door Latch: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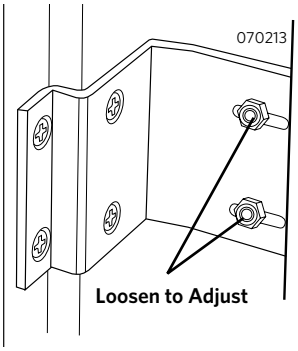
- Determine which bolt needs adjustment.
- Slowly close the entry door, observing the latch and strike bolt alignment. Do not attempt to latch if the alignment is off. If the alignment is correct, allow the latch to catch in the first (primary) position only.
- The latch should move to the second position 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.
- 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.

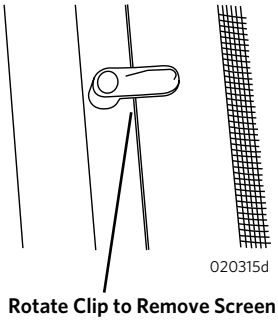
Adjusting the Screen Door:



- 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.

Removable Screen:

The top half of the screen door is removable, allowing a clear view through the entry door glass while in operation.



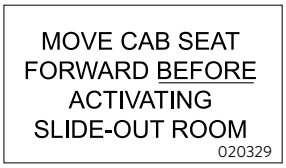
- To remove the top half of the screen door for travel, rotate clips and remove the screen.
- To store the screen for travel, use the clips provided on the bottom half of the screen door.

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 slideout room, secure all cabinet doors in the closed position prior to room activation. Interior doors may require being fully open or fully closed for sufficient clearance to operate the slideout(s).

Slideout Operation Requirements:

- Engine is running.
- Park brake is applied.
- House battery disconnect switch is on.
- House batteries are charged.
- Hydraulic jacks are extended with the motorhome supported by the leveling jacks.



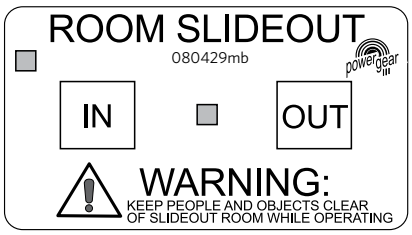
EXTENDING & RETRACTING SLIDE ROOMS

CAUTION:

To extend or retract the slideout room, the ignition must be on, the engine running and battery voltage 13.0 volts. Apply the park brake. 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:

- Ensure the park brake is applied.
- Start the engine.
- Level the motorhome using the hydraulic leveling panel. The motorhome must be supported by the air suspension before operating any slideout room.
- Shut off the engine.
- Move the driver and passenger seat forward.
- Clean the floor of dirt or grit that could result in damage during operation.
- Confirm there is sufficient clearance inside/outside the motorhome for the room to extend/retract.
- Allow at least five feet of clearance to extend the slideout.
- If applicable, remove any locking bars.
- Confirm the house batteries are fully charged.
- Open a window or vent to equalize pressure during slideout operation.
- 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.
- Release the switch to stop room movement at any time. A change in motor sound indicates full extension/retraction.



Living Room and Bedroom Slideout Swtich

Equipment

SECTION SIX

CAUTION:
Firmly latch all passage and cabinet doors adjacent to the slideout before extending or retracting slideout 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:
Dirt and grit trapped under the slide room can scratch and damage the floor. Clean the floor before retracting the slide room. Never move the motorhome with the slide 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 slide room can drain the batteries and overheat the motor.

CAUTION:
If a problem with the slideout occurs, contact a qualified technician.

Equipment

SECTION SIX

NOTE:
The slideout room is heavy and will require several people to push the room into position. When the slide room is in the fully retracted position, tighten the release nuts to hold the room in place. Do not over tighten.

TROUBLESHOOTING

If the slide room does not operate, the house batteries may be discharged or a safety feature may be engaged to prevent room operation.

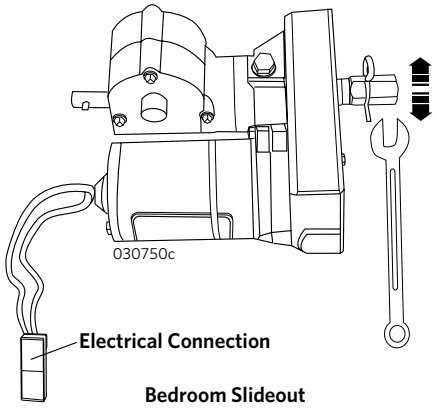
If the slideout does not respond from switch, check the following requirements:

- Engine is off.
- Park brake is applied.
- Confirm house batteries are charged.
- House battery disconnect switch is on.
- Lock bar is removed.
- Jacks are retracted (if applicable) with the motorhome supported by the air suspension (air springs).
- Ensure all electrical connections at the switch are good.
- Ensure the house batteries are fully charged and the interior house power is on.
- Check fluid level in reservoir. Maintain fluid within 1/2" from top of reservoir when slide-outs are retracted.
- Check the two fuses adjacent to the hydraulic pump. If the fuses are good and the room does not operate, it is possible to manually retract the slide.
- It may be necessary to contact a repair facility to have the problem diagnosed and repaired.

MANUAL OVERRIDE

The electric motor is located under the bed deck behind a false panel. Check house battery voltage is sufficient and related fuses are good before manually retracting the bedroom slideout.

- Turn off both the chassis and house battery disconnect switches.
- The above floor slideout motor is located under the bed. Lift the bed and remove the access panel.
- Disconnect the slideout motor electrical plug to remove 12 Volt DC power from the slideout motor. The plug can be located by following wires that run from the motor to the plug.
- Use a wrench to turn drive shaft and retract room. Once the slide room is manually retracted, apply pressure to the wrench to firmly set the room and prevent room drift.
- Once the slide room is manually retracted, reconnect power supply.
- Take the motorhome to an authorized repair center.



Bedroom Slideout

CAUTION:
Do not continue to turn the motor after the room is fully extended or retracted. Further damage to the slide mechanism can occur.

INSPECTION

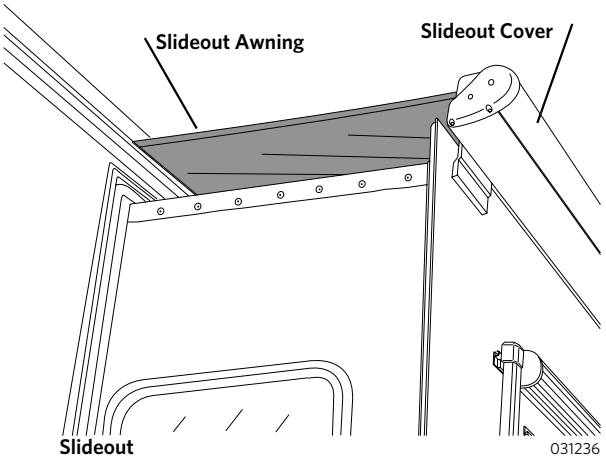
- Inspect roof of the slide for debris such as pine needles, dirt, leaves, sticks, etc. Debris left on the top may cause damage to the seals during retraction. If debris is present, wash with soap and water, then rinse.
- When the room is out, visually inspect the wipe seal for dirt or other foreign material and for tears.
- If the slide room leaks, fully retract the room. If necessary, tape exterior opening closed with duct tape until repairs to the motorhome can be completed.

AWNINGS

SLIDE-OUT 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 brackets mounts to the slideout. In hard rain the slideout cover helps prevent water from penetrating the seal of the slideout. The slideout cover automatically reaches full extension when the slideout room is fully extended.

The slideout cover automatically rolls up into the travel position when the slideout room is fully 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 slideout awning. The weight of the water can cause the awning to sag. Retract the room in small increments pausing to allow time for water to run off otherwise the awning material can become trapped between the upper seal and the roof of the slideout.

ENTRY DOOR AWNING (If Equipped):

The entry door awning operates on 12 Volt DC.

Door Awning Switch

To Extend or Retract the Awning:

- Press and hold the "Door Awning" switch on the passenger console panel.
- Awning travel may be stopped and reversed at any time by releasing then pressing and holding the awning switch.

WINDOW AWNING (OPTIONAL)

To Extend:

- Hook loop of pull strap with catch rod and pull awning, reel assembly and side arms to extend fully away from motorhome.
- Hook pull strap on side strap hook, remove catch rod from pull strap and store.

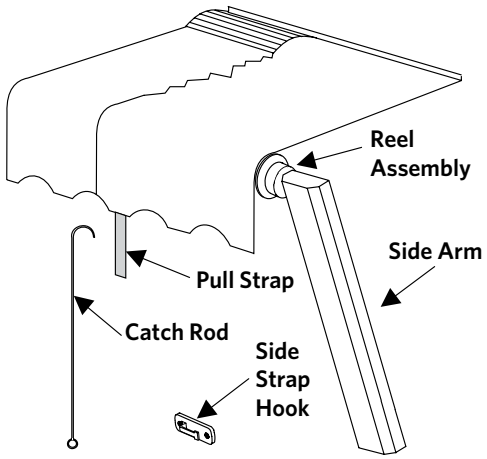
To Retract:

- Hook catch rod on pull strap, remove pull strap from side strap hook and slowly allow awning to retract.

- Remove catch rod from pull strap and store for future use.

PATIO AWNING (IF EQUIPPED)
The Girard patio awning operates from 120 Volt AC provided by shore power, the generator or the inverter.

Using the Remote:



Typical Window Awning 030792

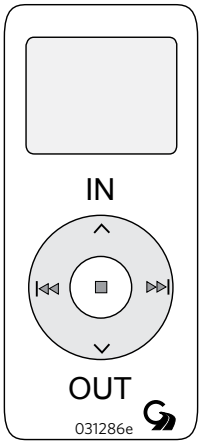
NOTE:
The remote displayed include the rear awning option.

- Hook to shore power, start the generator or turn on the inverter.
- Press the Up or Down arrow to select a channel.

  00 = Both Awnings

  01 = Front Awning

  02 = Rear Awning



- Press and hold the Right arrow (Extend) or Left arrow (Retract) for two seconds then release to extend the awning.
- The awning will travel full distance. Awning travel can be stopped at any time by pressing the Stop button.

CAUTION:
Ensure there is 10' of lateral side clearance for the awning.

CAUTION:
Extend the awning full distance for maximum strength. To prevent damage, retract the awning during gusting winds or inclement weather. Rainwater can quickly collect (pool) on the canvas and overload awning hardware, resulting in damage.

NOTE:
The awning motor is not designed for continuous use. In the event the motor is used to excess, it will automatically shut off and remain inoperative until the circuit breaker inside the motor cools down and automatically resets. Awning run time should not exceed four to five minutes per hour. If the breaker trips, it will automatically reset in 30 minutes to one hour depending on ambient temperature.

After Extending the Awning:
After the awning has fully extended, no further setup or hardware installation is necessary.

Retracting the Awning:
- Clear away any leaves, pine needles or other debris by lightly tapping the awning from underneath using a broom handle or other instrument that will not harm the fabric.

NOTE:
If the fabric is wet when the awning is retracted, extend the awning at the earliest opportunity to allow the fabric to thoroughly dry.

If the awning does not operate:
- Ensure 120 Volt AC is on by hooking to shore power, starting the generator or turning on the inverter.

- Check the circuit breaker in the load center. The circuit breaker inside the awning motor may have tripped. Wait 30 minutes to one hour then retry. If the awning still does not respond, the awning can manually retract by using the supplied telescoping crank handle.

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.

Girard Awnings:
Mix a solution of mild soap (natural soaps are best) and water. Use a brush to apply the solution. Thoroughly rinse to remove soap. If a liquid detergent is used, a water repellent (such as 303 Hi-Tech Fabric Guard) treatment will have to be applied. For stubborn stain removal contact Girard Systems.

Acrylic Awnings — Wash both sides of the awning with a mild soap (i.e. dish soap) and lukewarm water. Do not use detergents. If necessary, reapply the solution to keep fabric saturated. Rinse the awning thoroughly. Repeat, if necessary, until most of the stains disappear. 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. A mild soap (i.e. dish soap) and lukewarm water solution can be used. Do not use detergents. Be sure to follow the instructions on the container.

Leaks:
It is normal for slight leakage to occur through the fabric where 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

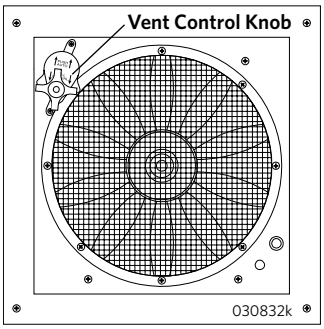
The warranty does not cover damage caused by acts of nature; therefore, steps should be taken to prevent damage from occurring due to wind, rain or storms. Retract the awning in inclement weather conditions or when leaving the motorhome unattended. Should the awning need to be retracted while the fabric is wet, extend as soon as possible to allow complete drying. Retract any awning in small increments to allow the water to evacuate and drain.

INFORMATION:
Water weighs 8.33 pounds per gallon. The awning was not designed to withstand the 500 to 700 lbs. of water that can accumulate on the canvas.

FAN

AUTOMATIC

See OEM Manual for Multiplex System for Vent Fan Operation.



Tips:

- Use the fan to help reduce condensation. Condensation occurs naturally from fluctuations in interior and exterior temperatures, humidity and dew point changes, steam from cooking or when boiling large amounts of water. Shower use is another source 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.
- To remove the screen, loosen the screws holding the screen in place. Use non-abrasive soap and water to clean and reinstall.
- Slightly open windows on the shaded side of the motorhome to create the most airflow, especially on hot, sunny days. Direct airflow by slightly opening selected windows. 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. High winds, unusual conditions or obstructions may prevent the fan lid from fully closing, resulting in leakage and serious water damage.

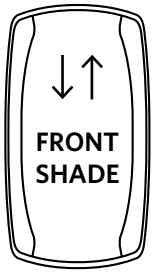
PRIVACY BLINDS & SHADES

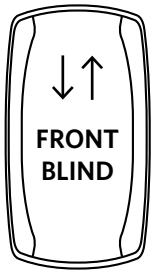
COCKPIT

Cockpit window is equipped with a dual shade/blind or single shade. Front windshield blind/shade are electric. The shades over the passenger, driver and entry door windows are manual. The power blinds are operated by switches on the driver's console and cockpit shade control switch panel.

WARNING:
It is strongly recommended to fully raise the shades during travel.

- Up — Press and release to fully raise shades.
- Down — Press and release to fully lower shades.
- Press either button to stop shade at desired level. Press again to continue.



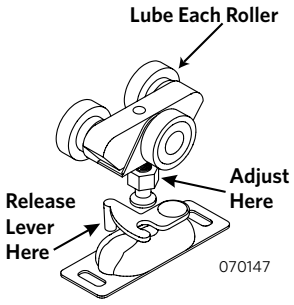


Windshield Blind and Shade Operation:

- The "Front Shade" switch on the driver's console operates the solar screen. Press and hold switch in the up or down position. Release switch to stop solar screen movement at any position.
- The "Front Blind" switch on the driver's console operates the privacy blind. Press and hold switch in the up or down retract position. Release switch to stop solar screen movement at any position.

WARNING:
For visibility and safety, do not drive the motorhome with any cockpit window treatment in the down position.

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 the pocket door, rotate lever outward to release the latches.

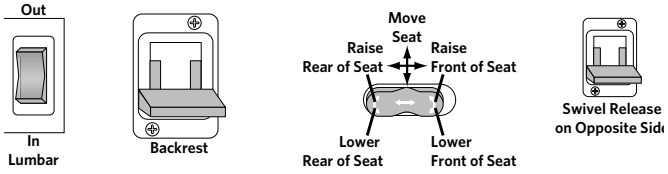
LUBE:
The pocket door rollers should be lubed with just a small drop of oil once a year to help increase the life of the rollers and improve sliding.

SEAT CONTROLS

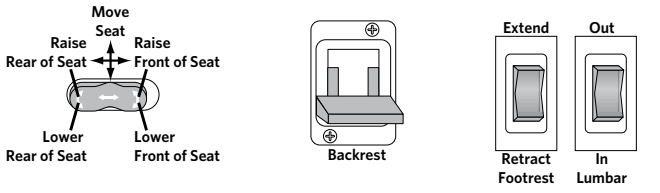
The Pilot and Co-pilot seats are adjustable to provide maximum comfort. Seats must be locked in the forward facing direction while traveling.

NOTE:
The seats operate from 12 Volt DC house power.

Pilot Seat Controls



Co-Pilot Seat Controls 060197I



NOTE:
If either power seat is rotated 180°, it must be rotated back in the opposite direction. The 12 Volt wiring in the seat may disconnect if seat is rotated 360°.

Equipment

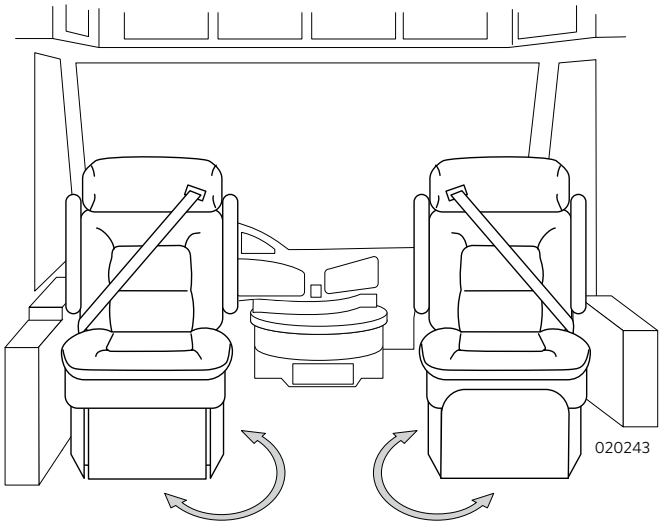
SECTION SIX

WARNING:
Seats must be locked in the forward facing position while the motorhome is in transit.

SWIVEL SEATS

Swivel Seat Operation:

- To swivel, pull up the swivel control lever.
- When rotating the driver seat, put the steering wheel in the upright position.
- Move the seat forward. Pull the swivel lever up and rotate to the desired position.



SOFA

JACK KNIFE SOFA (If Equipped):

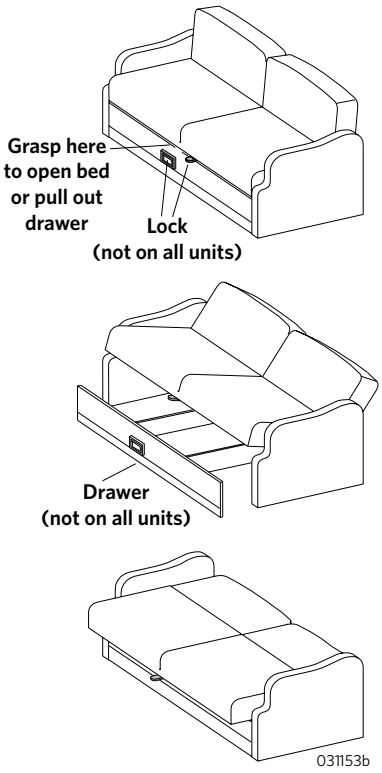
The sofa coverts into a bed. Clear the area of obstruction and debris.

Sofa to Sleeper:

- If applicable, release lock.
- 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:

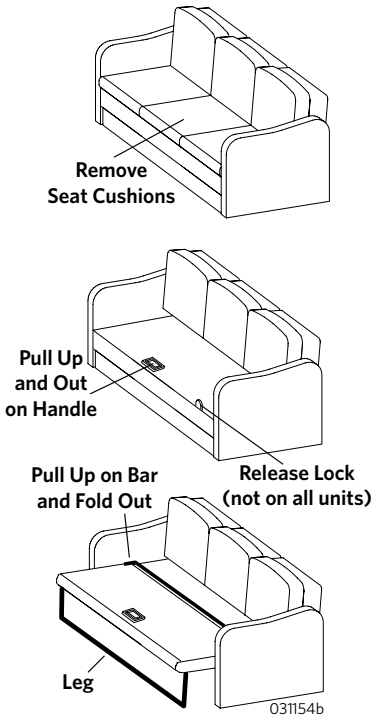
- Lift the seat base up until seat and back rest are in a "V" shape.
- Push down on seat base.



WARNING:
Do not use the sofa for transporting infants or children that require safety seats or booster seats.

HIDE-A-BED
(If Equipped)

The sofa hide-a-bed will convert 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.

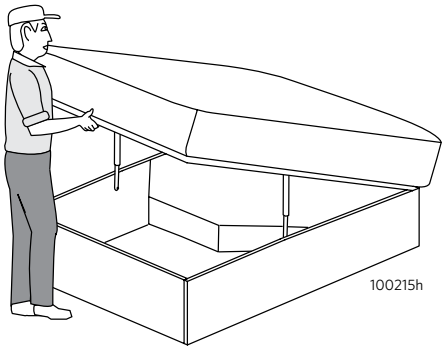
Sleeper to Sofa:

- 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.

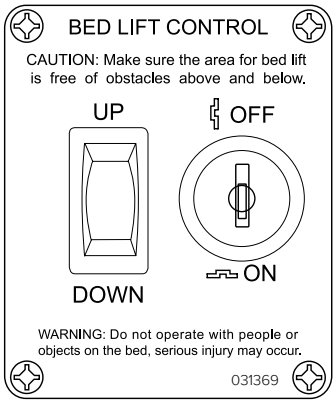
Equipment

SECTION SIX

WARNING:
The bed must be in the up/stowed away position while the motorhome is in motion. Do not attempt to drive the motorhome with the bed is the lowered/down position. This can result in a serious accident, injury or death.



NOTE:
The gas struts can be damaged if rapidly forced open or closed. In extreme cold, the struts may not hold the mattress platform open.



Drop Down Bed Control

Mattress Care:
The cover may be spot cleaned with carbonated water or mild detergent. Do not dry clean the mattress cover or put it in a washing machine.

STORAGE — UNDER BED (If Equipped)

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.

Use extra care storing items here since the slideout mechanism is also located here. Moving components can be impeded or items damaged.

NOTE:
Maximum weight capacity for the ladder is 300 lbs.

LADDER — REAR (IF EQUIPPED)

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. Stow the lower portion of the ladder in the cargo bay during travel.

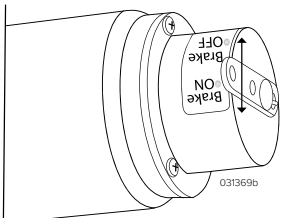
NOTE:
For Happy-Jac brand drop down bed/Project 2000 brand drop down bed please refer to manufacturer operation manual

DROP DOWN BED (HAPPY JAC/P2K)

The drop down bed is operated by a 12 volt motor. House power must be on for the bed to operate. A mattress is supplied as is a ladder to access the bed. A security net attaches to hardware adjacent to the bed to reduce the possibility of falling. (In certain applications) The bed stows out of the way for travel.

WARNING:
Do not place heavy objects or allow people or pets to be on the bed while raising or lowering the bed.

WARNING:
Articulating bed - the bed must be in the upright position in order for the slide box to operate in/out.



Drop Down Bed Motor Brake

Lowering the Bed:

- Turn off the engine.
- Turn on the battery cutoff switch.
- Clear all objects below the bed that may inhibit bed operation or be damaged. Keep fingers clear and loose clothing away from all moving parts.
- Turn the safety key to the on position.
- Press and hold the switch in the down position. Travel may be stopped at any time by releasing the switch. Release switch when the bed stops in the lowered/down position.
- Attach safety webbing to hardware provided to reduce likelihood of falling. (In certain applications)
- Install ladder.

Raising the Bed:

- Remove and store any extra items or heavy bedding from bed that could impede the bed from retracting to the travel/stowed position.
- Remove safety webbing from hardware. (In certain applications)
- Stow ladder.
- Check for any objects that will inhibit proper operation.
- Press and hold the switch in the up position until the bed is fully raised. Travel may be stopped at any time by releasing the switch. Release switch

WARNING:
The motorhome must be level when sliding the tray out of the bay compartment. The tray can slide out abruptly and cause bodily harm if the motorhome is not level.

NOTE:
Remote not shown.

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. While the system has many features, function buttons with black text mean the source or function (such as Navigation) is not available.

when bed stops.

Bed Will Not Operate:
The engine is off.

Check the battery disconnect switch is on.

Check the safety key is in the on position.

Manual Retract
If the bed will not retract or power cannot be restored to the motor, the bed can be manually raised to the stowed position.

- Move Brake lever to the Off position.
- At back of motor, use a 1/2" socket to manually crank the bed to the travel position.
- Engage Brake lever to the On position to prevent movement during travel.

STORAGE BAY SLIDEOUT TRAY

(IF EQUIPPED)

The storage bay slideout tray allows items to be stored and retrieved with easy access.

- Ensure the motorhome is level.
- Pull up on the latch to unlock.
- To close, slide the tray in until the latch locks the tray in place.
- Maximum weight capacity (800 lbs.).

DASH RADIO

The dash radio includes a combination of AM/FM tuner, SirusXM Satellite Radio, iPod/iPhone, USB, DVD, Rear Camera, Carplay and android AUPO. The system uses a touchscreen display. Each selected feature will bring up a new menu for the selected feature. Press the Home button to return to the main menu.

Steering Wheel Controls:
Please refer to Fleetwood owners manual.

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.

To Set the Clock:
- Press the Mode button.
- Press the Settings tab.
- Press the Time Set tab.

INFORMATION:
Subscription not provided. For information regarding subscriptions and service coverage areas, contact the system provider.

Sirius/XM® Radio
1-866-635-2349
www.siriusxm.com

- Use the arrows to set hour and minute. The clock can be set for 12 or 24 hour display by pressing the Time Format button.

To Play the Radio:
- From the Main menu, press the Radio tab. The radio menu will display.
- Press the Band tab to select AM or FM.
- Right or Left tab increase or decrease frequency.
- Press and hold one of the preset buttons to store the station in memory.
- Adjust Volume to desired level.

USB Port:
- Insert a USB device or connect an iPod (cable not provided) to the USB port.

- On radio select

Radio Switch
With the switch set to Park, the dash radio will operate when the ignition switch and house battery cutoff switch is turned off. Set the radio switch to Travel during transit. Radio memory is not affected in either setting.

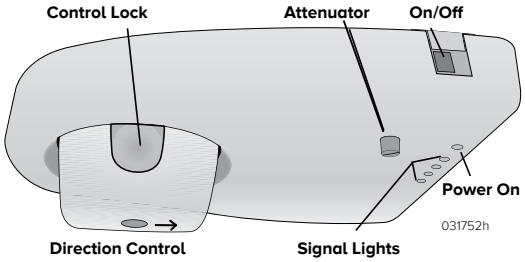
INFORMATION:
It is recommended to become familiar with individual components. Refer to the respective component's OEM manual for detailed instructions.

NOTE:
All components of the entertainment system require 120 Volts AC to operate. Hook to shore power, start the generator or turn on the inverter. The satellite system (if equipped) requires 12 Volts DC to operate. Turn on the interior house power using the battery cut-out switch.

Satellite Radio
The dash radio is Sirius/XM® ready. Radio Subscription is not included. Satellite signals are transmitted from a ground station to satellites orbiting over the continental United States.

To Play Satellite Radio:

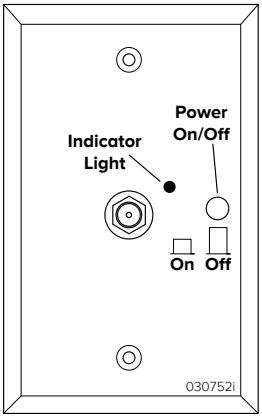
- Press the Home button and scroll to find Sirius.
- From the Main menu press the Sirius/XM tab. Use the appropriate tabs to select different satellite radio channels.



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.



Antenna Select Switch

TV ENTERTAINMENT COMPONENTS

The following paragraphs will discuss the operations and various components that make up the entertainment center.

TELEVISION (FRONT) LOCKOUT FEATURE

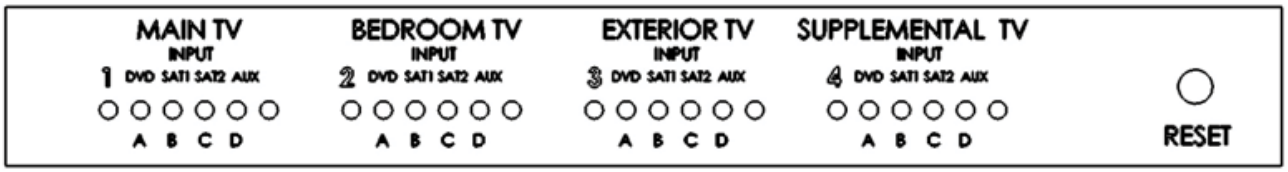
The park brake controls the outlet for the front TV, allowing the front TV to operate only when the park brake is applied. Viewing time of the front TV from the inverter depends on state of charge of the house batteries and any additional 12 Volt DC lighting used.

To Use the Roof Antenna:

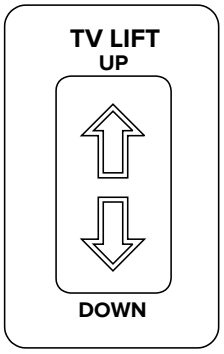
- Turn on Antenna Select switch.
- Rotate Attenuator fully clockwise.

Equipment

SECTION SIX



- Press inwards on lock to directional control then rotate antenna until maximum number of signal strength lights illuminate.
- Rotate Attenuator 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.



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To Use Shore Cable:

- Turn the Antenna Select switch off.
- Make the cable connection to the shore cable port located on the water service center panel.

To Operate Any Component:

- All the Entertainment Components require 120 Volt AC from shore power, the generator or the inverter to operate.
- The ignition key must be in the off position.
- Ensure the front curbside slide room is completely extended. Ensure the bay doors under the front curbside slide room are latched closed.
- Press Down on the TV Lift switch to extend the TV

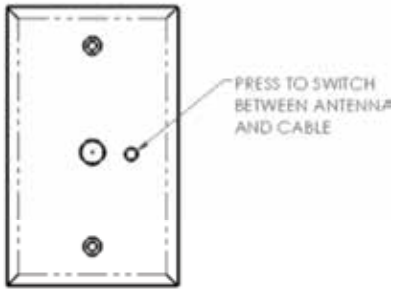
NOTE:
Satellite receiver(s) not included.

NOTE:
It is up to the individual to select a satellite provider and the installer to connect the cabling from the roof to the satellite receiver and TV(s). Subscription to the satellite service is not included.

SATELLITE SYSTEMS

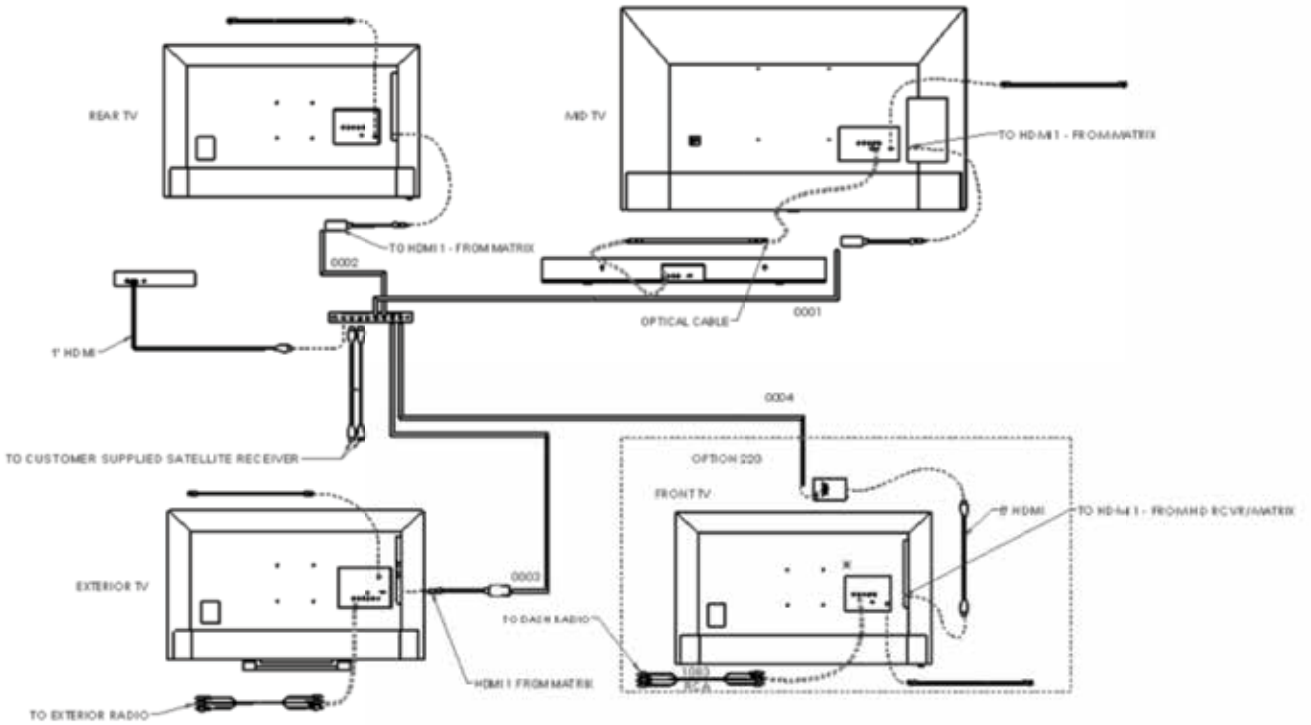
Video 4 X 4 Matrix

The motorhome is equipped with a Video 4 X 4 Matrix, which means any of the 4 video inputs can be viewed on any of the 4 zones independently or simultaneously. To change input at each zone momentary press the selector button to cycle through each inputs. Pressing the RESET button will set the matrix back to factory settings.



To Watch DVD or Blu-ray from Blu-ray Player (OEM or customer installed)

- The motorhome is pre-wired with coaxial cable for a roof mounted satellite system. Connect the RF1 to the main receiver and RF2 to the second receiver located next to the 4 x 4 Matrix.
- On the TV change in input to either HDMI 1 or HDMI 2, depending on which connection is used
- On the Video 4 X 4 Matrix select DVD (if equipped).
- Turn on Blu-ray Player and place the DVD or Blu-ray in the Blu-ray player then press play to start watching.



To Watch Satellite TV

- On the TV, if the 4 X 4 Matrix is equipped, change in input to either HDMI 1 or HDMI 2, depending on which connection is used.
- On the Video 4 X 4 Matrix select either Sat1 or Sat 2 depending upon which Satellite receiver is desired (if equipped).
- Turn on the Satellite receiver and related remote to change channels (customer supplied).

To Watch Over The Air (OTA) antenna or cable TV

- On the Antenna booster press the button in for (
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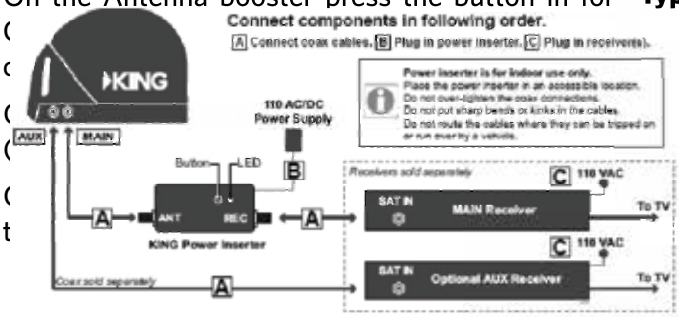

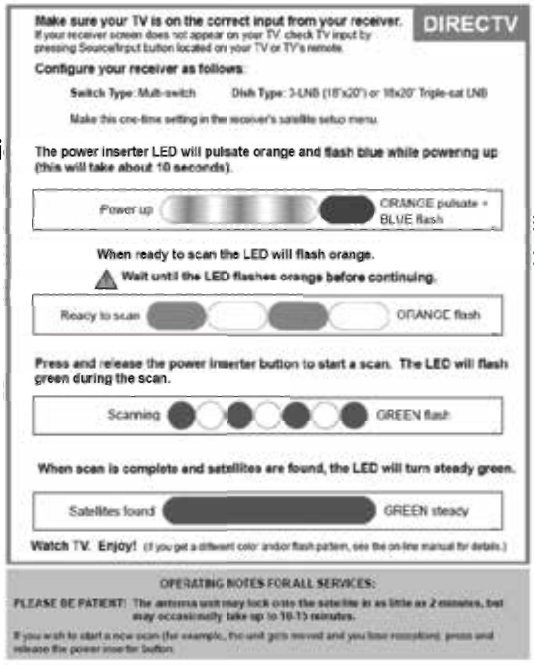

Water Systems

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Water Systems

SECTION SEVEN

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. In-depth 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 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 independently of shore services. 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 washer machine drain into the grey tank and the toilet(s) drains into the black tank. An onboard fresh 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 services.

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 the city water/fresh tank fill connection and the grey and black tank valves, drains and tank flush connections. If shore services are available, the shore water supply (city water) is 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 connects between the termination drain and the shore sewer port. 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 grey and black tanks after dumping and/or prior to departure.

Fresh Water System:

The fresh water system consists of a fresh water tank, water pump, pressure regulator, gravity fill connection, water filter, city water/fresh tank fill connection and a potable water hose. For sanitary purposes, proper care of the hose is necessary. After each use, drain and coil the potable water hose. Attach the ends of the hose together to keep out dirt, debris and insects.

> **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.

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.

WATER TANKS

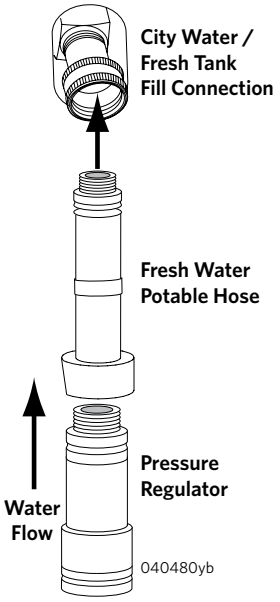
MEASUREMENTS & CALIBRATION

See OEM Manual for Multiplex System for Tank Monitoring.

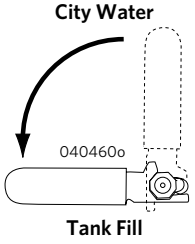
WATER — POTABLE

When connecting the motorhome to a fresh water source, use a hose manufactured and labeled "for potable water." This ensures the hose is 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.



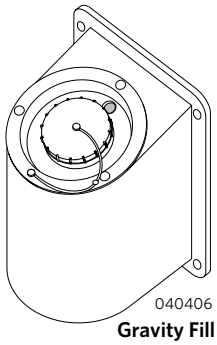
- Connect the pressure regulator to the water source.
- Connect potable hose to the regulator then to the City Water/Fresh Tank Fill connection located in the water service center.
- Set the water control lever to the Tank Fill position.
- Turn on the water.
- Periodically press the Test switch on the 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 "F" illuminates. When the tank is completely full, water will flow out an overflow tube under the motorhome.



- Turn off water supply and return the water control lever to City Water position.
- 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 Pounds per Square Inch (PSI). 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.

GRAVITY FILL (IF EQUIPPED)



The gravity fill inlet allows fluids to be introduced directly into the fresh water tank. Water can be poured directly from a container into the fresh water tank. The gravity fill inlet can be used to pour disinfecting solution into the fresh water tank. Use only potable water sources, solutions and delivery systems when using the gravity fill inlet.

Filling the Tank:

- Unscrew fill cap taking care to keep cap and inlet clean.
- Insert potable water hose into inlet.
- Fill tank until water overflows from inlet.

NOTE:
Do not leave the gravity fill inlet unattended when in use.

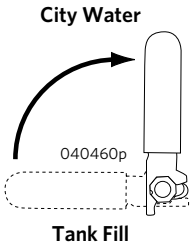
Water Systems

SECTION SEVEN

CITY WATER HOOK-UP

When connecting the motorhome to fresh 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.

- Install hose with pressure regulator to the water source.
- Connect the potable hose to the City Water/Fresh Tank Fill connection.
- Set City Water/Fresh Tank Fill handle to the City Water position.
- Turn on the water.
- The water pump can either be off or on. It will not affect the water pump to leave it on.



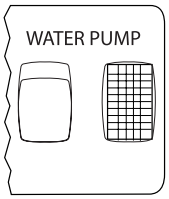
- Slowly open each faucet, one at a time, to purge trapped air.

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:

- Ensure the house battery disconnect switch is on.
- Battery cut-off switch must be on.



Typical Water Pump Switch
040537c

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 Switches are Located:

- The galley (Multiplex system)
- Bathroom. (Multiplex system)
- Water service center (Water pump switch)

To Turn the Water Pump On or Off:

- Momentarily press the 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.

To operate the water pump after unhooking from city water or removal from storage:

- Close all drain valves and low point drains.
- Fill the fresh water tank.
- Turn on the water pump.
- Individually open each faucet, hot and cold valves until each faucet delivers a steady stream of water.

WATER PUMP TROUBLESHOOTING

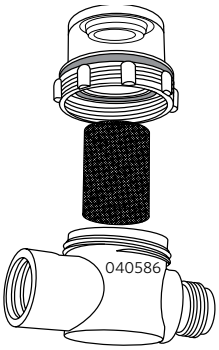
Vibration, induced by road conditions, can cause the plumbing fittings and/or pump hardware to loosen. Check the water pump system for components that may have been jarred loose especially after removal from storage as freeze damage may have occurred.

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.
- Check the inlet tubing and plumbing to see if it is sucking in air at plumbing connections (vacuum leak).



Water Pump Inset Screen (Located on water pump. Clean every two months.)

- 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

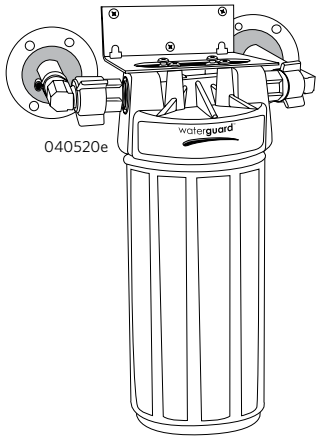
A whole house water filter is located in a curbside compartment. Change the water filter after 1,000 gallons of use or sooner if water flow is noticeably reduced.

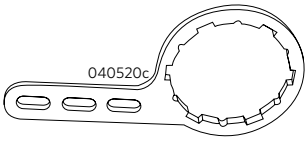
INFORMATION:
For specific water filter information, cautions and additional filter replacements consult the water filter OEM instructions or contact Culligan Customer Service at 1-888-777-7962.

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.
- 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.





Water Filter Removal Wrench

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.

Replacement Filter: CW-F

> **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.

WATER SYSTEMS

TROUBLESHOOTING

If the water pump cycles after closing the faucets, drain valves and inlet valves, a leak may be present. Check for leaks around fittings, valves, filter and connections of the hot and cold water system. If problems continue, take the motorhome to a qualified service technician for repair.

DISINFECTING FRESH WATER

Disinfecting the water system with household bleach (super chlorination) protects against bacteriological or viral contamination from common water sources.

Disinfect the fresh water system:

- If the motorhome is new.
- If the motorhome has been in storage.
- Every three months during use.

To Disinfect the Water System:

1. Remove water filter element and re-install the filter housing.
2. Drain the fresh water tank. Close drain when empty.
3. Prepare a disinfecting solution using one of the following methods:
    - Combine one gallon of water and 1/4 cup of household bleach. Use 1 gallon of this solution for every 15 gallons of tank capacity.
    - Multiply tank capacity (in gallons) by 0.13. The result is the amount (in ounces) of household bleach to pour into fresh water tank. These methods will yield a 50 PPM (parts per million) disinfecting solution in the water system that will act 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.
4. Pour the solution into the gravity fill opening.
5. Top off tank with fresh water
6. Turn on the water pump.
7. Systematically open each faucet, hot and cold, until a distinct bleach odor is present.
8. Allow the system to stand for four hours.
9. Drain the fresh water tank of the mixed solution.

10. Fill the water tank with fresh water. Thoroughly flush hot and cold lines with fresh water. Repeat this process until the chlorine bleach smell is no longer detected in the water.
11. Install a new water filter.

TIP:
Use the same hose labeled for potable water to introduce the chlorine solution into the system. This will disinfect the potable water hose at the same time. Several flushes will be required to remove chlorine residue from the potable hose.

INFORMATION:
Household bleach is 5.25% Sodium Hypochlorite. Higher concentration will increase PPM ratio.

Aqua-Hot:
The Aqua-Hot contains copper tubing designed for fresh water and winterizing solutions only. Periodic flushing with other common household chemicals, including bleach, will have little or no effect if thoroughly rinsed with fresh water.

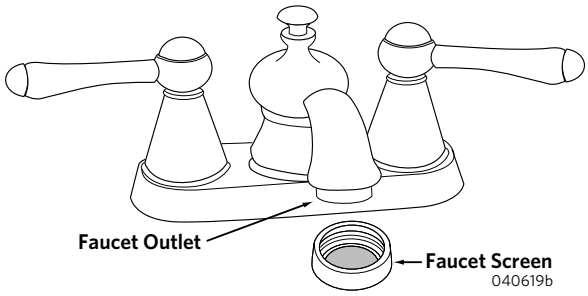
Failure of copper tubing, especially soft or flexible copper, can result when materials other than water or winterizing solutions are allowed to reside inside the piping for extended periods of non-use. The most common cause for failure is due to an extended exposure to chlorine, solutions containing chlorine (i.e. bleach).

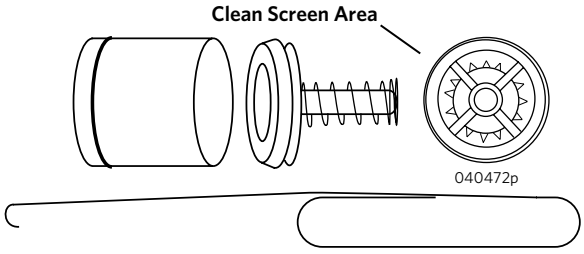
CAUTION:
Do not use vinegar to disinfect the water system. Vinegar will deteriorate the copper tubing inside the Aqua-Hot domestic water loop. Thoroughly rinse chlorine bleach or other concentrated chlorine bearing chemicals as they can also cause failure to the Aqua-Hot domestic water loop (copper tubing).

FAUCET SCREENS

Fresh water sources vary by location. Build up of lime deposits, or debris in 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. Check faucet screens when flow of water is reduced.

- The bathroom faucet screen is located on the outlet side of the faucet and held in place with a threaded collar.
- The kitchen faucet has two screens, one located at the faucet head, the other where the hose attaches to the faucet manifold assembly. The hose must be removed to access both screens.
- Clean screen using a small soft brush and de-liming solution.
- Reinstall screen and check water flow.





Bend a Paperclip to Help Remove Kitchen Faucet Screens

Water Systems

SECTION SEVEN

WATER SYSTEMS

PROPER WASTE DISPOSAL

Dumping raw sewage from the toilet holding tank is permitted only at authorized dumping stations. 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. Use odor control chemicals made especially 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. Specially designed tissue 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 tissue dissolvability, 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 distillates or ammonia in place of RV odor controlling chemicals. Petroleum distillates and/or ammonia will damage the plastic holding tanks, waste drain piping and valve 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.

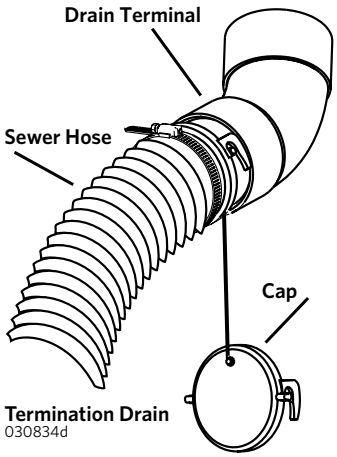
Black Water Tank:

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 or more gallons of water to the holding tank. Next, add the chemicals, in accordance with the manufacturer instructions. Pour mixture through toilet into 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 distillates or ammonia in place of RV odor controlling chemicals.

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.



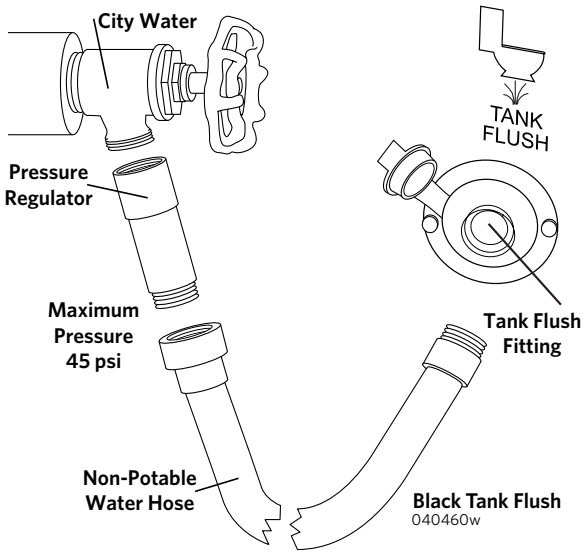
The shore fitting for the sewer hose may be a three or four-inch, male or female thread pipe; or a four-inch pipe with no threads. Different style adapters are available to fit most configurations. Hose ladders may also be purchased to support the hose.

It is important the sewer hose remains secure and restrained. Always tighten clamps and restraining devices before use. Position the sewer hose in-line 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 90° 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.

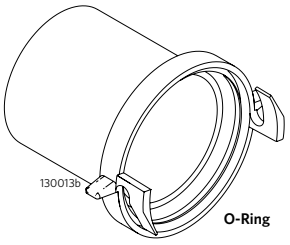
The solid waste drain (black water) valve remains closed until the black tank is full or until time of departure to help prevent clogging. Use the outside faucet or shower attachment for washing or rinsing the sewer hose after dumping the black tank.



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 grey 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.



Water Systems

SECTION SEVEN

DRAINING THE HOLDING TANKS

The motorhome comes equipped with a power flush nozzle located in the black tank to help reduce build-up of solids. Flush the black tank each drain cycle. Failure to thoroughly rinse the black tank may result in accumulated solids and a clogged power flush nozzle.

- Attach sewer hose to termination drain and shore facility.
- Prepare to dump the solid waste (black) tank first. Close the liquid waste drain (grey water) valve.
- Fill the grey tank to at least 50% by running water in the shower or sinks.
- Open the solid waste drain (black water) valve. Allow the black tank to drain.
- Connect one end of the pressure regulator to the water source and the other end to the non-potable water hose. Connect the non-potable hose to the tank flush fitting.
- Turn on the water source and allow water to rinse the black tank at least three minutes. Never operate the system unattended. Ensure the water is flowing freely though the drain hose.
- When completed, turn off the water source and close the black water valve.
- Open the grey water valve. The water in the grey tank will help flush remaining solids from the hose. With the grey water valve open, run two or more gallons of water down any drain to flush grey tank. The grey valve remains open until the next drain cycle, or time of departure.

WARNING:
Use the tank flush system each time the holding tanks are cycled. Failure to routinely use the flush system will result in a clogged spray nozzle. Turn off the water supply when finished flushing the tank. Operating the flush system unattended can risk flooding.

- When preparing for travel, close both black and grey termination drain valves. Undo restraining devices from the hose. Disconnect the hose from the termination drain by rotating the fitting counterclockwise 90°.
- Raise the hose and drain using hand over hand method working the hose towards shore fitting. Rinse the hose with outside facility and repeat the hose drain process.
- Remove the hose from shore fitting. Install hose in carrier and lock door.

Secure the termination cap (required by law in some states) to termination drain. 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 before driving.

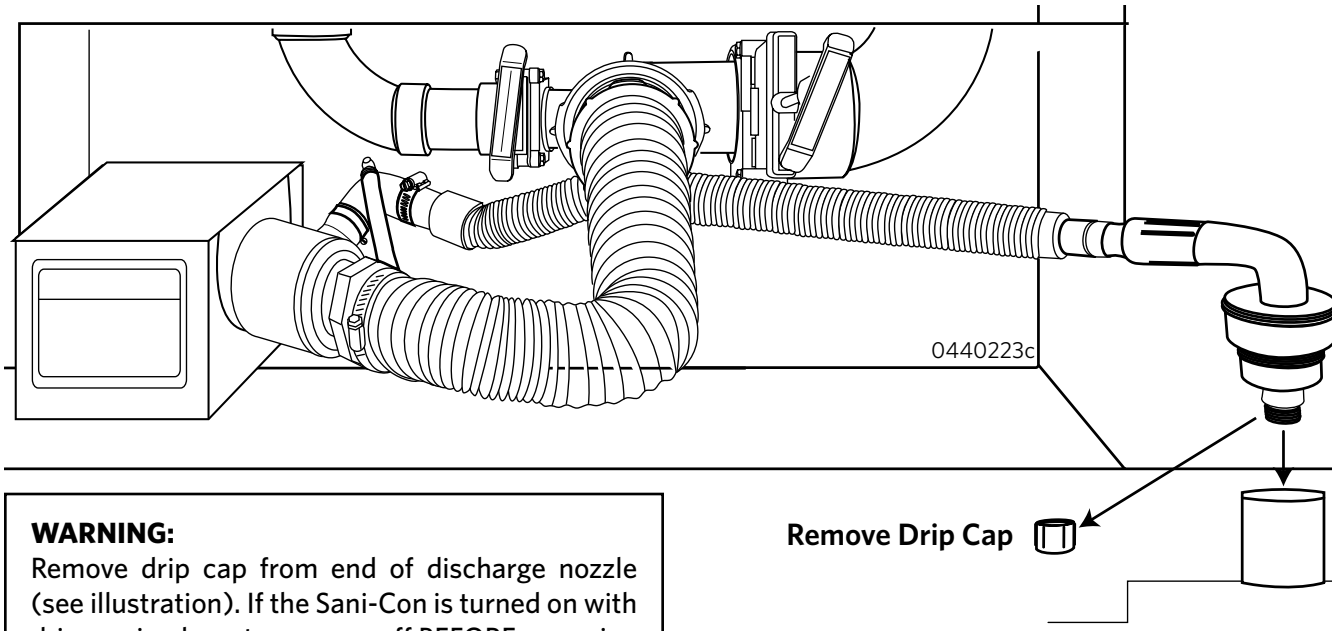
WASTE PUMP (If Equipped)

The waste pump (Sani-Con system) is a self-priming macerator pump. Waste is discharged through a 1/2" outlet hose that connects to a sewer connection. It is recommended to wear disposable gloves, safety glasses and appropriate clothing when operating the Sani-Con. The waste pump operates on 12 Volts DC from the house battery. The house battery disconnect switch must be on for the Sani-Con system to operate.

INFORMATION:
Refer to the OEM Sani-Con manual or visit the website: **www.emptythetanks.com**

WARNING:
Do not flush personal hygiene products, cigarette butts, paper towels, table scraps, grease, any tissue that remains in one piece or any object that can be considered foreign. These objects will damage the Sani-Con system and void manufacturer's warranty.

WARNING:
Never leave the Sani-Con pump unattended while in use. Do not allow the pump to run dry. Damage to the pump impeller and Sani-Con system will result and void manufacturer's warranty.



WARNING:
Remove drip cap from end of discharge nozzle (see illustration). If the Sani-Con is turned on with drip cap in place, turn pump off BEFORE removing drip cap. Allow at least 30 seconds for pressure to dissipate before removing drip cap.

To Empty the Holding Tanks:

- Close the black tank (solid waste) and grey tank (liquid waste) termination valves.
- Remove the Drip Cap from end of discharge nozzle (see illustration).
- Remove termination drain outlet cap.
- Secure Sani-Con inlet hose to the termination drain outlet by aligning hose coupler tangs with termination tabs.
- Twist coupler clockwise to lock coupler to termination outlet.
- To prevent leaks, ensure all hose clamps are tight 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. 72-139

100220

- 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.
- Verify pump operation by opening the grey water valve then momentarily (less than one second) turn on and off the Sanicon switch. Close grey water valve. If pump does not operate see Troubleshooting before proceeding.
- Open the black tank valve.
- Turn on the Sani-Con switch.
- Allow the black tank to empty.
- Turn off the Sani-Con pump when the black tank is empty. Close the black tank valve.
- Open the grey tank valve.

- Turn on the Sani-Con pump. Allow the grey tank to empty.
- Turn off the Sani-Con pump when the grey tank is empty. Close the grey tank valve.

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Using the Black Tank Flush:

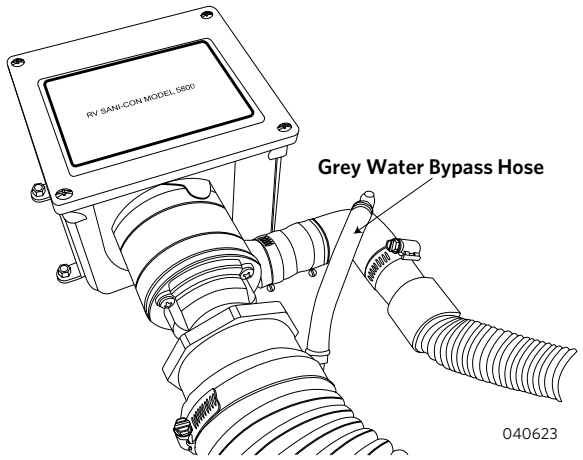
> **NOTE:**
> Empty the holding tanks before operating the black tank flush system.

> **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 three minutes. Do not leave the system unattended during operation.
- While flushing the tank, briefly turn on the Sani-Con pump to help flush impeller and housing then turn off the Sani-Con 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 Sani-Con discharge hose.
- Secure Sani-Con 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.

Grey Water Bypass:

The grey water bypass system allows continuous grey water flow. The grey water uses gravity to drain from the tank to the pump through the bypass hose into the sewage service. The bypass hose "T-s" into the Sani-Con discharge hose on the outlet side of the macerator pump.



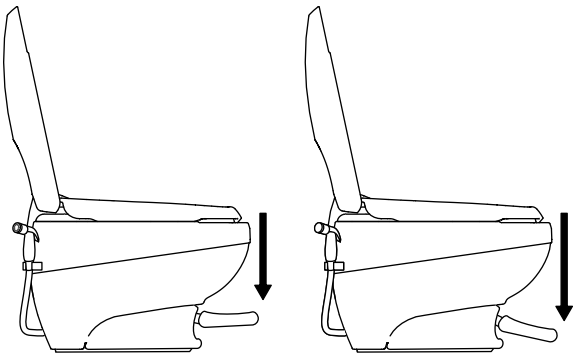
Troubleshooting:

- The house battery disconnect switch must be on.
- Check the 20 Amp fuse in the House 12 Volt DC Distribution Panel.

TOILET

PEDAL FLUSH (IF EQUIPPED)

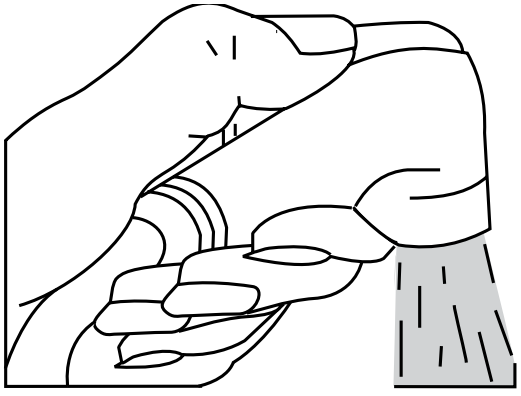
The toilet uses water from either the fresh water tank or a city water supply. The water pump must be on or connected to city water. The toilet flushes directly into the sewage holding tank (black water).



Pedal Flush 040467

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.

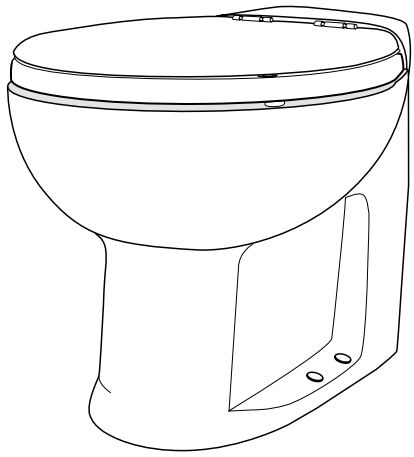
NOTE:
Do not dispose of sanitary supplies or other non-dissolving items into the toilet. Facial tissue, wet strength tissue, paper towels or an excess toilet tissue can clog the tank or termination valve.



Press Thumb Lever to Spray 040397

- 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.

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



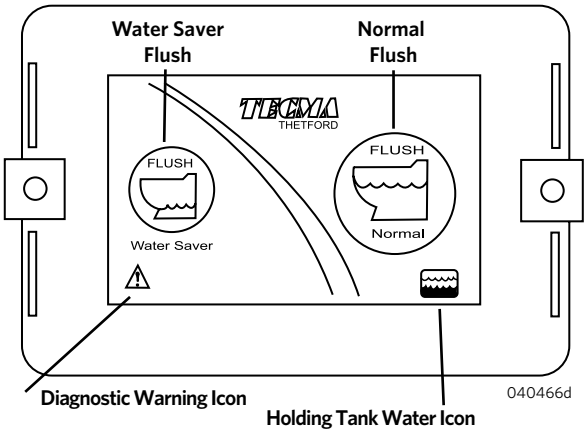
damaged.

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.

Water Systems

SECTION SEVEN



ELECTRIC FLUSH (IF EQUIPPED)

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.

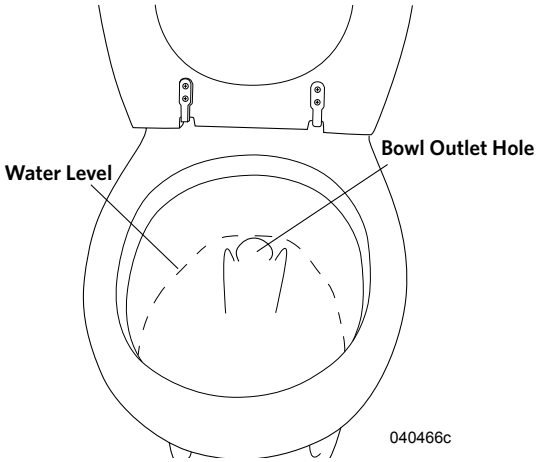
Empty Bowl:

- 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 1/2" above the bowl out fall 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. Take four or five sheets of toilet tissue and wipe all the water line connections. Start at the top of the unit and work downward. When the tissue comes in contact with leaking water it immediately changes texture.

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

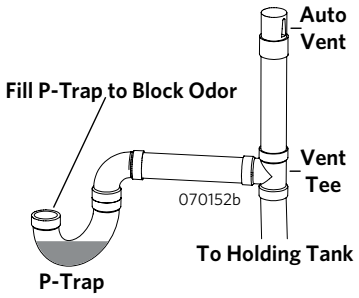
- The toilet uses an automatic reset circuit breaker located behind the 12 Volt fuse panel above the Pilot seat.

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 odor from the waste water holding tank 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.



Water Systems

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Auto Vents:
The auto(matic) 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 odors from the waste water holding tank 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

Extended use in below freezing (32° F./0° C.) weather will require operation of the furnace to protect interior water lines, fixtures, water storage tanks and pumps. Exposed drains may freeze quickly. If in doubt about what temperature the motorhome will tolerate, winterize with potable antifreeze. Cold temperature can adversely affect water systems below the floor level because the furnace does not provide heat to these components.

WATER CENTER HEATER

A small Aqua-Hot heat exchanger is located in the water service center to help prevent freezing in the water service center. The Aqua-Hot supplies coolant to the heater and must be turned on to supply heated coolant to the exchanger. Turn on the Aqua Hot when freezing temperatures may occur.

System Operation:

1. Turn on the Aqua-Hot.
2. Set thermostat to Gas in Zone 4.3. Adjust Aqua-Hot bay thermostat, located in water center, to approximately 40° F.

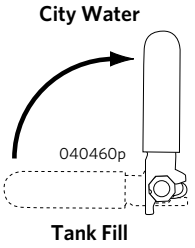
As temperature reaches approximately 40° F., the blower on the heat exchanger will run to help prevent water center freeze-up.

Aqua-Hot Thermostat (located behind service panel) It is factory preset and should not require adjustment.

CAUTION:
While the water center is equipped with a heat exchanger, it will not prevent freeze-up in extreme cold.

COLD WEATHER STORAGE

If the motorhome is stored where freezing temperatures may occur, drain the fresh water system. Begin draining the fresh water tank and allowing the water to drain.

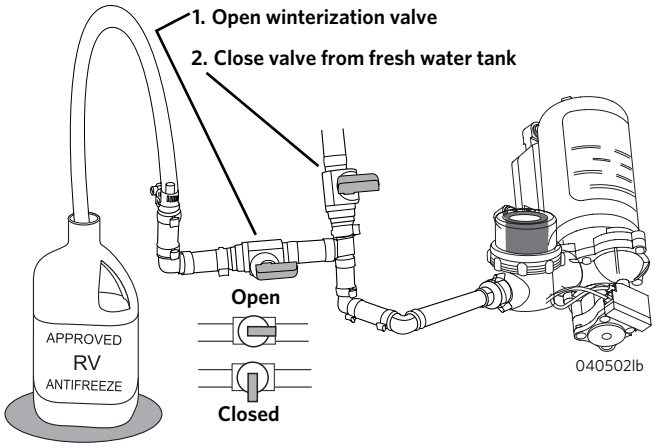


CAUTION:
Icemakers, water filters, and water heaters all use the fresh water tank for water. These systems should be drained and stored in accordance with the OEM recommendation for winterization. Consult specific OEM manual for instructions and recommendations.

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.



Winterization Procedure Using Non-Toxic Antifreeze

WARNING:
Freeze damage is not covered under warranty.

CAUTION:
It is recommended that a qualified RV service technician familiar with motorhomes, such as an authorized dealer, perform the winterizing procedure.

WARNING:
Turn off the Aqua-Hot and allow it to cool before beginning the winterization procedure. Hot water can result in burn injuries.

NOTE:
Some items (optional and otherwise) such as the Aqua-Hot, icemaker and washer-dryer require individual winterizing procedures. Refer to all OEM manuals for winterization instructions and procedures.

POISON:
Use only non-toxic FDA approved RV antifreeze that is specifically made for potable water systems. Automotive antifreeze, if ingested, can cause blindness, deafness or death.

USING AIR PRESSURE

Access to an air compressor and an adapter to connect the air pressure regulator to the water system is necessary. Air adapters used for winterizing are available at RV supply locations. Air pressure should not exceed 40 PSI. Higher pressure can damage the lines.

1. Empty and flush the holding tanks.
2. Drain the fresh water tank by opening the drain valve located in the water service center behind termination valves.
3. Open hot and cold low point drain valves. Open a faucet to break vacuum and let water drain.

WARNING:
Ensure the water is not hot when opening the low-point drain valves. Hot water can cause burn injuries.

4. Remove water filter. Empty water from filter bowl then reinstall filter bowl without filter.
5. Close faucet and low point drains.
6. Connect an air hose with pressure regulator to the potable hose. Turn the City Water/Fresh Tank Fill lever to City Water. Set regulator for 40 psi and turn on air.
7. Individually open faucets, hot and cold, until only air comes out. Ensure to open water service center faucets.
8. Hold the toilet flush mechanism open until the water has stopped running.

9. Open hot and cold low point drain valves. Allow remaining water to purge from system then close drain valves.
10. Remove water filter bowl and do not re-install.
11. Disconnect the air hose.
12. If applicable winterize the washer-dryer (see washer-dryer "Winterize"). Winterize the Aqua Hot domestic water loop (see Aqua Hot "Winterize" and OEM manual).
13. Use one (1) gallon of FDA approved RV antifreeze to protect various water drain lines in the motorhome. Pour one pint into both the kitchen and bath shower drains. Pour two 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.
14. Open the valve on the toilet. Pour another three pints into the toilet, letting the antifreeze run into the black tank to protect the drain valve. Use a soft cloth to wipe out the sinks, shower and toilet (after the antifreeze is poured in) to protect the surfaces from stains. Pour the last pint into the washer-dryer drain.

WARNING:
Clean up antifreeze spills immediately to prevent permanent staining.

USING NONTOXIC ANTIFREEZE

Approximately eight gallons of FDA approved RV antifreeze will be needed to winterize the motorhome.

POISON:
Use only non-toxic FDA approved RV antifreeze that is specifically made for potable water systems. Automotive antifreeze, if ingested, can cause blindness, deafness or death.

CAUTION:
Ensure the fresh water tank is completely drained as antifreeze will not enter the fresh water tank.

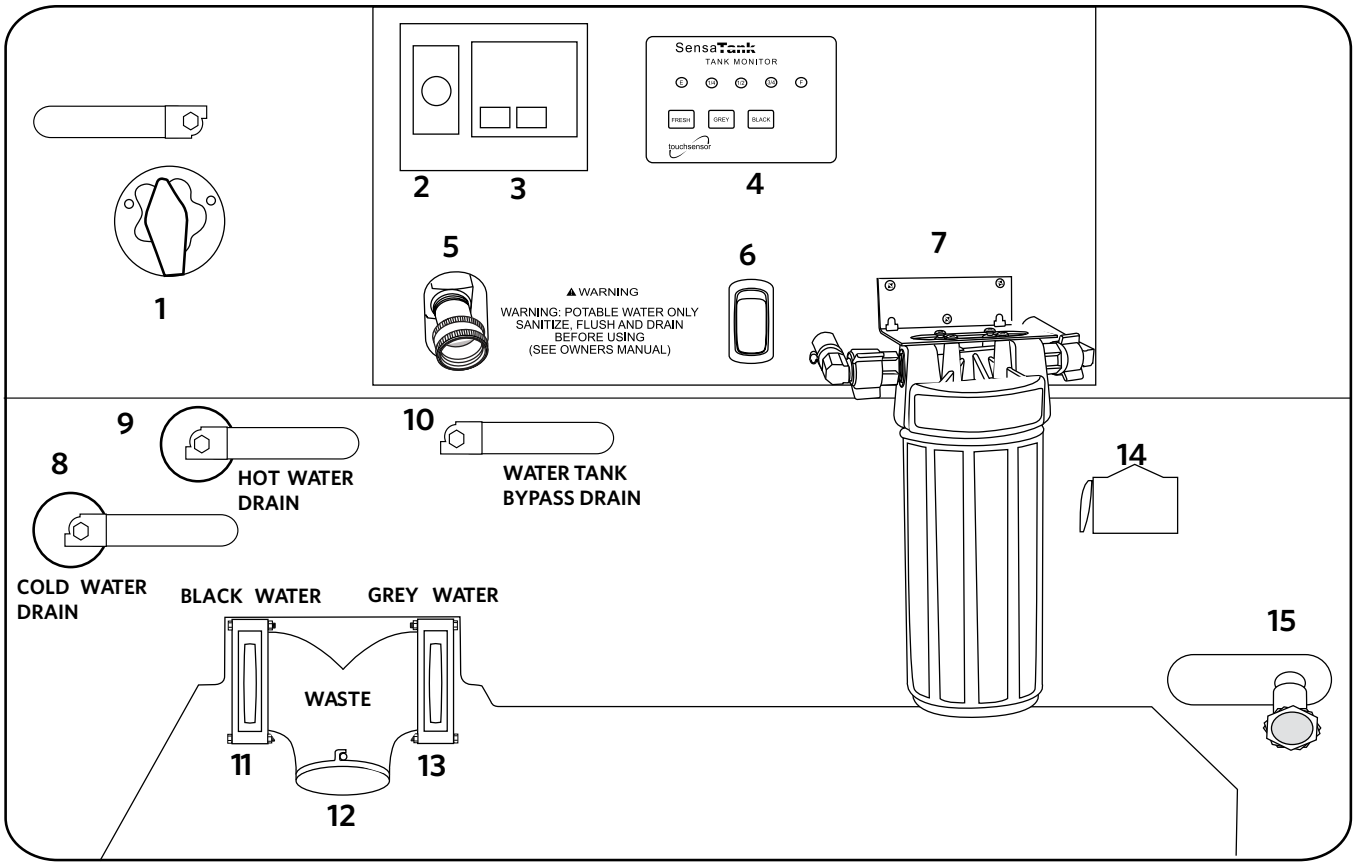
NOTE:
Some items (optional and otherwise) such as the Aqua-Hot, icemaker and washer-dryer may require special instructions. Check all OEM manuals for instructions and recommendations.

DE-WINTERIZATION

1. Close the winterization valve and fresh water tank drain valve
2. Close low point drain valves.
3. Fill fresh water tank with water.
4. Install new water filter (see "Water Filter").
5. Turn on the water pump and operate all faucets, hot and cold, one at a time, until clear water is present.
6. If applicable connect water line to ice maker. Cycle ice maker several times until clear fresh water is present.

CAUTION:
Discard the first two trays of ice from the icemaker. They may contain contaminants.

NOTE:
Depending on length of storage, the fresh water tank may need to be sanitized.



Typical Water Center 040592mh

NOTE:
Layout of the water service center and location of components will vary.

WATER SERVICE CENTER

1. Black Tank Flush Connection
2. DC Outlet
3. Water Pump and Cargo Lt Switch
4. Tank Monitor
5. Tank Fill Inlet
6. Sani Con Switch
7. Water Filter
8. Cold Water Drain
9. Hot Water Drain
10. Tank Fill Valve
11. Black Tank (Solid Waste) Drain Valve
12. Common Termination Drain
13. Grey Tank (Liquid Waste) Drain Valve
14. Water Hose Reel Retract Switch
15. Water Hose Reel/City Water

Water Systems

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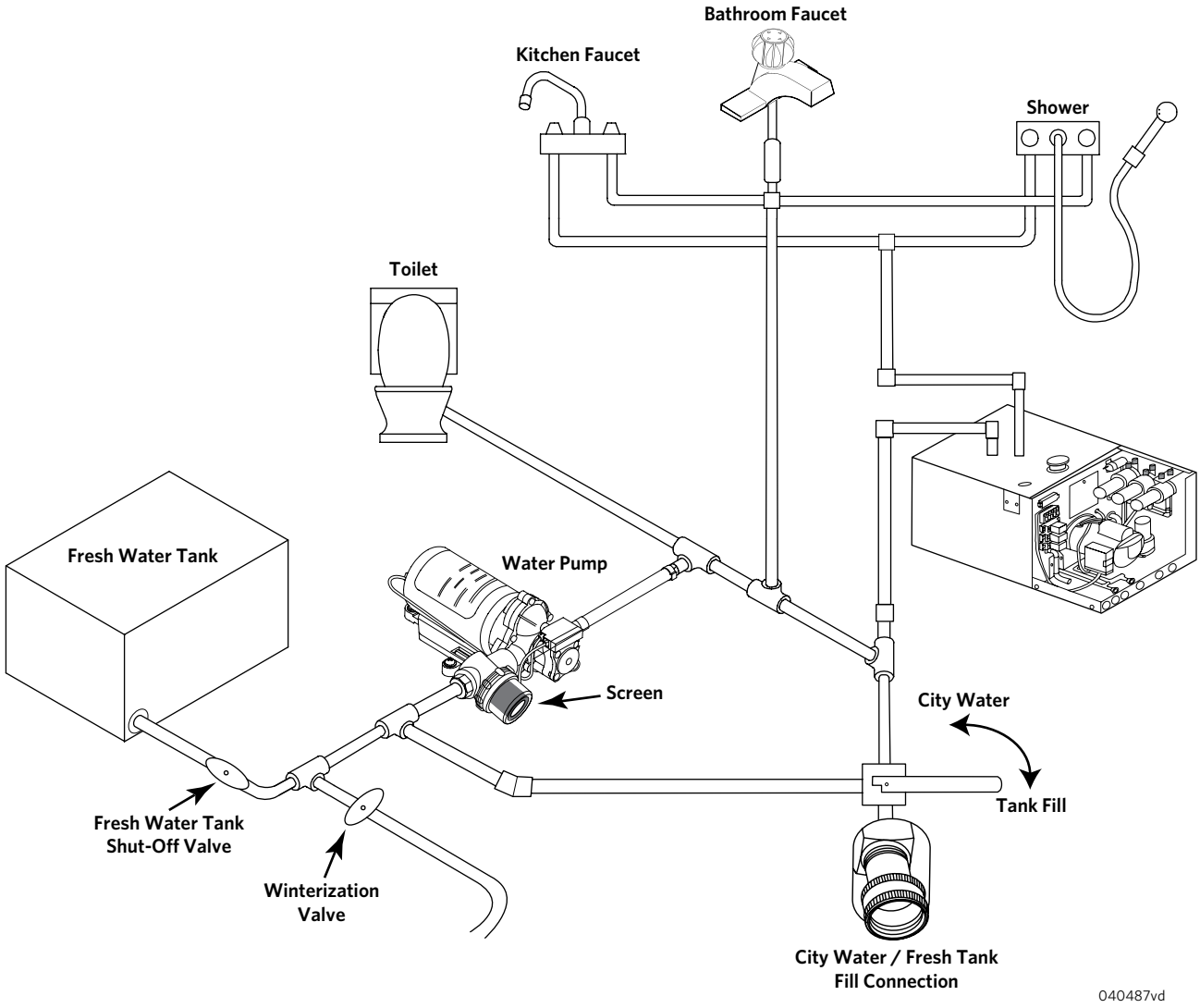
WATER SYSTEM DIAGRAM

NOTE:
Layout of the water system diagram can vary with floorplans, options, and changes to the motorhome.



Notes

Propane Systems

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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.

Propane Systems

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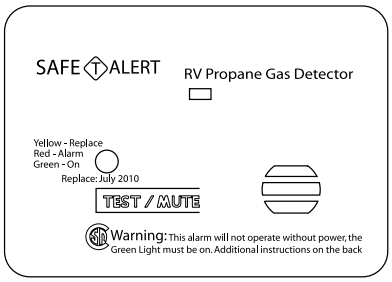
NOTE:
It may be illegal to travel in some States and Canadian provinces with the primary propane valve open. Failure to comply with these State and Canadian province requirements may result in fines and/or pose a safety hazard.

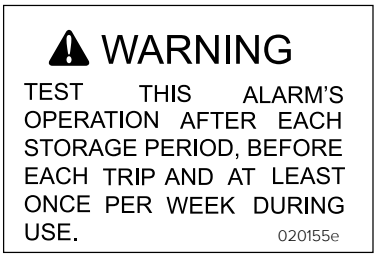
NOTE:
The propane detector indicates the presence of propane only at its sensor. Combustible levels of propane may be present in other areas. The detector is intended for detection of propane only.

PROPANE DETECTOR

The propane detector is required safety equipment in RVs. 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".*



Typical Propane Detector 050258c



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.

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.

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.

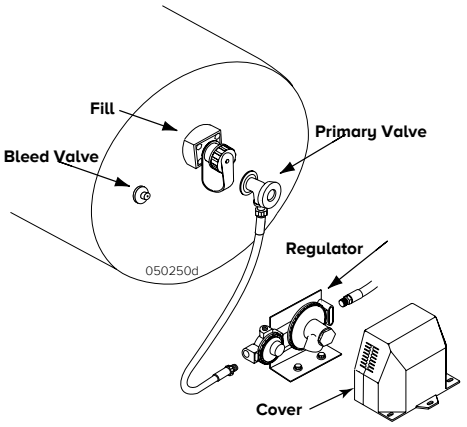
The propane detector draws less current than one instrument panel lamp and will detect propane until the battery is discharged to approximately 7.0 Volts DC. The detector may not operate properly at extreme low voltage. The detector will not operate if power is disconnected or if power is interrupted. 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.

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/stove, 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	Defective Propane Connection
Oven	Defective Regulator
Refrigerator	Portable Propane Operated Appliances/Accessories
Water Heater	
Furnace	

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 Systems

SECTION EIGHT

PROPANE EMERGENCY PROCEDURES

If a propane smell is detected (a rotten egg or sulfur smell) at any time, perform the following steps immediately:

WARNING:
A fire or explosion from ignited propane or propane fumes can cause serious injury or death.

- 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.

PROPANE TANK

MEASUREMENT

See Multiplex OEM Manual for more Propane Monitoring Information.

TANK CAPACITY

Propane Tank Capacity

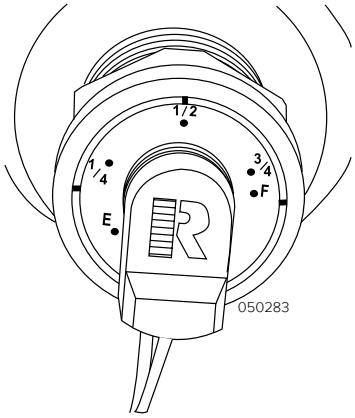
28* gallons

* 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. Actual capacity may differ depending upon model and floor plan.

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



Gauge Mounted on Propane Tank

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.

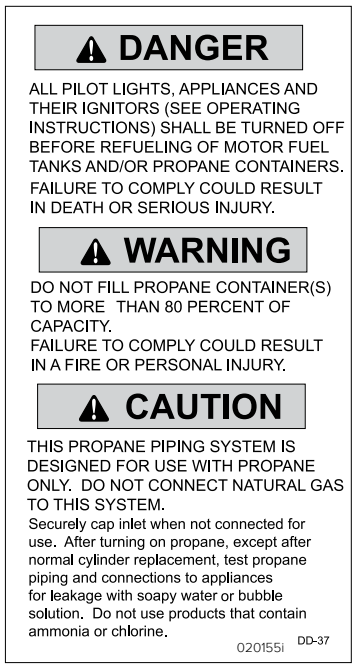
The tank must be filled to the proper level to allow for expansion. An over-filled tank may cause the tank safety valve to release pressure emitting a strong rotten egg odor near the tank and/or a hissing noise.

WARNING:
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.

WARNING:
Extinguish all sources of heat, sparks, flames and smoking materials within a 50' radius during the fueling process.

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.

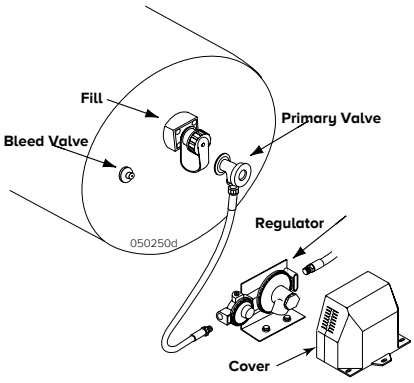


Pressure inside the tank varies with the temperature of the liquid. All propane tanks are required to have a safety pressure relief valve to vent excess pressure.

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.

# 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 #54-1998.

Conversions

Gallons to Liters	1 Gallon = 3.785 Liters
Fahrenheit to Celsius	F° - 32 ÷ 1.8 = C°
11 in. Water Column = 6 1/4 oz. per sq. in. pressure	
27.7 in. Water Column = 1 lb. per sq. in. pressure	

Propane Systems

SECTION EIGHT

Propane Statistics

Pounds Per Gallon	4.24
Specific Gravity of Gas	1.5
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

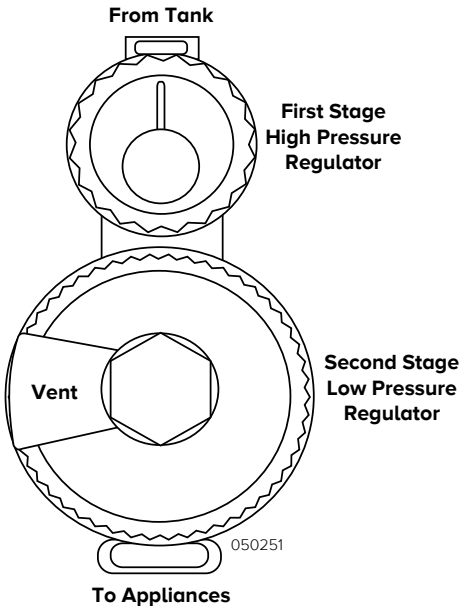
Basic Facts About Propane

- 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 ounces per square inch.
- An inch of Water Column is a measurement of applied pressure to one side of a U-Tube filled with water at sea level. The amount of pressure required to raise the water level 11", represents 11" of Water Column.

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.

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 6 1/4 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:

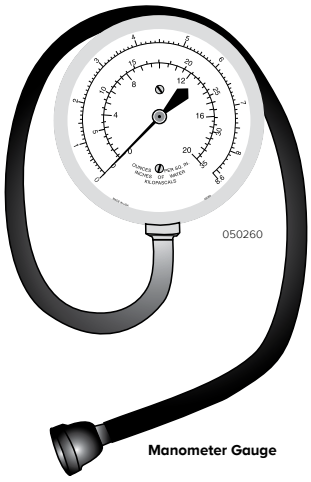
- Have an propane distributor purge the tank.
- If necessary, have the propane distributor inject methyl alcohol in the tank.

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.

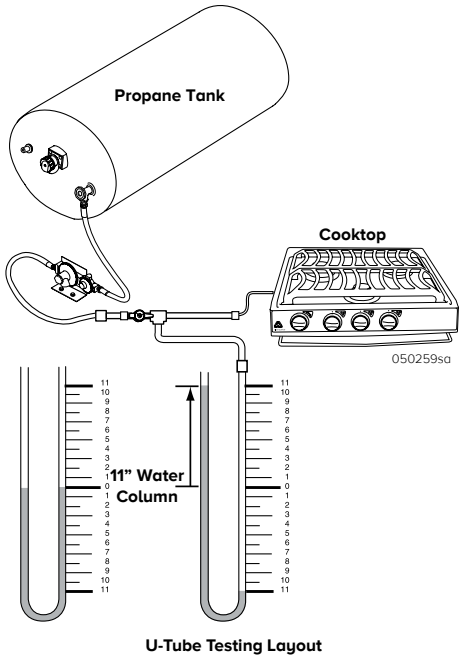
This is why it is important to have the propane pressure checked for proper pressure and accurate regulation during appliance operation. Erratic pressure regulation causes unreliable and potentially dangerous appliance operation and negatively affects performance of refrigerator.

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.



Manometer Gauge



U-Tube Testing Layout

Propane Systems

SECTION EIGHT

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.

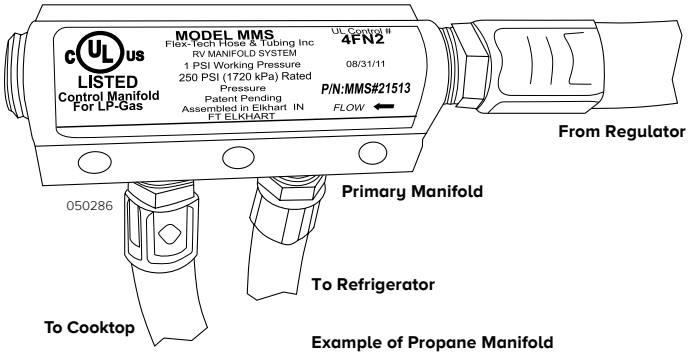
CAUTION:
Only a qualified service technician should perform repairs or component replacement.

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

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.



Example of Propane Manifold

INSPECTION:
Inspect the rubber flexible lines twice a year for abrasions, tears, kinks or other signs of damage.

Follow the recommended guide lines as outlined in Propane Hose Inspection in this section.

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: 1-25k BTU (front), 1-20k BRU (rear)

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.

Propane Systems

SECTION EIGHT

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.

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House Electrical

SECTION NINE

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, the generator, inverter, 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 Volt AC and 12 Volt DC.

The motorhome 120 Volt AC system can be operated from three different power sources: shore power, the 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 AC power by using the house batteries to supply AC power to selected appliances and outlets. However, AC power output from the inverter is limited and should be used sparingly to conserve house battery power. Two different sources supply the main AC circuit breaker panel (load center) with power: the 50 Amp 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 separate from one another. 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 maintain a charge to the house batteries. Likewise, while the motorhome is plugged into shore power, or the generator is running, the chassis batteries are being charged. Each system will supply 12 Volt DC power to the 12 Volt DC distribution panels.

Chassis and House System:

The chassis and house systems have their own sets of batteries. The chassis batteries supply 12 Volt DC power to the chassis fuse boxes and the front distribution box. These panels contain mostly engine system circuits and wiring such as headlights, taillights, dashboard functions, gauges, etc. The house batteries supply 12 Volt DC power to the house distribution panel. This panel 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 electrical system. 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. When this type of power source is not available, electrical adapters will be required to allow a proper and safe connection to the electrical service supply.

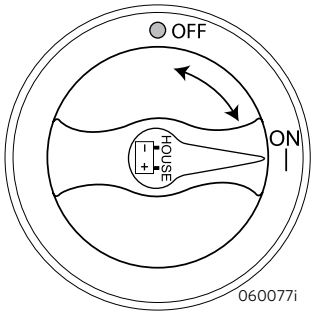
NOTE:
When 50 Amp shore service is not available, care will have to be used when operating the appliances and using the outlets to avoid overloading the shore power service.

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:
The inverter is an auxiliary 120 Volt AC power source that uses 12 Volt DC house battery power to make 120 Volts AC. This device has limited AC power output, measured in watts, and operates only selected appliances and outlets. The inverter also converts 120 Volts AC power, supplied from either shore power or the generator, to 12 Volts DC power to recharge the batteries. When dry camping, the inverter may be used to supply power to selected outlets and appliances.

BATTERY DISCONNECT — HOUSE

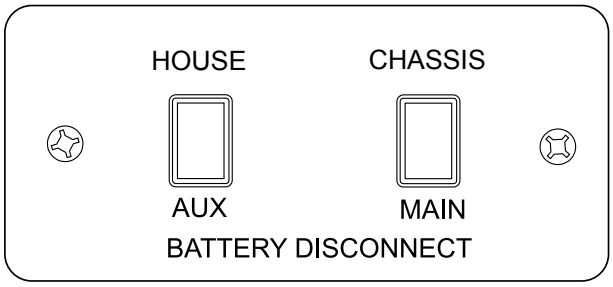
The main house battery disconnect switch turns the house battery power supply on or off by disconnecting 12 Volt DC power to the following items: the inverter, house fuse panel above the driver and house fuses in the roadside front electrical panel. Turn the house battery disconnect switch off when the motorhome is going to be stored for more than 48 hours or before performing electrical maintenance. If possible, leave the motorhome plugged into an outside electrical service with the house battery disconnect switch on to help prevent the possibility of dead batteries. Use of the house battery disconnect switch will not turn off all DC electrical items or other parasitic loads present on the house battery. The house battery disconnect is located in the rear roadside compartment.



BATTERY CUTOFF SWITCH

The battery cutoff switch (Battery Cutoff) 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 in unaffected by the operation of this switch.



Battery Disconnect Switches Located Near Entry Door 060077j

NOTE:
The switch is labeled Aux and the term is synonymous with Battery Cutoff.

CAUTION:
Avoid flash damage to electrical contacts. Turn off the interior lighting before activating the battery cut-off switch.

House Electrical

SECTION NINE

SHORE POWER

The power requirement for the motorhome is 50 Amp 120 Volt AC single phase. The motorhome can be operated from 30 Amp 120 Volt AC single phase but in limited capacity. If 50 Amp service is not available, electrical adapters are required to make the connection. Power consumption must also be reduced and appliances will need to be operated in sequence. While shore power is the most efficient source of electricity, there is a limit on how many appliances can be operated simultaneously.

To help prevent over current of the shore power breaker, the load center (circuit breaker panel) monitors electrical loads. In instances when combined electrical loads exceed the capacity of shore power, the load center will temporarily turn off power to an appliance of lesser need so that appliances of greater importance will continue to operate.

Example; when connected to 30 amp shore power, the water heater electric element will be temporarily turned off when both roof A/C units are on. This will help prevent potential over current of shore power causing the shore power breaker to trip. Power to the water heater will be turned on once combined electrical loads do not exceed capacity of shore power. See "Load Center" for more information and appliance priority sequence of operation.

While there are several onboard appliances, remote appliances such as a coffee maker or hair dryer increase power consumption. The load center will compensate over current of shore power by remote appliances by turning off onboard appliances. Refer to the load charts as a guide to approximate power consumption in total.

Appliances are generally rated in watts. Watts can be converted to amps using the following formula; Watts divided by Volts equals Amps.

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

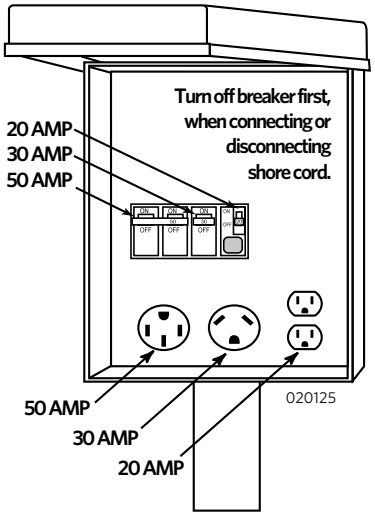
Approximate amperage of typical remote appliances

Onboard Appliances

Device	AC Load	Device	AC Load
Microwave	7.1 Amps	Roof A/C	13 Amps
Refrigerator	3.6 Amps	Converter	7.5 Amps

Approximate amperage of onboard appliances

CAUTION:
Prevent flash damage to electrical system contacts. Turn off all appliances prior to hooking up to shore power, starting the generator or using the inverter.



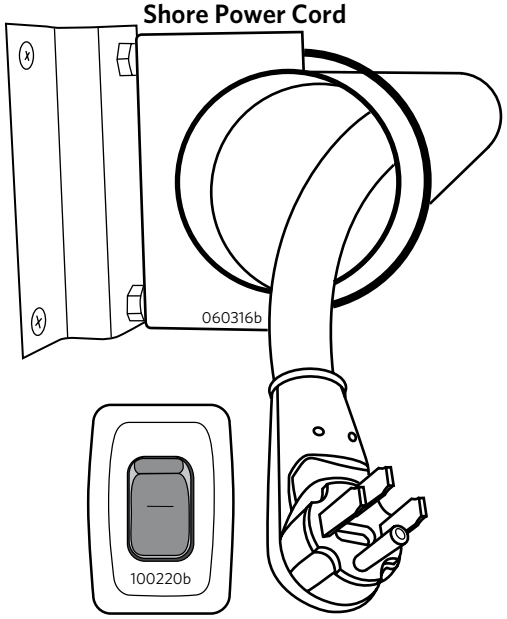
WARNING:
Keep fingers away from metal contacts of the shore plug end. DO NOT stand in water when making electrical connections. Serious electrical shock and personal injury can occur. To avoid the risk of an electrical shock, turn the circuit breaker off for the power supply outlet before making the shore power connection.

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.

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.

CONNECTING THE POWER CORD

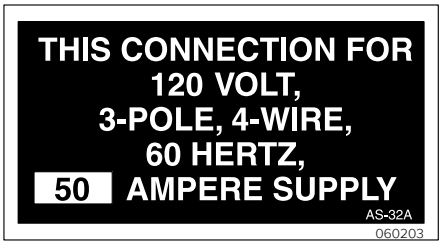
The power cord is stowed on a reel assembly that is 12 Volt DC powered. The power cord switch operates a 12 Volt DC motor that retracts the power cord.



Power Cord Retract Switch

- Ensure all appliances are turned off.
- Extend a sufficient amount of cable to reach the power supply.
- If shore power service is less than 50 amps, install the proper adapter on the shore plug to ensure a safe connection.
- Always turn off the shore power breaker before connecting or disconnecting the shore cord. This will prevent an accidental shock and flashing of electrical contacts.
- Align terminals of the shore cord plug with the terminal sockets of the shore power outlet. Carefully, without touching electrical contacts, push plug completely into socket until the plug is firmly seated. The cord should be slightly slack to prevent strain on the plug and socket.
- Turn on the shore power breaker.
- The LED on the power cord will illuminate to verify power.
- Turn on the battery cutoff switch.

When Hooked to 50 Amps:
After verifying proper voltage, wait approximately one minute for the inverter to stabilize charging of the batteries before starting air conditioners or other large AC loads.



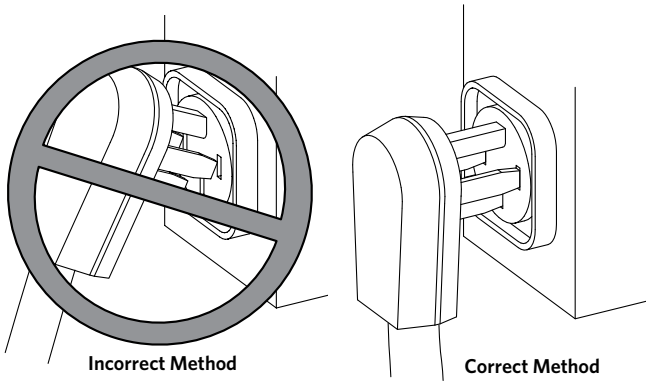
When Hooked to 30 Amps:
Allow the inverter sufficient time to stabilize battery charging before operating electric appliances. Operate appliances and outlets in sequence rather than all at the same time.

House Electrical

SECTION NINE

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.
- Pivot plug handle to disconnect the plug from the outlet.
- Straighten, clean and store the cord.
- Assist the cord when retracting. Stop retracting the cord when it is 6" from the opening. Retracting the cord too far will make it difficult to retrieve the plug.



30 amp Outlet Shown

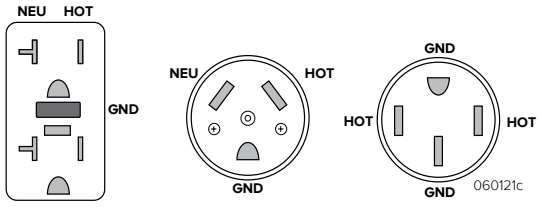
Maintenance:

Kinks may form in the shore power cable when only a short section is frequently used. Routinely extend the cable full distance. Unwind any kinking. Clean cord and inspect ends for fraying.

Inspect contact terminals for overheating evident by discoloration of contacts or melting of the plug housing. Replace damaged or worn components for continued safety and reliability of the power cord.

ELECTRICAL ADAPTERS

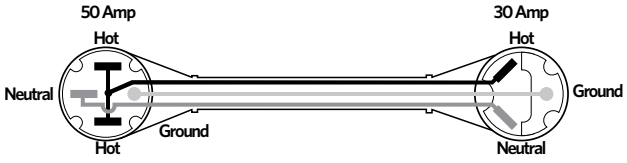
Shore power comes in three basic configurations: 15-20 amp, 30 amp and 50 amp.



15-20 AMP 120 VOLT AC | **30 AMP 120 VOLT AC** | **50 AMP 240VOLT AC**

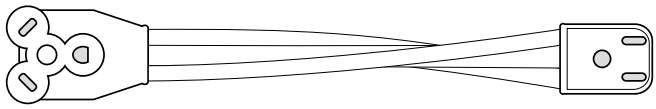
- The continuous amount of current through a breaker or fuse is 80% of its rated capacity.
- 50 Amp 120 Volt AC shore power service consists of two power supply conductors, a neutral and a safety ground.
- The 50 Amp breaker simultaneously limits each power supply conductor to no more than a short-term maximum of 50 Amps for each conductor.
- 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.

Due to outlet configurations for each type of shore power service, electrical adapters are required to adapt the plug end of the shore cord to the different type of outlets. For safety, use only UL approved adapters. The most common adapter is a 50-30 amp adapter. This adapts the 50 amp plug of the 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
060164

Another common adapter is a 30 to 20 amp adapter. If all that is available is 20 amp service, it will be necessary to use both adapters. This type of connector adapts the 30 amp plug to a 20 amp shore power outlet.



Typical 30 - 20 Amp Adapter
060174

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:
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.

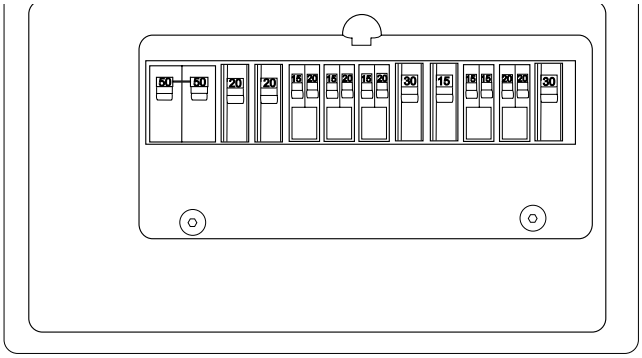
LOAD CENTER

The load center (breaker panel) receives power from the transfer switch supplied by either shore power or the generator. AC power is supplied to the 50 Amp main breaker first, then power is supplied to individual branch circuit breakers. The panel label describes the breaker layout and item, outlet or appliance to which they pertain. Monitoring done via Multiplex System.

WARNING:
The load center contains high voltage that can cause serious injury or death. Unplug from shore power, turn off the generator and the inverter before performing any testing procedures or repairs involving the load center or any branch circuits. Disable the Auto Gen Start feature. Certain testing procedures may require the AC power to be on. Only qualified personnel with electrical backgrounds should attempt any testing procedures or repairs.

POWER CONTROL SYSTEM

Overview:
The Power Control System (PCS) monitors AC power consumption. If AC power consumption exceeds shore power supply, the system automatically reduces power consumption by "shedding" predetermined loads. The system also monitors AC voltage and current as well as polarity. A PCS monitor panel located on the systems control panel details operating conditions.



Load Center Located Above Pilot Seat 060357d

Requirements:

- Connect to shore power or start the generator.
- Turn on the battery cutoff switch.

Operation:
The PCS senses whether it is connected to 50 Amp 120 Volt AC or 30 Amp 120 Volt AC shore power or if operating from the generator. When connected to 20 amp shore power, the remote will need to be changed to 20 amp service by using the Set button.

The PCS controls operation of five possible loads to shed. Shedding a load means removing power from the load allowing extra power to operate other loads of greater importance. These shed loads are typically heavy power consuming loads that can be temporarily postponed until enough power is available to safely operate the loads without the possibility of overloading the shore power breaker.

Load shed example: If average current demand exceeds 24 amps when hooked to a 30 amp service, the system will automatically shed load Number 1 to keep average current demand below 80% (24 Amps) of the 30 amp shore service to avoid the possibility of overloading the shore power breaker. If shedding load Number 1 is insufficient to avoid tripping the shore power breaker,

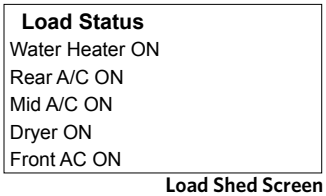
the system will shed load 2 and so on until current demand, in total, is within safe operating limits.

The PCS remote will indicate which loads have been shed. Repeatedly press the Down arrow on the remote to display the load shed list. Any loads that are shed will automatically be reactivated when sufficient power is once again available.

NOTE:
20 amp shore service mode is not automatically detected and the operator must manually set 20 Amp mode when connected to 20 amp shore power.

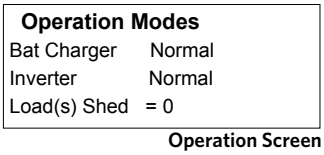
Loads are shed in order of priority.

1. Inverter Charger
2. Block Heater
3. Aqua Hot
4. Front AC
5. Rear AC Heat Pump
6. Mid AC
7. Front Floor Heat
8. Rear Floor Heat



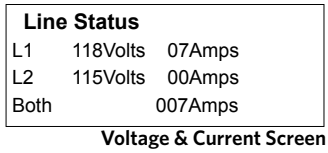
Load Shed Screen

Power Share and Reduced Charging:
Depending on operating conditions, amperage of shore power and battery state of charge, the system may attempt to reduce battery charging as a way to conserve AC power during peak demand or if batteries are of sufficient charge, the system will automatically enable the inverter to help supply extra power during peak demand periods. These operating conditions will be indicated on the remote.



Operation Screen

Power Monitoring:
The system monitors voltage and current as well as polarity when connected to shore power or operating from the generator. Refer to the remote to monitor voltage and current.



Voltage & Current Screen

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 connected to less than 50 Amp 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

Typical Circuit Assignments*

MAIN	50
MAIN	50
A/C 1	20
Charger 1	30
A/C 3	20
FL HT 2	20
Block HT	15
Dryer	20
Hydronic	20
Cooktop	20
Wash/Dry	15
FL HT 1	20
A/C 2	20
Charger 2	30
Gen Pur 1	20
Gen Pur 2	20
Refer	15
Port Appl 2	20
Micro	20
Inverter In 2	30
Port Appl 1	20
Inverter 1	30

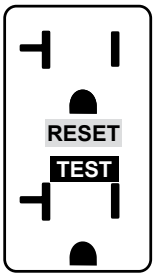
*Refer to actual label.

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 convert watts to amps, divide watts by the voltage. For example: 1370 watts divided operating voltage of 115 Volts equals 11.913 amps.

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.



GFCI Outlet
060072

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.

GFCI Breaker

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 such as 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.

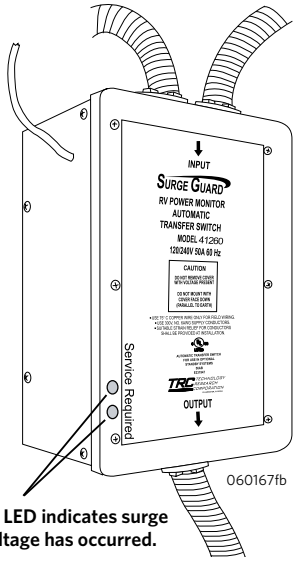
TRANSFER SWITCH

The transfer switch will automatically select either shore power or generator when energized. In the event both shore and generator power are available, generator power will override shore power after a 30 second delay. Once the generator is shut down, shore power will be available after a two second delay.

House Electrical

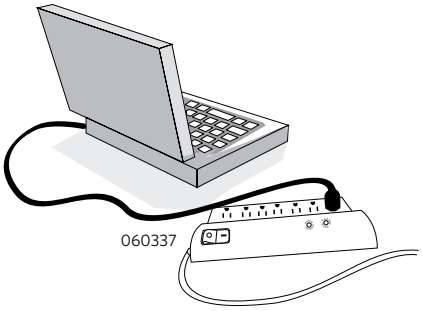
SECTION NINE

The transfer switch uses electronics to monitor voltage input for high or low voltage conditions. If the incoming voltage from the generator or shore power exceeds 132 AC Volts, or if voltage drops below 102 AC Volts, the transfer switch automatically disconnects electrical service to prevent damage that can occur to voltage sensitive equipment.



Lit LED indicates surge voltage has occurred.

The transfer switch monitors for faulty wiring from the power pedestal and protects from reverse polarity and the dangers of an open neutral condition. A multi-mode surge protection eliminates the potential for power surges to enter the motorhome through power cables during electrical storms.



It is recommnded to use a surge protector to protect voltage sensitive equipment.

CAUTION:
While the transfer switch has surge protection, sensitive electronic equipment such as laptops should be plugged into a separate surge protector.

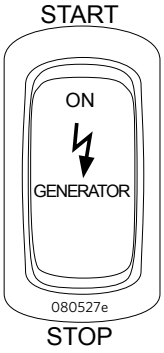
NOTE:
To prevent damage to transfer switch contacts, discontinue appliance operation and turn off auxiliary electrical loads operated by outlets before connecting/disconnecting shore power or starting/stopping the generator.

NOTE:
The electrical contacts of the shore cord are not electrically energized when the generator is operating,

SHORE POWER MONITOR
See Multiplex Panel for more information about the Shore Power Monitor.

GENERATOR

The generator is located in the front compartment of the motorhome. To open the generator compartment, park on level ground then pull the latch located above the license plate then slide out the generator. Ensure the motorhome is level as tray can slide out abruptly.



The generator can be started from the following locations:

- Generator remote start on the monitor panel, Dash and/or bedroom nightstand.
- Generator switch on the generator.

INFORMATION:
For detailed operating instructions and information refer to the Onan generator OEM manuals.

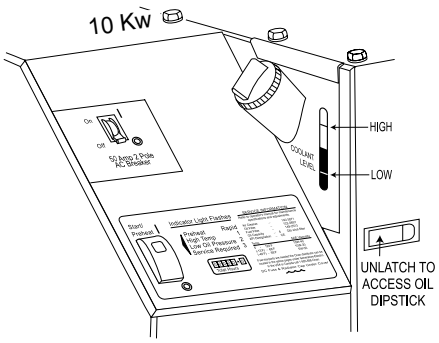
PRE-START CHECKS

Prior to the first start of the day, perform a general inspection including oil and coolant levels. Keep a maintenance log on number of hours in operation since the last service. Perform any service or maintenance that may be due.

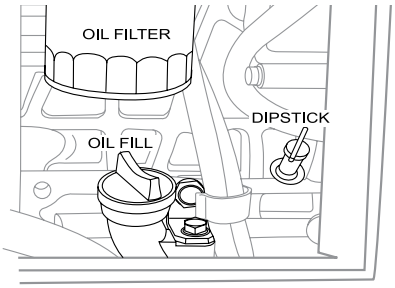
Before Starting the Generator:

- People and animals must be clear of hazards of electrical shock and moving parts.
- All appliances and other large AC electrical loads must be off.

CAUTION:
Allow the generator to cool before removing the coolant fill cap.



Coolant Level Window 060144r



10 Kw Oil Dipstick Located Behind Access Door On Generator 090492

NOTE:
The generator may require priming. To prime, hold control switch in the Off position. Repeat if necessary. The generator fuel pick-up tube is cut to approximately 1/4 tank so as not to run the main engine out of fuel.

STARTING THE GENERATOR

- House and chassis battery disconnect switches must be on.
- Push and hold the control switch in Start position until the generator starts. Release switch. The control switch may flash up to 15 seconds, indicating engine preheat.

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:
Carbon Monoxide hazard! To prevent generator exhaust gases from entering the motorhome when parked position the dash air conditioner to the recirculation position by turning the ignition on, activating the blower fan control and set the dash HVAC system to Recirculation mode. The blower and ignition key can now be turned off. This will close off the dash HVAC system to the outside. 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 put the motorhome where the exhaust 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 parking near high grass, be sure the hot exhaust does not come into contact with the grass this can be a fire hazard. Hot exhaust pipe or hot exhaust gases can ignite grass.

House Electrical

SECTION NINE

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/turn off all AC loads. Allow the generator to run unloaded for about a to allow the engine to cool before shutdown. Momentarily push the control switch to the Stop position. Release the switch. The generator requires only a momentary stop signal. It is not necessary to hold the switch in the stop position.

POWERING THE EQUIPMENT

The AC output of the generator powers the air conditioners, inverter, 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 "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

There is always a possibility fuel may be contaminated. Diesel fuel may contain water or a microbe growth (black algae).

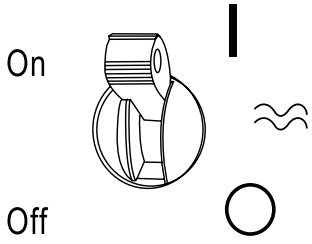
Any contamination of fuel can greatly reduce the total output of the generator and may cause erratic AC output.

Average Fuel Consumption	Diesel 10,000 Watts (gal/hr)
No Load	.1
Half Load	.43
Full Load	1.01

NOTE:
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 main AC breaker panel or on the generator control panel, there may be a short circuit or too much load.



Circuit Breaker on Generator
020159t

NOTE:
The generator will continue to run after a circuit breaker trips.

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 trip after being reconnected. Do not continue to reset breaker. Have the problem corrected before resuming operation.

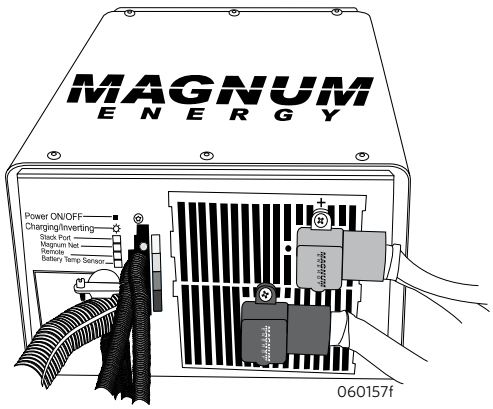
GENERATOR EXERCISE

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.

INVERTER

The inverter changes DC battery power to AC electrical power. It also converts AC power to DC to charge the house and chassis batteries when hooked to shore power or operating from the generator. 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 most outlets, microwave, residential refrigerator and home entertainment system.



The inverter consumes house battery power at exchange rate of approximately 11 amps DC to produce 1 amp of AC power.

Turn off the inverter when not in use to conserve house battery power. The inverter works in conjunction with the "load shed" feature of the AC load center. In instances where shore power amperage is limited to 20 or 30 amps, the inverter will "power assist" during periods of peak demand when total amount of amperage available exceeds shore power capacity. The battery cutoff switch must be on for the inverter remote panel to function and respond to commands. 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

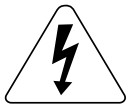
To Turn the Inverter On:

- Turn on the house battery cutoff switch.
- Press the Inverter On/Off switch on the remote panel.
- Inverter control is via Multiplex.

If the inverter does not sense AC power from the generator or shore power, it will provide AC power from the motorhome batteries to most outlets and appliances. If the generator is started or the motorhome is connected to shore power, the inverter will automatically begin charging.

House Electrical

SECTION NINE



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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

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 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:

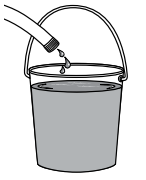
Shore Setting	AC Power
50 Amp	When hooked to 50 Amp shore service
30 Amp	When hooked to 30 Amp shore service
20 Amp	When hooked to 20 Amp shore service
10 Amp	Used when shore service is severely limited or experiencing shore power overload
5 Amp	Minimum charge capacity setting. Used when shore service is severely limited or experiencing shore power overload.
Contrast	75%

Three-stage charging cycle:

The inverter optimizes battery charge rate and 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 battery voltage is the same as the Bulk Charge Cycle, between 14.2 - 14.6 Volts DC. Length of the Absorb Cycle is a timed event determined by the inverter.
- **Float Charge Cycle:** Charge voltage is generally around 13.3 - 13.7 Volts DC. Approximately 80% of the charging cycle has been completed by this time.

Bulk Charge
Water (charger) on full until the bucket (battery) is 80% full.



Absorb Charge
Water (charger) slows until the bucket (battery) is 90% full.

Float Charge
Water (charger) slowly trickles into the bucket (battery) until 100% full. Water (charger) will adjust flow to maintain level.

Hose = Inverter in Charge Mode
Bucket = Battery
06023b

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%

FACTORY DEFAULT SETTINGS

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.

AUTO GENERATOR START (OPTIONAL)

The automatic generator start (AGS) on Multiplex touchscreen 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.

NOTE:
The battery cutoff switch (interior house power) must be on for the AGS/ATS features to function.

WARNING:
The Test button initiates an Auto Gen Start test cycle. Be sure it is safe to perform a test cycle before activating a test cycle. Serious damage, personal injury or death can result.

NOTE:
Refer to the OEM manual located in the Owner's Information File Box for detailed instructions.

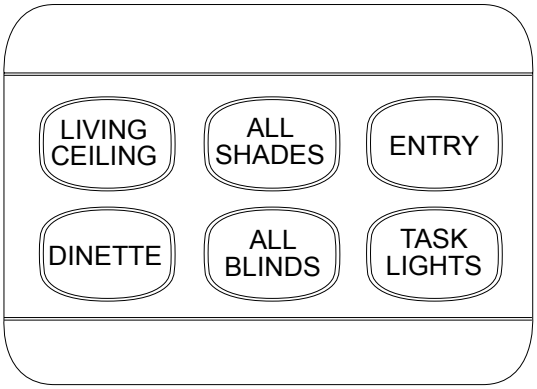
HOUSE 12 VOLT DC

FIREFLY (IF EQUIPPED)

Several components within your motor home are controlled by a system called the "Firefly". This is a system set up where easy to use keypads and screens show the operating status of the individual system through out the motor home. These Firefly activated systems are controlled by an on-board computer system. The system uses network cables to connect the switch panels to central junctions. For purposes in this manual only we will refer to the Firefly computer controlled system as "multiplexing". Keep in mind this is not a "true multiplex" system, but operates in a similar fashion.

Each switch panel and individual switches are "addressed". The computer is programmed to recognize the address of each switch panel and individual switch and continually monitors the state of each switch. When a switch is pressed, the computer detects a change then activates or deactivates the particular function of the switch.

Operation:
The Firefly switches operate items directly such as a light or shade. Switch description and operation is generally intuitive and marked on the switch. A light switch changes color depending whether off or on. Refer to Appendix for a complete operators manual for the Firefly system.



Multiplex Switch Panel 060297pb

House Electrical

SECTION NINE

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 insulation. 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.

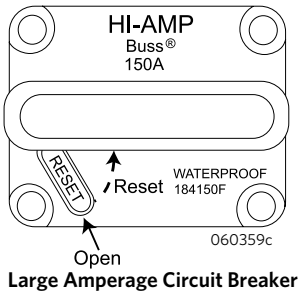
The application of the electrical load can determine whether a fuse or circuit breaker is selected. Circuit protection devices come in a variety of shapes and ratings.

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.

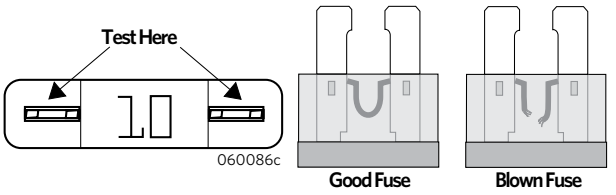
WARNING:
Replacement fuses or circuit breakers must be of the same type and rating as the original equipment. Installing protection devices other than the original type and rating will create a safety hazard that will potentially result in circuit and/or component damage and fire.

Fuses:

Blade fuses 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. Two exposed terminals are located atop the blade fuse housing. 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.



Large Amperage Circuit Breaker

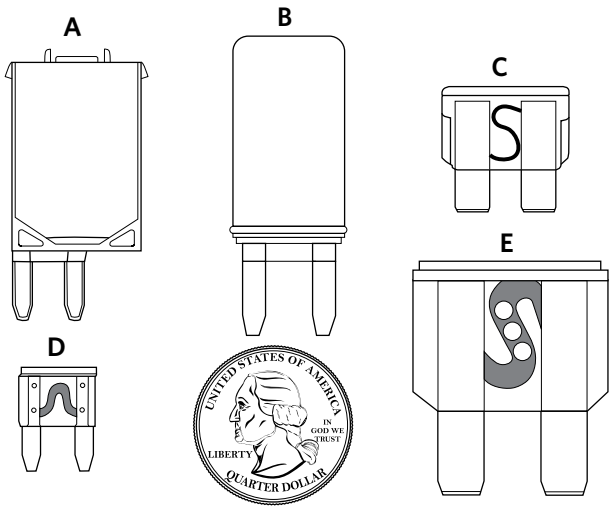


ATC Fuse 060086B

Blade Fuse Guide

Color	Mini	Standard	Maxi
Black	1		
Gray	2	2	25
Violet	3	3	
Pink	4	4	
Tan	5	5	10
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



Representation of various fuses and a circuit breaker. 080528e
Quarter is used for size comparison of fuses.
A. Manual Reset Circuit Breaker
B. Auto Reset Circuit Breaker
C. Standard Fuse
D. Mini Fuse
E. Maxi Fuse

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.

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.

AGM BATTERIES (If Equipped):

Absorbed Glass Mat (AGM) batteries are sealed and require no maintenance. Battery acid is absorbed between the battery plates and immobilized by a fiberglass mat. This glass mat absorbs and immobilizes the acid while still keeping the acid available to the plates. This allows a fast reaction between acid and plate material.

AGM batteries are more resilient than LLA batteries, but the life cycle capacity is also reduced with each successive severe discharge. AGM batteries have a much lower self-discharge rate and require only 102% charge to get 100% SOC. AGM batteries are sealed; they do not require hydrometer testing, nor do they loose water. Voltage is the only way to test the SOC of AGM batteries.

While an AGM battery requires less maintenance, the cables must still be checked for cleanliness and the connections must be secure.

A sign that batteries are questionable for continued service is shortened discharge time. Even one battery in a bank with a shorted cell can quickly discharge the whole battery bank while at rest. Some batteries do not last as long as they should because they were never fully charged or have been abused while in service.

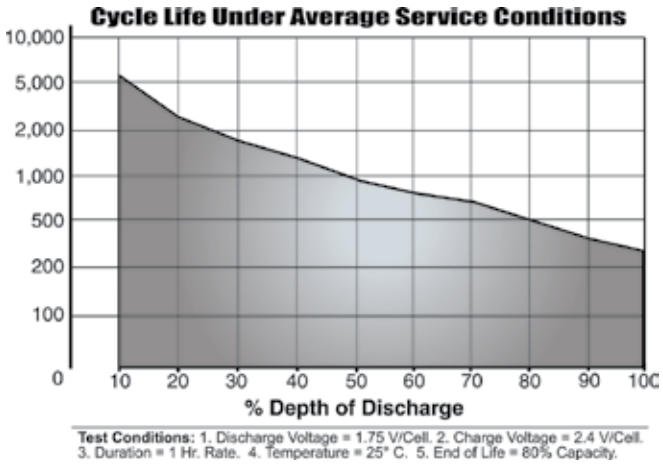
AGM Batteries*		
State of Charge%	Open Circuit Voltage per cell	Open Circuit Voltage 12 Volt Battery
100	2.13 or greater	12.8 or greater
80	2.1	12.6
60	2.05	12.3
40	2	12
20	1.97	11.8
0	1.93 or less	11.6 or less

***Figures are from Concorde Battery Corp. (Lifeline).**

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 hat 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.

Example of Battery Filler Bottle

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.

NOTE:
The cap on individual cells is threaded onto the battery and can be removed to inspect water level.

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.

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.

Battery Tools:

A few simple hand tools are required to work on the batteries and should be kept aside for working on batteries only.

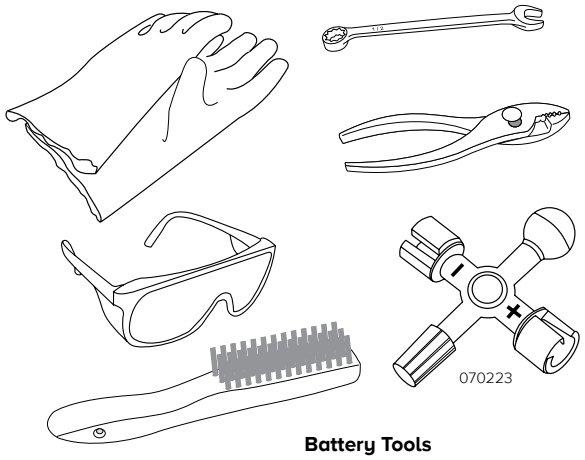
WARNING:
Liquid lead acid batteries produce hydrogen gas while charging. Do Not smoke around batteries and keep all sources of ignition or flames away from batteries. Hydrogen is an extremely flammable gas and can explode resulting in fire, personal injury, property damage or death.

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.

- Wear old clothes. Clothing is easily damaged when in contact with batteries.
- Wear thick rubber gloves that are solvent and thinner proof.
- Keep a 1/2" box-end wrench, wire brush and pair of adjustable pliers separate from other 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.



Battery Tools

- 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. 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, 1/2" 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.
- 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 right 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.

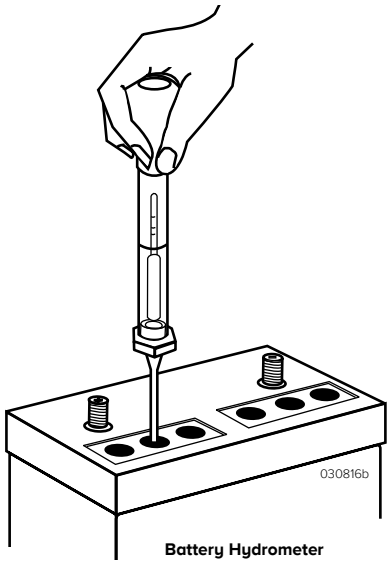
- Verify proper voltage in the system before turning on the main battery disconnects.
- Coat terminals and posts with a protective coating to seal the connections from the gas and electrolyte.
- Turn on the main battery disconnect switches.

TESTING THE BATTERY

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.

A battery can be tested and/or monitored several ways.

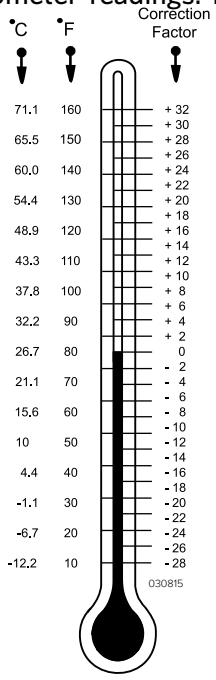
Checking the Electrolyte Solution (LLA Only):
The most efficient way to test the batteries is check the electrolyte solution with a hydrometer. Many styles are available, from types with cylinder graduation (shown in the illustration) to types with floating balls. Hydrometers can be purchased from most 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.



Temperature Correction Chart

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. 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.

House Electrical

SECTION NINE

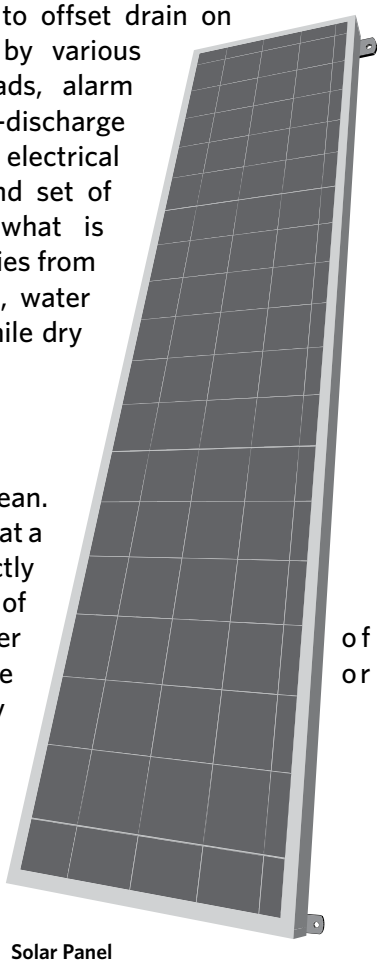
SOLAR PANEL

The solar panel system is designed for use with liquid lead acid batteries only.

Solar Panel:

The solar panel is a laser-grooved, buried-grid panel that is most efficient when clean and in full sunlight.

Depending upon consumption of house battery power and environmental conditions, the solar panels can deliver enough power to offset drain on the batteries caused by various parasitic electrical loads, alarm systems, natural self-discharge of batteries and minor electrical usage. Adding a second set of panels may replace what is drawn out of the batteries from the operation of lights, water pump, inverter, etc., while dry camping.



Solar Panel (located on the roof) 060364

SOLAR PANEL CARE

Keep the solar panel clean. The amount of power that a panel produces is directly related to the intensity of sunlight. A single layer of dust, road grime or other debris can greatly reduce power. Regular inspections and regular cleaning will assure maximum charging power. Use a non-abrasive cleaner and paper towels to clean the panel. The surrounding environment and the amount of road dust encountered will determine how frequently the panel should be cleaned.

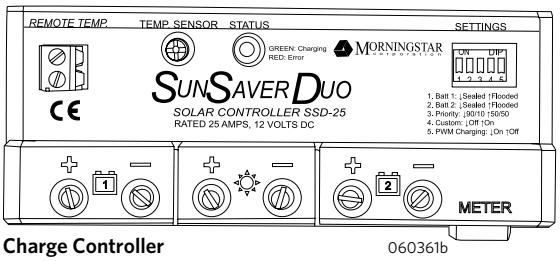
- Solar panels should be cleaned monthly or more frequently depending upon weather conditions.
- The panel should be cleaned if a film or a layer of dust is on the windshield.
- High winds can blow dust and debris around causing dirt build up. Frequently inspect the panel and clean as necessary.

CHARGE CONTROLLER

The charge controller automatically charges the house and chassis batteries whenever sunlight is available. Features include Pulse Width Modulation (PWM) charging. This means the controller delivers full charging amperage (Bulk Charge) when batteries are low. As battery voltage rises, charge amperage lowers (Absorption Charge) until the batteries reach their set voltage point. The charger then delivers low amperage (Float Charge) to maintain the batteries.

The green Charging LED illuminates when sunlight is reaching the solar panel. Solid green indicates bulk charging; flashing green indicates absorption or float charging. The LED will glow red if errors occur. A red LED means that the system is not charging. An error code will also display on the remote monitor. See the OEM manual for troubleshooting. It is normal for the controller to become warm to the touch, especially when processing higher amperage.

NOTE:
See OEM manuals for more information.



Charge Controller 060361b

Maintenance:

Perform the following maintenance tasks twice a year for best performance.

- Tighten all terminals. Inspect for loose, broken or corroded connections.
- Ensure all wire clamps and tie-downs are secure.
- Verify LED indication matches system conditions.

MONITOR PANEL (IF EQUIPPED)

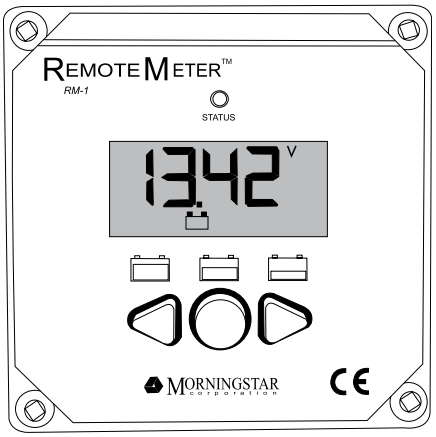
The solar panel monitor features a display screen, three operation buttons and three battery state of charge LED's for a quick reference charging levels.

Press the center button to scroll through four main

screens, and use the left or right arrow buttons to scroll through sub-screens.

NOTE:
The charge controller is limited to 425 watts maximum input.

CAUTION:
The charge controller may be warm to the touch. This is a normal function of the charge controller.



Solar Monitor 060361

Main Screens:

- **Solar Charge Current:** Press the left and right arrows to view solar amp hours and maximum charge current.
- **Battery 1 Voltage:** This is house battery voltage. Press the left or right arrows to view battery amp hours and minimum and maximum battery voltage.
- **Battery 2 Voltage:** This is chassis battery voltage. Press the left or right arrows to view battery amp hours and minimum and maximum battery voltage.
- **Temperature Screen:** This displays the ambient temperature at the remote monitor.

LIGHTS

Light fixtures will vary depending on location. Shown are typical light fixtures. Actual styles and types may differ.

Notes

Maintenance Records

SECTION TEN

MAINTENANCE RECORDS 193
WEIGHT RECORD SHEET 194
TIRE & BATTERY RECORDS 195

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

	Services									Job Performed	
Mileage	A	A1	A2	A3	A4	B	C	D	E	Date	By
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											

Maintenance Records

SECTION TEN

WEIGHT RECORD SHEET

Date: ____________________ Date: ____________________

Place: ____________________ Place: ____________________

Front: ______ + ______ = ______ (Left, Right, Total) Front: ______ + ______ = ______ (Left, Right, Total)

Rear: ______ + ______ = ______ (Left, Right, Total) Rear: ______ + ______ = ______ (Left, Right, Total)

Total Gross Vehicle Weight = ______ **Total Gross Vehicle Weight = ______**

Date: ____________________ Date: ____________________

Place: ____________________ Place: ____________________

Front: ______ + ______ = ______ (Left, Right, Total) Front: ______ + ______ = ______ (Left, Right, Total)

Rear: ______ + ______ = ______ (Left, Right, Total) Rear: ______ + ______ = ______ (Left, Right, Total)

Total Gross Vehicle Weight = ______ **Total Gross Vehicle Weight = ______**

Date: ____________________ Date: ____________________

Place: ____________________ Place: ____________________

Front: ______ + ______ = ______ (Left, Right, Total) Front: ______ + ______ = ______ (Left, Right, Total)

Rear: ______ + ______ = ______ (Left, Right, Total) Rear: ______ + ______ = ______ (Left, Right, Total)

Total Gross Vehicle Weight = ______ **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

Firefly Operation

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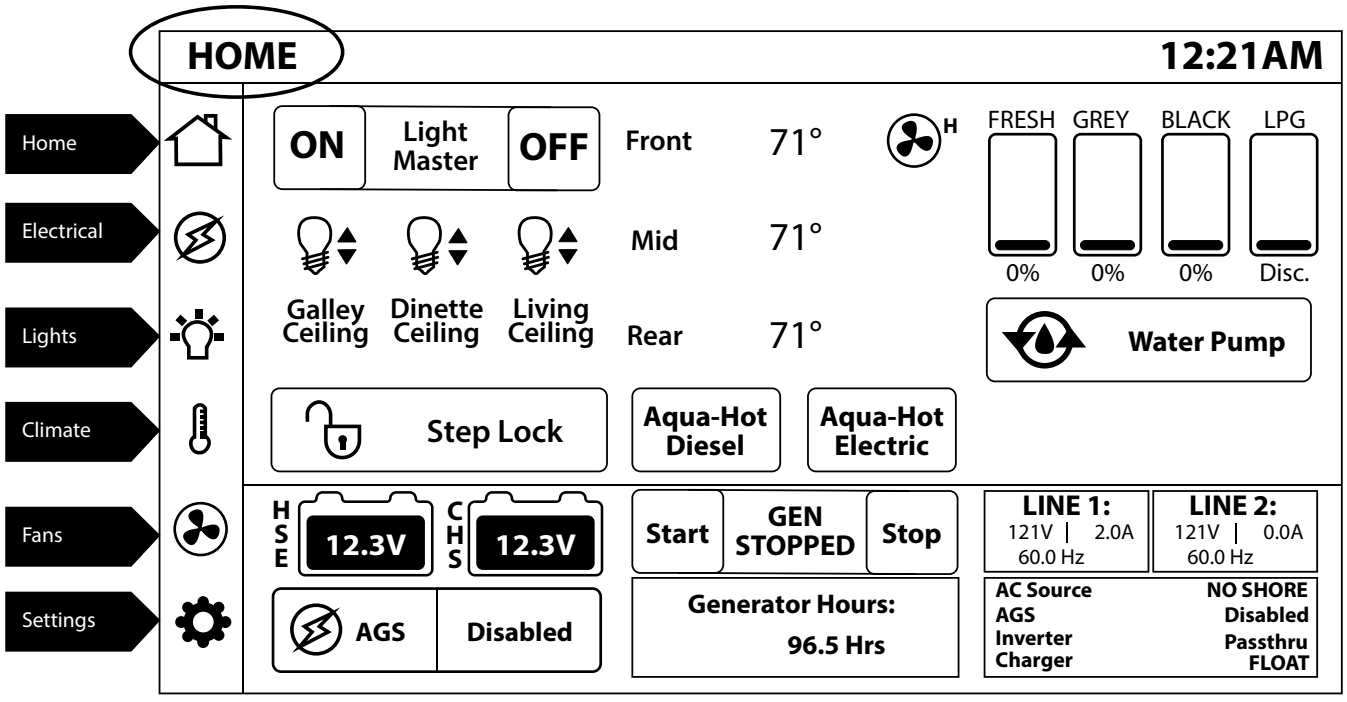
FIREFLY VEGATOUCH (LYRA) OPERATIONAL MANUAL

Your motor home may be equipped with a "Firefly" network system. This is designed to operate virtually all of the electrical components in your motor home.

The simple to use "touch" screen keypad and "self-guided" menus are easy to use. This system also has the feature of being able to help troubleshoot and diagnose electrical problems should one arise. Your authorized dealer will be able to assist you if the need arises.

SCREEN NAVIGATION

Tap any icon from the navigation bar to select the desired page. The currently selected page will always be listed in the top corner or the screen.

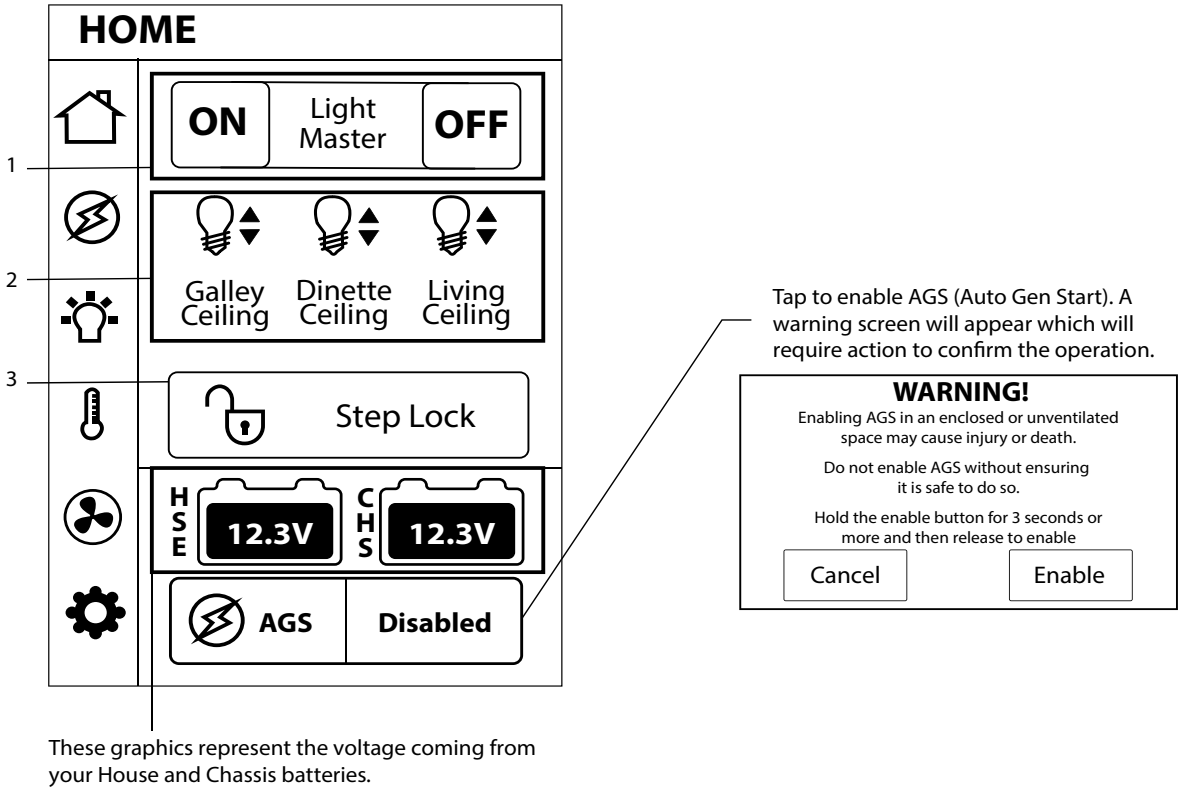


Firefly Operation

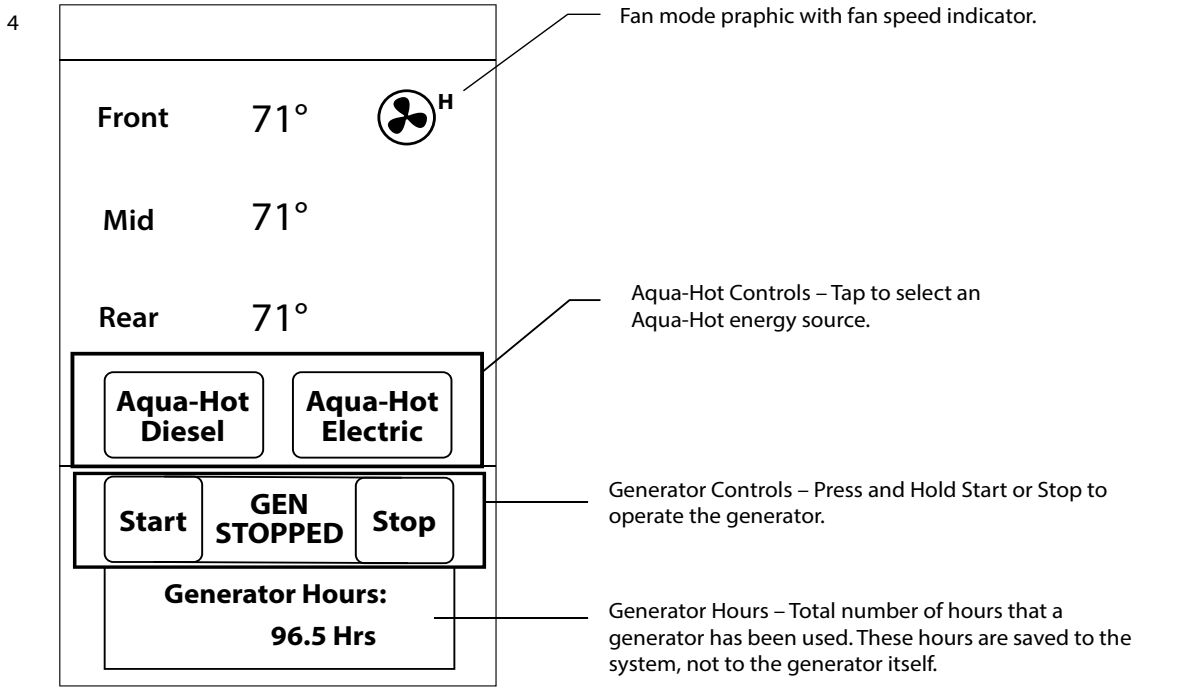
APPENDIX A

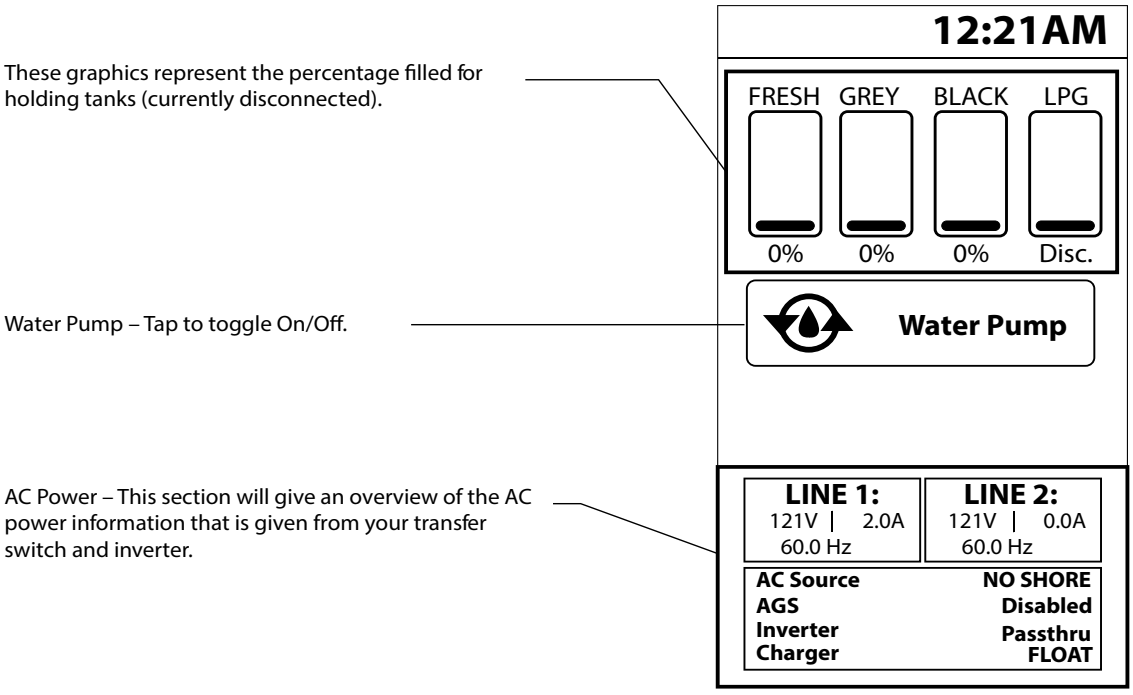
HOME

1. The Light Master controls all interior lights at once. When Light Master Off is pressed, it will remember which lights were on. Then, when Light Master On is pressed, it will only turn on the lights that are in memory. To turn on all lights again, press and hold Light Master On for at least one second. *Troubleshooting – Memory is rewritten each time Light Master Off is pressed. In the case that it is pressed twice in a row, it will remember that no lights were on and just touching Light Master On won't turn on any lights. Press and hold Light Master On to turn the lights back on.
2. Lights – Tap to toggle an individual light On or Off. After 90 seconds of inactivity, the touch screen will automatically change to the Lights page.
3. Step Lock – Tap to enable or disable the Step Lock.



4. Climate Control Status – The current temperature and climate control mode for each zone will display on the home screen. A white fan graphic will represent Fan mode, a blue snowflake will represent Air Conditioning, and a red flame graphic will represent Aqua-Hot.



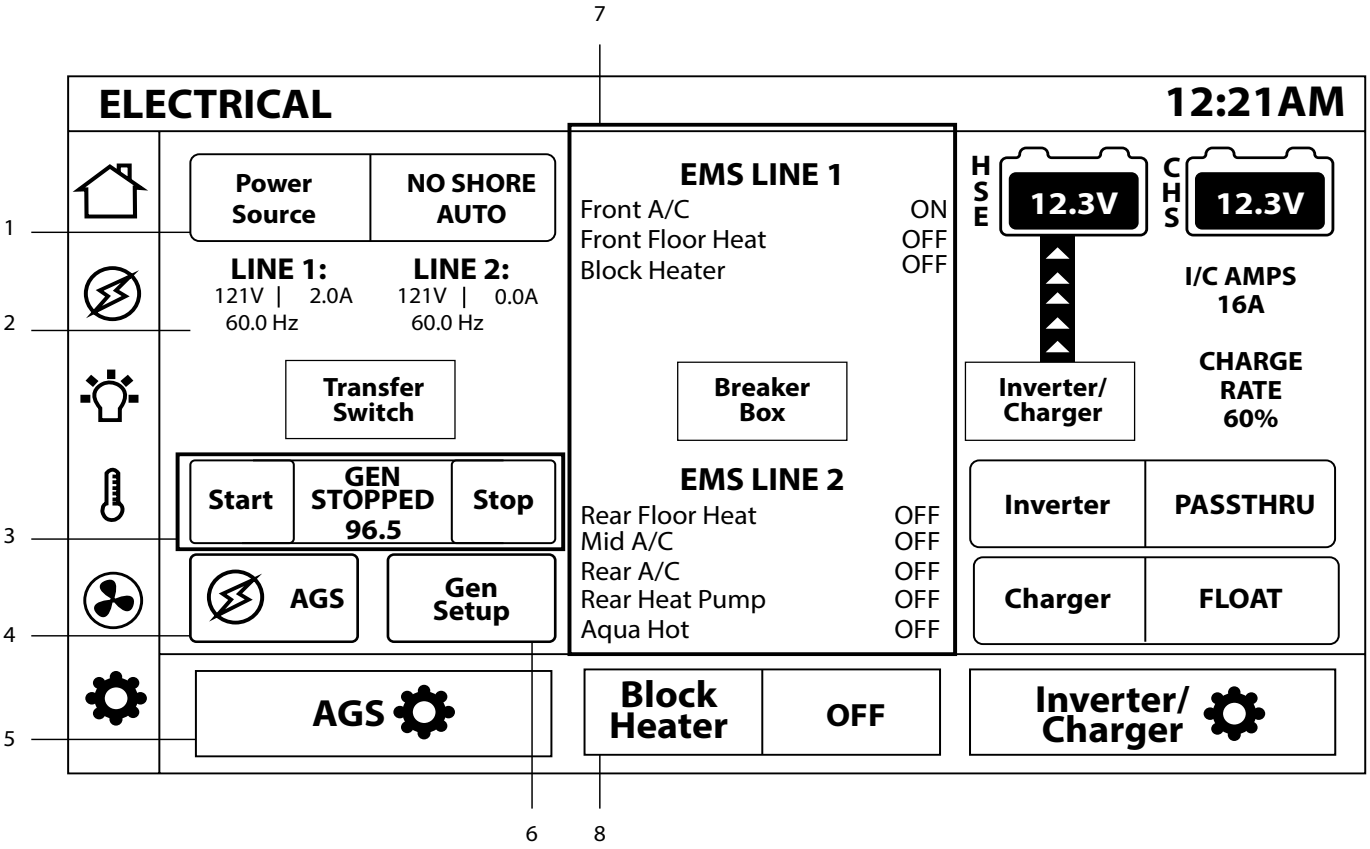


Firefly Operation

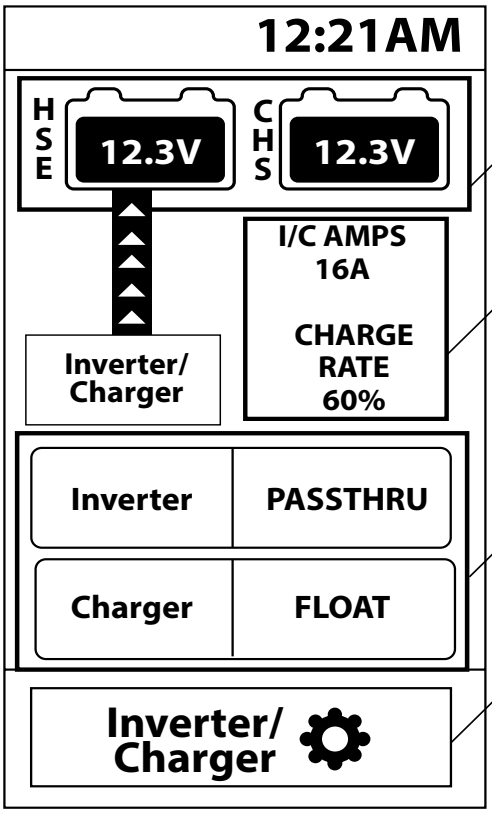
APPENDIX A

ELECTRICAL

1. Power Source Select – 50 Amp shore power will display automatically if connected to a 50 amp line. Tap to select 30, 20, or 15 amp if your coach is connected to a 30 amp line.
2. Shore Line Display – AC Power displays the voltage, amperage draw and frequency for each line.
3. Generator – Creates electrical energy. Press and hold Start to start the generator. Tap Stop to stop the generator.
4. AGS – Auto Gen Start is a system that will start the generator automatically based on your customized trigger settings. Press to Enable/Disable AGS. A warning page will appear requiring you to press an additional Enable button for 3 seconds to enable AGS. Only enable AGS if your coach is in a well-ventilated area.



5. AGS Settings – Tap to navigate to the AGS Settings page.
6. Gen Setup – Tap to navigate to the generator setup page.
7. Energy Management System (EMS) – EMS will ensure that power is available before allowing certain systems to run. If power is not available, it will not allow particular systems to run (shed the load).
8. Block Heater – Tap to enable/disable the block heater.



Battery Icons will be displayed as RED if they are reading below 12 volts.

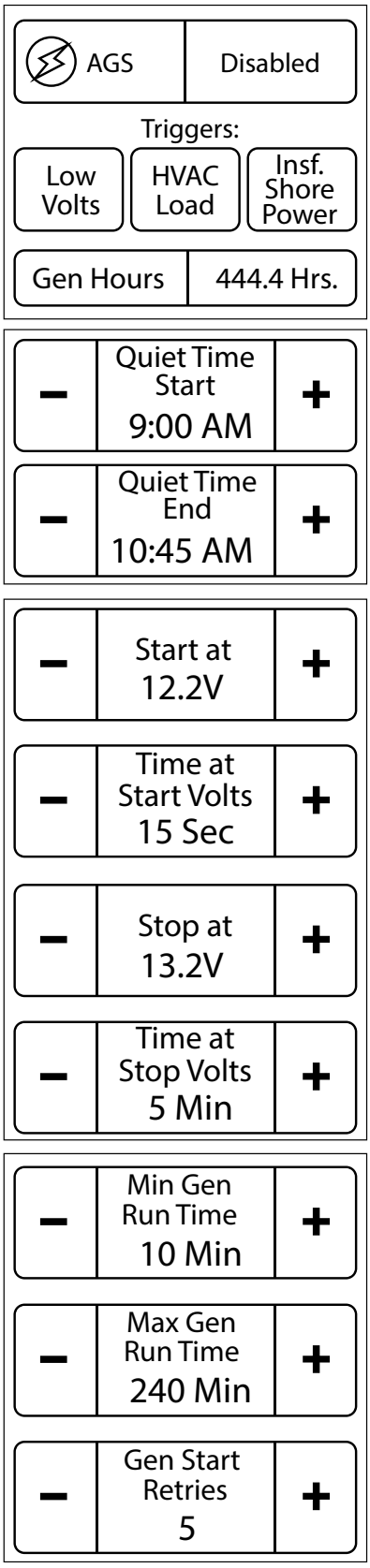
This section will display Inverter status and charging information.

Inverter/Charger controls.

Tap to navigate to the Inverter/Charger settings page.

Firefly Operation

APPENDIX A



AGS Settings

Tap to Enable/Disable AGS.

Trigger Options – Automatically start the generator using specified voltage settings (Low Volts), when A/C or Heat Pump starts (HVAC), or when Shore Power is insufficient. If no triggers are selected, AGS will not run.

Gen Hours Display – The number of hours that the generator has been used. These hours are saved to the system, not the generator itself. Press and Hold for 5 seconds to change the generator display hours.

Quiet Time Start – Use the +/- buttons to select the starting point for Quiet Time. AGS will work normally at this point.

Quiet Time Stop – Use the +/- buttons to select the stopping point for Quiet Time. AGS will work normally at this point.

Start at Volts – The generator will start when the voltage drops to this set point depending on "Time a Volts" setting below.

(Range 10.5v - 12.5v)

Time at Start Volts – The generator will start when the voltage drops to the Start at Voltage for this specific amount of time.

(Range 5 seconds - 1 minute)

Stop at Volts – The generator will shut off when the voltage reaches this set point depending on "Time at Stop Volts" setting below.

(Range 13.2v - 14.5v)

Time at Stop Volts - The amount of time required for the voltage to remain at "Stop at Volts" level before the generator shuts off.

(Range 5 min - 120 min)

Minimum Gen Run Time –Use the +/- buttons to set the minimum amount of time that your generator will run once it has started.

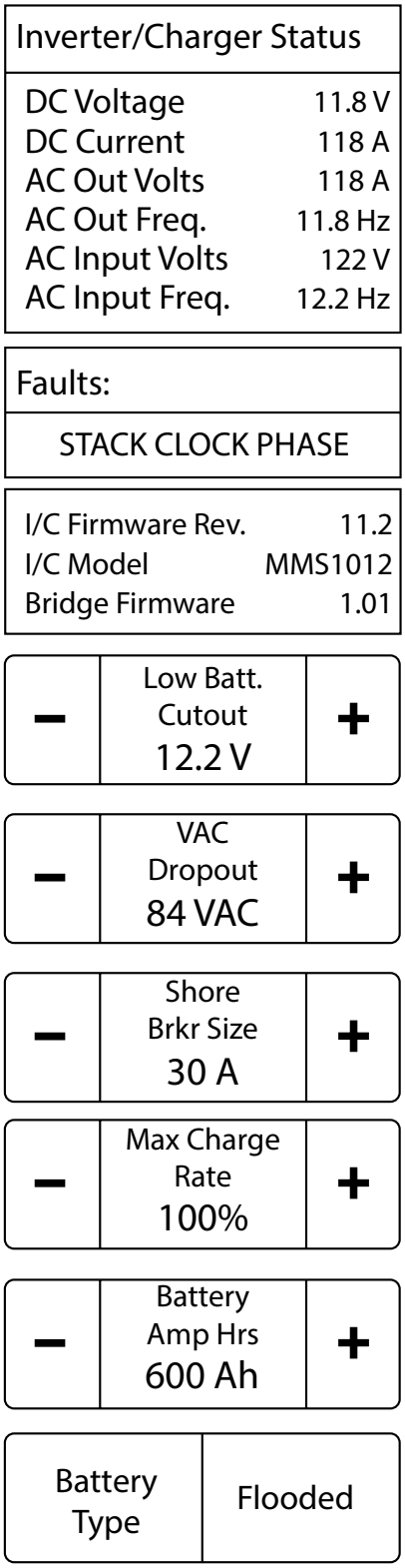
(Range 10 min. - 30 min.)

Maximum Gen Run Time – Use the +/- buttons to set the maximum amount of time that your generator will run once it has started.

(Range 120 Min. - 240 Min.)

Gen Start Retries – Use the +/- buttons to set the number of tries that your generator will retry to start.

(Range 1-5 Retries)



Inverter/ Charger Settings

DC (Battery) Power Information

AC Power Information

Any Inverter/ Charger faults will display here.

Inverter version information.

LBCO – Use the +/- buttons to set the DC voltage level that turns off the inverter. This protects the batteries from over-discharge damage.

VAC Dropout – Use the +/- buttons to set the minimum AC voltage that must be present before the inverter kicks off and switches the coach back to AC power.

Shore Breaker Size – Use the +/- buttons to adjust to the required shore power amp breaker setting.

Max Charge Rate – Use the +/- buttons to adjust the charge rate.

Battery Amp Hours – Use the +/- buttons to adjust the amp hours for your battery bank. Please contact REV Customer Service for more information regarding batteries and battery settings.

Battery Type – Tap to select your battery type.

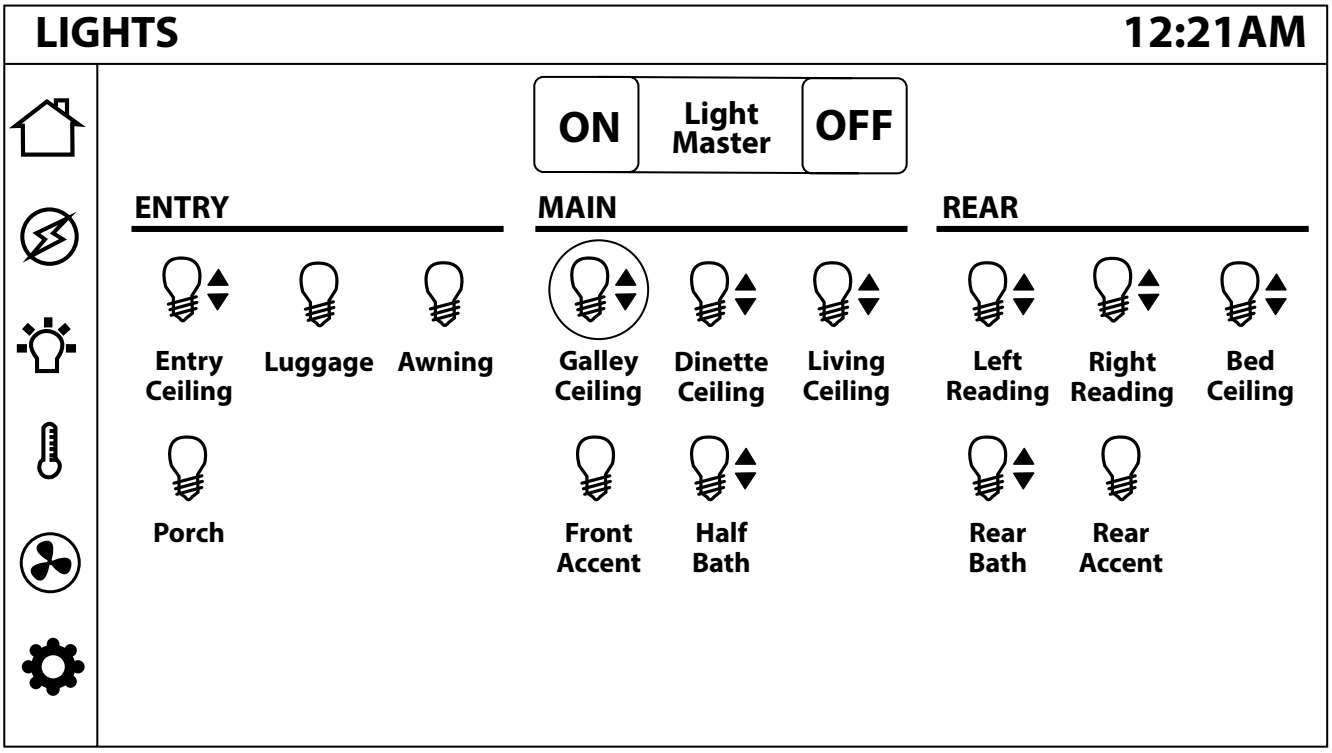
Firefly Operation

APPENDIX A

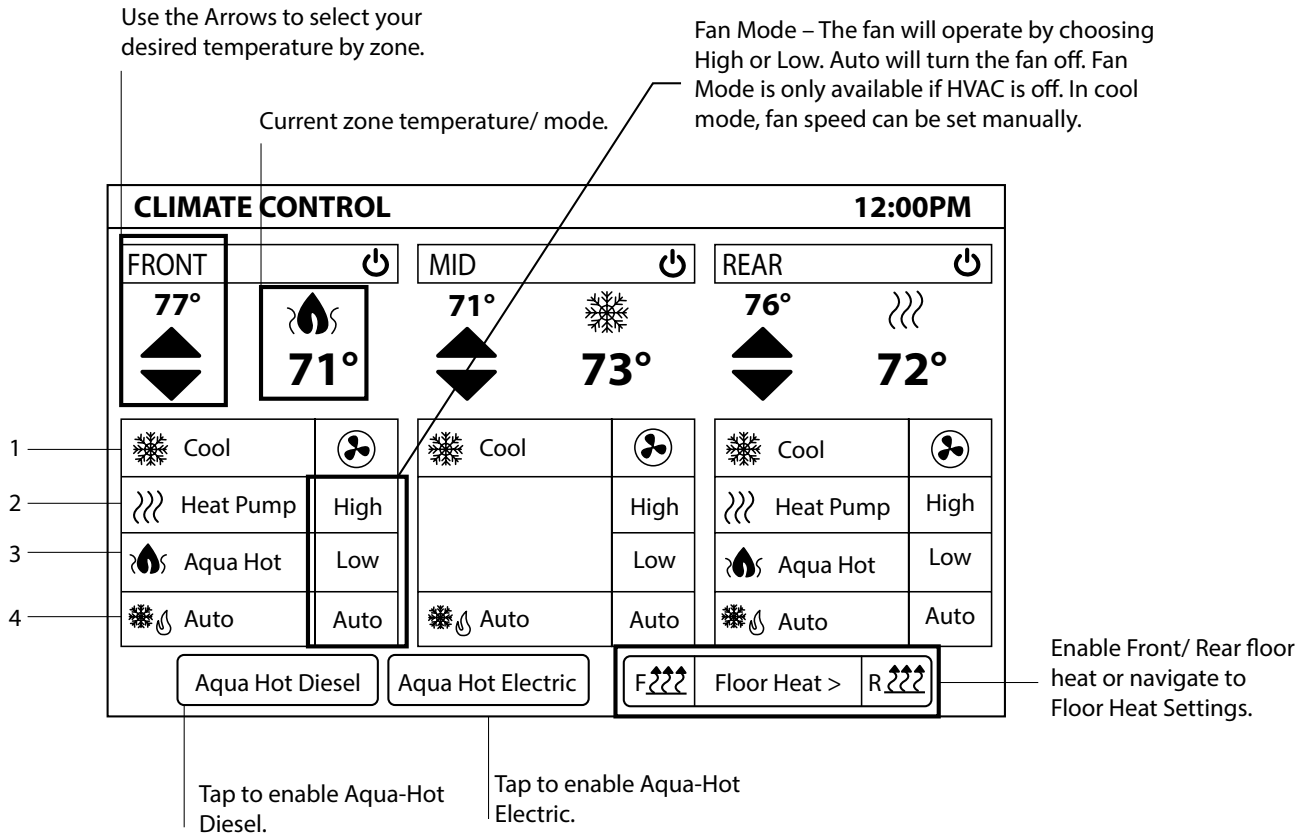
LIGHTS

This screen will control the lighting for the entire coach, including the exterior. Tap any button to turn the desired light On/Off.

Lights with up/down arrows are dimmable. Press and hold these buttons to ramp the brightness up or down. Tap the buttons to toggle On/Off.



CLIMATE CONTROL



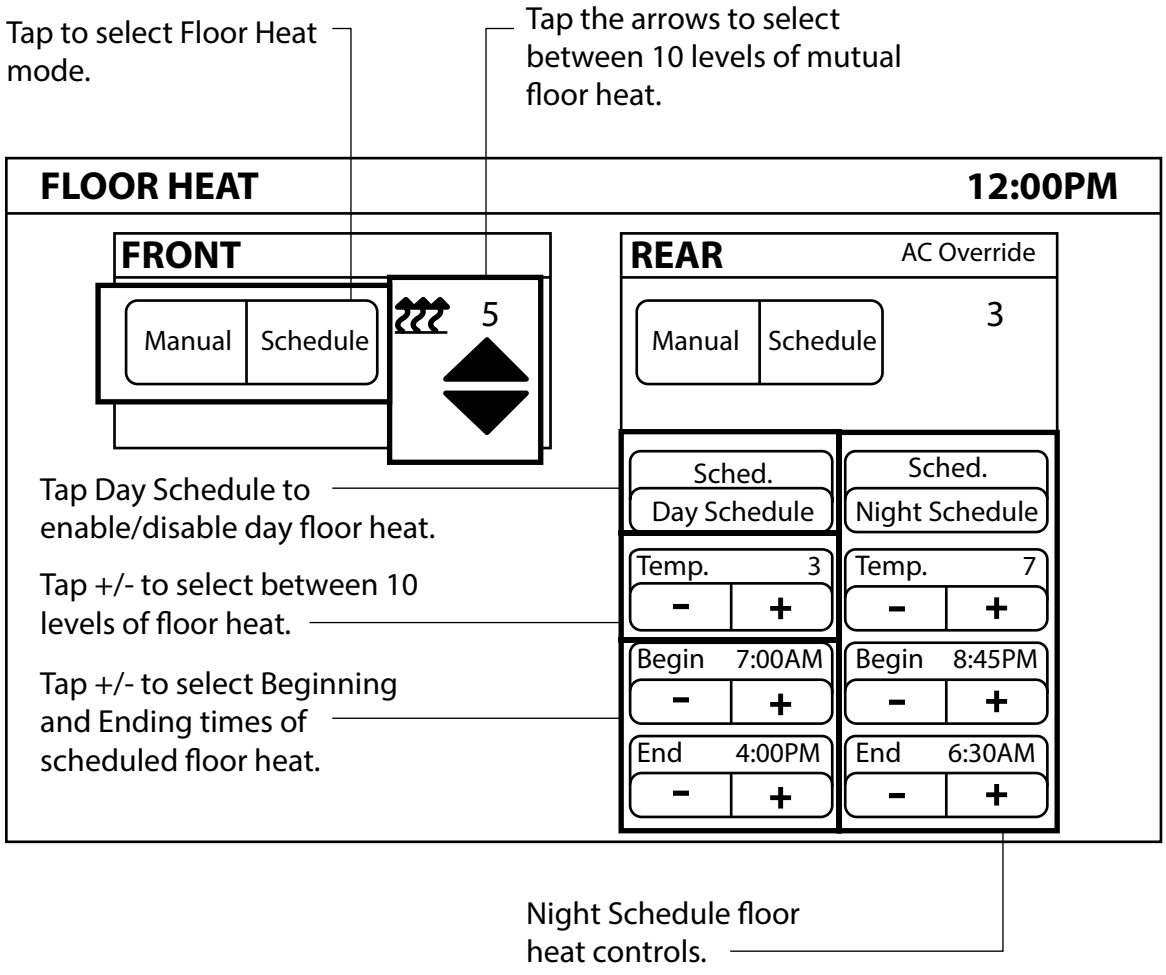
1. Cool – Tap to operate the air conditioning. The A/C will run until the current temp reaches your desired temp and then shut off.
2. Heat Pump – Tap to operate the heat pump. The Heat Pump will run until the current temp reaches your desired temp and then shut off. Heat Pump mode has a 2nd stage heat feature that will automatically enable Aqua-Hot if it cannot bring the zone temp up to the set temp. Aqua-Hot will enable if the set point reaches 5 degrees below the set point.
3. Aqua Hot – Select an Aqua-Hot Source and Tap to operate.
4. Auto – Tap to put the system into Auto mode. The A/C or Heat will automatically run to keep your desired temperature consistent.

* Selecting Cool, Heat Pump, Heat Pump or Auto will cause the respective buttons to change color. Once a mode is chosen, either a Fan, Snowflake, Flame or Radiant Heat icon will appear above the Current Temp to show which system is currently working.

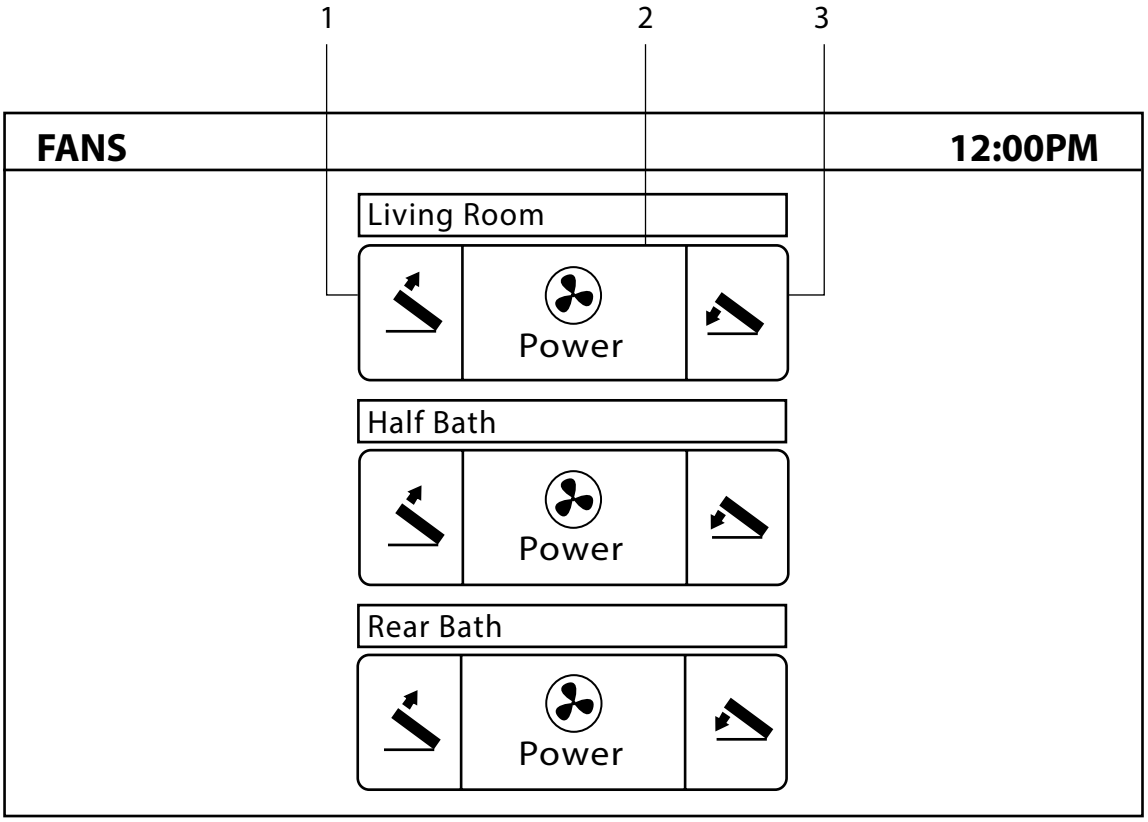
Firefly Operation

APPENDIX A

Floor Heat



FANS

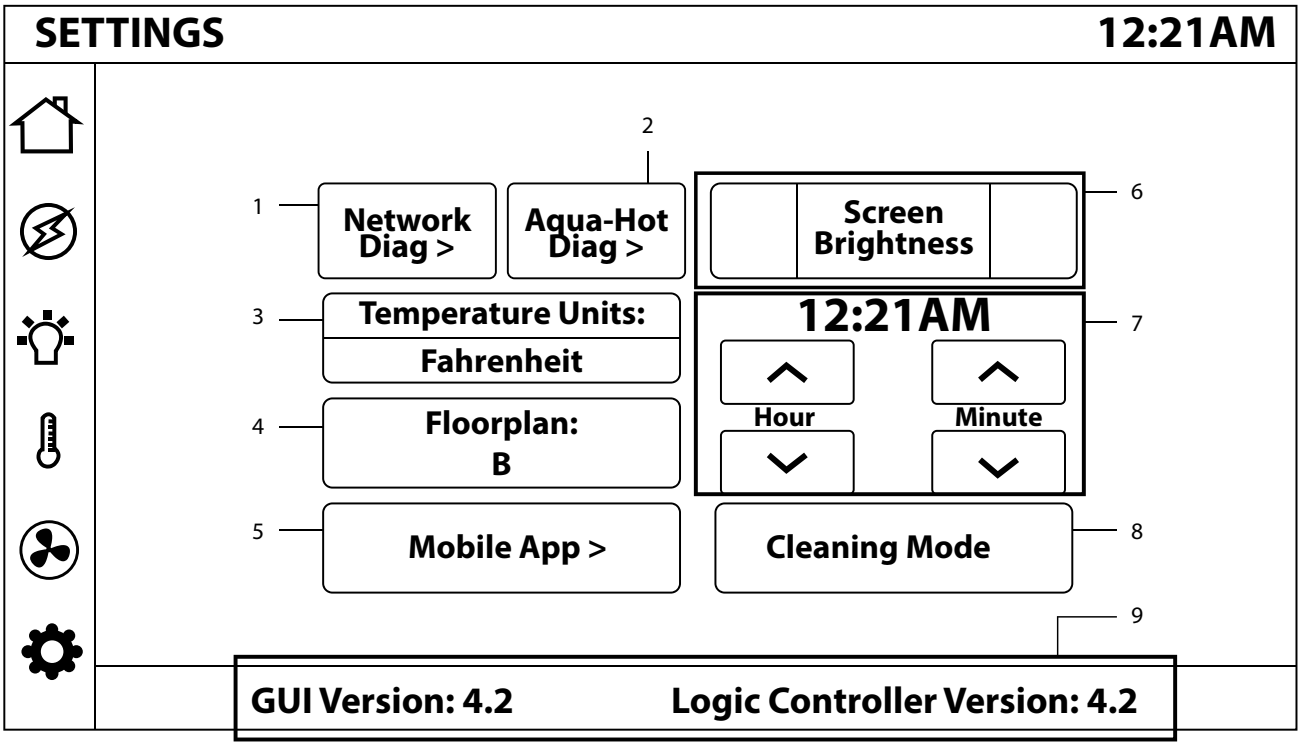


1. Tap the Lid Arrow Up button to raise the lid completely. If you do not want to open the lid completely, Press and Hold the button and remove your finger when you would like to stop the lid.
2. Tap the Power button to toggle the fan On/Off. The power button color will change to blue while it is on.
3. Tap the Lid Arrow Down button to lower the lid completely. If you do not want to lower the lid completely, Press and Hold the button and remove your finger when you would like to stop the lid.

Firefly Operation

APPENDIX A

SETTINGS



1. Tap to enter the Network Diagnostics page.
2. Tap to enter the Aqua-Hot Diagnostics page.
3. Tap to change the temperature units display between Fahrenheit and Celsius.
4. Floorplan display.
5. Tap to enter the Vegatouch Mira connection screen.
6. Use the +/- buttons to select between 10 levels of screen brightness or screen sleep mode.
7. Tap the arrows to adjust the time.
8. Clean Mode – Disables touchscreen functionality (15 seconds) for the purpose of cleaning.
9. Please note the GUI and Logic Controller Versions (screen software) and have these numbers available before contacting Technical Support.

This page was intentionally left blank.

Firefly Operation

APPENDIX A

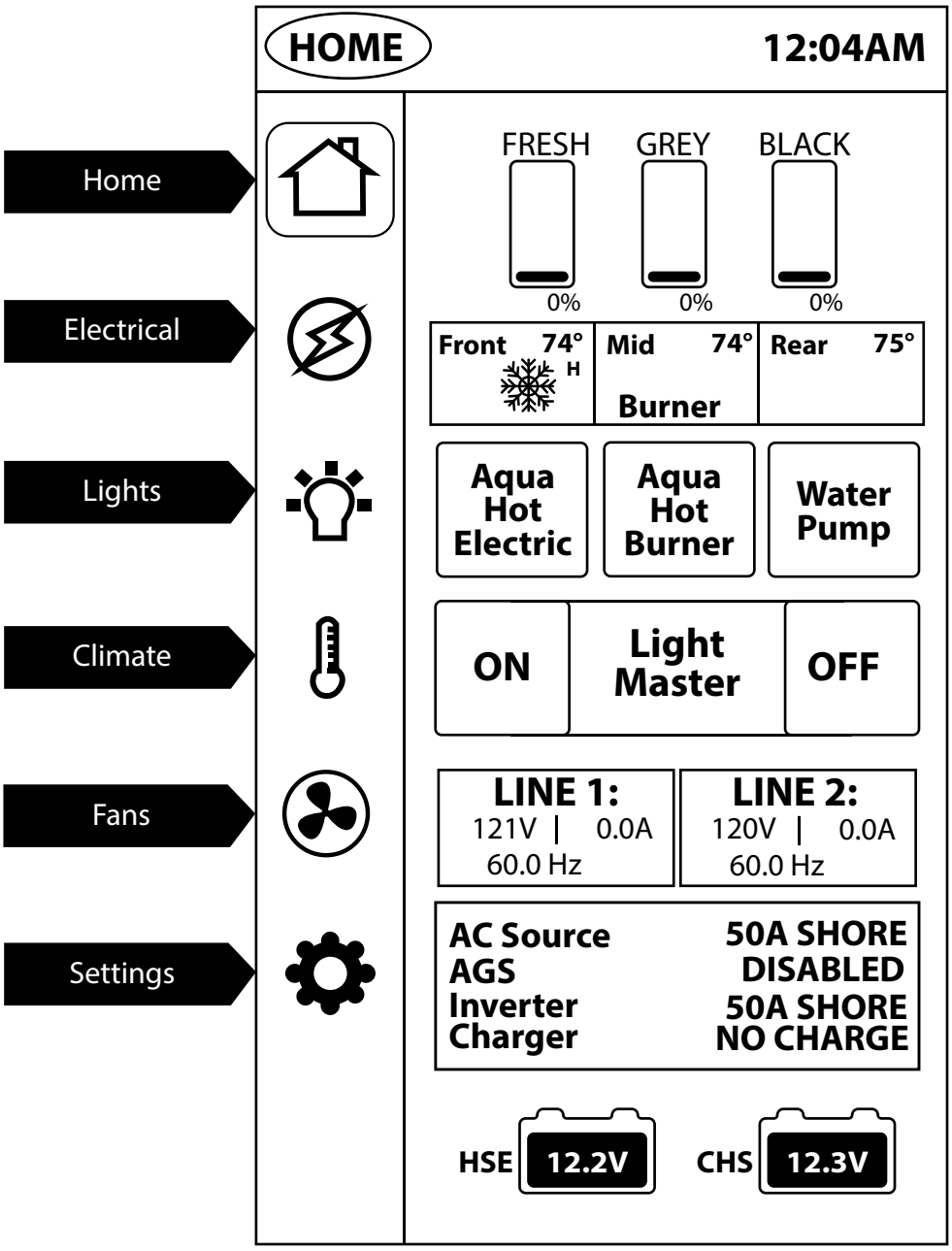
FIREFLY VEGATOUCH (LYNX) OPERATIONAL MANUAL

Your motor home may be equipped with a "Firefly" network system. This is designed to operate virtually all of the electrical components in your motor home.

The simple to use "touch" screen keypad and "self-guided" menus are easy to use. This system also has the feature of being able to help troubleshoot and diagnose electrical problems should one arise. Your authorized dealer will be able to assist you if the need arises.

SCREEN NAVIGATION

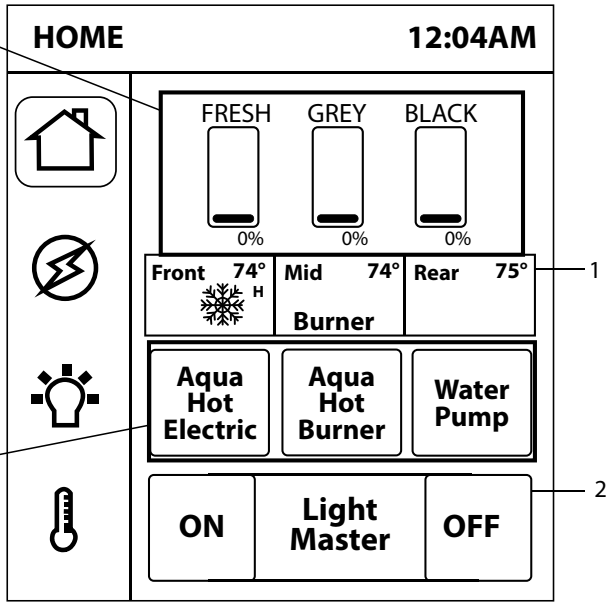
Tap any icon from the navigation menu to select the desired page. The currently selected page will always be listed in the top corner of the screen. After 90 seconds of inactivity, the touch screen will automatically change to the Lights page.



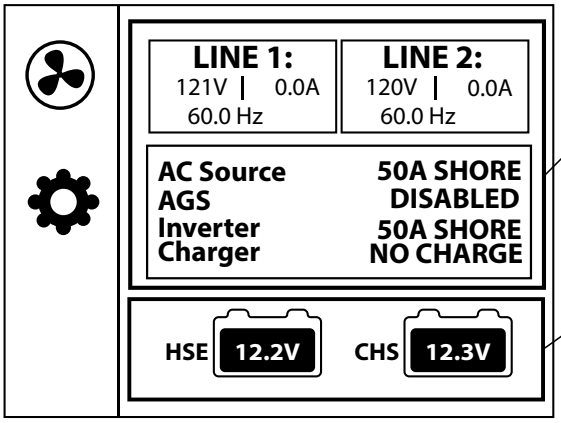
HOME

These graphics represent the percentage filled for holding tanks.

Tap to select an Aqua-Hot heat source or toggle the Water Pump On/Off. The Aqua-Hot burner status indicator will light up if the burner is lit or if there is a fault.



1. Climate Control Status – The current temperature and climate control mode for each zone will display on the home screen. A white fan graphic will represent Fan mode, a blue snowflake will represent will represent Air Conditioning, a red flame graphic will represent Aqua-Hot and a Radiant Heat icon will represent Heat Pump.
2. The Light Master controls all interior lights at once. When Light Master Off is pressed, it will remember which lights were on. Then, when Light Master On is pressed, it will only turn on the lights that are in memory. To turn on all lights again, press and hold Light Master On for at least one second. *Troubleshooting – Memory is rewritten each time Light Master Off is pressed. In the case that it is pressed twice in a row, it will remember that no lights were on and just touching Light Master On won't turn on any lights. Press and hold Light Master On to turn the lights back on.



AC Power – This selection will give an overview of the AC power information that is given from your transfer switch and inverter.

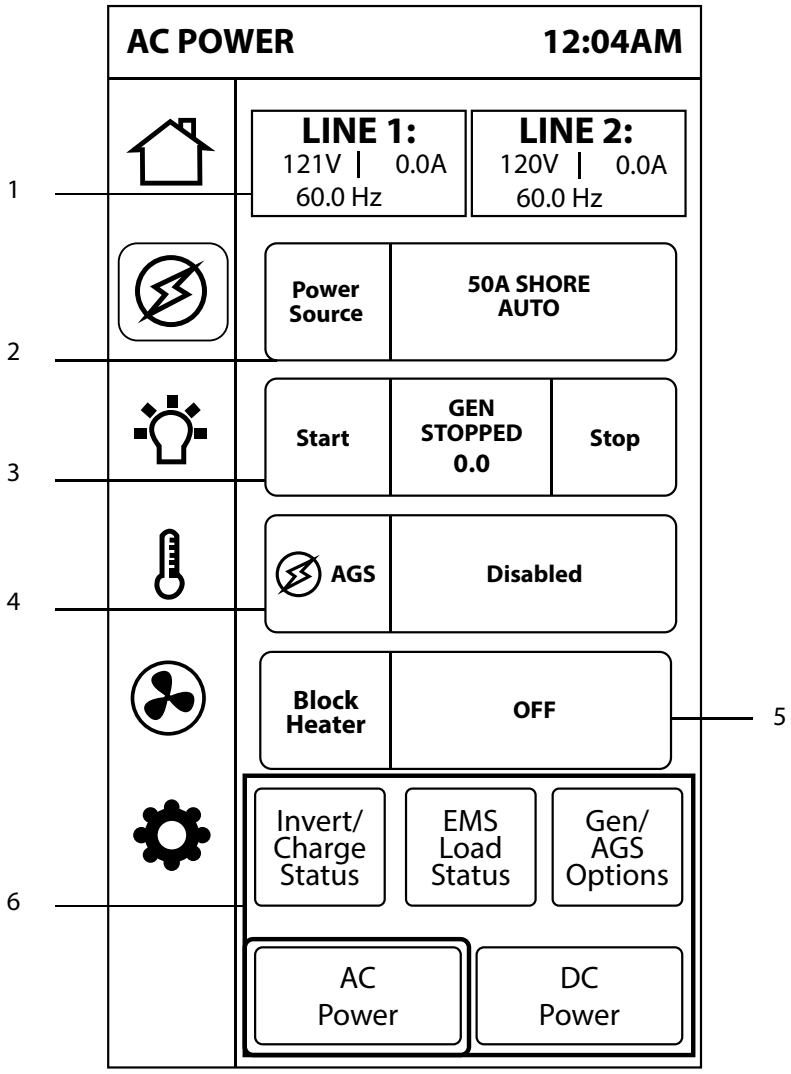
DC Voltage – These graphics represent the voltage available from your House and Chassis batteries. The battery icons will display Green above 12V and Red below 12V.

Firefly Operation

APPENDIX A

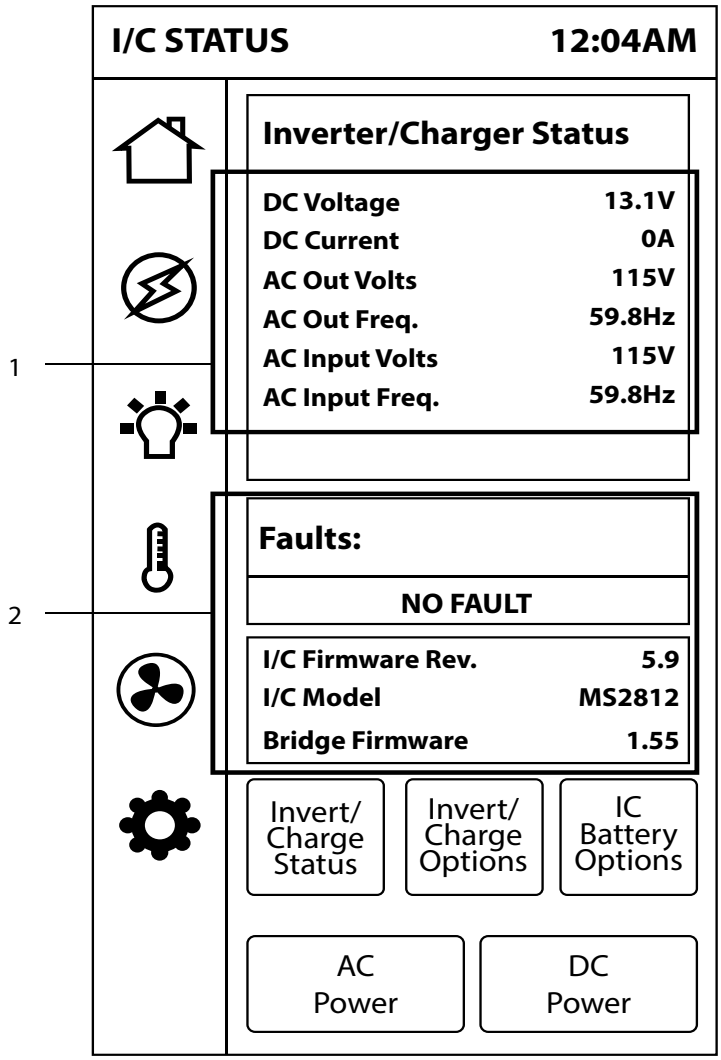
ELECTRICAL/ AC POWER

1. Shore Line Display – AC Power displays the voltage, amperage draw and frequency for each line.
2. Power Source Select – 50 amp shore power will display automatically if connected to a 50 amp line. Tap to select 30, 20, or 15 amp if your coach is connected to a 30 amp line.
3. Generator – Creates electrical energy. Press and hold Start to start the generator. Tap Stop to stop the generator.
4. AGS – Auto Gen Start is a system that will start the generator automatically based on your customized trigger settings. Press to Enable/ Disable AGS. A warning page will appear requiring you to press an additional Enable button for 3 seconds to enable AGS. Only enable AGS if your coach is in a well-ventilated area. Always DISABLE AGS before plugging into shore power to keep your generator from running unnecessarily.
5. Block Heater – Tap to toggle the Block Heater On/Off.
6. Screen Navigation Buttons.



ELECTRICAL/ AC POWER/ IC STATUS

1. DC and AC power information that is being received by the Transfer Switch and Inverter.
2. This section will display any related faults and the inverter bridge technical information.

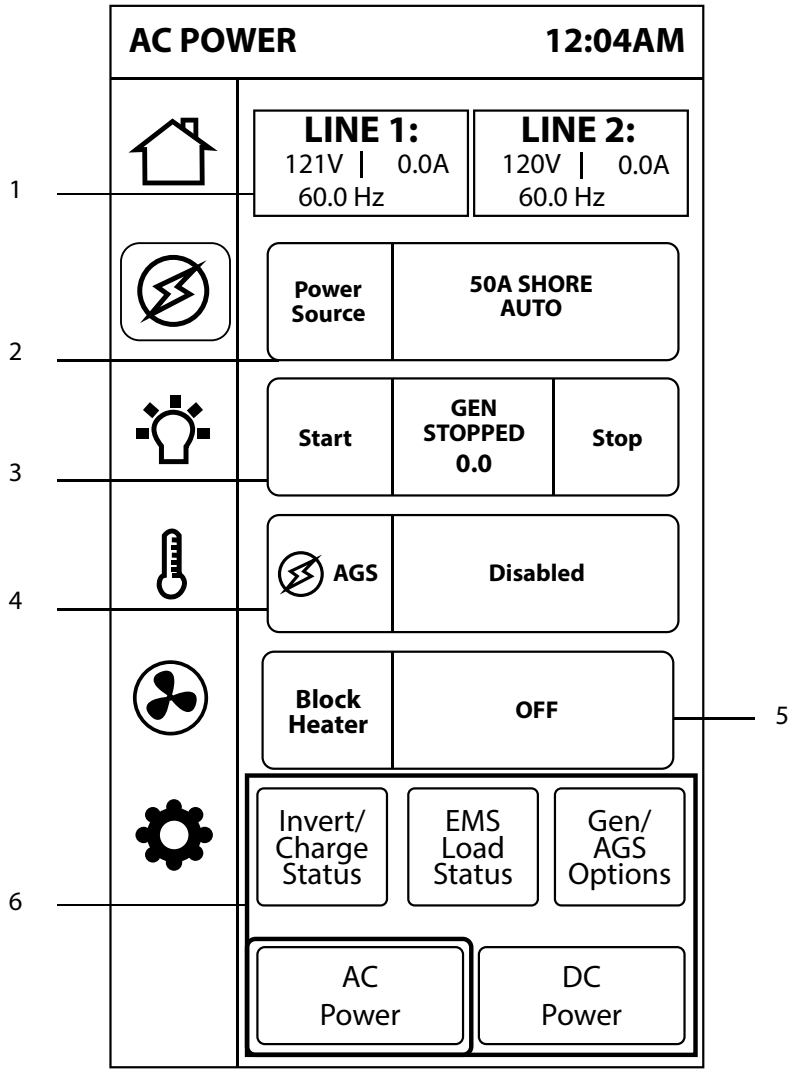


Firefly Operation

APPENDIX A

ELECTRICAL/ AC POWER/ EMS LOAD STATUS

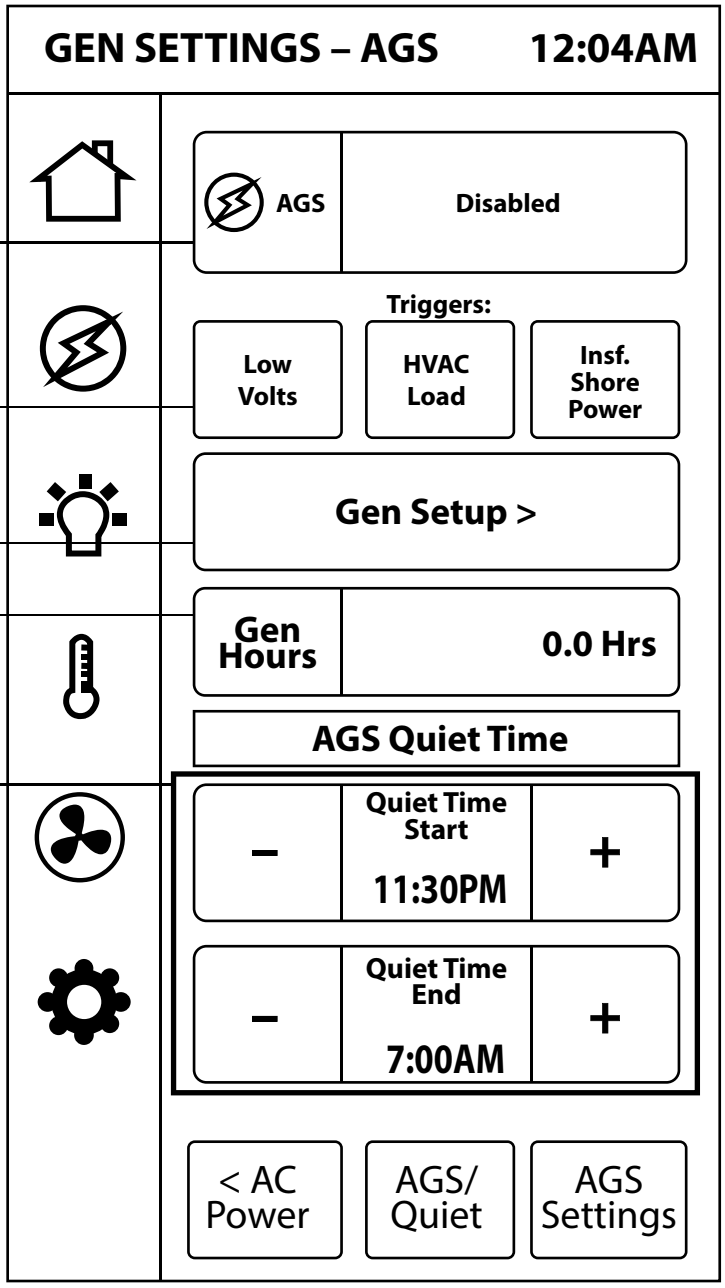
1. Energy Management System (EMS) – EMS will ensure that power is available before allowing certain systems to run. If power is not available, it will not allow particular systems to run (shed the load).



ELECTRICAL/ AC POWER/ GEN AGS OPTIONS

1. Tap to Enable/ Disable AGS. Note, if enabling, a warning screen will appear which will require action to proceed. Press and hold the Enable button for 3 seconds to enable AGS.
2. Trigger Options – Automatically start the generator using specified voltage settings (Low Volts), when Climate Control energy needs arise (HVAC Load), or when Shore Power is insufficient. If no triggers are selected, AGS will not run.
3. Gen Hours Display – The number of hours that the generator has been used. These hours are saved to the system, not the generator itself. Press and hold for 5 seconds to change the generator display hours.
4. Quiet Time – Tap the buttons to select the hours that your generator will not run, in an effort to reduce noise.

Tap to navigate to the Gen Setup screen.



Firefly Operation

APPENDIX A

ELECTRICAL/ AC POWER/ GEN SETTINGS/ AGS SETTINGS

Start at Volts – The generator will start when the voltage drops to this set point depending on "Time at Volts" setting below. (Range 10.5v - 12.5v)

Time at Start Volts – The generator will start when the voltage drops to the Start at Voltage for this specific amount of time. (Range 5 seconds - 1 minute)

Stop at Volts – The generator will shut off when the voltage reaches this set point depending on "Time at Stop Volts" setting below. (Range 13.2v - 14.5v)

Time at Stop Volts – The amount of time required for the voltage to remain at "Stop at Volts" level before the generator shuts off. (Range 5 seconds - 120 seconds)

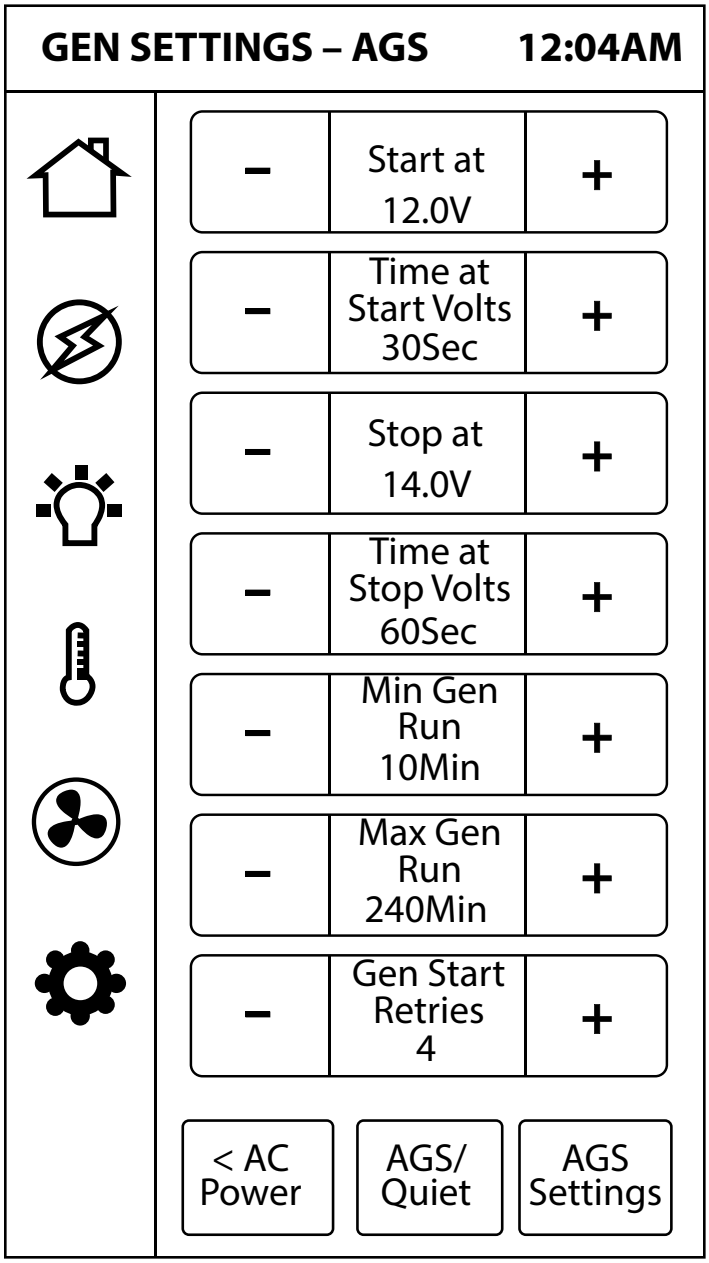
Minimum Gen Run Time – Use the +/- buttons to set the minimum amount of time that your generator will run once it has started. (Range 10 min. - 30 min.)

Maximum Gen Run Time – Use the +/- buttons to set the maximum amount of time that your generator will run once it has started. (Range 120 min. - 240 min.)

Gen Start Retries – Use the +/- buttons to set the number of tries that your generator will retry to start. (Range 2 - 5 retries)

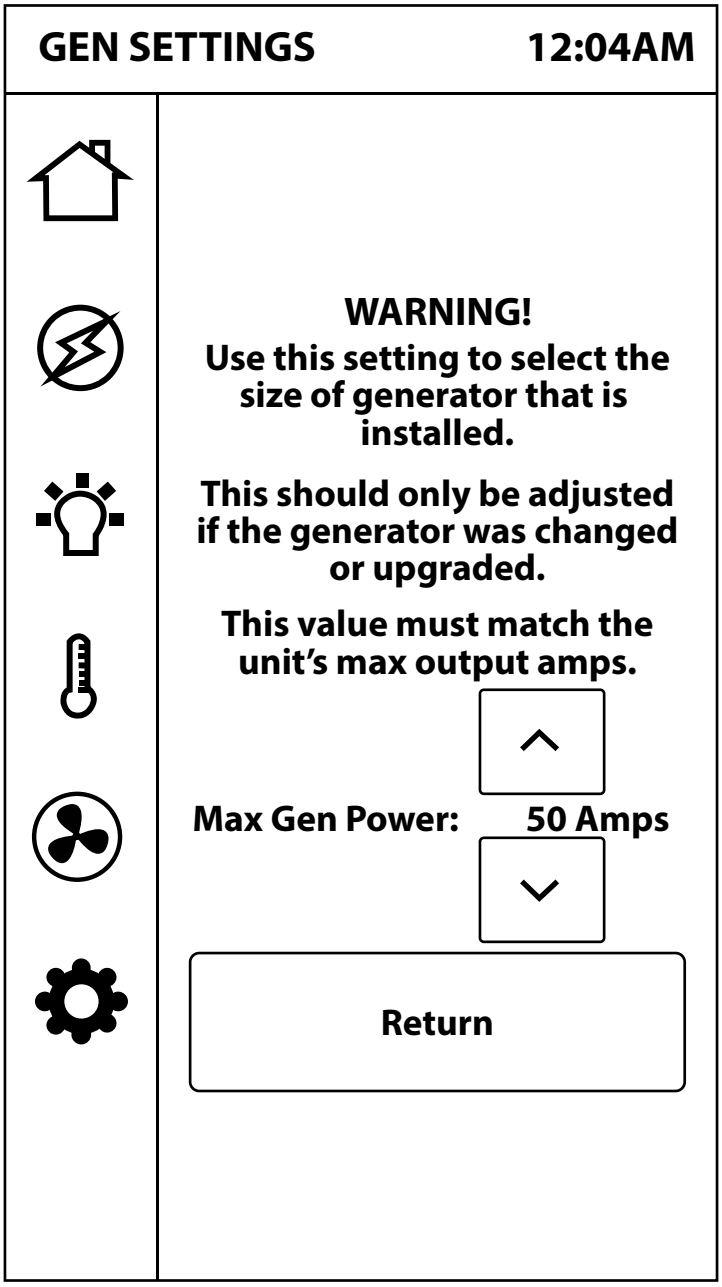
AGS Default Settings:

- Start at Volts: 12.0V
- Time At Start Volts: 30 seconds
- Stop At Volts: 14.0V
- Time At Stop Volts: 60 minutes
- Quiet Time Start: 11:00PM
- Quiet Time End: 7:00AM
- Min Gen Run Time: 10 minutes
- Max Gen Run Time: 240 minutes
- Gen Start Retries: 5
- Max Gen Power: 65A



ELECTRICAL/ AC POWER/ GEN AGS OPTIONS/ GEN SETUP

Tap the arrows to adjust the Max gen amps. This setting should only be adjusted if the generator was changed or upgraded.

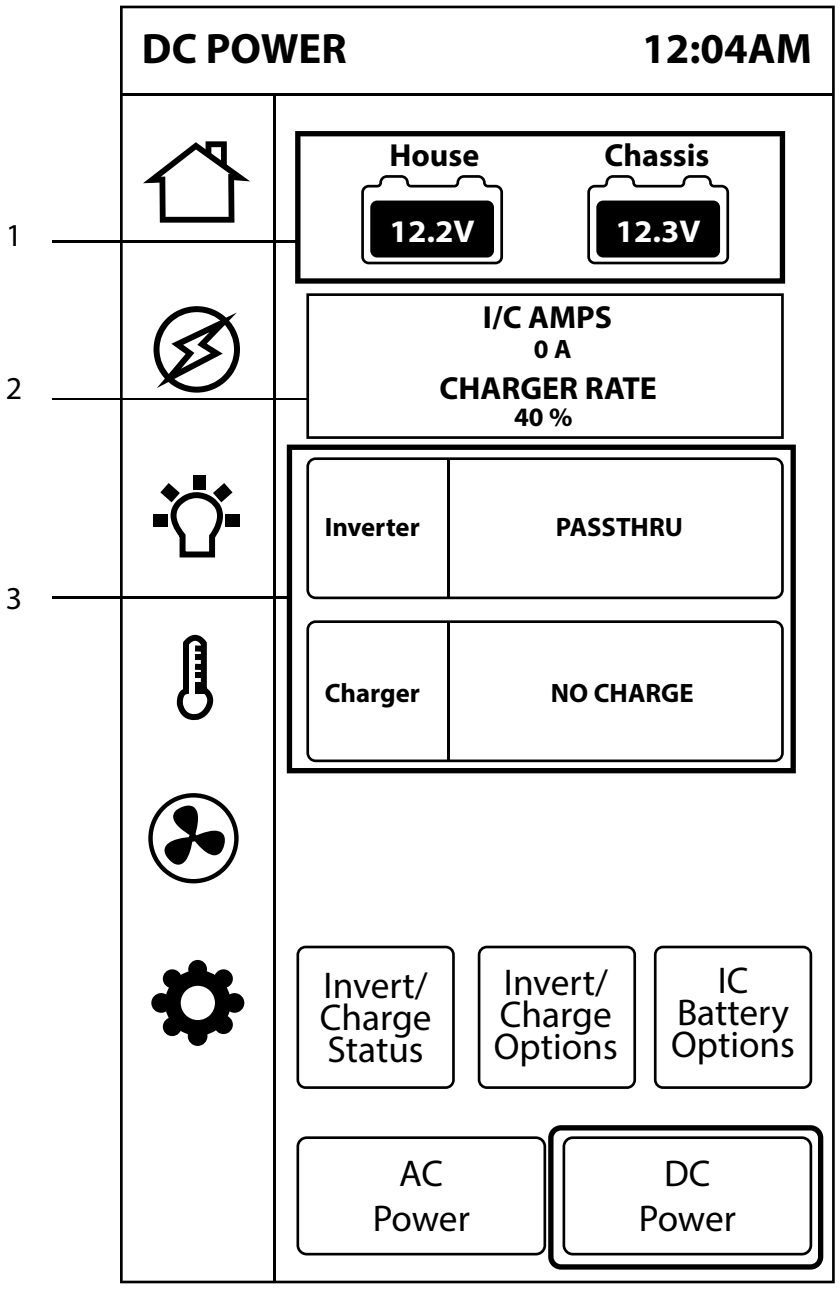


Firefly Operation

APPENDIX A

ELECTRICAL/ DC POWER

1. These graphics represent the DC voltage available from the House and Chassis batteries. They will display Green above 12V and Red below 12V.
2. Inverter/ Charger Amps and Charge Rate setting.
3. Tap the buttons to operate the Inverter or Charger.



ELECTRICAL/ DC POWER/ IC OPTIONS

1. Low Battery Cutout – Tap the buttons to set the DC Voltage level that turns off the inverter. This protects the batteries from over-discharge damage.
2. VAC Dropout – Tap the buttons to set the minimum AC Voltage that must be present before the inverter kicks off and switches the coach back to AC power.
3. Shore Breaker Size – Tap the buttons to adjust the required shore power amp breaker setting.
4. Max Charge Rate – Tap the buttons to adjust amount of available AC power that will be used for the purpose of charging. This value should be kept low when connected to shore power, or when there is a high demand for energy.

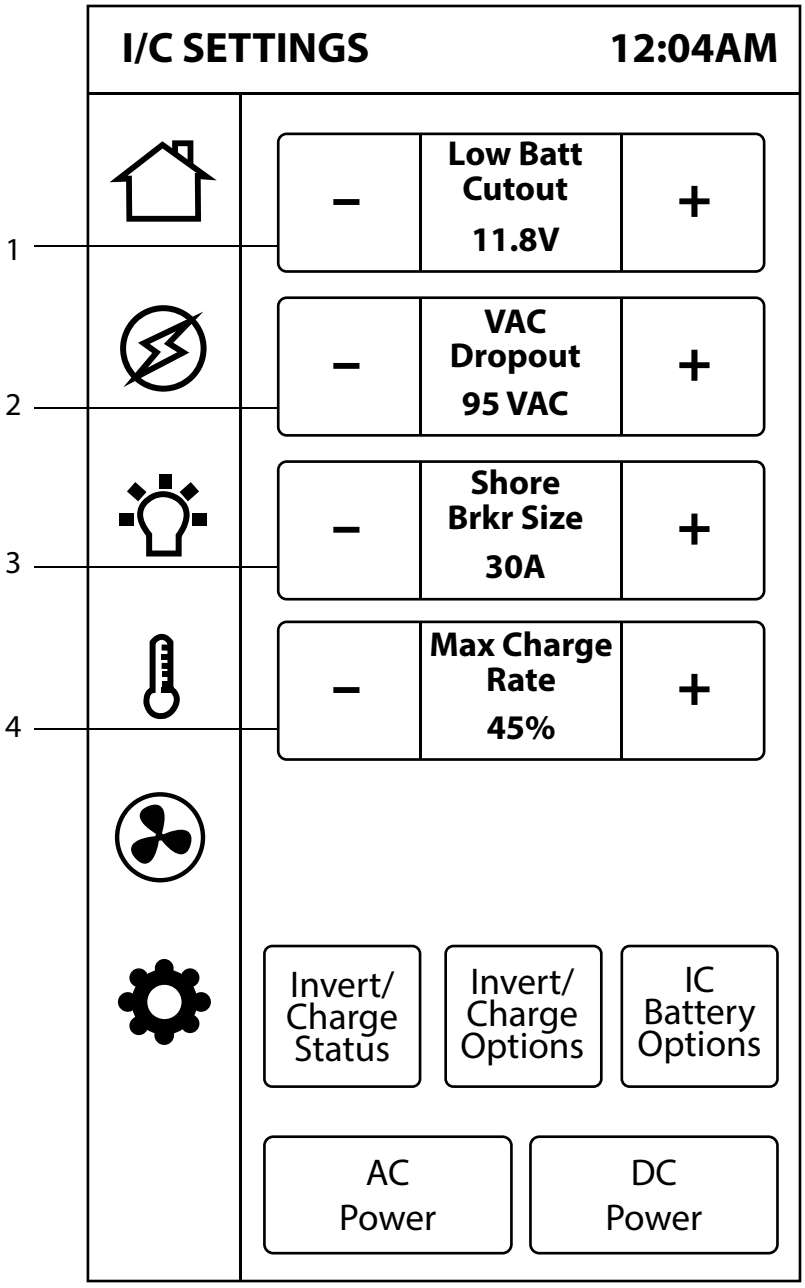
Inverter/ Charger Default Settings:

Custom Battery

- Low Battery Cutout: 11.8V
- VAC Dropout: 100 VAC
- Battery Amp Hours: 400 Ah
- Max Charge Rate: 100%
- Shore Breaker Size: 30A
- Absorb Volts: 14.4V
- Float Volts: 13.4V
- Equalize Volts: 14.4V

All Other Battery Types

- Low Battery Cutout: 11.0V
- VAC Dropout: 100 VAC
- Battery Amp Hours: 400 Ah
- Max Charge Rate: 50%
- Shore Breaker Size: 30A
- Battery Type: 0 (Flooded)



Firefly Operation

APPENDIX A

ELECTRICAL/ DC POWER/ IC BATTERY OPTIONS

1. Tap the buttons to select your desired battery amp hours.
2. Tap to select your required desired setting.

Inverter/ Charger Default Settings:

Custom Battery

- Low Battery Cutout: 11.8V
- VAC Dropout: 100 VAC
- Battery Amp Hours: 400 Ah
- Max Charge Rate: 100%
- Shore Breaker Size: 30A
- Absorb Volts: 14.4V
- Float Volts: 13.4V
- Equalize Volts: 14.4V

All Other Battery Types

- Low Battery Cutout: 11.0V
- VAC Dropout: 100 VAC
- Battery Amp Hours: 400 Ah
- Max Charge Rate: 50%
- Shore Breaker Size: 30A
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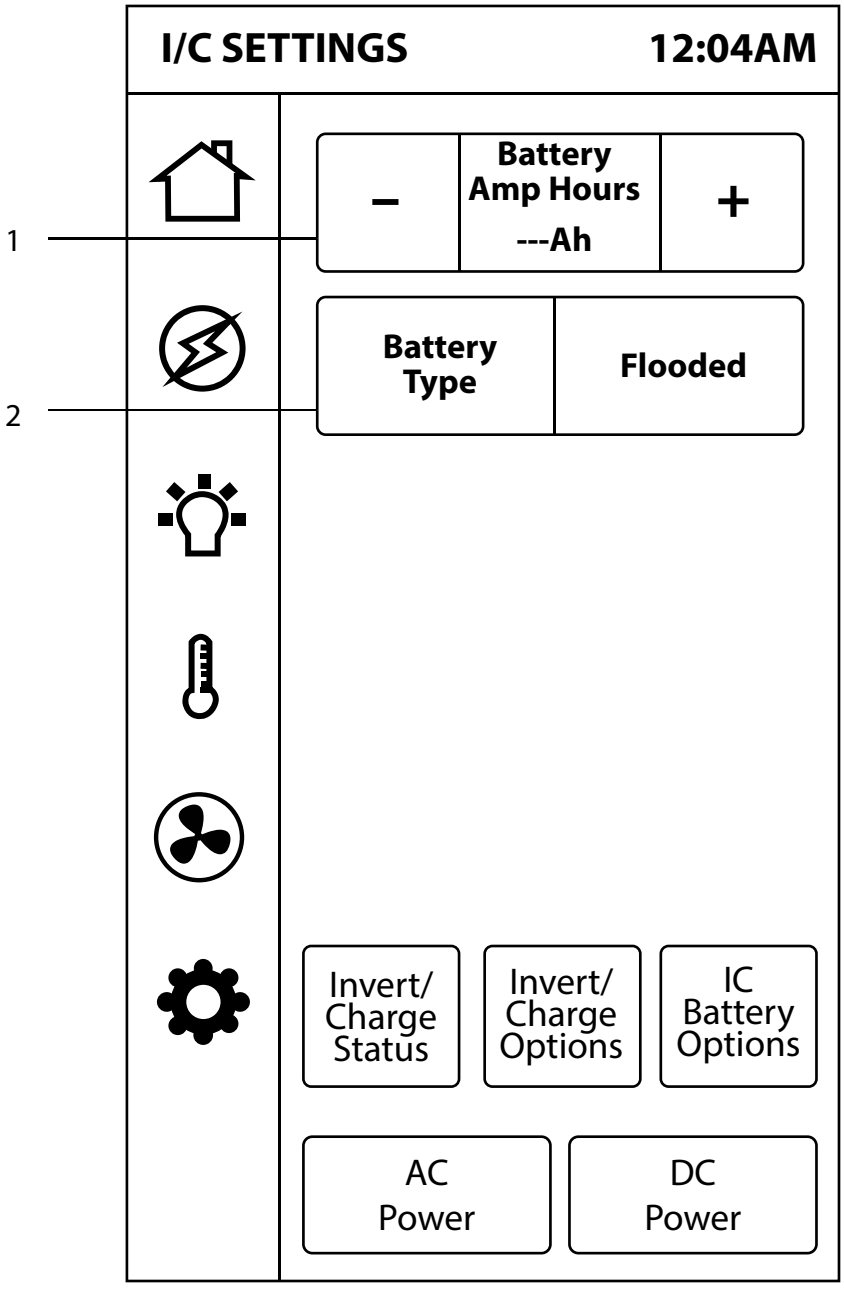
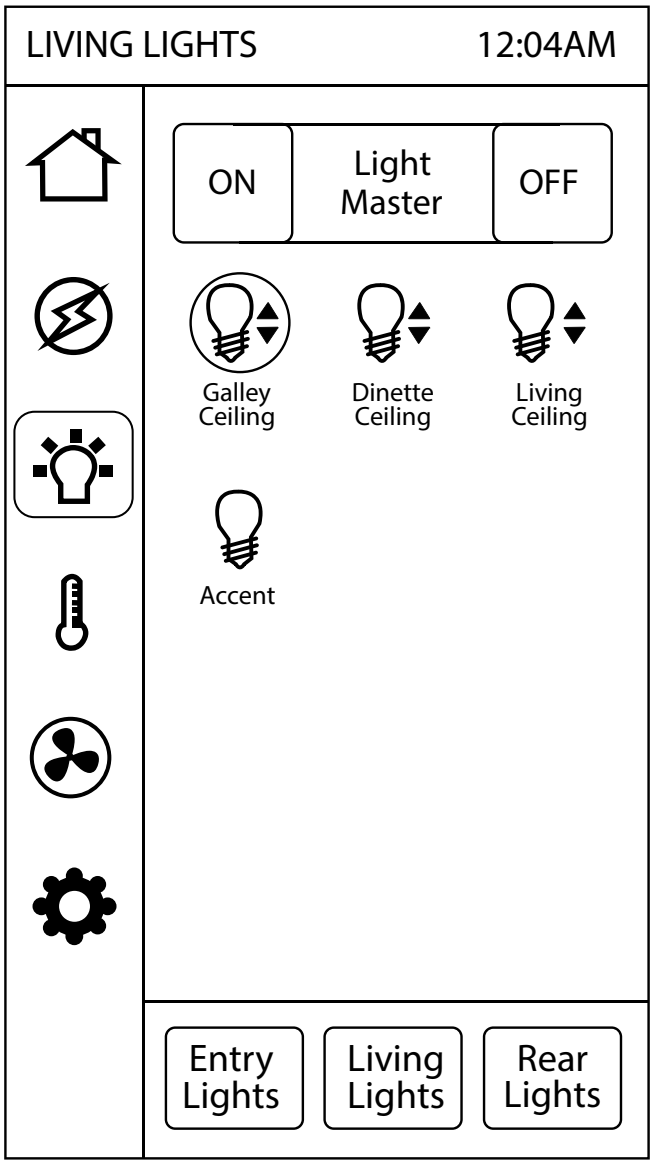


LIGHTS

This screen will control the lighting for the entire coach, including the exterior. Tap any button to turn the desired light On/Off.

Lights with up/down arrows are dimmable. Press and hold these buttons to ramp the brightness up or down. Tap the buttons to toggle On/Off.

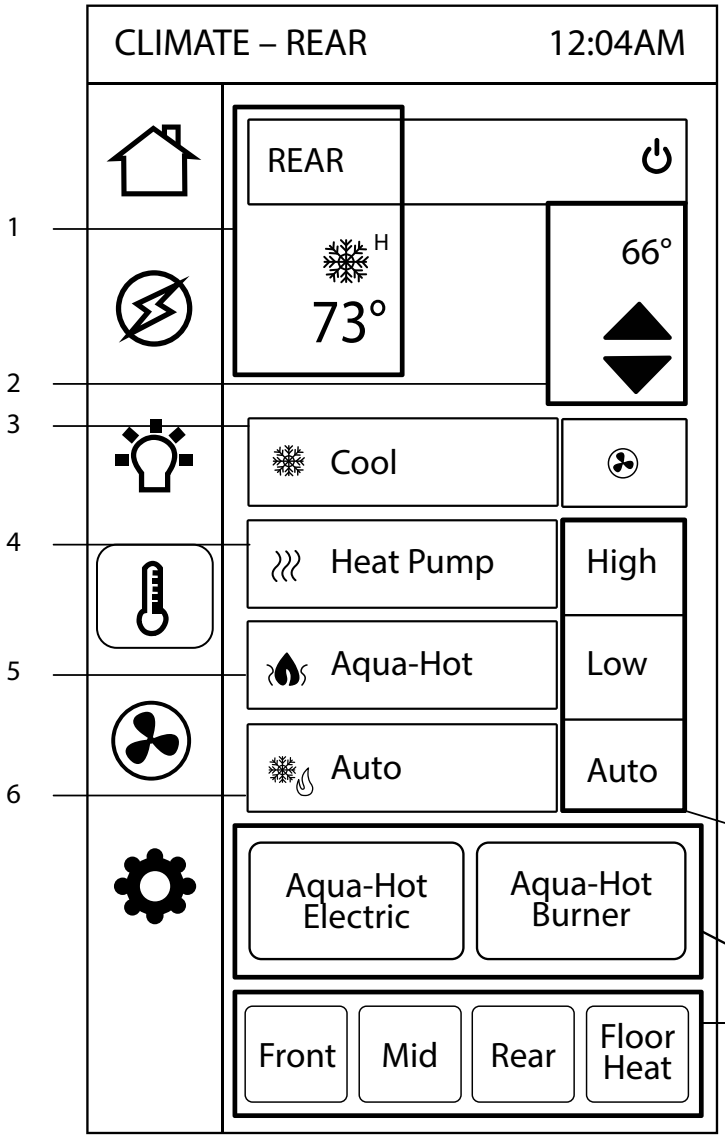


Firefly Operation

APPENDIX A

CLIMATE CONTROL

1. Current Temperature by zone with climate mode graphic and fan speed indicator.
2. Tap the arrows to select your desired temperature, also known as Set Temp.
3. Cool – Tap to operate the air conditioning. The A/C will run until the current temp reaches your desired temp and then shut off.
4. Heat Pump (Rear Zone Only) – Tap to operate the heat pump. Heat Pump mode has a 2nd stage heat feature that will automatically enable Aqua-Hot if it cannot bring the zone temp up to the set temp. Aqua-Hot will enable if the set point reaches 5 degrees below the set point.
5. Auto – Tap to enable Aqua-Hot.
6. Tap to put the system into Auto Mode. The A/C or Heat will automatically run to keep your desired temperature consistent.



*Selecting Cool, Heat Pump, Aqua-Hot or Auto will cause the respective buttons to change color. Once a mode is chosen, either a Fan, Snowflake, Flame or Radiant Heat icon will appear above the Current Temp to show which system is currently working.

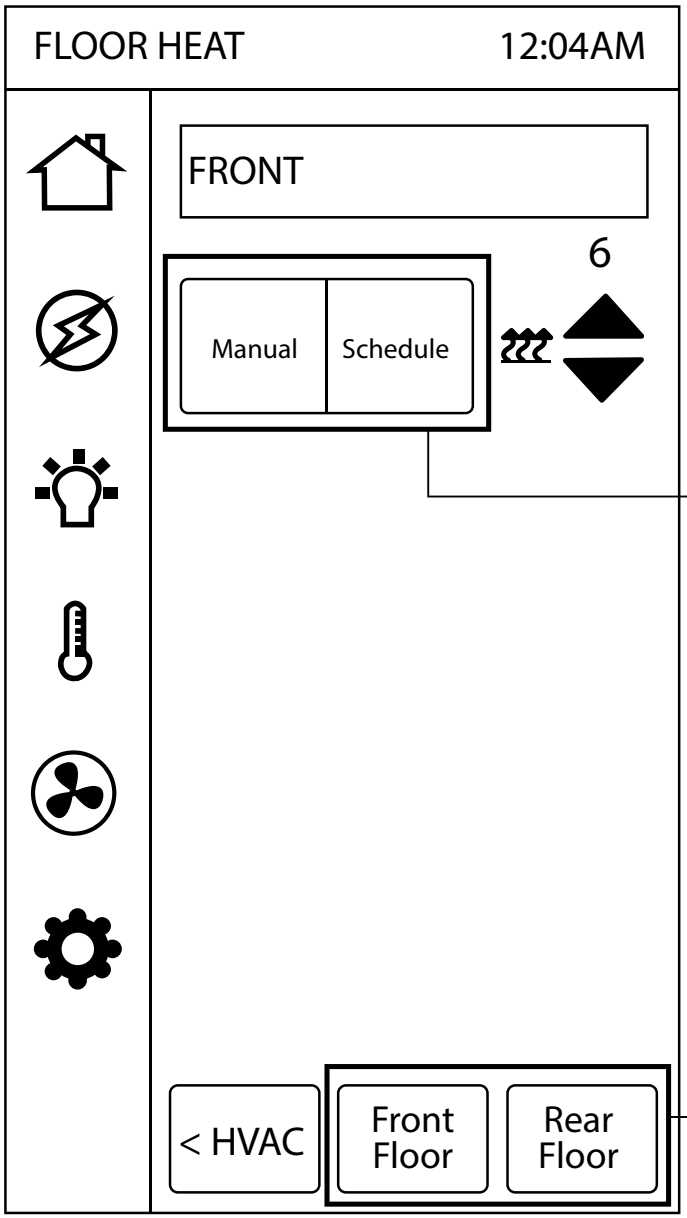
Fan Mode – The fan will operate by choosing High or Low. Auto will turn the fan off. Fan Mode is only available if HVAC is off. In cool mode, fan speed can be set manually.

Aqua-Hot heat source selector

Climate Zone navigation buttons.

FLOOR HEAT MANUAL MODE

In Manual mode, tap the arrows to select between 10 levels of floor heat.



In Manual mode, tap the arrows to select between 10 levels of floor heat.

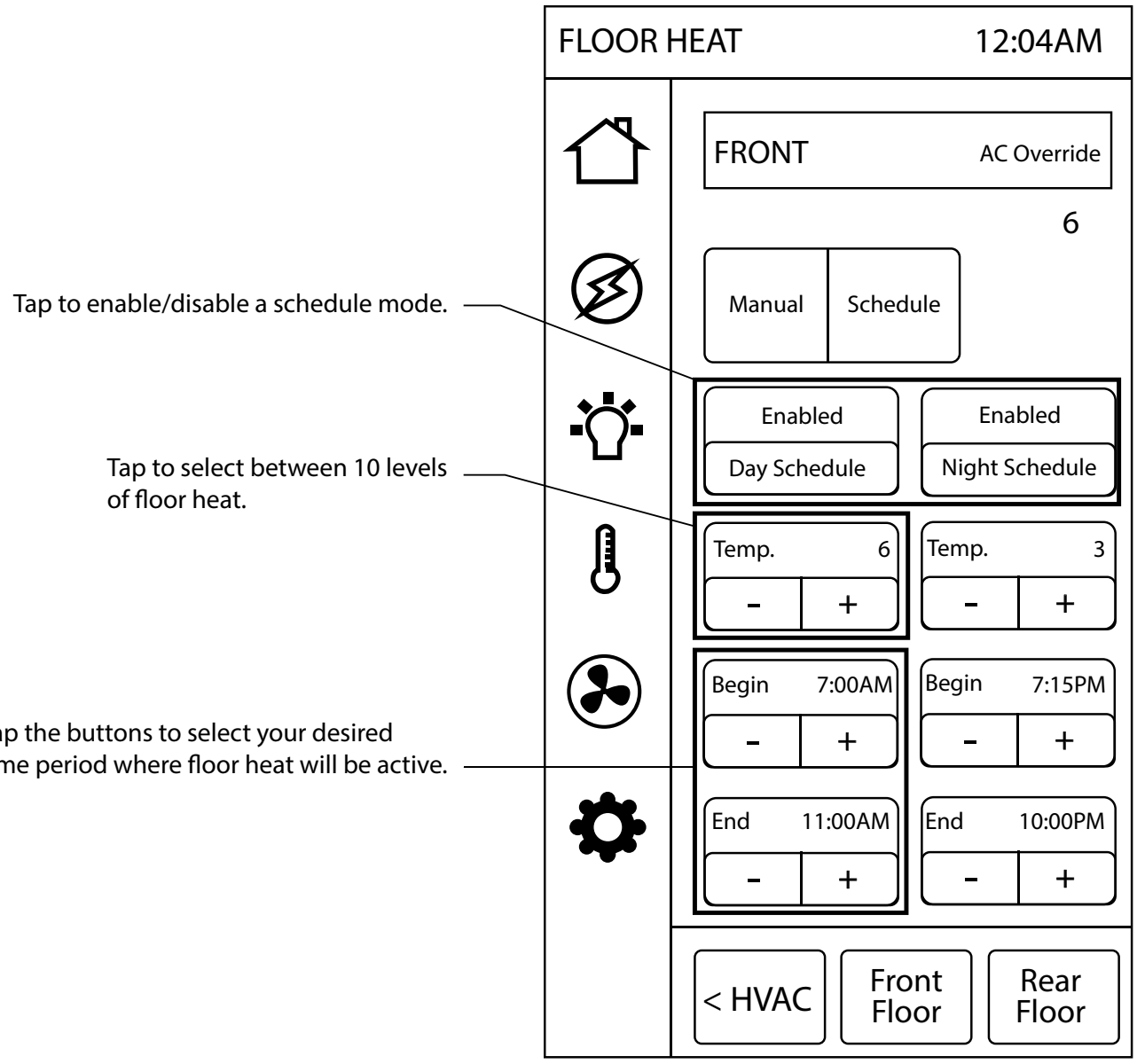
Tap to enable/disable Manual or Schedule mode.

Tap to select a floor heat zone.

Firefly Operation

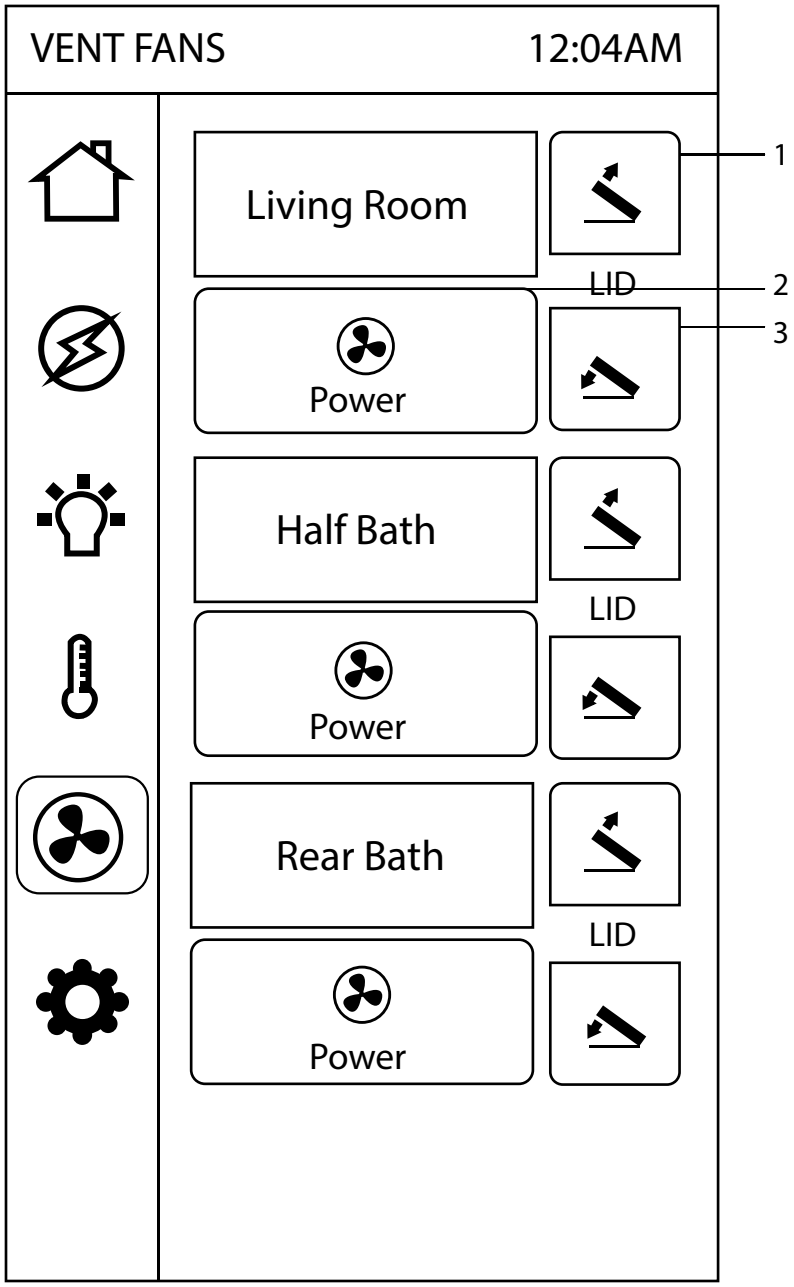
APPENDIX A

FLOOR HEAT SCHEDULE MODE



FANS

1. Tap the Lid Arrow Up button to raise the lid completely. If you do not want to open the lid completely, Press and Hold the button and remove your finger when you would like to stop the lid.
2. Tap the Power button to toggle the fan On/Off. The power button color will change to light blue while it is on.
3. Tap the Lid Arrow Down button to lower the lid completely. If you do not want to lower the lid completely, Press and Hold the button and remove your finger when you would like to stop the lid.



Firefly Operation

APPENDIX A

SETTINGS

Tap the buttons to select between 10 levels of screen brightness and off.

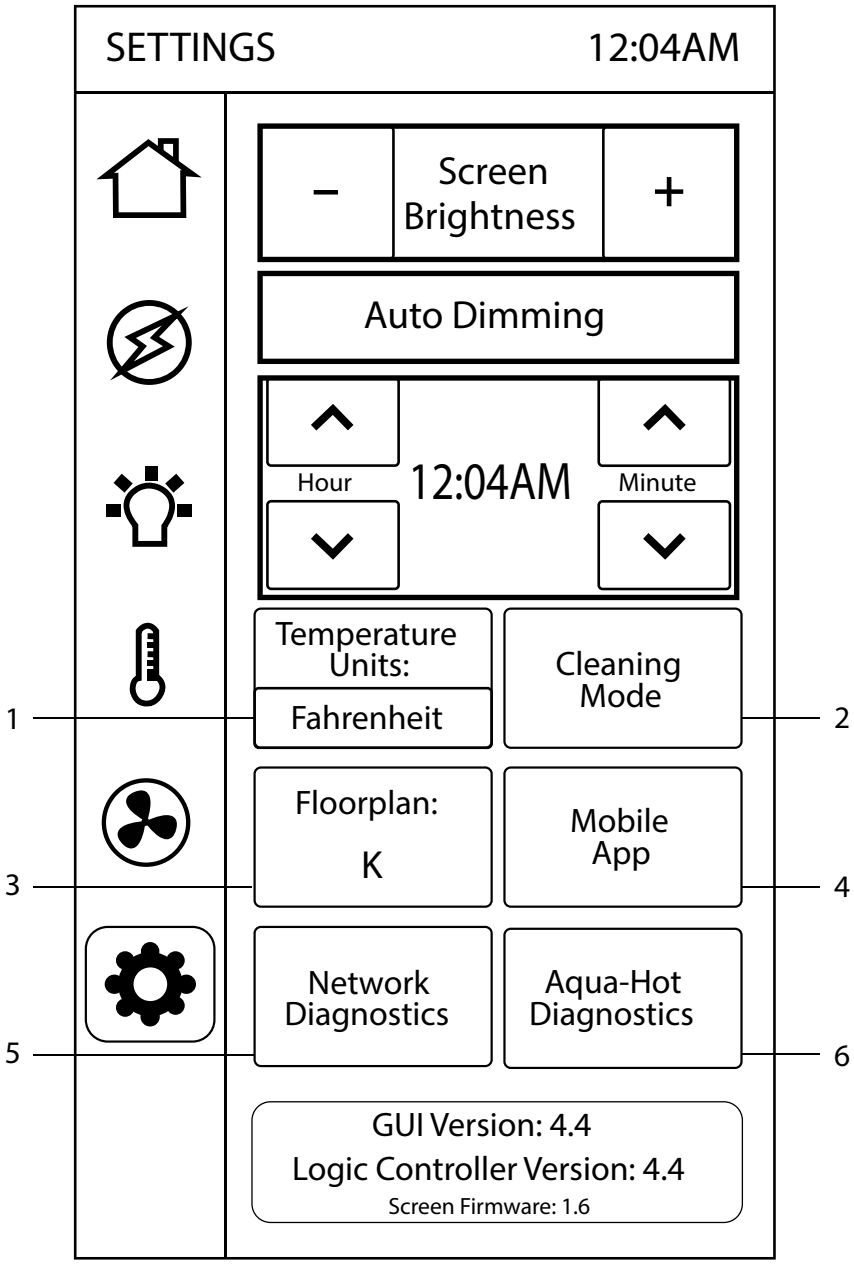
Tap to enable/Disable Auto Dimming. Once enabled, the screen will go dark after 60 seconds of inactivity.

Tap the Hour and Minute arrows to adjust the time.

1. Tap the Temperature Units display to toggle between Fahrenheit and Celsius.
2. Tap Cleaning Mode to disable the screen for 15 seconds for the purpose of cleaning.
3. This box displays the Floorplan.
4. Tap to navigate to the Vegatouch Mira connection screen.
5. Tap to navigate to the Network Diagnostics screen.
6. Tap to navigate to the Aqua-Hot Diagnostics screen.
7.

Automatic Screen Saver - Your touchscreen will go black and turn off backlighting (even when auto-dimming is disabled) in the following two conditions:

- Not touching the screen for 15 minutes between 11pm-5am.
- Not touching the screen for 4 hours any other time.



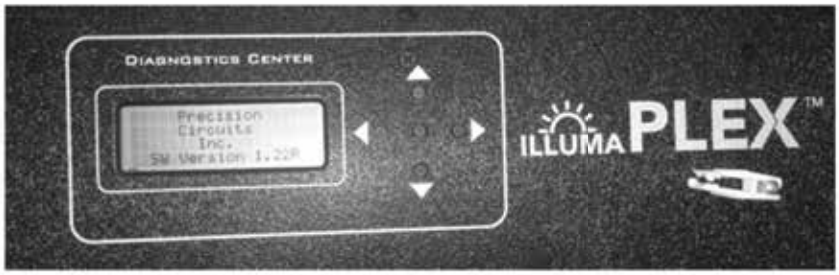
Please note the version numbers and have this information available before calling Tech Support.

ILLUMA PLEX (WHEN EQUIPPED)
BLUETOOTH PAIRING AND OPERATION

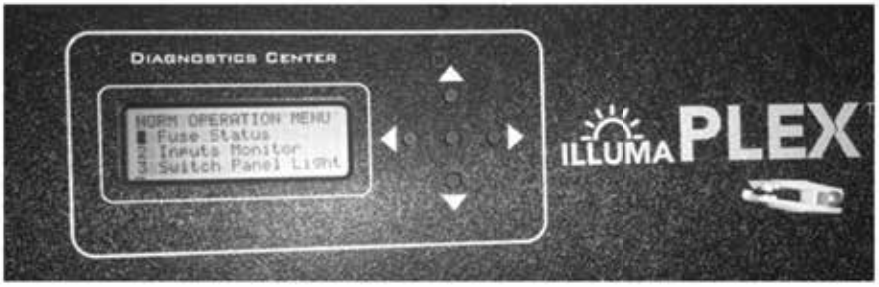
Download the Precision Plex app from the app store.

- *Important that the mobile device has Bluetooth 4.0 + LE. If the mobile device does not have BT 4.0 the app will not work.*

Locate the Illuma Plex Diagnostic Center.



Press the Down arrow button until item 4 is shown.

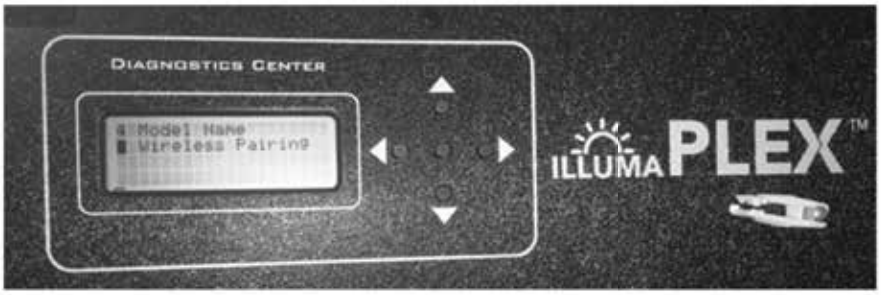


Firefly Operation

APPENDIX A

Verify the correct coach model is selected.

Press the down arrow button and select item 5, using the center select button to initialize pairing.



If the phone or tablet has already been paired with another coach you will need to “Forget Paired RV” on the device. To do this go to settings, the wheel in the upper left hand corner of the home screen.

Once the coach is in pairing mode go to settings in the app, located in the upper left corner of the screen. Now your coach should be paired.

Illuma Plex Operation

APPENDIX B

From the home screen you can select Lighting, Slideout, Fans, and Utilities.

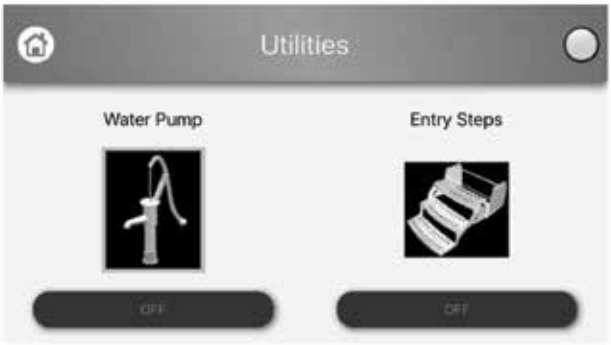
Scroll right or left to go to different areas of the coach to control lighting.

Typical Slideout Controls

APPENDIX A

Typical Fan Controls

Typical Utility Controls



Notes

Roadside Assistance. Anywhere. Anytime.

24/7 CUSTOMER SUPPORT FOR:
FUEL—TOWING—BATTERY—SLIDE-OUT ISSUES
A LOCKSMITH AND MUCH MORE!
No matter where you go, it's easy one-step prevention for anywhere peace of mind.

ONE YEAR OF REV ASSIST IS FREE WITH THE PURCHASE OF ANY NEW 2022 FLEETWOOD.
Then after one year of ownership you may extend your coverage for only $109 annually.
https://www.revgroup.com/rev-assist

REV ASSIST™
FLEETWOOD RV

Providing safety and convenience for customers when they're on the road. REV Assist membership includes emergency roadside assistance and concierge services for customers of all 2022 Fleetwood vehicles.

TECHNICAL SUPPORT AND ROADSIDE ASSISTANCE
Features 24/7 technical assistance from our staff of RVIA/RVDA and ASE certified technicians, who speak directly with customers to troubleshoot operational issues. Should they need emergency roadside assistance, our vast network of providers offers a wide range of services.

TOWING
Towing disabled REV-manufactured vehicles to the nearest qualified repair facility.

TIRE ASSISTANCE
Changing flat tires using a mounted and inflated spare tire, delivering comparable tires to disablement sites, or towing vehicles to a tire facility. The cost of a delivered replacement tire, alignment, mount and dismount, and balancing is not covered. Customers are responsible for all charges related to on-site repairs, including but not limited to parts and labor costs.

DELIVERY OF FUEL AND EMERGENCY FLUIDS
Delivering fuel, oil, and water, as necessary, to remedy disablements. Customers are responsible cost of fluids.

LOCKSMITH/LOCKOUT SERVICE
Providing locksmith services, opening locked vehicles, and/or obtaining replacement keys. Customers are responsible for all charges related to on-site repairs, including but not limited to parts and labor costs.

JUMP-STARTS
Jump-starting vehicles' dead batteries or towing vehicles to qualified repair facilities.

RV MOBILE MECHANIC
Dispatching of a mechanic to the site of mechanically disabled vehicles. Customer is responsible for all charges related to on-site repairs, including but not limited to parts and labor costs.

DEALER LOCATOR ASSISTANCE
In an unfamiliar territory, where do customers go for service should the need arise? We'll assist in finding the closest qualified service facility.

PERSONAL ASSISTANCE/CONCIERGE SERVICES
Access to a full range of services to make life easier.
Here are just a few:
- ATM & Business Locators
- Car Rental/Hotel/Restaurant Reservations
- Rental Car Return
- Emergency Return Travel Arrangements
- Turn-By-Turn Driving Directions
- Traffic Reports
- Road Closures
- Restaurant Reservations
- RV Campground Referrals
- RV Storage Facility Locators
- Wireless Device Assistance
- Historical Site and Pet Care Locators
- Golf Course Tee Time Reservations/Referrals
- Ticket Coordination (Theater/Music/Sports)
- Pharmacy/Hospital/Emergency Care Locator Service
- Weather Reports
- Shopping Centers
- Local Activities Calendar

855-268-0414 **TO SIGN UP**
877-904-1473 **24/7 REV ASSIST**

FLEETWOOD RV

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Part Number: L90-0300-74