

# OWNER'S MANUAL



**KEYSTONE**  
RV COMPANY

**LIVE IT OUT.**



# DEAR KEYSTONE OWNER

Congratulations and thank you for your purchase of your new Keystone Recreational Vehicle, including its divisions Dutchmen and CrossRoads/Redwood ("Keystone"). As you may know, Keystone RV Company is the #1 selling Travel Trailer and Fifth Wheel brand in North America. This is not a title we take for granted and we want your experience with your new Travel Trailer or Fifth Wheel to bring you joyful memories and experiences.

To help get you started, we supply with every unit an Owner's Manual, Warranty Guide and any manuals made available by the manufacturer of the various appliances and components installed in your unit. Because many of the appliances and equipment are unique to recreational vehicles, it is very important to understand how they function to assure safe operation and your overall enjoyment so please take the time to review these. The Owner's Manual also has important information about indoor air quality, avoiding condensation and how to properly maintain your new RV. The Warranty Guide contains the Keystone Limited Base and Limited Structural Warranties and important information about your options to get help if something does go wrong.

Keystone is committed to ensuring your satisfaction with your new recreational vehicle (RV) and we are here to help if you ever need us. If you have questions or the dealer is unable to resolve any warrantable issues or provide assistance in arranging repairs in a timely manner, please contact the Customer Service Department, Keystone RV Company, P.O. Box 2000, Goshen, Indiana 46527. We can also be reached toll free at 866.425.4369 or at [www.keystonerv.com](http://www.keystonerv.com).


For product news and updates you can go to our website(s) through the links below; where you will also discover a multitude of topics such as our "Do it Yourself" (DIY) series, "How To" and "Frequently Asked Questions" (FAQ) videos, a dealer locator and much, much more.

Keystone RV  
[www.keystonerv.com](http://www.keystonerv.com)

Dutchmen Manufacturing  
[www.dutchmen.com](http://www.dutchmen.com)

CrossRoads RV/Redwood  
[www.crossroadsrv.com](http://www.crossroadsrv.com)

On behalf of everyone at Keystone RV Company and its divisions, we want to thank you for purchasing our product. We hope you enjoy the camping lifestyle in your new recreational vehicle.



This manual is based on the latest information available at the time of publication. Due to continuous product development and improvements, Keystone RV Company reserves the right to make changes in product specifications and components without prior notice. The most recent version of the owner's manual can be found on our website [www.keystonerv.com](http://www.keystonerv.com) under the Customer Service heading. Manual Publication 7.1.2021.



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**Keystone RVs are  
built to carry you  
forward -  
a transport to  
the moments,  
memories and  
milestones  
that turn your  
aspirations into  
reality.**

**LIVE IT OUT.**





# 0 INTRODUCTION

## 1

### OWNER'S MANUAL

The Keystone Owner's Manual is not intended to be inclusive of every operational aspect of your RV, but to work in conjunction with the manuals of the components in your RV supplied by the different component manufacturers. Please note that some components may be optional or not available for specific models. Also, you may be entitled to additional warranties on individual components beyond Keystone's one-year (two-year for the Redwood brand) limited base warranty and three-year structural warranty. Individual product warranty registrations may be required by each component manufacturer to be eligible. If supplied to Keystone, they are put in the RV at the time of manufacture. We recommend these be completed and mailed promptly if applicable. See a list of component suppliers on pages 51-53.

### SAFETY

#### IMPORTANT SAFETY PRECAUTIONS AND INFORMATION

##### DANGER, WARNING, CAUTION, NOTICE AND NOTE BOXES

We have provided many important safety messages in this manual. Always read and obey all safety messages.

##### TERMS AND SYMBOLS USED

(Optional) This denotes items that may be an option on all or particular models. Additionally, some optional items can only be included during the manufacturing phase and cannot be added. The inclusion of optional items does not imply or suggest the availability, application, suitability, or inclusion for any specific RV.



DANGER indicates an imminently hazardous situation that, if not avoided, may result in death or serious injury.



WARNING indicates a potentially hazardous situation that, if not avoided, may result in death or serious injury.



CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.



NOTICE is used to address practices not related to personal injury. This applies to hazardous situations involving property damage only.



NOTE brings attention to: Important information regarding the maintenance of your RV.

##### APPLIANCES AND EQUIPMENT

The appliances (stove, refrigerator, outdoor grills, etc.) and equipment (water heater, furnace, generator, etc.) typically operate on propane. Propane is flammable and contained under high pressure. Improper use may result in a fire and/or explosion. Be sure to follow all instructions and warnings in this manual (see Chapter 7) as well as the specific owner's manuals of each appliance and piece of equipment.



This manual is NOT intended to be inclusive of every operational aspect of your RV, but to work in conjunction with the manuals of the components in your RV supplied by the different component manufacturers. Please note that some components may be optional or not available for specific models. Some appliances and features of the RV do not come with instructions or warning labels. For example, a dinette table that folds down into a bed may not have a written manual. If you need assistance with an appliance or feature please contact your selling dealer or call Owner Relations at 866.425.4369.

## **SAFETY RECALLS AND SERVICE CAMPAIGNS**

From time to time, Keystone may initiate a Safety Recall or Service Campaign in an effort to prevent a possible product failure from manifesting itself.

A Safety Recall involves a likely failure that can lead to property damage or personal injury. Notifications are mailed to your physical home address and may be emailed to you. Please make certain that you supply Keystone with an accurate home address and email address. The recall process is all about notice to you and making certain you deliver the RV to your local dealer for when a Recall and Service Campaign have been initiated by Keystone. It is very important that the issue be remedied before the RV or related component is used again.

Recalls can also be found on Keystone's website at [www.keystonerv.com/owners/recalls/](http://www.keystonerv.com/owners/recalls/).

Although similar to a Recall, a Service Campaign is a potential product failure that is not likely to lead to personal injury. Notifications are mailed to the registered owner's address and may be emailed to you. Campaigns can also be found on Keystone's website at [www.keystonerv.com/owners/recalls/](http://www.keystonerv.com/owners/recalls/). Repairs should be scheduled at your earliest convenience.

Recalls and Service Campaigns may also be posted on Keystone's Facebook and Instagram pages. Please check Keystone's social media from time to time to determine if your RV is subject to a Recall or Service Campaign.

## **REPORTING SAFETY DEFECTS**

If you believe your vehicle has a defect which could cause a crash, injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA), as well as, notifying Keystone. 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. However, NHTSA cannot become involved in individual problems between you, your dealer, or Keystone RV Company.

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](http://www.safercar.gov); or write to: Administrator, NHTSA, 1200 New Jersey Ave. SE, Washington, DC 20590. You can also obtain other information about motor vehicle safety from [www.safercar.gov](http://www.safercar.gov).

Transport Canada can be reached toll-free at 1-800-333-0510 or at 819-994-3328 in the Gatineau-Ottawa area or internationally. Written correspondence can be sent to: Transport Canada-ASFAD, 330 Sparks St., Ottawa, ON K1A 0N5.

Adresse postale: Transports Canada - ASFAD 330, rue Sparks, Ottawa (Ontario) K1A 0N5. Téléphone: 819-994-3328 (dans la région de Ottawa-Gatineau et à l'extérieur du pays). Sans frais: 1-800-333-0510 (au Canada).

Internet: <http://canada.ca/rappels-securite-automobile>.



## OWNER ASSISTANCE

It's reasonable to expect your RV may need some service during the base and structural limited warranty periods. Keystone's authorized dealers and service centers are the exclusive provider of parts, service, and warranty support. We recommend you contact your selling dealer first. However, if for any reason, your issue is not resolved by your dealer, Keystone is always willing to help so please don't hesitate to contact us.

We also understand that returning your RV for service takes time and effort. Therefore, we have outlined steps and options in hopes to reduce your inconvenience as much as possible.

### VERIFY THE PROBLEM BEFORE SCHEDULING AN APPOINTMENT

Are you sure there is something wrong? It can be extremely frustrating to take the time, effort, and expense to return your RV to your dealer only to find your RV is operating correctly, was not being operated properly, or its condition is normal. Here are some resources and suggestions to help you validate your situation before taking the RV in for a service appointment.

- 1 | Review your Owner's Manual or the specific component and appliance manual for the component in question (if applicable). Visit the "Owners" link on [www.keystonerv.com](http://www.keystonerv.com) for Frequently Asked Questions (FAQ), "How to" Videos, or to chat with one of Keystone's Owner representatives.
- 2 | Review the component and appliance website for more information regarding the component in question.
- 3 | Contact your selling dealer or Keystone Customer Service to run the issue by one or both of us.

### NOTICE FOR THE "DO-IT-YOURSELF" CROWD

Can you do it yourself? More now than ever many RV owners are relating to the "Do-it-Yourself" (DIY) method of repairs. This allows you to use and develop your skills to save you time and money.

For example, if you need to replace a part (such as, a blind, radio, cabinet door, drawer guide, etc.) and you are comfortable replacing it yourself, we can help you. We may be able to send you a part without charge to install yourself or with the help of someone you know and trust. While we want you to have the opportunity to complete simple repairs, **USE CAUTION AND GOOD COMMON SENSE:** Your safety and comfort in working on RV repairs are very important. If at any time you realize you don't have the necessary knowledge, training, or experience to independently work on any repair project, please stop what you are doing and seek the advice of someone familiar with your RV or contact your authorized Keystone dealership to arrange for the dealership's service group to address and fix the issue.

**If the repair involves life safety related items, such as, the liquid propane (LP) gas system, any of the electrical systems, and plumbing, or such things, as the slide-out systems, hydraulics, and appliances, STOP and schedule an appointment with your dealer.**

Returning the old part may sometimes be required, however, we can e-mail you a UPS return label. You can use the packaging from the new part to box the return part and it can be dropped at the nearest UPS location.

**PLEASE NOTE:** The "Do-it-Yourself" (DIY) method of repairs is not required when the unit is within the terms of the warranty. It is strictly presented to you as an option for a more convenient and timely service experience to a willing consumer.

## SERVICE APPOINTMENT

If you verify the problem and the issue needs a professional's touch, no problem, make an appointment to bring your RV into your selling dealer for service. During peak camping season, service appointment lead times can be extended. Consider the issue at hand. If it is more of a nuisance issue that does not affect your ability to use the RV, you may want to consider making your appointment when it is not peak season so it doesn't interrupt your camping season or your use. Follow these steps to help assure a smooth service experience:

- 1 | Call Ahead - Give thought to an appointment time and call ahead. All shipping or towing expenses incurred in transporting the RV for warranty service will be your responsibility. Upon requesting the warranty services you will be asked for:
  - Your name.
  - Date of purchase.
  - Vehicle Identification Number (VIN).
  - An explanation of the anticipated warranty claim.
- 2 | Be Prepared/Make a List – Have a detailed list ready to review with the dealer when making the appointment. Clearly identify what occurred, when it occurred, and how the RV was being used at the time it occurred (plugged in/not plugged in; on city water/on pump, etc.) The more information you provide up front, the better chance the dealer will address your concerns timely and accurately the first time.
- 3 | Parts Lead Times – While many of the parts needed for warranty repairs are in stock at your dealer or at Keystone, a number of them may be special order. Many of these parts need to be manufactured with extended lead times that can delay the repair process. In those situations, we recommend the dealer complete the repairs that can be completed without the special order parts. We also recommend that you take the RV to use. Once the parts needed to complete the repairs are received by the dealer, you can return the RV to complete the remaining repairs.
- 4 | Inspect Your Repairs – Your dealer and Keystone want you to be satisfied with any repair. After a repair is performed, inspect it thoroughly. Go over the repairs with the dealer service representative, checking off your list as you go. In the event a problem should reoccur after you have left the dealership, contact the dealer or Keystone as soon as possible.

If the dealer is unable to resolve any warrantable issues or provide assistance in arranging repairs in a timely manner, please contact: Customer Service Department, Keystone RV Company, P.O. Box 2000, Goshen, Indiana 46527. You can also reach Keystone at 866.425.4369 or at [www.keystonerv.com](http://www.keystonerv.com). Upon receipt of notice of a claim where a dealer was unable or unwilling to resolve your issue, Keystone may then direct you to another dealer or service center.

Keystone may also, at its option, request that you return your RV to one of its Customer Service facilities in Goshen, Indiana or Pendleton, Oregon.

If a dealer is unable to correct any covered defect that you believe substantially impairs the value, use, or safety of your RV, you must, to the extent permitted by law, notify Keystone directly of the dealer's failure to successfully repair the covered defect so that Keystone can become directly involved with the purpose of performing a successful repair to the covered defect.

## OBTAINING WARRANTY SERVICE IN TRANSIT

Should you encounter an issue affecting the use, value, or safety of your RV while traveling, contact your selling dealer for assistance. Should you need to locate an Authorized Keystone Service Center, a dealer locator can be found at [www.keystonerv.com](http://www.keystonerv.com) or Keystone Owner Relations Monday-Thursday 8 A.M. to 5 P.M. EST and Friday 8 A.M. to 4 P.M. EST at 866.425.4369.

When you are away from your selling dealer and an authorized service center is not available, it may become necessary to use a non-authorized Keystone service center or mobile service which we will be happy to work with, however, please note:

- Service Calls are not covered under warranty.
- We will need to approve a reasonable estimate for the cost of repair BEFORE the work begins.
- We may elect to ship parts to the location.
- The defective parts may require return prior to payment for the work.
- While Keystone is more than willing to pay non-authorized service centers or mobile service companies, they may charge you since we do not have "relationship" with either. Upon receipt of the paid invoice, Keystone would then make arrangements to reimburse you the pre-approved amount.

## YOUR RESPONSIBILITIES AS AN OWNER

Your RV was designed and manufactured by Keystone for recreational travel and family camping with suitable materials, appliances, and components. If you choose to use your RV for any purpose other than recreational travel and family camping, it could reduce the life expectancy of soft goods, appliances, and other components. In addition, more frequent maintenance intervals may be required.

Review the information contained in the Warranty Guide, the Owner's Manual, and all supplied component manuals. Ensure the proper care and maintenance is performed according to the Maintenance Schedule outlined in the Warranty Guide and the Owner's Manual, including taking whatever preventative measures that are necessary to maintain the exterior sealants and prevent foreseeable secondary moisture or water damage to the RV. Examples of secondary damage include, but are not limited to, stained upholstery, carpeting or drapes, mold formation and growth, furniture, cabinetry or floor damage, etc.

In the event the unit leaks (exterior, plumbing, etc.), take whatever action necessary to prevent foreseeable secondary moisture, water damage, or other natural accumulation of water in the RV. Also:

- Mitigate the leak. (Turn off the water, cover the area or have someone cover the area to the extent it is safe to do so, etc.)
- Remove the accumulated water to the extent it is safe to do so. (Use towels, a shop vacuum, etc. If severe enough, a professional water restoration company may be needed.)
- Reduce indoor humidity and/or ventilate the trailer to aid in the drying process. (Utilize roof vent fans, secondary fans directly on the area, a dehumidifier, operate the furnace fan and/or air conditioner, etc.)

**Failure to take reasonable action to mitigate leaks, secondary moisture, or the accumulation of water is not covered by the terms of the limited warranties.**

Mold grows naturally given certain environmental conditions and is not covered by the terms of the limited warranties.

Facts about Mold from the United States Environmental Protection Agency (EPA):

- Molds can be found almost anywhere; they can grow on virtually any substance when moisture is present. There are molds that can grow on wood, paper, carpet, and foods.
- Clean and dry any damp or wet materials or furnishings within 24-48 hours to prevent mold growth.
- There is no practical way to eliminate all mold or mold spores in an indoor environment; the best way to control indoor mold growth is to control moisture.
- Fix the source of the water problem or leak to prevent mold growth.
- Reduce indoor humidity to 30-60% to decrease mold growth by:
  - 1 | Venting bathrooms, dryers, and other moisture-generating sources to the outside.
  - 2 | Using air conditioners and de-humidifiers.
  - 3 | Increasing ventilation.
  - 4 | Using exhaust fans whenever cooking, dishwashing or cleaning.



"I can't wait for my next adventure!"

Stephen | Utah

## MAINTENANCE REFERRAL

FOR ADDITIONAL INFORMATION ON YOUR MAINTENANCE RESPONSIBILITIES, SEE CHAPTER 13.

## INDOOR AIR QUALITY AND AVOIDING CONDENSATION REFERRAL

FOR ADDITIONAL INFORMATION ON HOW YOU CAN MANAGE INDOOR AIR QUALITY AND AVOIDING CONDENSATION, SEE CHAPTER 3.

### WARRANTY REGISTRATION/CHANGE OF ADDRESS

To enable Keystone to contact you with important product safety updates, including safety recalls or service campaigns, please make sure your warranty registration information, including your email address, is correct and up to date.

You can register your new or used unit ownership and change your address at [www.keystonerv.com/owners/update-ownership/](http://www.keystonerv.com/owners/update-ownership/) or contact Keystone Owner Relations Monday-Thursday 8 A.M. to 5 P.M. EST and Friday 8 A.M. to 4 P.M. EST at 866.425.4369.

### COMPONENT PARTS WARRANTY REGISTRATION

Your RV has components, appliances, and accessories with printed materials that their individual component manufacturers have provided. These materials are included in the packet located in your RV that contains your Owner's Manual and warranty registration cards.

Appliance and component manufacturer warranties, if any, are separate from the Keystone Limited Warranties. We know it seems like a lot, but please review all of the materials located in your RV as part of the owner's packet. Not only should you be familiar with the many components and appliances, you are responsible for submitting any warranty registration cards and following the appropriate procedures for obtaining warranty service after your first year of ownership.

During the first year of your ownership, Keystone administers all the separate appliance and component warranties except for tires, batteries, generators, and ASA supplied electronics (those items are not only excluded but Keystone does not administer those components' separate warranties).

Keystone does not warrant any appliance or components. In no way will Keystone's Limited Warranties be modified or amended by this provision.

All warranty service claims on components must be directed during the one-year (two-year for the Redwood brand) base limited warranty coverage period to Keystone through an authorized Keystone dealer or service center. After the Keystone one-year (two-year for the Redwood brand) base coverage period expires, all appliance and component warranty claims must be directed to the respective appliance and component manufacturers.

**“Traveling is our passion  
and our RV allows us to  
pursue that passion.”**

**Tucker & Janae**  
Montana



# 0 LIMITED 2 WARRANTIES (4 PAGES)

## WHAT IS COVERED?

Keystone RV company, including its divisions, Dutchmen and CrossRoads/Redwood ("Keystone"), provides the two following limited warranties with this recreational vehicle ("RV") which set forth what Keystone will cover and what Keystone will do if a defect exists. Neither limited warranty is a guarantee about the RV for any time period. Please read them closely before your purchase of the RV.

**PLEASE NOTE: WHEN YOU REQUEST AND ACCEPT THE PERFORMANCE OF WARRANTY REPAIRS UNDER THE TERMS OF EITHER LIMITED WARRANTY, YOU ARE ACCEPTING ALL TERMS OF BOTH LIMITED WARRANTIES, INCLUDING BY WAY OF EXAMPLE, THE RESPECTIVE WARRANTY LIMITATIONS AND DISCLAIMERS, THE FORUM SELECTION CLAUSE AND THE CLAUSE REDUCING THE TIME PERIOD WHEN SUIT MUST BE FILED FOR BREACH.**

## ONE-YEAR (TWO-YEAR FOR THE REDWOOD BRAND) LIMITED BASE WARRANTY:

The Keystone Limited Base Warranty covers this RV for a period of one-year (two-year for the Redwood brand) from the date of purchase by the first retail owner. This Limited Base Warranty covers defects in materials and workmanship supplied by and attributable to Keystone's manufacturing and assembly of the RV when the RV is used solely for its intended purpose of recreational camping. This Limited Base Warranty does not cover the items excluded under the section "What is Not Covered" (page 9).

**IN ADDITION, SINCE IT IS REASONABLE TO EXPECT THAT THE RV WILL NEED SOME SERVICE DURING THE WARRANTY PERIOD, THIS LIMITED BASE WARRANTY DOES NOT EXTEND TO FUTURE PERFORMANCE. IT ONLY SETS FORTH WHAT KEYSTONE WILL DO IF A DEFECT EXISTS AND DOES NOT GUARANTEE ANYTHING ABOUT THE RV FOR ANY TIME PERIOD.**

Keystone is not responsible for any undertaking, representation, service agreement, or warranty beyond what is expressly set forth in this Limited Base Warranty.

**TRANSFERABILITY** | This Limited Base Warranty may be transferred by the first retail purchaser to a subsequent retail purchaser; however, the Limited Base Warranty will in no way be extended beyond the one-year (two-year for the Redwood brand) coverage period. For you, the second retail purchaser, to receive the unexpired balance of the base warranty coverage, as previously described, after purchasing the RV, you must go to our website at [www.keystonerv.com](http://www.keystonerv.com) and provide Keystone your VIN, name, address, phone, and email address (proof of purchase may be requested). You may also notify Keystone of the transfer by:

Phone | 866.425.4369

Email | [ownerrelations@keystonerv.com](mailto:ownerrelations@keystonerv.com)

**PLEASE NOTE:** The limited base warranty is not part of the separate limited three-year structural warranty provided with the RV. The Limited Base Warranty will expire on the one-year (two-year for the Redwood brand) anniversary date of the first retail purchase.

## LIMITATIONS AND DISCLAIMERS:

**THE LIMITED BASE WARRANTY IS PROVIDED EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF KEYSTONE. IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IF ANY, GIVEN BY LAW, WILL BE LIMITED TO AND NOT EXTEND BEYOND THE SCOPE OF COVERAGE AND BEYOND THE DURATION OF THE ABOVE ONE-YEAR (TWO-YEAR FOR THE REDWOOD BRAND) LIMITED BASE WARRANTY PERIOD.**

**KEYSTONE WILL NOT BE RESPONSIBLE OR LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE THAT RESULT FROM ANY DEFECT IN THE RV, INCLUDING BUT NOT LIMITED TO, LOSS OF USE OF THE RV, LOAN PAYMENTS, ON-SITE SERVICE CALLS, LOSS OF TIME, INCONVENIENCE, EXPENSES FOR GASOLINE, TOWING CHARGES OR TRANSPORTATION COSTS, RENTAL OF SUBSTITUTE EQUIPMENT, TELEPHONE, TRAVEL, LODGING, DAMAGE OR LOSS TO PERSONAL PROPERTY, LOSS OF REVENUES, OR OTHER COMMERCIAL LOSS, OR ANY OTHER SPECIAL OR CONSEQUENTIAL DAMAGES, OF ANY KIND OR NATURE RESULTING FROM ANY DEFECT IN THE RV. THE DISCLAIMER OF CONSEQUENTIAL DAMAGES IS NOT DEPENDENT UPON THE LIMITED BASE WARRANTY FULFILLING ITS ESSENTIAL PURPOSE.**

**SOME STATES DO NOT ALLOW LIMITATIONS OF HOW LONG AN IMPLIED WARRANTY LASTS, OR ALLOW THE EXCLUSION OF LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSIONS MAY NOT APPLY TO YOU.**

## **THREE-YEAR LIMITED STRUCTURAL WARRANTY (ALL KEYSTONE BRANDS):**

The Keystone Limited Structural Warranty covers this RV for a period of three (3) years from the date of purchase by the first retail owner. This Limited Structural Warranty covers defects in materials and workmanship supplied by and attributable to Keystone's manufacturing and assembly of the "structural" (as defined below) portions of the RV when the RV is used solely for its intended purposes of recreational camping. This Limited Structural Warranty does not cover the items excluded under the section "What is Not Covered?" (page 9).

**"Structural"** means the RV's (i) main steel frame and steel support members (outriggers and cross members) (ii) exterior sidewalls, laminated or non-laminated, including fiberglass, aluminum siding and wall studs (iii) floors, laminated or non-laminated, including decking and floor joists (iv) roofs, laminated or non-laminated, including decking, roof rafters and roof material installation (v) fiberglass cap(s) including paint application, and windshield installation (does not cover damages such as, rock chips, dents, scratches, or failure to maintain) and (vi) slide-out box, exterior sidewalls/end walls/roofs/floors, skeletal framing, decking and roof material installation.

**IN ADDITION, SINCE IT IS REASONABLE TO EXPECT THAT THE RV WILL NEED SOME SERVICE DURING THE WARRANTY PERIOD, THIS STRUCTURAL WARRANTY DOES NOT EXTEND TO FUTURE PERFORMANCE. IT ONLY SETS FORTH WHAT KEYSTONE WILL DO IF A DEFECT EXISTS AND DOES NOT GUARANTEE ANYTHING ABOUT THE RV FOR ANY TIME PERIOD.**

Keystone is not responsible for any undertaking, representation, service agreement, or warranty beyond what is expressly set forth in this Limited Structural Warranty.

**TRANSFERABILITY** | This Limited Structural Warranty may be transferred by the first retail purchaser to a subsequent retail purchaser; however, the Limited Structural Warranty will in no way be extended beyond the three (3) year coverage period. For you, the second retail purchaser, to receive the unexpired balance of the structural warranty coverage as described above, after purchasing the RV, you must go to our website at [www.keystonerv.com](http://www.keystonerv.com) and provide Keystone your VIN, name, address, phone, and email address (proof of purchase may be requested). You may also notify Keystone of the transfer by:  
Phone | 866.425.4369  
Email | [ownerrelations@keystonerv.com](mailto:ownerrelations@keystonerv.com)

**PLEASE NOTE:** The limited three-year structural warranty is not part of the separate limited base warranty provided with the RV. The Limited Structural Warranty will expire on the three-year anniversary date of the first retail purchase.

### **LIMITATIONS AND DISCLAIMERS:**

**THE LIMITED STRUCTURAL WARRANTY IS PROVIDED EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF KEYSTONE. IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IF ANY, GIVEN BY LAW, WILL BE LIMITED TO AND NOT EXTEND BEYOND THE SCOPE OF COVERAGE AND BEYOND THE DURATION OF THE ABOVE THREE-YEAR LIMITED STRUCTURAL WARRANTY PERIOD.**

**KEYSTONE WILL NOT BE RESPONSIBLE OR LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE THAT RESULT FROM ANY DEFECT IN THE RV, INCLUDING BUT NOT LIMITED TO, LOSS OF USE OF THE RV, LOAN PAYMENTS, ON-SITE SERVICE CALLS, LOSS OF TIME, INCONVENIENCE, EXPENSES FOR GASOLINE, TOWING CHARGES OR TRANSPORTATION COSTS, RENTAL OF SUBSTITUTE EQUIPMENT, TELEPHONE, TRAVEL, LODGING, DAMAGE OR LOSS TO PERSONAL PROPERTY, LOSS OF REVENUES, OR OTHER COMMERCIAL LOSS, OR ANY OTHER SPECIAL OR CONSEQUENTIAL DAMAGES, OF ANY KIND OR NATURE RESULTING FROM ANY DEFECT IN THE RV. THE DISCLAIMER OF CONSEQUENTIAL DAMAGES IS NOT DEPENDENT UPON THE LIMITED STRUCTURAL WARRANTY FULFILLING ITS ESSENTIAL PURPOSE.**

**SOME STATES DO NOT ALLOW LIMITATIONS OF HOW LONG AN IMPLIED WARRANTY LASTS, OR ALLOW THE EXCLUSION OF LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSIONS MAY NOT APPLY TO YOU.**



## REPAIR REMEDY

If, within the stated limited warranty period, a defect in materials or workmanship is found to exist that is not excluded from coverage, whether under the Limited Base Warranty or the Limited Structural Warranty, Keystone's sole and exclusive obligation will be to repair the defect.

*Back-Up Remedy* | As a limited back-up remedy in the event the defect cannot be repaired, after receiving a reasonable opportunity to repair and after a reasonable number of repair attempts, Keystone may, at its option, either (1) pay you the diminution in value damages, or (2) provide a similar replacement RV, less a reasonable allowance for the owner's use of the original RV. The primary and back-up remedies must both fail to fulfill their essential purpose before other uniform commercial code remedies can be obtained for breach of express or implied warranty.

PLEASE NOTE: Any performance of repairs after the stated coverage periods expire or any performance of repairs to those portions of your RV excluded from coverage will be considered **"good will"** repairs and will not alter the express terms of the base and structural limited warranties.

## WHAT IS NOT COVERED?

THE LIMITED BASE AND STRUCTURAL WARRANTIES WILL NOT APPLY TO:

- Routine maintenance including, without limitation, caulking, re-caulking and waxing of the body of the RV, tightening screws, brake squeak/lock-up/adjustment, latches, locks, combustion systems, changing fuses, or light bulbs, and maintaining the air conditioning and heating systems.
- Any water leaks or related consequential damages that are a result of your failure to properly maintain the exterior seals as required in the Owner's Manual.
- Any water leaks or related consequential damages that arise after the limited one-year (two-year for the Redwood brand) base warranty expires (water leaks are covered under the base warranty and not the structural warranty).
- Adjustments to all doors, drawers, locks, latches, slide outs, awnings and window treatments beyond 90 days after retail sale.
- Equipment, products, components, appliances, or accessories not manufactured by Keystone.
- RV's used for business, rental, residential, commercial, or disaster relief purposes, or any purposes other than recreational travel and family camping.
- RV's that are not originally purchased through an authorized dealer or those purchased through auction, repossession, salvage or an otherwise damaged or distressed condition.
- Damage or loss caused in whole or in part by the misuse, abuse, neglect, theft, vandalism, product modification, improper customer or dealer installation, improper stowing of equipment, overloading or improper balancing of the load, low or high voltage, unauthorized repair or failure to follow instructions supplied with the RV.
- Damage or loss caused in whole or in part by the unauthorized attachments, modifications or alterations to the structure, body, pin box or frame of the RV including but not limited to trailer hitches for towing, or platforms for supporting cargo.
- Any fading or dye lot changes of fabrics or carpet or cosmetic issues with the roof material(s) or its installation.
- Design defects; redesign/re-construction of any part of the RV; or anything related to wheel or axle alignment.
- Rust or corrosion due to the environment; or any broken glass damage.
- Damage or loss caused in whole or in part by animals, exposure to natural or atmospheric elements, corrosive chemicals, ash or fumes generated or released by vehicles, collision, road hazards, rock chips, condensation, or any other source; impact, rock chips, dents, scratches or failure to maintain.
- Damage or loss caused in whole or in part by extreme weather conditions such as extreme cold or heat, winds, rain, lightning, hail, ice, and/or flooding.
- Damage or loss caused in whole or in part by the willful or negligent acts of the driver of the vehicle pulling the RV, an accident involving the RV, or the condition of any road surface.
- Damage or loss caused in whole or in part by the tow vehicle selected by the owner, owner's operation or use of the tow vehicle, improper selection or installation of towing hitch on tow vehicle, weight distribution, sway control or equalizer equipment, or damage to the owner's tow vehicle.
- Any injury, loss or damage due to mold or fungi.
- Any RV licensed, registered, or primarily used outside the USA or Canada.

## DEFECTS V. DAMAGE

Please note the distinction between "defect" and "damage". "Defect" means the failure of the workmanship performed and/or materials used to conform with the design, manufacturing specifications and tolerances of Keystone. Defects are covered under the limited warranties. On the other hand, Keystone has no control over "damage" caused by such things as collision, misuse, or lack of maintenance that occurs after the RV is delivered to the owner. Therefore, "damage" for any reason which occurs after the RV is delivered is not covered under this warranty. **Maintenance services are also excluded from the warranty because it is the owner's responsibility to maintain the RV.**

## COMPONENT AND APPLIANCE WARRANTY SERVICE/ ADMINISTRATION

Appliance and component manufacturer warranties, if any, are separate from the Keystone Limited Warranties. Keystone administers the separate appliance and component warranties ONLY during the Keystone one-year (two-year for the Redwood brand) base limited warranty coverage period except for tires, batteries, generators, and ASA supplied electronics (those items are not only excluded, but Keystone does not administer those components' separate warranties). All warranty service claims on components must therefore be directed during the one-year (two-year for the Redwood brand) base limited warranty coverage period to Keystone through an authorized Keystone dealer or service center. After the Keystone one-year (two-year for the Redwood brand) base coverage period expires, all appliance and component warranty claims must be directed to the respective appliance and component manufacturers. **Keystone is not warranting any appliance or components. In no way will Keystone's Limited Warranties be modified or amended by this provision.**

## LEGAL REMEDIES

**ANY ACTION TO ENFORCE ANY PORTION OF THE LIMITED BASE OR STRUCTURAL WARRANTIES, OR ANY IMPLIED WARRANTY, MUST BE COMMENCED WITHIN SIX (6) MONTHS AFTER EXPIRATION OF THE STATED RESPECTIVE LIMITED WARRANTY PERIODS OR THE ACTION WILL BE BARRED BECAUSE OF THE PASSAGE OF TIME. ANY PERFORMANCE OF REPAIRS WILL NOT SUSPEND THIS LIMITATION PERIOD FROM EXPIRING.**

**SOME STATES ALSO DO NOT ALLOW THE REDUCTION IN THE STATUTE OF LIMITATIONS, SO THEY MAY NOT APPLY TO YOU.**

**EXCLUSIVE JURISDICTION FOR DECIDING LEGAL DISPUTES RELATING TO ALLEGED BREACH OF WARRANTY OR REPRESENTATIONS OF ANY NATURE MUST BE FILED IN THE COURTS WITH IN THE STATE OF MANUFACTURE. ALSO, THE LIMITED WARRANTIES WILL BE INTERPRETED AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF INDIANA. ANY AND ALL CLAIMS, CONTROVERSIES, AND CAUSES OF ACTION ARISING OUT OF OR RELATING TO THE LIMITED WARRANTIES, WHETHER SOUNDING IN CONTRACT, TORT OR STATUTE, WILL BE GOVERNED BY THE LAWS OF THE STATE OF INDIANA, INCLUDING ITS STATUTE OF LIMITATIONS, WITHOUT GIVING EFFECT TO ANY CONFLICT OF LAW RULE THAT WOULD RESULT IN THE APPLICATION OF THE LAWS OF A DIFFERENT JURISDICTION.**

**PLEASE NOTE: THE ABOVE LIMITED WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.**

# AND | EVEN MORE PROTECTION

During the first year (two-year for the Redwood brand) of your ownership, Keystone administers all the separate component and appliance warranty coverage except for tires, batteries, generators, and ASA supplied electronics (those items are not only excluded but Keystone does not administer those components' separate warranties). For added protection, the appliances and components listed below have warranty coverage directly administered from and by the components' suppliers themselves beyond Keystone's base and structural warranty.

## COMPONENT AND APPLIANCE WARRANTY COVERAGE

<b>LIFETIME</b>	TREDIT - ALUMINUM & STEEL WHEELS	ALPHA SYSTEMS - ALPHA PLY 45MIL MEMBRANES
<b>25 YEARS</b>	DYNA SPAN - FLOOR DECKING	WESCO - FLEX PEX PIPING (FITTINGS 10 YEARS, EXCLUSIONS)
<b>12 YEARS</b>	ALPHA SYSTEMS - ROOFING MATERIAL (18 YEARS STARTING 1/1/2020 DOM)	
<b>11 YEARS</b>	LIPPERT - TORSION AXLES	
<b>7 YEARS</b>	BEAUFLOOR - VINYL FLOORING	
<b>6 YEARS</b>	LIPPERT - SPRING AXLES	SAILUN - TIRES
	RAINIER - TIRES	GOODYEAR - TIRES
	INTERVAC - CENTRAL VACUUM (ACCESSORIES 90 DAYS)	
<b>5 YEARS</b>	DEXTER - AXLES	TRAILER KING - TIRES
	SAMSUNG - REFRIGERATOR - SEALED SYSTEM & LABOR ON DIGITAL INVERTER COMPRESSOR (10 YEARS ON COMPRESSOR PARTS)	WINEGARD - AIR-360, ROADSTAR, RAZOR Z1 ANTENNA SYSTEM - (PARTS ONLY)
	FURRIION - SHORE POWER PRODUCTS	BGS - GRAPHICS
	WINEGARD - AIR-360, ROADSTAR, RAZAR Z1 ANTENNA SYSTEMS (PARTS ONLY)	
<b>3 YEARS</b>	LIPPERT - CHASSIS	ONAN - GENERATOR ENGINE (ELECTRICAL 2 YEARS)
	TREKK - FLOORING	FLO-JET - WATER PUMP
	STANDARD TECHNOLOGIES - FUEL PUMP SYSTEM & FUEL TANKS	
<b>2 YEARS</b>	COLEMAN - A/C (W/ OPTIONAL 3-YEAR EXTENDED WARRANTY)	MORryde - RUBBER SUSPENSION SYSTEM (IS SYSTEM 5 YEARS, CRE SYSTEM 2 YEARS)
	CHENG / ARTERRA - CONVERTER & WATER PUMP	CRANE - EXTERIOR FIBERGLASS
	PROGRESSIVE DYNAMICS - CONVERTER, INVERTER, TRANSFER SWITCH	SUBURBAN - FURNACE (5 YEAR HEAT EXCHANGERS PARTS ONLY)
	FURRIION - 12V REFRIGERATOR	SUBURBAN - WATER HEATER (TANK 3 YEARS)
	GIRARD PRODUCTS - TANKLESS WATER HEATER (PARTS ONLY)	SUBURBAN - OVEN
	VENTLINE - POWER FAN, RANGE HOODS & ROOF VENTS	MIDWEST - GE ROOFTOP A/C
	ATWOOD/DOMETIC - REFRIGERATOR & A/C (W/ OPTIONAL 1-3 YEAR EXTENDED WARRANTY)	ATWOOD/DOMETIC - FANTASTIC VENT, PARTS & LABOR (PARTS ONLY - 5 YEARS, DOME -- LIFETIME)
	ATWOOD/DOMETIC - RANGE, FURNACE, & WATER HEATERS	

THIS IS ONLY A SUMMARY. FOR COMPLETE INFORMATION REGARDING THE ACTUAL WARRANTY STATEMENT(S) CONSULT THE WRITTEN LIMITED WARRANTY PROVIDED BY EACH SUPPLIER WHICH CAN BE FOUND IN THE COMPONENT SUPPLIER OWNER'S MANUAL INCLUDED WITH YOUR RV OR ON THE SUPPLIER(S) WEBSITE. WHILE KEYSTONE ADMINISTERS THE COMPONENT AND APPLIANCE WARRANTIES AS AN ADDED BENEFIT TO OUR CONSUMERS, WE DO NOT WARRANTY THESE COMPONENTS. REVISED 7.1.21.

# 03 INDOOR AIR QUALITY AND AVOIDING CONDENSATION

Unlike a home which can be thousands of square feet in size, your RV is much smaller. The relatively small volume and tight compact construction of modern RV's means that the normal living activities of even a few occupants (or animals) may lead to rapid moisture saturation of the air contained in the RV. Estimates indicate that a family of four can vaporize up to three gallons of water daily through breathing, cooking, bathing and washing.

Unless the water vapor is carried outside by ventilation or condensed by a dehumidifier, it may condense on the inside of the RV. It may condense out of sight inside cabinets, closets, etc. where the air temperature may be slightly different. This may not only cause damage to your RV but also your personal belongings.

**Appearance of these conditions may be misconstrued as a water leak.**

Good indoor air quality is essential for long term enjoyment of your Keystone RV. To maintain good air quality you need to be attentive to the proper ventilation of your RV, keeping the RV clean, and avoiding unnecessary air pollutants. Common indoor air pollution sources include molds, pollen, dander from pet fur, secondhand smoke, carbon monoxide from burning propane and other fuels (and charcoal), and household cleaners. Inadequate ventilation may increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants outside. High temperatures and humidity levels may also increase concentrations of some air pollutants. People most at risk from poor indoor air quality include people with: asthma, allergies, chronic lung diseases such as bronchitis and emphysema, a pre-existing heart disease, children, and the elderly.



**YOUR RV WAS DESIGNED PRIMARILY FOR RECREATIONAL TRAVEL AND FAMILY CAMPING. IF YOU USE YOUR RV FOR ANY OTHER PURPOSE, IT MAY LEAD TO PREMATURE COMPONENT WEAR/FAILURE AND DAMAGE TO YOUR RV. THESE TYPES OF "DAMAGE" ARE NOT COVERED UNDER THE LIMITED WARRANTIES.**

## IMPROVING INDOOR AIR QUALITY

- 1 | BREATH FRESH AIR
  - Open Windows.
  - Spend as much time outside in fresh air as you can.
- 2 | CONTROL MOLD
  - Clean your bathroom and kitchen often to fight mold.
  - Fix any water leaks.
  - Clean up any mold you see or smell with a mix of no more than 1 cup of bleach mixed with 1 gallon of water.  
**Never mix bleach with ammonia.**
  - Close windows and run your air conditioner (A/C) or your dehumidifier to help control mold.
- 3 | OTHER WAYS TO IMPROVE AIR QUALITY
  - Clean often to get rid of dust and pet fur which can bother your nose and throat.
  - Try not to use bug spray inside your RV.
  - **Do not smoke inside your RV.**

## EPA RECOMMENDATIONS

There are 3 basic strategies recommended by the Environmental Protection Agency (EPA) to improve indoor air quality.

1 | Remove Sources - The most effective way to improve indoor air quality is to eliminate sources of pollution or reduce their emissions. Pollutants that this strategy can have an impact upon are:

- Biological contaminants such as bacteria, molds, mildew, viruses, animal dander, and pollen.
- Household products such as paints, varnishes, cleaning and disinfecting solutions, cosmetics, and hobby products.
- Pesticides.

2 | Ventilation - Increase the amount of outdoor air coming indoors. Typically, RV furnaces and air conditioners DO NOT mechanically bring fresh air into the RV. Simultaneously opening doors and windows to allow fresh air in while turning on exhaust fans such as the bathroom, ceiling and range hood to take inside air out is an effective way to improve indoor air quality. If too little outdoor air enters a RV, pollutants may accumulate at higher levels.

3 | Air Cleaners - Air Cleaners are designed to remove particles from the air. There are many types and sizes of air cleaners on the market; however, air cleaners are not generally designed to remove gaseous pollutants. The effectiveness of an air cleaner depends on how well it collects pollutants from indoor air and how much air it draws through the cleaning or filtering element.

For more information about indoor air quality and its effects, please refer to [www.epa.gov/indoor-air-quality-iaq](http://www.epa.gov/indoor-air-quality-iaq)

## TIPS TO AVOID CONDENSATION

- When bathing, washing dishes, hair-drying, laundering, cooking, and using appliances and non-vented gas burners, always turn on the nearest exhaust fan.
- Keep the bathroom door closed and the vent open (if equipped, exhaust fan on) when bathing/showering and for a period of time after you have finished.
- Do not hang wet clothes in the coach to dry.
- In hot weather, start the air conditioner early as it removes excess humidity from the air while lowering the temperature.
- Manage the inside temperature during cold weather. The higher inside temperature along with colder outside temperatures may cause condensation to form on areas that are not insulated as well as others (windows, vents, wall studs, etc).
- Poor air circulation inside the RV may cause condensation to form inside closets and cabinets. Allow air to circulate inside closets and cabinets (leave doors partially open) so the temperature inside the cabinet is the same as in the rest of the RV. Please keep in mind that a closed cabinet full of stored goods prevents circulation and may cause condensation.
- The natural tendency is to close the vehicle tightly during cold weather. This may actually compound the problem. Simply put, you need to get the moisture in the air, that is created from normal use, outside. The most effective way to do this is to utilize your vents and vent fans.

If the tips presented here are not effective in controlling condensation, it may be necessary for you to invest in a dehumidifier. Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.



## WHERE THERE IS MOISTURE, THERE MAY BE MOLD

Molds, which are pollutants, are microscopic organisms that naturally occur in virtually every environment, indoors and out. Outdoors, mold growth is important in the decomposition of plants. Indoors, mold growth is unfavorable. Left unchecked, molds break down natural materials such as fabrics and wood products.

For mold growth to occur temperatures must be between 40 degrees and 100 degrees Fahrenheit and there must be a source of moisture such as humidity, standing water, damp materials, etc. Indoors, the most rapid growth occurs with warm and humid conditions.

By controlling relative humidity (moisture), the growth of mold and mildew can be inhibited.

- In warm climates, use of the air conditioner will reduce the relative humidity.
- Opening vents and operating exhaust fans when introducing high levels of moisture to the inside of the RV (bathing, showering, cooking, washing dishes, etc.) will help control the environment needed for mold to grow.
- Clean any spills immediately.
- Avoid leaving damp towels, clothes, etc. to dry inside the RV.
- On safe surfaces, use mold or mildew-killing cleaning products.
- Check sealants regularly and reseal when necessary to avoid water leaks. Proper preventative maintenance to the RV and its accessories, as described both in this manual and in accompanying literature, will provide the best protection for your RV.
- In extreme conditions, a dehumidifier may be necessary.

## FORMALDEHYDE AND RVs

Formaldehyde is used widely in building materials such as pressed wood products, particle board, hardwood, plywood paneling, plywood and medium density fiberboard (MDF), which are commonly used throughout the RV industry. As mandated by the RV Industry Association, Keystone RVs contain composite wood products that comply with the EPA Formaldehyde Standards for Composite Wood Products under Title VI of the Toxic Substances Control Act ("TSCA"), which can be found at <https://www.epa.gov/formaldehyde/formaldehyde-emission-standards-composite-wood-products>, and the California Air Resource Board (CARB) [Phase 2] formaldehyde emission standards under California Code of Regulations § 93120.2(a) <https://ww3.arb.ca.gov/research/indoor/formaldehyde.htm>.

To the extent that formaldehyde is contained in some of the components used to construct your RV or is used in the holding tank chemicals, you should properly ventilate your RV as described earlier in Chapter 3 to maintain good indoor air quality. Decreasing the flow of air by sealing the RV may increase the presence and concentration of indoor air pollutants, such as mold, household chemicals, and formaldehyde.

Finally, we recommend that you do not smoke inside your RV. In addition to causing damage to your RV, tobacco smoke releases formaldehyde and other air pollutants.

If you have any questions regarding the health effects of formaldehyde or any other air pollutants, please consult your doctor or local health department.

## WEBSITES OF INTEREST

There are various websites which maintain information about indoor air pollutants, including molds and formaldehyde, along with ways to improve indoor air quality. Here are just a few we recommend you visit if you have any questions or concerns:

<https://www.epa.gov/indoor-air-quality-iaq>, <https://www.atsdr.cdc.gov/formaldehyde/index.html>, or [https://www.atsdr.cdc.gov/formaldehyde/docs/factsheet\\_indoor\\_air\\_quality.pdf.pdf](https://www.atsdr.cdc.gov/formaldehyde/docs/factsheet_indoor_air_quality.pdf.pdf)

**"This toy hauler has all the up-to-date amenities needed for four-wheeling, motorcycling, and bicycling."**

Jason | Virginia



# 0 AXLES, 4 TIRES, AND 4 WEIGHTS

## AXLES AND SUSPENSION

Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dexteraxle.com](http://www.dexteraxle.com) or [www.lci1.com](http://www.lci1.com).



**EXCEEDING THE ESTABLISHED WEIGHT RATINGS FOR THE AXLES, RUNNING GEAR, TIRES AND WHEELS COULD LEAD TO FAILURE THAT CAN AFFECT RV SAFETY AND LEAD TO PROPERTY DAMAGE OR DAMAGE TO THE RV.**

## SUSPENSION

In most cases, there are two types of suspension used on Keystone RVs, Leaf Spring or Rubberized suspension. Please refer to the manufacturer's instructions supplied with the RV for care and operation.

## SHOCK ABSORBERS

If equipped, shock absorbers may provide a "ride enhancement" to the RV. They do not affect the stability or towability of the RV.

## SPARE TIRE

If equipped, a spare tire can be utilized in an emergency if a RV tire loses air pressure or goes flat. Certain brands use different wheels than the originals with the intent for the spare to be temporary.

## TIRE SAFETY INFORMATION

This portion of the owner's manual contains tire safety information as required by 49 CFR 575.6(4) and is based in part on the National Highway Traffic Safety Administration's Brochure, entitled "Tire Safety - Everything Rides on It." It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

<https://one.nhtsa.gov/Vehicle-Safety/Tires/Tire-Safety:-Everything-Rides-On-It>

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, driving within the designated tire speed ratings, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation blowouts, and flat tires.

These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling.
- Help protect you and others from avoidable breakdowns and accidents.
- Improve fuel economy.
- Increase the life of your tires.

## TIRE SAFETY

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Under inflated tires and overloaded vehicles are a major cause of tire failure.

## SAFETY CHECKLIST

1 | Check tire pressure (including the spare) at least once a month and before any long trip. See Tire and Loading Information label on page 21 for recommended tire size, inflation pressure, Cargo Carrying Capacity as well as weight and axle weight ratings.

2 | Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma and remove bits of glass and foreign objects wedged in the tread. Please see page 18.

3 | Do not exceed the safe age to operate the tire. Please see page 18 on tire aging.

4 | Do not overload your vehicle and distribute weight evenly in the RV. See Federal Certification label and Cargo Carrying Capacity labels on page 21.

5 | Make sure your tire valves have valve caps.

6 | Do not exceed tire speed ratings regardless of the posted maximum speed limit. See "Breaking Down Tire Codes" on page 16.

Use this information to make tire safety a regular part of your vehicle maintenance routine and use good judgment to adjust towing to road conditions, weather conditions, traffic, and posted speed limits while operating the vehicle. Recognize that the time you spend going over the check-list is minimal compared to the inconvenience and safety consequences of a flat tire or other tire failure.

# BREAKING DOWN TIRE CODES

## TIRE LABELING AND US DOT TIRE IDENTIFICATION NUMBER (TIN)

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

The TIN begins with the letters "DOT" and indicates that the tire meets all federal standards.

### ST205/75D14

ST identifies your tire as a Special Trailer tire.

### ST205/75D14

The three digits following the service type tell us the cross-sectional width of the tire in millimeters.

### ST205/75D14

The next two digits tell us the aspect ratio measurement.

### ST205/75D14

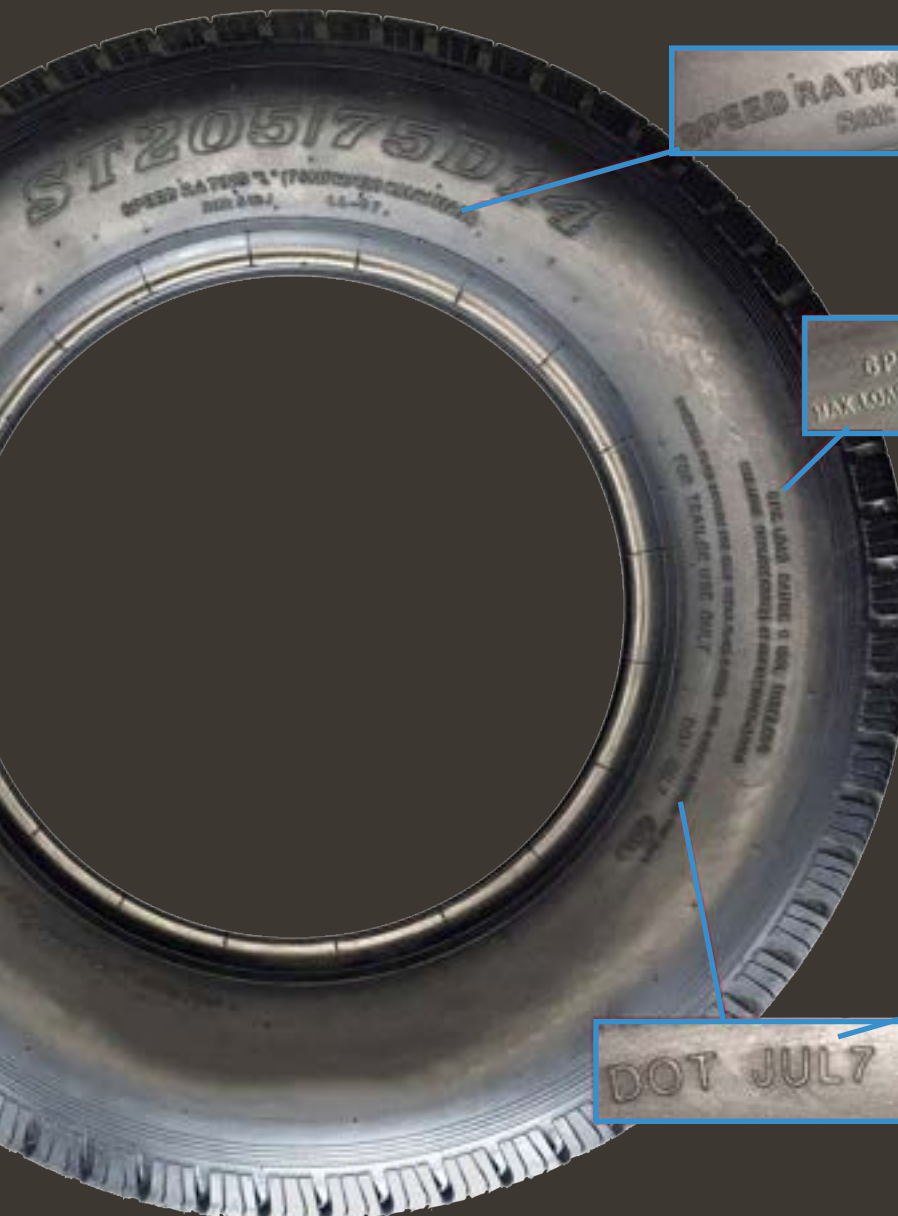
This letter tells us about the tire's construction.

R=Radial

D=Bias

### ST205/75D14

The last digits represent the tire and wheel diameter.



The speed rating is a measurement of the speed at which the tire is designed to run for extended periods.



**Load Range C** means this tire is a 6 ply tire with a max load pressure of 50 psi.

C = 6 ply 50 psi

D = 8 ply 65 psi

E = 10ply 80 psi

100L means this tire has a load index of 100 and speed index of L.

100 = 1760 LBS

L = 75 MPH

Manufacturer's Unique Code



First two digits - Week made  
Last two digits - Year made



## CHECKING TIRE PRESSURE

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

- Most tires naturally lose air over time.
- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb.
- Usually, it isn't possible to determine if radial tires are under-inflated by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires warm up causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

## LIVE IT OUT.

## STEPS FOR MAINTAINING PROPER TIRE PRESSURE

- 1 | Locate the recommended tire pressure on the vehicle's Tire and Loading Information label located on the exterior front left side wall.
- 2 | Record the tire pressure of all tires.
- 3 | If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
- 4 | If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add.
- 5 | At a service station or using an air compressor, add the missing pounds of air pressure to each tire that is under-inflated.
- 6 | Check all the tires to make sure they have the same air pressure.

If you have been driving your vehicle and think that a tire is under-inflated, fill it to the recommended cold inflation pressure indicated on your vehicle's Tire and Loading Information label. While your tire may still be slightly under-inflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly under-inflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

## UNDERSTANDING TIRE PRESSURE AND LOAD LIMITS

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and it affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure – measured in pounds per square inch (psi) – a tire requires to be properly inflated. (You will also find this number on the vehicle information label expressed in kilo pascals (KPA), which is the metric measure used internationally.)

Vehicle manufacturers determine this number based on the vehicle design's load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size.

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.



## TIRE SAFETY TIPS

### TIRE TREAD

The tire tread provides the gripping action and traction that prevents your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe when the tread is worn down to 1/16 of an inch and should be replaced. Tires have built-in tread-wear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down facing you. If you can see the top of Lincoln's head, you are ready for new tires.

### HONEST ABE TEST



### TREAD INDICATOR

	Condition	Possible Cause	Remedy
	Even Center Wear	Over-Inflation	Check and Adjust Pressure When Cold
	Inside and Outside Wear	Under-Inflation	Check and Adjust Pressure When Cold
	Smooth Outside Wear (One Side)	Loss of Camber or Over-Loading	Check/Unload as Necessary and/or Have Alignment Checked
	"Feathering" Across the Face	Axle Not Square to Frame or Incorrect Toe-In	Square Axles and/or Have Alignment Checked
	Cupping	Loose Bearings or Wheel Balance	Check Bearing Adjustment and Wheel and Tire Balance
	Flat Spots	Wheel Lock-Up	Adjust Brakes

### TIRE AGING

Tires are manufactured by bonding rubber to fabric plies and steel cords. Despite the anti-aging ingredients mixed into the rubber compounds, tires remain perishable. Since most RVs spend a lot of idle time at the campground or in storage, with only occasional trips on the road, they are not operated like a typical car or truck. Therefore, it is much more likely that the tires on your RV will actually "age out" or expire before their treads wear out. Most studies indicate that tires should be replaced, regardless of tread depth, when they are between 6-10 years old. The age of the tire can easily be determined by inspecting the sidewall of the tire. See "Breaking Down Tire Codes" on page 16. Refer to the tire manufacturer directly for the age life cycle of your tires.

### VEHICLE LOAD LIMITS

Determining the load limits of a RV includes more than understanding the load limits of the tires alone.

On RVs, there is a Federal Certification Label that is located on the forward half of the left (road) side of the RV. The certification label will indicate the vehicle's gross vehicle weight rating (GVWR). This is the most weight the fully loaded vehicle can weigh. It will also provide the gross axle weight rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.



In the same location as the certification label, there is a vehicle label. This label provides tire and loading information. This label will also show a statement regarding maximum cargo capacity. See page 21.

### CARGO CAPACITIES

Cargo can be added to the vehicle, up to the maximum weight specified on the label. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded RV cannot exceed the stated GVWR.

Water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the RV before it is loaded with cargo and is not considered part of the disposable cargo load. Water, however, is a cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank, when filled, will weigh about 800 pounds. If more cargo is being transported, water must be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as to not overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel and camping needs. See page 21.

For more information on cargo weight distribution, read chapter 12, "Sports Utility Recreational Vehicle", and see "Weight Distribution" on page 26.

### HOW OVERLOADING AFFECTS YOUR RV AND TIRES

The results of overloading can have serious consequences. Too much weight on your RV's suspension system can cause spring, shock absorber or brake failure, handling or steering problems, irregular tire wear, tire failure or other damage. An overloaded vehicle is hard to drive and hard to stop. In cases of serious overloading, brakes can fail completely, particularly on steep hills. The load a tire will carry safely is a combination of the size of tire, its load range, and corresponding inflation pressure. Excessive loads and/or under-inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire, which may lead to tire failure.

It is the air pressure that enables a tire to support the load, so proper inflation is critical. Since RVs can be configured and loaded in many ways, air pressures must be determined from actual loads (determined by weighing the RV) and taken from the load and inflation tables provided by the tire manufacturer. These air pressures may differ from those found on the certification label. However, they should never exceed the tire limitation for load or air pressure. If you discover that your tires cannot support the actual weights, the load will need to be lightened.

### TIRE SIZE

To maintain tire safety, purchase new tires that are the same size as the RV's original tires or another size recommended by the tire manufacturer. Look at the Tire and Loading Information label, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

### TIRE WARRANTY

Keystone RV does not administer the warranty for tires. Please contact the tire distributor direct at:

Americana	Hi Spec	Lionshead	Tredit
574.522.9450	574.807.8588	574.533.6169	855.8.TREDIT
<a href="http://www.americanatire.com">www.americanatire.com</a>	<a href="http://www.hispecwheel.com">www.hispecwheel.com</a>	<a href="http://www.lionsheadtireanwheel.com">www.lionsheadtireanwheel.com</a>	<a href="http://www.tredittire.com">www.tredittire.com</a>
Karrier	Good Ride	Castle Rock	Arisun
Kenda	Grand Ride	Constancy	Goodyear Endurance
Klever	Noble	Ridgway Sport	Mudstar
	Provider	Sterling Sport	Rainier
	Oracle	Vail Sport	Sailun
	Trail Guide	West Lake	Towmax
			Trailer King



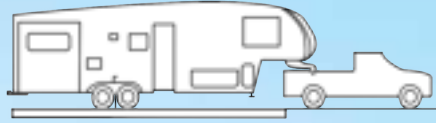
## WEIGHING YOUR RV

**STEP 1:** Pull on the scales until only the RV axles are on the scale. Record axle weight.

**STEP 2:** Unhook the RV on the scale to get a total weight of the RV.

**STEP 3:** To determine hitch weight, subtract the axle weight from the total weight.

- Note: To calculate suspension weights/ratings, it is necessary to subtract the hitch weight. This weight is being carried on the tow vehicle, not by the suspension of the RV.



STEP 1



STEP 2



**IF THE TOTAL WEIGHT OF THE RV EXCEEDS THE GVWR, THE RV IS OVERLOADED. OPERATING YOUR RV WHILE EXCEEDING THE SPECIFIED WEIGHT RATINGS INCREASES THE RISK OF A CRASH, PERSONAL INJURY AND DEATH. IT IS NECESSARY TO REMOVE CARGO (EQUIPMENT, PERSONAL BELONGINGS, WATER, ETC.) UNTIL THE TOTAL WEIGHT OF THE RV NO LONGER EXCEEDS THE GVWR BEFORE OPERATING THE RV.**



**IF THE WEIGHT ON THE RV AXLES EXCEEDS THE GAWR, THE AXLES ARE OVERLOADED. OPERATING YOUR RV WHILE EXCEEDING THE SPECIFIED WEIGHT RATINGS INCREASES THE RISK OF A CRASH, PERSONAL INJURY AND DEATH. IT IS NECESSARY TO REMOVE OR REARRANGE CARGO (EQUIPMENT, PERSONAL BELONGINGS, WATER, ETC.) UNTIL THE AXLE WEIGHT NO LONGER EXCEEDS THE GAWR BEFORE OPERATING THE RV. NOT OPERATING YOUR RV WITHIN THE DESIGNED WEIGHT RATINGS CAN CAUSE DAMAGE TO YOUR RV WHICH IS NOT COVERED UNDER WARRANTY.**

## WEIGHT RATINGS AND DEFINITIONS

**GVWR (GROSS VEHICLE WEIGHT RATING)** The maximum permissible weight of this RV when fully loaded. It includes the maximum allowable weight at the RV axle(s) plus the hitch (tongue/pin) weight.

**UVW (UNLOADED VEHICLE WEIGHT)** The weight of this RV as manufactured at the factory. It includes all weight at the RV's axle(s) and hitch.

**CCC (CARGO CARRYING CAPACITY)**  
 - U.S. - Equal to GVWR minus the UVW and LP gas weight. (Water is considered a component of cargo).  
 - CANADA - Equal to GVWR minus the UVW, full fresh (potable) water weight (including the water heater) and full LP gas weight.

**GAWR (GROSS AXLE WEIGHT RATING)** The maximum permissible weight on an axle(s) when fully loaded.

**HITCH (TONGUE / PIN) WEIGHT**  
 The weight of the RV that is transferred to the hitch of the tow vehicle when hooked up.

## WEIGHT RATINGS - LABELS

There are three labels that use weight information. They are the Federal Certification Label, Tire and Loading Information label, and the Cargo Carrying Capacity label. Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.

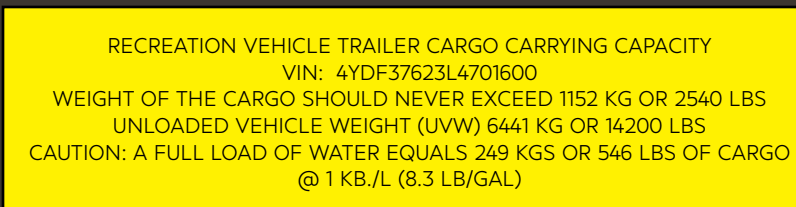
1 | Federal Certification Label - This label specifies maximum capacities for GVWR, GAWR and tires. It is located on the exterior left front of vehicle.



2 | Tire and Loading Information label - This label specifies the maximum amount of cargo that can be safely added to the RV. It is located on the exterior front left of vehicle.



3 | Cargo Carrying Capacity (CCC) label (US) - This label supplies the CCC information for the customer. It is located on the backside of the screen door or the door jamb of the main entry into the RV.



## WHEEL LUG NUT TORQUING

The lug nuts on your RV were torqued during the build process and were checked three more times prior to leaving the factory. Being sure wheel mounting nuts (lug nuts) on RV wheels are tight and properly torqued is an important responsibility that RV owners and users need to be familiar with and practice. Inadequate and/or inappropriate wheel nut torque (tightness) is a major reason that lug nuts loosen in service. Loose lug nuts can rapidly lead to a wheel separation with potentially serious safety consequences.

The information contained in these printed instructions outlines the most recently recommended processes involving Lug Nut Torque and takes precedent over any information regarding Lug Nut Torque shown in your Lippert or Dexter owner's manuals.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.



**ALWAYS TORQUE WHEEL NUTS TO THE WHEEL MANUFACTURER'S SPECIFICATIONS. OVER OR UNDER-TORQUED WHEEL NUTS COULD CAUSE THE WHEEL TO SEPARATE FROM THE WHEEL MOUNTING SURFACE DURING OPERATION, CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.**

The axle and wheel assemblies of your RV are designed differently than those on your car. A RV's overall size, weight, and center of gravity subject its wheels to pressures unique to RVing. During normal cornering, the tires and wheels experience a considerable amount of stress called "side-load". Therefore, the lug nuts on your RV require periodic torque maintenance.

Proper torque of lug nuts can only be achieved by using:

- Torque wrench (Dial indicator or Adjustable dial, not supplied by Keystone).
- 3/4", 13/16", or 7/8" socket (Not supplied by Keystone).



Some wheel assemblies require an extension. DO NOT USE a flexible extension. Also DO NOT USE a 4-way socket or any other type of wrench which does not measure the actual pressure applied to the lug nut.

## USING TORQUE WRENCHES

Most torque wrenches are required to be set at "0" when not in use to maintain calibration. Please refer to the manufacturer's instructions for further information on care and use.

### SETTING TORQUE VALUE ON A DIAL INDICATOR WRENCH

- 1 | Make sure your indicator needle is set to "0".
- 2 | As you apply clockwise pressure to the lug nut, both needles will show the current amount of torque being applied.
- 3 | When you reach your desired torque value, stop applying pressure and your indicator needle will stay at the highest torque value reached.

### SETTING TORQUE VALUE ON AN ADJUSTABLE DIAL WRENCH

- 1 | Unlock the handle and set the dial to your desired torque value.
- 2 | Lock the handle back in place.
- 3 | As you apply clockwise pressure to the lug nut, you will hear an audible "click" when the desired torque wrench value is reached. Do not apply further pressure after you hear the "click".

**"We only have so many Summers left with the kids. We have to make the most of them."**

**Claire & Gavin** | New Mexico

## PRE-TRIP MAINTENANCE

### ALWAYS REMEMBER

- Check lug nut torque before every trip. Keystone RV recommends this maintenance procedure to ensure proper torque has been applied to lug nuts before heading out on the road.
- Lug nuts should be torqued to 110-120 ft./lbs. (140-150 ft./lbs. on hubs using a 9/16" stud).
- Always follow the appropriate star pattern (See pg. 24) as indicated in these instructions or in your axle manufacturer's owner's manual to assure proper torque.
- Torque lug nuts in the correct stages and follow-up intervals after any wheel reinstallation.

### PRE-TRIP PROCEDURE

- 1 | Set your torque wrench to 110-120 ft./lbs. (140-150 ft./lbs. for 9/16" stud).
- 2 | Refer to the Wheel Nut Torque Sequence patterns on the next page. Position wheel as illustrated then, starting with the bolt labeled #1, apply torque to all lug nuts following the star pattern that match's your RV's wheels.
- 3 | Complete the procedure on each wheel. Before moving to each new wheel, be sure to verify your preset torque wrench value.



**ALWAYS TORQUE WHEEL NUTS TO THE WHEEL MANUFACTURER'S SPECIFICATIONS. OVER OR UNDER-TORQUED WHEEL NUTS COULD CAUSE THE WHEEL TO SEPARATE FROM THE WHEEL MOUNTING SURFACE DURING OPERATION, CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.**

## TIRE CHANGING BASICS

- 1 | Use emergency flares when near a road or highway.
- 2 | Block the wheels on the opposite side from the tire you wish to change to prevent accidental movement.
- 3 | Position a hydraulic jack on the frame close to the spring hanger. (Never attempt to use a stabilizer jack to lift the RV.)
- 4 | Raise the RV until the tire clears the ground.
- 5 | Set a jack stand under the frame just to the rear of the tire being changed.
- 6 | Follow the Wheel Nut Torque and Wheel Reinstallation instructions provided in this section.



## WHEEL REINSTALLATION

After removing a wheel from your RV for any reason, you must carefully follow a 2 step process:

- 1 | Wheel Reinstallation.
- 2 | Follow-up.

### STEP 1 | WHEEL REINSTALLATION

During wheel reinstallation, the lug nut torque must be applied in 3 stages. This will ensure the wheel studs are centered in the wheel holes, and will help the lug nuts maintain proper torque. Start all lug nuts by hand.

For each Stage refer to the Wheel Nut Torque Sequence patterns on this page. Position wheel as illustrated then, starting with the bolt labeled #1, apply torque to all lug nuts following the star pattern that match's your RV's wheels.

Stage 1: Set your torque wrench to 20-30 ft./lbs. (50-60 ft./lbs. for 9/16" stud).

Stage 2: Increase your torque wrench setting to 55-60 ft./lbs. (90-100 ft./lbs. for 9/16" stud).

Following stage 2, the wheel can support the weight of the RV and can be lowered off of the jack stand.

Stage 3: Increase your torque wrench setting to 110-120 ft./lbs. (140-150 ft./lbs. for 9/16" stud).

### STEP 2 | FOLLOW-UP: RETORQUE AFTER 10, 25, AND 50 MILES:

- 1 | After the first 10 miles of your trip, pull your RV off the road into a safe work area.
- 2 | Set your torque wrench to 110-120 ft./lbs. (140-150 ft./lbs. for 9/16" stud).
- 3 | Reapply torque (at 110-120 ft./lbs. or 140-150 ft./lbs. for 9/16" stud) and repeat steps 1-3 again after 25 miles and after 50 miles of your first trip.

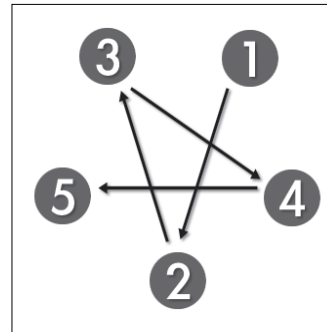
The follow up process is complete and you should refer to the general lug nut torque maintenance process described in "Pre-Trip Maintenance" on page 16.



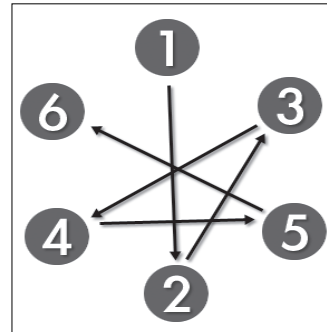
Some wheel assemblies require an extension. DO NOT USE a flexible extension. Also, DO NOT USE a 4-way socket or any other type of wrench which does not measure the actual pressure applied to the lug nut.

## WHEEL NUT TORQUE SEQUENCE

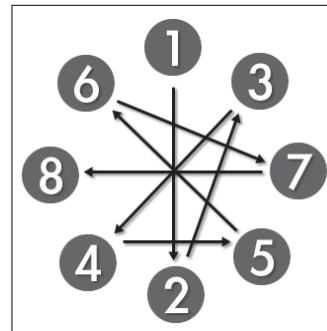
5 LUG



6 LUG



8 LUG



## WHEEL REINSTALLATION SUMMARY

### STEP 1 | WHEEL REINSTALLATION

1. 20-30 ft./lbs  
50-60 ft./lbs (9/16" stud)
2. 55-60 ft./lbs  
90-100 ft./lbs (9/16" stud)
3. 110-120 ft./lbs  
140-150 ft./lbs (9/16" stud)

### STEP 2 | FOLLOW-UP

3. 110-120 ft./lbs  
140-150 ft./lbs (9/16" stud)

**RE-TORQUE AFTER FIRST:  
10 MILES -> 25 MILES -> 50 MILES**



“Perfect set-up  
with an outside  
shower for  
cleaning fish or  
washing off before  
going inside.”

Andy | Colorado

## SUMMARY

- 1 | Check wheel nut torque before every trip.
- 2 | Use proper size torque wrench.
- 3 | Follow the appropriate star pattern sequence.
- 4 | Torque lug nuts in the correct stages.
- 5 | Follow-up intervals after any wheel reinstallation.



DO NOT TOW THE RV WITH MISSING OR DAMAGED AXLE STUDS OR AN INCREASED RISK OF WHEEL SEPARATION WILL OCCUR.

INSTALLATION OF WHEELS WHICH ARE NOT COMPATIBLE WITH THE MANUFACTURER INSTALLED AXLE ASSEMBLY COULD RESULT IN WHEEL SEPARATION, WHICH COULD LEAD TO PROPERTY DAMAGE, SERIOUS INJURIES OR LOSS OF LIFE.



# 0 TOWING 5 CONSIDERATIONS

## GETTING STARTED

### TOW VEHICLE SELECTION

We recommend your tow vehicle have a tow weight rating to handle at least the Gross Vehicle Weight Rating (GVWR) of the RV you have selected. Please consult with your tow vehicle's dealer for more information about the specific ratings of your tow vehicle.

### TOW VEHICLE DISCLAIMER

In connection with the use and operation of Keystone RVs, Keystone customers and owners of Keystone RVs are solely responsible for the selection and proper use of tow vehicles. All customers should consult with a motor vehicle manufacturer or dealer concerning the purchase and use of suitable tow vehicles for Keystone products. Keystone further disclaims any liability with respect to damages which may be incurred by a customer or owner of Keystone RVs as a result of the operation, use or misuse of a tow vehicle.

PLEASE NOTE: Keystone's limited warranties DO NOT cover damage to the RV or the tow vehicle as a result of the operation, use or misuse of the tow vehicle.



**DO NOT ALLOW PASSENGERS TO RIDE IN THE RV DURING TRAVEL. THE RV DOES NOT HAVE SEAT BELTS AND IS NOT DESIGNED TO CARRY PASSENGERS. THIS MAY ALSO BE PROHIBITED BY STATE LAW.**

### TOWING AND WEIGHT DISTRIBUTION

Weight distribution is an important factor when loading your fifth wheel and travel trailer. Properly distributing cargo will result in efficient, trouble free towing.

### TOW VEHICLE SET UP

#### WEIGHT DISTRIBUTION

Proper weight and load distribution is absolutely essential for safe towing. Before your first trip, load your RV with the weight distributed evenly (front to rear, side to side) with all personal belongings, equipment, food, water, etc. you feel are needed and weigh the RV as shown on page 20, "Weighing Your RV". Compare the weights of the RV to the weight ratings of the RV. Keep the loaded tongue weight between 10% and 15% of the total weight for travel trailers and between 15% and 25% of total weight for fifth wheels. More detailed information for Ramp RVs can be found under the headings "Ramp RV Weight Distribution" on page 78, and "Cargo Placement" and "Cargo Area Load Ratings" on pg. 79.

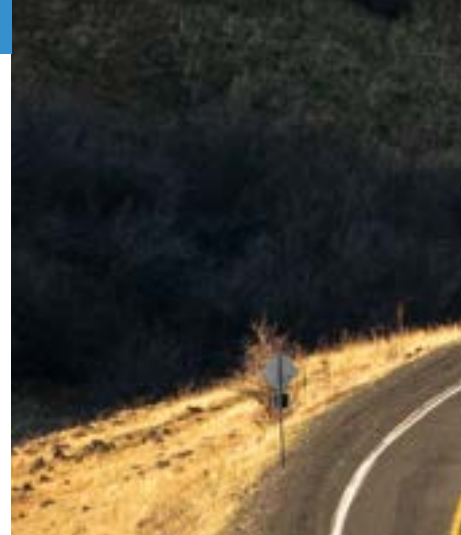


**LOCATE AND SECURE CARGO AND VEHICLES TO MAINTAIN SAFE WEIGHT DISTRIBUTION IN THE CARGO AREA AND THROUGHOUT THE RV.**

**IMPROPER WEIGHT DISTRIBUTION OR OVERLOADING COULD LEAD TO LOSS OF VEHICLE CONTROL DURING TRAVEL RESULTING IN SERIOUS INJURY OR DEATH.**

**THE ROOF SHOULD BE FREE OF SNOW PRIOR TO TRANSPORTING THE RV.**

**FOLLOW ALL GUIDELINES CONTAINED IN THIS MANUAL FOR LOADING AND WEIGHING PROCEDURES. MAINTAIN THE LOADED HITCH WEIGHT WITHIN THE PERCENT LEVELS STATED. WHERE APPLICABLE, A HITCH WITH BUILT IN SWAY CONTROL IS RECOMMENDED. DO NOT EXCEED THE GVWR (GROSS VEHICLE WEIGHT RATING) OR THE GAWR (GROSS AXLE WEIGHT RATING) OF EITHER THE RV OR TOW VEHICLE.**





# "Marking off the Bucket List- ALL 50 States."

Mark & Jennifer | California

## BRAKE CONTROL

A brake control is a device that is installed in the tow vehicle that activates the electric RV brakes. Your RV brakes should work in synchronization with your tow vehicle brakes. Never use your vehicle or RV's brakes alone to stop the combined load. Your brake controller must be set up according to the brake control manufacturer's specifications to ensure proper synchronization between the tow vehicle and the RV. Additionally, you may have to, occasionally, make minor adjustments to accommodate changing loads and driving conditions.

## HITCH SELECTION

The hitch must be rated over the GVWR and the hitch weight of the RV. Weight specifications can be found at [www.keystonerv.com](http://www.keystonerv.com). Keystone RV does not supply the tow vehicle hitch, weight distribution bars or the sway control; however, your RV dealer will be able to help with proper hitch selection for your tow vehicle.

## SAFETY CHAINS - TRAVEL TRAILERS

Safety chains are included with every travel trailer and, in most states, are required when towing a travel trailer. Hook them to the safety chain loops provided on the tow vehicle's hitch, crossing them under the trailer tongue. Inspect the length of the chains once attached to the tow vehicle frame. They should be long enough to allow for turns, but short enough to avoid any drag.



**ALWAYS USE SAFETY CHAINS WHEN TOWING. THEY MAINTAIN THE CONNECTION BETWEEN THE TRAVEL TRAILER AND TOW VEHICLE IN THE EVENT OF THE TRAILER BECOMING DETACHED DURING TRAVEL.**

## BREAKAWAY SWITCH

The breakaway switch is another safety device as it provides a means of automatically slowing and stopping your RV should it become detached from the tow vehicle during transit. The cable from the breakaway switch should be attached to the tow vehicle and if a separation occurs, the pin is pulled out of the switch which activates the brakes of the RV to slow and eventually stop the RV. The breakaway switch is only powered by a 12 volt RV battery on the RV. The RV battery is not supplied by Keystone. Please consult your RV dealer to purchase the proper battery.

## HOW TO TEST THE BREAKAWAY SWITCH

- 1 | Disconnect the 7-way cord from the RV to the tow vehicle. Failure to do so may cause an error message or damage to the brake controller.
- 2 | Pull the lanyard pin out.
- 3 | Brakes should audibly engage.
- 4 | Double check by moving the tow vehicle forward slightly to be sure the RV brakes have engaged and are operating correctly.
- 5 | Reinsert the lanyard pin to deactivate the breakaway switch.



**NEVER USE THE BREAKAWAY SWITCH FOR PARKING, OR REMOVE THE PIN FROM THE SWITCH. THIS WILL APPLY THE RV BRAKES AND RUN DOWN THE TRAILER BATTERIES, AND POSSIBLY DAMAGE THE SWITCH CONTACTS AND BRAKE SHOE MAGNETS. WHEN DISCONNECTING THE RV FROM THE TOW VEHICLE, REMOVE THE LANYARD FROM THE TOW VEHICLE.**

## NOTICE

Disconnect the 7-way cord from the tow vehicle prior to testing the breakaway switch. Failure to do so may cause an error message or damage to the brake controller.

## LIGHTS

Check all electrical connections to ensure all exterior lights on the tow vehicle and RV are functioning properly. The brake lights, hazards and turn signals should be in synchronization with the tow vehicle. See "7-way Trailer Plug" on page 60.

## MIRRORS

Adjust the mirrors on the tow vehicle prior to departure. First, line up the tow vehicle and RV. Then, sitting in the driver's seat and adjust the left mirror until you can see the entire left side of the RV and beyond. Adjust the right mirror until the same result is achieved. If you have manual side mirrors, have someone in the passenger seat adjust the right mirror until you can see down the right side of the RV and beyond. Some vehicles may require the use of mirror extensions to properly see down the side of the RV. See your Keystone dealer for recommendations.

## TOWING

Towing a RV can be enjoyable when special attention toward safety is applied every time you tow your RV. Before heading out on your first camping trip practice turning, stopping, and backing in low traffic areas or large parking lots.

Driving with a RV in tow is different. Start out slowly, checking the traffic after signaling and being sure the road is clear. Accelerate slowly and evenly, checking the mirrors frequently as you move into the proper lane. Try to drive with an anticipation for problems that may occur way ahead and prepare for them even if they may never happen.

As a motorist sharing the road, you are taller, heavier, longer, and require more time and distance to stop. Weather and road conditions will require adjustments to speed. Anticipate dips, gutters, and depressions in the road, slowing down well in advance. These are the hardest jolts of any kind on your vehicle, hitch, RV and items stored inside the RV. Take dips and bumps slowly and be certain the RV wheels have passed the obstacle before accelerating.

## WEIGHT DISTRIBUTION BARS - TRAVEL TRAILER

Weight distribution bars transfer weight from the rear axle of the tow vehicle to the front axle and the trailer axles. Properly set up, they will control up and down oscillation at the hitch while towing. Weight distribution bars do not control sway. Keystone recommends weight distribution bars for safe towing. Your dealer will be able to assist with proper selection for your specific tow vehicle and travel trailer setup.

## CONTROLLING SWAY OR FISHTAILING

Sway or fishtailing is the sideways action of a trailer caused by external forces. It is common for travel trailers to sway in response to strong winds or crosswinds or when passed by or passing a semi-tractor and trailer or driving downhill.

Sway or fishtailing of your RV can be controlled and is primarily impacted by four factors:

- 1 | Equipment.
- 2 | Tongue weight.
- 3 | Driving.
- 4 | Corrective measures.

## SWAY CONTROLS - TRAVEL TRAILER

A sway control hitch is installed by dealers as part of the hitch set up and helps prevent sway (or fishtailing) while towing. Keystone recommends a sway control device that will prevent sway (or fishtailing) for safe towing. If you experience sway while towing, contact your dealer immediately for corrective action. Some less expensive brands of sway control are not adequate to control sway in larger travel trailers. The sway control must be properly set up for it to be effective. Your dealer will be able to assist with proper selection based on cost for your specific tow vehicle and travel trailer setup.

## **⚠️ WARNING**

**EXCESSIVE SWAY OR FISHTAILING OF YOUR RV COULD LEAD TO THE ROLLOVER OF THE TRAILER AND TOW VEHICLE. SERIOUS INJURY OR DEATH COULD OCCUR. IT IS IMPORTANT THAT YOU READ AND UNDERSTAND THE INFORMATION IN THIS SECTION.**

**Equipment** – When hitched together, the RV and the tow vehicle must be level. The tires of both the RV and tow vehicle should be in good condition and inflated to the pressure recommended as noted on the tire labels of the RV and tow vehicle. See "Hitch Selection", "Weight Distribution Bars", and "Sway Controls" in this chapter for more information on equipment to control sway.

**Tongue Weight** - See "Weight Distribution" in this chapter for information on maintaining proper tongue weight.

**Driving** – This is the most important component. The tendency for the vehicle to sway increases with speed; therefore, obey all speed limits and reduce speed during inclement weather or windy conditions.

**Corrective Measures** – If sway occurs, the following techniques should be used:

1 | Slow down immediately; remove your foot from the accelerator. Avoid using the tow vehicle brakes unless there is a danger of collision. Reduce speed gradually whenever possible. If you can do so safely, use the brake hand controller (independent of the tow vehicle brakes) to gently and progressively apply the trailer brakes. This will help to keep the vehicles aligned. Location of the brake hand controller is important and should be made easily accessible. Practice using the brake hand controller in a deserted parking lot. Don't wait until an emergency occurs before using it.

2 | Steer as little as possible while maintaining control of the vehicle. Because of natural reaction lag time, quick steering movements to counter trailer sway will actually cause increased sway and loss of control. Keep both hands on the wheel. Hold the wheel as straight as possible until stability is regained.

3 | Do NOT jam on the brakes or attempt to press on the accelerator to speed your way out of fishtailing. Both actions make the situation worse and could cause severe injury or death.

4 | Once the swaying is under control, stop as soon as possible. Check tire pressures, cargo weight distribution and look for any signs of mechanical failure. Travel at reduced speeds that permit full control until the problem can be identified and corrected.

## **BACKING**

Back with care. Having a person outside to assist is a good idea. If no one is available to help, the driver should inspect the area behind the vehicle to avoid any unseen obstacles and unpleasant surprises. Many campsites offer "pull through" sites that require no backing. When you do not have this option and backing will be required, set yourself up to back into the site from the left. This allows you to see the entire "Drivers Side" while you are backing into your site.

## **BRAKING**

Start braking sooner than you would if driving without a RV in tow. Stopping distances are increased while towing RVs. See "Brake Control" in this chapter.

## **PASSING AND ACCELERATING**

Remember if you pass another vehicle, that it takes longer to accelerate and additional time must be allowed due to the added length of the RV. Passing should be done on level terrain and downshift, if necessary for added acceleration. Whenever deciding to pass another vehicle, exercise caution and always use your turn signals.

## **SHARPLY WINDING AND NARROW ROADS**

Keep well to the center of the lane, equally away from both the center line and pavement edge. This allows the RV to clear the edge of the pavement without the likelihood of the wheels dropping onto the shoulder, causing potential dangerous sway. Do not crowd or cross the center line.

# "Looking forward to making fun memories!"

Kim | Arkansas



## STEEP OR LONG GRADES

Down shifting into a lower gear or range in advance assists braking on descents and adds power on the climb. Avoid situations that require excessive and prolonged use of the brakes. Apply and release brakes at short intervals to give them a chance to cool.

## SLIPPERY PAVEMENT

On slippery and icy pavement, reduce speed and drive slowly. Hydroplaning can occur with little water on the pavement. If skidding begins, remove your foot from the throttle and gently apply the RV brakes only.

## DRIVING IN WINDY CONDITIONS

Wind can create hazardous conditions when towing a RV. Wind can cause your RV to oscillate or suddenly pull to one side. Thirty mile per hour crosswinds can blow you off the road if there is a sudden gust. For example, say a hard gust of wind hits your RV from the left. Your RV pitches to the right and moves towards the right. In order to stay on the road, you steer to the left. With the RV leaning to the right, the centrifugal force generated by steering left can be the added ingredient that puts you on your side, or worse yet, down the side of a ravine. The only way to lower the risk of traveling in these conditions is to slow down. The safest way is not to drive in extremely windy conditions. Park until it is safe to continue.

## FREEWAYS AND HIGHWAYS

Try to pick the lane you want and stay in it, preferably keeping to the slower lane on the right.

## TURNING CORNERS

Here is where you find the first basic difference when you're towing. The RV wheels do not follow the path of your tow vehicle's wheels. The RV will make a closer turn than the tow vehicle. Compensate by pulling further into the intersection so that the RV will clear the curb or clear any parked vehicles along the road. Left turns require a wider than normal swing into the new lane of traffic to keep the RV from edging into the opposing lane. Use the turn signals early to communicate to traffic behind and slow down well in advance.

## MUD AND SAND

Let the momentum of the tow vehicle and RV carry you through. Apply power gently and stay in the tracks of the previous vehicle. If stuck, tow out the RV and tow vehicle together without unhitching.

Additional towing safety information can be found at the National Highway Traffic Safety Administration's web site <https://icsw.nhtsa.gov/cars/problems/equipment/towing/index.htm>.

## TOWING BEHIND YOUR RV



THE HITCH RECEIVER INSTALLED ON YOUR RV IS A WEIGHT CARRYING HITCH ONLY. DO NOT USE WEIGHT DISTRIBUTION BARS OR EQUIPMENT WHEN TOWING. USING WEIGHT DISTRIBUTION BARS OR EQUIPMENT WITH THE HITCH RECEIVER COULD RESULT IN DAMAGE TO THE RV OR ADD ON ITEMS THAT ARE NOT COVERED BY KEYSTONE'S LIMITED WARRANTIES AND COULD LEAD TO ADVERSE TRAILER COMBINATION TOWING AND HANDLING, LOSS OF CONTROL OR AN ACCIDENT RESULTING IN DEATH OR SERIOUS INJURY.



If you do not have a Keystone factory installed hitch receiver, do not tow anything behind your RV. The RV frame and bumper are not designed for towing.

A hitch equipped for trailer towing will have tabs to hang the safety chains and there will be a bracket for the trailer wiring plug. There should also be a label on the hitch stating maximum towing capacity.



## ADDITIONAL TOWING - MULTIPLE TRAILER COMBINATIONS (IF SO EQUIPPED)

If your RV (applies to limited fifth wheel models only) is equipped with a factory installed hitch receiver, you have the ability to tow an additional trailer behind your RV.

The hitch receiver may be used as a weight carrying hitch to tow a trailer. Do not use a bar longer than 10 inches (254 mm). The maximum length of the draw bar is from the center of the fastening pin to the center of the ball. The maximum trailer tow rating of the fifth wheel hitch is 3,000 Lbs. (1361 kg.) with a maximum tongue weight of 300 Lbs. (136 kg.).

The receiver may also be used for attaching a cargo basket/carrier for other items. Ensure the cargo carrier is properly attached to the hitch receiver and all cargo is properly secured in place. The cargo weight carrying capacity includes the weight of the cargo carrier. The maximum total weight when used to carry cargo is 300 Lbs. (136 kg.).

Be sure the trailer being towed by your RV is properly equipped with brakes. Contact your tow vehicle dealer or manufacturer for assistance in determining whether a separate braking system is recommended and what limits there are for towing multiple trailer combinations. Check the state or province where your tow vehicle and RV are registered as well as any state or province where travel is planned in the U.S. and/or Canada for brake requirements, overall length restrictions, or other regulations.

These labels have been placed on the hitch receiver and on the rear bumper of your RV. Be sure to read, understand, and follow the information on them.

### ⚠ WARNING

Do not exceed the ratings (GCWR) of either the tow vehicle or trailer manufacturer. Exceeding the rating(s) of the manufacturer(s) may result in adverse trailer combination towing and handling that could lead to loss of control or an accident resulting in death or serious injury. Do not cut, drill, weld or modify the hitch receiver and/or its associated equipment, structure or brackets. Cutting, drilling, welding or any modification to the hitch receiver and equipment will void warranty and may cause damage that could lead to adverse trailer combination towing and handling, loss of control or an accident resulting in death or serious injury.

### ⚠ AVERTISSEMENT

Ne pas dépasser le poids technique maximal combiné (PNBC) recommandé par le fabricant du véhicule de remorquage ou de la remorque. Le dépassement du PNBC recommandé par ces fabricants peut présenter un risque lors du remorquage ou de la manipulation et ainsi provoquer une perte de contrôle ou un accident causant des blessures sévères, voire la mort.

En aucun cas il ne faut couper, percer, souder ni modifier le récepteur d'attelage et/ou l'équipement associé, structure ou supports. Le découpage, le perçage, le soudage ou la modification du récepteur d'attelage et de son équipement aura pour effet d'annuler la garantie et peut présenter un risque lors du remorquage ou de la manipulation et ainsi provoquer une perte de contrôle ou un accident causant des blessures sévères, voire la mort.

12228

HITCH TYPE TYPE D'ATTELAGE	MAXIMUM GROSS TRAILER WEIGHT LBS./ (KG) PODS BRUT MAX. DE LA REMORQUE LB (KG)	MAXIMUM TONGUE WEIGHT LBS./ (KG) DE POIDS MAXIMUM DE LANGUE LBS / (KG)	
WEIGHT CARRYING BOAT/WATERCRAFT ONLY SANS REPARTITION DE CHARGE BATEAU/EMBARCATION SEULEMENT	3,000 (1361)	300 (136)	
ACCESSORY / ACCESSOIRE	N/A	300 (136)	

### NOTICE

Check the regulations in the state or province where your tow vehicle and RV trailer are registered as well as regulations in any state or province where travel is planned in the U.S. and/or Canada before towing multiple trailer combinations.

### AVIS

Vérifiez les règlements en vigueur dans l'état ou la province où votre véhicule de remorquage et votre véhicule tracté (caravane, remorque) sont enregistrés, de même que les règlements des États ou provinces où vous prévoyez voyager aux États-Unis et/ou au Canada avant de remorquer plusieurs véhicules tractés (p.ex. caravane + remorque pour bateau, etc.).

### ⚠ WARNING

Your tow vehicle and RV trailer are rated for braking operation at GVWR NOT GCWR. The braking capacity of your tow vehicle/RV trailer combination is NOT necessarily as great as the towing capacity. Separate braking systems must be used for control of multiple towed trailer combinations.

Check the state or province where your tow vehicle and RV trailer are registered as well as any state or province where travel is planned in the U.S. and/or Canada and follow all brake requirements and regulations before towing multiple trailer combinations. Consult your tow vehicle dealer or manufacturer for assistance in determining whether a separate braking system is recommended and what limitations there are for towing multiple trailer combinations.

Towing multiple trailer combinations without proper brakes on each applicable trailer may result in adverse trailer combination towing and handling that could lead to loss of control or an accident resulting in death or serious injury.

### ⚠ AVERTISSEMENT

Votre véhicule de remorquage et votre véhicule tracté (caravane, remorque) sont homologués en fonction d'un freinage basé sur le poids nominal brut du véhicule (PNBV) et non sur le poids nominal brut combiné (PNBC). La capacité de freinage de votre combinaison « véhicule de remorquage-véhicule(s) tracté(s) » n'est PAS nécessairement aussi élevée que la capacité de remorquage. Des systèmes de freinage séparés doivent être utilisés pour contrôler des combinaisons de remorquage.

Vérifiez l'état ou la province où votre véhicule de remorquage et votre véhicule tracté sont enregistrés de même que les règlements de États ou provinces où vous prévoyez voyager aux États-Unis et/ou au Canada et observez tous les règlements relatifs au freinage avant de remorquer une combinaison de véhicules tractés (p.ex. caravane + remorque, etc.).

Consultez le concessionnaire ou le fabricant du véhicule de remorquage afin de savoir si un système de freinage séparé est recommandé et si des limites doivent être respectées dans le cas d'un remorquage d'une combinaison de véhicules tractés.

Le remorquage d'une combinaison de véhicules tractés sans système de freinage approprié peut présenter un risque lors du remorquage ou de la manipulation et ainsi provoquer une perte de contrôle ou un accident causant des blessures sévères, voire la mort.

12229

## **KNOW YOUR RV BEFORE HEADING OUT**

Throughout the manufacturing process, your RV has been inspected by qualified inspectors and then again at the dealership. As the owner, however, you will be the first to camp and extensively use every system. Keystone RV wants the first camping experience to be a happy one and recommends a "trial camping experience" before heading out. Plan a weekend in the yard or driveway and really camp in your RV.

By camping for several days, full-time in your RV, you will have the opportunity to use and become accustomed to the systems within your RV and find out what items are needed or not needed while camping. Note any questions that arise, difficulties encountered, or problems that occur. After your trial, call your dealer and ask any questions that have arisen. Getting to know your RV before the first adventure can save frustration and leave more time for fun!

## **HOOK UP TO THE TOW VEHICLE**

### **FIFTH WHEEL**

- 1 | Place wheel chocks behind the tires and raise stabilizer/leveling jacks.
- 2 | Adjust the landing gear jacks until coach is at level for hooking to the tow vehicle.
- 3 | Lower the tailgate on truck.
- 4 | Release the fifth wheel lock handle on the tow vehicle.
- 5 | Back up slowly to line up the tow vehicle so the fifth wheel is within 12" to 15" of accepting kingpin.
- 6 | Close and latch tailgate.
- 7 | Back truck slowly until kingpin engages the fifth wheel and automatically locks.
- 8 | Engage the hitch lock and secure with a padlock or pin.
- 9 | Connect the power cord between the tow vehicle and the fifth wheel.
- 10 | Connect the breakaway switch cable to the tow vehicle. Make sure the breakaway switch pin has not been pulled out of the housing. If the pin has been pulled out, reinstall by fully inserting the pin back into the breakaway housing. See page 27, "Breakaway Switch".
- 11 | Check all lights on trailer and tow vehicle (running, turn signals, brake, back-up) for proper operation.
- 12 | Completely raise the landing gear and stabilizer jacks and store the wheel chocks.
- 13 | Pull forward and check the operation of the trailer brakes with the hand control to assure proper operation. Refer to the manufacturer's specifications on setting the brake control.

### **TRAVEL TRAILER**

- 1 | Place wheel chocks behind the tires and raise stabilizer/leveling jacks.
- 2 | Crank the tongue of the trailer jack up until the hitch coupler is high enough to clear the tow vehicle hitch ball.
- 3 | Back the tow vehicle to the trailer until the hitch ball is directly under the coupler.
- 4 | Set the parking brakes, raise the locking latch on the coupler and lower it down on the ball with the tongue jack.
- 5 | Engage the locking latch to lock it on the ball. Secure with a padlock or pin.
- 6 | Connect the power cord between the tow vehicle and the trailer.
- 7 | Connect the breakaway switch cable to the tow vehicle. Make sure the breakaway switch pin has not been pulled out of the housing. If the pin has been pulled out, reinstall by fully inserting back into the breakaway housing. See page. 27 "Breakaway Switch".
- 8 | Install the weight distribution bars and sway control. Refer to the hitch manufacturer's directions for proper hook up and adjustment.
- 9 | Crank the tongue jack all the way up and store wheel chocks.
- 10 | Check all lights on the trailer and tow vehicle (running, turn signals, brakes, back-up) for proper operation.
- 11 | Pull forward and check the operation of the trailer brakes with the hand control to assure proper operation. Refer to the manufacturer's specifications on setting the brake control.



## SECOND TRAILER HITCHING PROCEDURE

The following procedure will help to assist you in securely hooking up the second trailer to your RV.

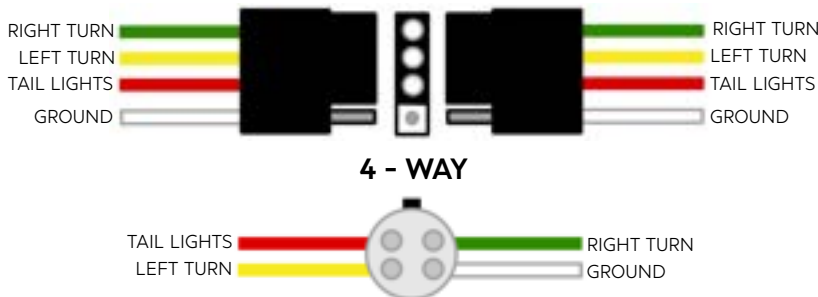
- 1 | Make sure the (second) trailer wheels are blocked.
- 2 | Turn the tongue jack crank to raise the trailer tongue above the hitch ball.
- 3 | Open the coupler latch on the trailer hitch.
- 4 | Back the tow vehicle/fifth wheel combination into the proper position.
- 5 | Turn the (second) trailer tongue jack crank to lower the coupler onto the hitch ball.
- 6 | Close the coupler latch after it is completely seated. Secure with a padlock or pin.
- 7 | Remove the dolly wheel or platform (if so equipped) and retract the tongue jack to its maximum height.
- 8 | Attach the breakaway cable to the hitch receiver on the RV fifth wheel.
- 9 | Attach the safety chains. See "Safety Chains" on page 27 for additional information.
- 10 | Plug in the wire harness/connector.
- 11 | Walk around the RV and the second trailer making sure all exterior lights are working correctly.
- 12 | Remove the trailer wheel blocks.

## WIRE HARNESS/CONNECTOR PLUG

If equipped, a 4-way wire harness/connector plug is wired into your RV to connect electrical power from the RV to the second trailer for travel. This supplies power to the tail lights, clearance lights, turn signals, brake lights, etc. The 4-way wire harness/connector is not wired for operating electric brakes.

The connector plug may corrode with extended use and should be cleaned periodically to insure good electrical contact. Make sure the connector plug is kept clean and protected from road elements as you travel.

### BRAKE LIGHTS ARE COMBINED WITH TURN INDICATORS



"Tows like a dream, very easy to setup and level."

Bevan | New Jersey



## PRE-TRAVEL CHECKLIST

Now that the unit is properly hooked to your tow vehicle, please use the following Pre-Travel checklists to verify the rest of the unit is safe for travel.

### EXTERIOR

- Close the valves on the LP bottles.
- Empty the gray/black holding tanks.
- Inspect the awning(s) and ensure that they are properly retracted and secured for travel.
- Inspect all exterior baggage doors and hatches ensuring they are locked.
- Inspect the tires and check the pressures. Refer to Chapter 4.
- Check the wheel nut torque. Refer to Chapter 4.
- Position the battery disconnect to the on position.
- Ensure the steps are retracted.
- Remove all snow from the roof.
- Disconnect all park connections and securely store.

### INTERIOR

- Close all vents and windows.
- Place the television antenna in the "down" position.
- Retract the slide-outs.
- Inspect the interior of the RV ensuring that all cabinet, interior, and the shower doors are closed and secured.
- Secure all loose items in storage compartments.
- Ensure that the refrigerator door is closed and latched.
- Verify that all safety devices such as smoke, carbon monoxide and LP detectors are in working condition.
- Verify that the fire extinguisher is in good working condition.
- Engage the deadbolt on entrance door for transport.



# 0 CAMPER 6 SET-UP AT DESTINATION

## SITE REQUIREMENTS AND SELECTION

### ELECTRICAL

Do you need 30 or 50 amp service? What will you be running in the camper will help decide this. If you will be running one roof A/C, refrigerator and converter most of the time and the microwave periodically, we would recommend at least 30 amp service. You may not be able to run the microwave and roof A/C at the same time, but it is easy to adjust the thermostat of the roof A/C so it is off while the microwave is running. Two roof A/Cs will need 50 amp service. Please refer to page 58 for an amperage consumption chart which will help decide your needs. See video at [www.keystonerv.com](http://www.keystonerv.com).

### ANTENNA/SATELLITE

If equipped, be sure your selected site will allow you to set-up to get these signals.

### SEWER

Holding tank sizes can vary significantly by brand and floor plan. How large are your holding tanks? How long and how many people will be using the facilities? How much water is typically used? Answering these questions will help you decide if you should go for the added cost of a sewer hook up at your campsite. You might just consider a site closer to the campground facilities. If you do choose a site with a sewer hook up, DO NOT leave the valves open. Please refer to Chapter 10 Plumbing Systems for more detail.

### WATER

In most instances, water and electric come in combination. Should you be without a water source for city water, you can fill your water tank and utilize the on board water pump. Once again, holding tank sizes can vary significantly by brand and floor plan so know how many gallons your fresh water tank is and monitor how many people are using the facilities and how often so you don't leave yourself dry.

### CAMPSITE

Many campsites offer "pull through" sites that require no backing. When you do not have this option and backing will be required, set yourself up to back into the site from the left. This allows you to see the entire "Drivers Side" while you are backing into your site. Backing in from the right can be done, you are just not able to see as well. Before beginning, safely park and survey the campsite for fire pits, stumps, posts, trees, low tree branches, etc. and decide where you want the camper to end up. Use a spotter to help guide you into position. If you are alone, ask a neighbor for some help, you might meet a new friend.



While entering and exiting your campsite, be careful not to cut your turn short and clip something. Once again, we recommend a spotter to assist.

## CAMPER SET UP

Once you have arrived and parked in your campsite, before removing the camper from your tow vehicle, your camper needs to be leveled to assure the proper operation of certain features (refrigerator, slide-outs, etc.)

## LEVELING PROCEDURES

1 | Choose a site that is as level as possible (some sites are equipped with a prepared surface such as concrete or asphalt). Ensure the ground is not soft and will support the weight of jacks and/or other support devices.

2 | Before uncoupling, level the RV from side to side with suitable lengths of 2" x 6" wood blocks under the tires. Place the wood blocks on the ground forward of the wheels and tow the RV onto the blocks. Use wheel chocks to be sure the RV cannot roll.

3 | Use a small level on the refrigerator, a counter top, or the floor of the RV to make sure it is level.

4 | Lower the A-frame jack (Travel Trailers) or landing jacks (Fifth Wheel) onto wood blocks (or other).

5 | Once the RV is level, put wheel chocks or blocks in place so the RV can't move, uncouple the RV from the tow vehicle.

6 | If equipped, lower the stabilizing jacks onto blocks until they firmly engage. Be sure all 4 jacks have about the same pressure on them as to not put the RV in a twist. Doing so can cause slide-outs, doors, etc. to bind and/or operate intermittently. DO NOT attempt to lift the RV with the stabilizer jacks. These are not designed to bear weight, only help stabilize the RV from movement.

7 | Before resuming travel, be sure the stabilizer jacks are fully retracted.

### NOTICE

DO NOT overextend or retract the A-frame or landing jacks as that could cause damage which would not be warrantable.

## STABILIZING JACKS

Dependent upon the type (travel trailer/fifth wheel), product and model purchased, the stabilizer jacks included will vary. Although stabilizer jacks come in different types and sizes, all perform the same function: To stabilize the front and rear of all RVs while parked for camping. DO NOT attempt to lift the RV with the stabilizer jacks. These are not designed to bear weight, only help stabilize the RV from movement. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com), [www.davecarter.com](http://www.davecarter.com), [www.domarproducts.com](http://www.domarproducts.com), [www.nationalsales.us](http://www.nationalsales.us), [www.norcoind.com](http://www.norcoind.com).

## HOOK-UPS

1 | Once the RV is safely leveled and stabilized, continue with set-up.

2 | Connect the shoreline cord to an external 120 volt 30-50 amp (depending on model) rated AC service.

3 | Open the step.

4 | Inside, set the thermostat to the desired temperature (air conditioning/furnace), open a roof vent and turn on the fan (if applicable) to create air exchange, turn on the refrigerator, then complete the remainder of the set up.

5 | Turn on the LP.

6 | Connect the water hose.

7 | Connect the sewer hose, park cable (if applicable).

8 | Open slide-outs.

9 | Set up the remaining features as needed.

## COLD WEATHER CAMPING

Some RVs are equipped with additional features to enhance your ability to camp in cold weather. Depending on your specific want/needs, it may be necessary for you to take additional actions or invest in additional enhancements to suit your particular needs. Consult your local Keystone dealer for more information regarding after market equipment that may be available to adapt a model to your needs. The cost of these enhancements would not be warrantable.

# 07 APPLIANCES AND EQUIPMENT



In this section of the manual, we rely on the component manufacturer's manuals supplied with the RV for detailed operating instructions. Keystone can only provide a summary operational description and recommend you review each of the component manuals before use of the component.



Some appliances and features of the RV do not come with instructions or warning labels. For example, a dinette table that folds down into a bed may not have a written manual. If you need assistance with an appliance or feature please contact your selling dealer or call Owner Relations at 866.425.4369.



**Operating Appliances at High Altitude:**  
All gas appliances experience lowered efficiency (or rating) at high altitude. This is a direct result of lower atmospheric pressure and oxygen levels, and is not a defect of appliance. See component manual for each appliance.

## PROPANE APPLIANCE MAINTENANCE

Follow the instructions and warnings noted in the appliance and equipment owner's manual as well as the ones listed below:

- Annual maintenance should be conducted on the propane appliances and equipment by an authorized dealer or repair facility.
- Insects can build nests in the burners of the various appliances and equipment. The burner and burner orifice of the propane appliances and equipment should be cleaned out by an authorized dealer or repair facility anytime circumstances or conditions warrant, but no less frequently than on an annual basis.

## SAFETY

Always follow the manufacturer's instructions on the use of all appliances and observe all safety warnings and instructions included.

Before camping, all campers should review and understand the locations of all safety equipment inside the coach and all emergency exit windows and doors. An escape plan for emergencies, whether at home or camping, is always a good idea.

## AIR CONDITIONER (OPTIONAL)

Those RVs equipped with roof mounted or sidewall/window air conditioners, operate on 120 volt A/C power. There are different sizes and variations available depending on the RV. An air conditioner takes a sizable amount of power to run. (See page 58). It may be necessary to reduce other loads when using air conditioning to reduce the chance of overload and possibly tripping the main breaker. (For thermostat operation on the air conditioner, see "Thermostat" on the next page). In climates that experience high temperatures, a second air conditioner may be necessary to maintain a comfortable indoor temperature on larger RVs. A second air conditioner requires 50 amp service. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or

[www.dometicus.com](http://www.dometicus.com), [www.mwss-inc.com](http://www.mwss-inc.com), <https://www.geappliances.com/ge/service-and-support/>, [www.rvcomfort.com](http://www.rvcomfort.com), [www.furrion.com](http://www.furrion.com).

## CAPABILITY VS. ENVIRONMENT

At best, a properly functioning roof air conditioner will cool the intake air it receives by 20 degrees Fahrenheit. The capability of the air conditioner to maintain the desired inside temperature is directly affected by the heat gain of the RV. During extreme high outdoor temperatures, the heat gain of the vehicle may be reduced by:

- 1 | Parking in a shaded area.
- 2 | Keeping blinds down or drapes shut.
- 3 | Operation on High Fan/Cooling mode will provide the maximum efficiency in high humidity or high temperatures.
- 4 | Using awnings to block direct sunlight exposure on the RV.
- 5 | Avoiding use of heat producing appliances.
- 6 | Giving the A/C a "head start" by turning the air conditioner on early in the morning.



Never run the A/C without the filter. This could plug the RV evaporator and substantially impact performance.

## FURNACE

**⚠ DANGER** **⚠ WARNING** (SEE PAGE 50)

The furnace is a propane gas appliance that requires 12 volt power to electronically light. New furnaces sometimes emit smoke and an odor during the first 5-10 minutes of initial use due to paint burning off the heating chamber. Do not mistake this for a malfunctioning furnace. Follow the suggestions in Chapter 3 regarding maintaining Indoor Air Quality if this occurs. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicusa.com](http://www.dometicusa.com) or [www.rvcomfort.com](http://www.rvcomfort.com).

## FLOORPLAN AND LOCATION OF FURNACE

If the furnace is located towards one end of the unit, the other end will not be as warm. Keystone makes no claim the vehicle will be the same temperature throughout the unit. When temperatures drop below freezing, it's time to pack up and end the season. Suggestions to maintain a more comfortable heat:

- 1 | Keep all entry doors closed.
- 2 | Keep the interior doors open. The door to the garage also needs to remain open if using as a bedroom.
- 3 | During the day open blinds to allow the sun to assist in warming the RV.
- 4 | Run the A/C fan to help push the naturally rising warm air down and distribute throughout the RV.
- 5 | Refill empty Propane tank(s) promptly. Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.

## THERMOSTAT - WALL-MOUNTED

If equipped, a wall mounted thermostat can be for furnace only or a combination air conditioner/furnace thermostat. Please refer to the manufacturer's instructions supplied with the RV for care and operation.

## DUAL-ZONE THERMOSTAT

If equipped, the main A/C and furnace are typically programmed to regulate the temperature in Zone 1 and the 2nd roof air conditioner to Zone 2 which can be regulated at a different temperature. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicusa.com](http://www.dometicusa.com) or [www.rvcomfort.com](http://www.rvcomfort.com).

## iN-COMMAND CLIMATE CONTROL/HVAC

If equipped, all heating, ventilation, and air conditioning is controlled from the iN-Command DC or Smart Device APP. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.asaelectronics.com](http://www.asaelectronics.com).

"The fit and finish of everything is fantastic."

Matthew | North Carolina



## TELEVISIONS

If equipped, please refer to the manufacturer's instructions included in the RV for care and operation. The typical operation temperature range for a LCD TV is 41° F (5° C) to 104 ° F (40 ° C).

## CABLE HOOK-UP

If equipped, locate the exterior hookup on the side of the RV. Attach the cable source to the cable jack on the RV. The TV Antenna booster must be off for the cable signal to reach the TV location.

## SATELLITE

If equipped, please refer to the manufacturer's instructions supplied with the RV for Care and Operation. When selecting your campsite, make sure you have a clear line of site (no obstruction from trees, etc.) to the southwest so you can obtain the satellite signal.


## 4G LTE

If equipped, 4G LTE Antenna, provides in-motion nationwide 4G LTE connection when WiFi is not available. This feature requires a data service plan which is not attributable or warranted by Keystone RV. See antenna manufacturer's instructions for applicable service plans and options.

## 4G LTE/WIFI ANTENNA PREP

If equipped, 12 volt power is provided to supply power to an aftermarket modem (not provided). This feature requires additional aftermarket equipment (router/modem/antenna upgrade/ data plan) to function. Please visit [www.winegard.com](http://www.winegard.com), [www.furrion.com](http://www.furrion.com) for more information concerning aftermarket equipment.

## ANTENNA BOOSTER

 **DANGER** (SEE PAGE 50)

If equipped the booster will be typically located near one of the TV locations and has switch to turn it on and off. The booster is designed to amplify the TV (Air) signal. The antenna is designed to capture the best signal available by moving it to the optimal position. If your RV is equipped with "Cable", the booster must be off for the "Cable" signal to reach your desired TV locations. Before raising the TV Antenna, be sure the area is clear of any electrical wires or other obstructions. Also, be sure to properly stow the antenna before moving the RV.



Every time you move your RV to another location, using the Televisions menu you must run a new "Channel Scan" to receive channels.

Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.winegard.com](http://www.winegard.com).

## KEYTV

If equipped, KeyTV identifies over-the-air cable and satellite signals. KeyTV then sends each signal to the TV outlets located throughout the RV. There's no need for a "booster button" as KeyTV senses the signal source and automatically boosts the over-the-air signal. When you hook up to Park/Home Cable; KeyTV senses the signal source and automatically boosts the over-the-air signal. Additionally, when you hook up to Park/Home Cable; KeyTV also automatically senses the Cable signal and turns off the Antenna signal so that you may watch Cable. Unlike other systems, each TV location is Satellite TV compatible. KeyTV is compatible with DISH, DIRECTV, Shaw, and Bell satellite systems. Please refer to the Quick Start Guide supplied with the RV for care and operation.



Every time you move your RV to another location you must run a new "Scan" using the Televisions menu to receive channels.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.



## AWNING, PATIO

Keystone RV Company uses a variety of styles and sizes of awnings. They are primarily designed as a sun/rain protection. During any rain it will be necessary to tilt one end of the awning for proper water run off and/or store the awning. Typically, the end farthest away from the entry door is tilted so the door won't hit and damage the awning fabric when it is opened and closed. Awnings that experience damage from wind or rain are not considered warrantable. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicus.com](http://www.dometicus.com), [www.carefreeofcolorado.com](http://www.carefreeofcolorado.com), [www.lci1.com](http://www.lci1.com).



It is best to close the awning when unattended. Damage to the awning due to wind, rain or any weather condition is not covered under warranty by Keystone or the awning manufacturer.

## AWNING, ELECTRIC PATIO

If equipped, this awning can be extended and retracted electrically. This awning may or may not have tilt functionality. Awnings without tilt functionality will need to be stored during any rain. For awnings equipped with tilt functionality, during rain, it will be necessary to tilt one end of the awning for proper water run off and/or store the awning. Please refer to the awning manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicus.com](http://www.dometicus.com), [www.carefreeofcolorado.com](http://www.carefreeofcolorado.com), or [www.lci1.com](http://www.lci1.com).



An awning damaged from wind or rain is not covered under warranty even if it was tilted. The best way to keep the awning from being damaged is to put it away.

## AWNING, SLIDE-OUT (OPTIONAL)

(SEE PAGE 50)

If equipped, a slide-out awning will automatically open and close along with the slide-room. Fully extended, the awning is level which may cause water to puddle on top of the canopy. As the slide-out is closed, the awning will roll up and cause any puddles to spill over the sides of the awning.

Before retracting the slide-out, check to make sure the slide-out awning is free of any debris (leaves, twigs, etc.), which can damage the awning or slide-out components. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicus.com](http://www.dometicus.com), [www.carefreeofcolorado.com](http://www.carefreeofcolorado.com), or [www.lci1.com](http://www.lci1.com).

## BACKUP MONITOR

If equipped, the backup monitor will allow you to see directly behind your RV. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.furrion.com](http://www.furrion.com), [www.asaelectronics.com](http://www.asaelectronics.com).

## iN-COMMAND

(SEE PAGE 50)

The iN-Command™ system is a next generation control for your RV. Using a "Display Commander" (DC-LCD screen) and "Body Control Module" (BCM-Brain), you can sync with a mobile application (App) to a "Smart device" ("Android" or "Apple" phone or tablet) to monitor and operate many features from the smart device or DC. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.asaelectronics.com](http://www.asaelectronics.com).

## GENERATOR (OPTIONAL)

(SEE PAGE 50)

IMPORTANT: MAKE SURE TO READ AND UNDERSTAND THE GENERATOR OWNER'S MANUAL BEFORE OPERATING THE GENERATOR.

Observe all operating instructions and warnings as well as all recommended maintenance schedules and procedures. Generators are not warranted by Keystone RV. Contact the manufacturer direct at: [www.cumminsonan.com](http://www.cumminsonan.com) or 800.888.6626.

If equipped, a generator can provide you flexibility when you are unable to plug your shoreline cord into a power source. When running, the generator supplies 120 volt power to the RV very similar to having your shoreline cord plugged in to the campground. In order to operate, it requires 12 volt power and a fuel source to burn (gasoline or propane depending on the application). Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.cumminsonan.com](http://www.cumminsonan.com).



"Great company,  
great product,  
and  
great service!"

Roger & Jan | Alabama



The onboard generator makes your RV fully self-contained. It allows you access to 120 volts when there is no shore power available, but keep in mind that carbon monoxide (CO) is deadly! Test the CO detector every time you use the RV. Before you start and use the generator, inspect the exhaust system. Do not use it if the exhaust system is damaged.

- 1 | DO NOT operate the generator while sleeping unless the vehicle is equipped with a working CO detector and you test the CO detector immediately before sleeping.
- 2 | Never store anything in generator compartment. Always keep compartment clean and dry.
- 3 | DO NOT operate the generator in an enclosed building or in a partly enclosed area such as a garage.
- 4 | Review the safety precautions for fuel and exhaust fumes in Chapter 12.
- 5 | DO NOT operate the generator when the RV is parked in high grass or brush. Heat from the exhaust could cause a fire in dry conditions.
- 6 | Never operate your tow vehicle, generator, or the engine of any vehicle, longer than necessary when the vehicle is parked.
- 7 | DO NOT simultaneously operate the generator and a ventilator which could result in the entry of exhaust gas. When exhaust ventilators are used, we recommend that a window on the opposite side of the RV "upwind" of exhaust gases be opened to provide cross ventilation.
- 8 | When parked, orient the vehicle so that the wind will carry the exhaust away from the vehicle. DO NOT open nearby windows, ventilators, or doors into the passenger compartment, particularly those which can be "down wind", even part of the time.
- 9 | DO NOT operate the generator when parked in close proximity to vegetation, snow, buildings, vehicles, or any other object that could deflect the exhaust under or into the vehicle.
- 10 | DO NOT touch the generator when running, or immediately after shutting off. Heat from the generator can cause burns. Allow the generator to cool before attempting maintenance or service.

Know what the symptoms of CO poisoning are. If you or anyone else experience any of these symptoms, get to fresh air immediately. Shut the generator down and do not operate it until it has been inspected and repaired by a professional. If the symptoms persist, seek medical attention. See page 46.

## OVEN OR COOK TOP (RANGE)


  (SEE PAGE 50)

If equipped, the oven and/or cook top can be used for general baking. It requires propane gas to operate. Some models require a pilot to be lit while others light electronically using 12 volt. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/ or [www.dometicusa.com](http://www.dometicusa.com).

## RANGE HOOD

Range Hoods operate on 12 volt power and should be used to ventilate the RV while cooking. Operational switches for the fan and/or light are on the front panel of the range hood. They are designed to exhaust to the exterior or the interior of the RV. If your range hood exhausts to the exterior, unlock the exterior flap before turning the fan on and lock the flap before transporting the unit. Range hoods that circulate through a filter (requires periodic cleaning) to the interior will have a ceiling vent within 5 feet of the range hood. Open the ceiling vent and turn on the range vent while cooking. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or visit [www.ventline.com](http://www.ventline.com).

## OUTSIDE RANGE/COOK TOP

 (SEE PAGE 50)

If equipped, this feature typically is located behind a compartment door and slides out or folds down. Please refer to the manufacturer's instructions supplied with the RV for care and operation.

## REFRIGERATOR

  (SEE PAGE 50)

Depending on the type, refrigerators can operate on 120 volt, 12 volt or LP gas (requires 12 volt to light). Residential refrigerator uses a compressor to complete the cooling cycle. An RV refrigerator operates by absorption exchange of gas to liquid thru heating so it takes an RV refrigerator longer to cool and recover when the doors are opened. The RV must be level to operate properly. The refrigerator will operate most efficiently when:

- 1 | The RV is level.
- 2 | It is allowed 4 hours to cool prior to putting items in it.
- 3 | The items are already cold or frozen before putting them in the refrigerator.

Some brands may have altitude limits for proper operation on LP gas. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.norcold.com](http://www.norcold.com), [www.dometicusa.com](http://www.dometicusa.com), <https://www.geappliances.com/ge/service-and-support/> or [www.wayinterglobal.com](http://www.wayinterglobal.com).

## REFRIGERATOR - RESIDENTIAL STYLE

 (SEE PAGE 50)

By design, these refrigerators will not operate properly when indoor air temperatures exceed approximately 110 degrees Fahrenheit. In addition, operating the refrigerator in these conditions could cause compressor failure which may not be considered warrantable. Leave the air conditioner set at a temperature below this if the refrigerator is left running in a vehicle that is not being used or shut it off.

Residential refrigerators have two power sources, the shoreline and the battery. All residential refrigerators (except park models) come equipped with an inverter that transforms the battery 12 volt DC to 120 volt AC power in order to operate the refrigerator. The inverter is wired to a transfer switch (this switch is internal on some models) that transfers power between the shoreline and the inverter. The transfer switch defaults to shore power when available.

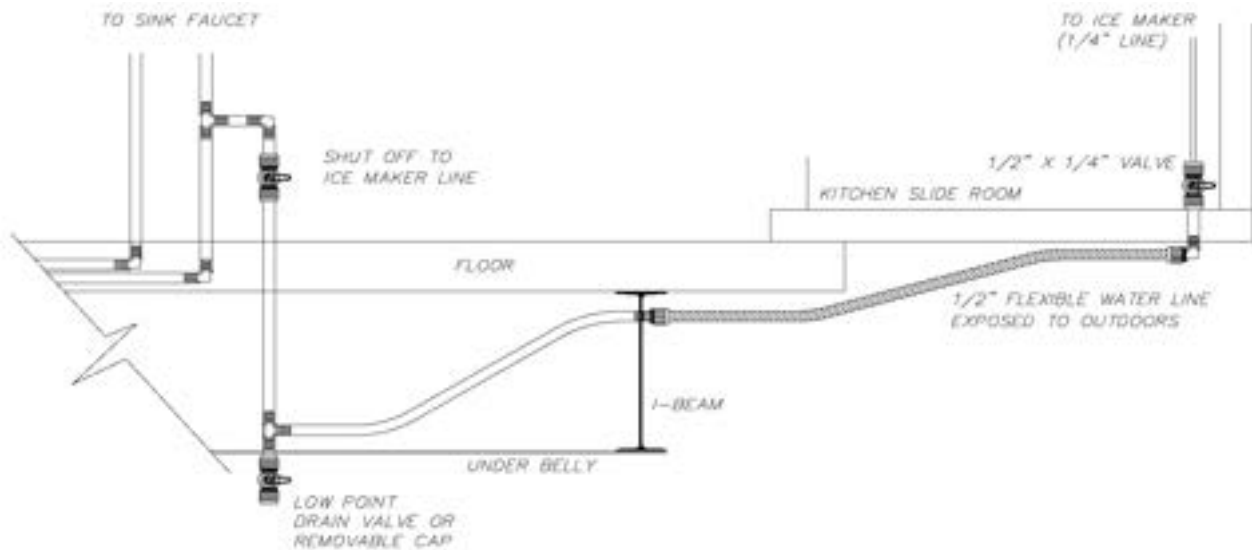
The inverter is supplied and sized specifically for operating the residential refrigerator temporarily until shore power can be connected. Some inverters are supplied with a duplex 120 volt receptacle built into them which should not be used for anything other than the residential refrigerator as it will likely overload the inverter and cause it to shut down. When not in use, the inverter should be turned off. All inverters will shut down when battery voltage drops too low. Consult the inverter owner's manual supplied with your RV for the minimal operational voltage for your inverter. When coupled to a fully charged deep cycle RV battery in good condition, it can generally supply power to a refrigerator for about 12 hours. This time estimate can vary greatly depending on the efficiency of the inverter, charge level of the battery, type and brand of battery, etc. Consult your dealer for more information on making sure your batteries are sized properly to meet your specific camping needs. The battery receives a charge whenever the RV is plugged in to shore power or the tow vehicle is connected and running. It can take a while to recharge a fully drained battery so take care to monitor the charge level.

**"The appliances and electronic components are like eye candy."**

Deb | Nevada

## NOTICE

Most residential refrigerators come equipped with an ice maker. If the refrigerator is installed in a slide-out that does not have an access point inside the RV for the ice maker line to be routed then the line is run outside through a wire tender and into the slide box behind the refrigerator. This introduces the possibility of the ice maker line freezing in cold weather. In order to prevent this, the ice maker should be turned off and the water line drained. A shutoff valve is installed near the kitchen sink and a low point drain valve is located beneath the RV for this purpose. To drain this line, the shutoff valve must be turned off and the low point drain valve (or cap) must be opened. This low point is part of the water line that continues on to the ice maker and opening this drain will allow all water in the line up to the ice maker to drain out. (See Diagram below.) The ice maker water line should not be winterized with anti-freeze. Simply drain the line along with the rest of the water lines when preparing for the cold weather months, but do not add anti-freeze.



### FIREPLACE (OPTIONAL)

If equipped, a fireplace requires 120 volt to operate. Please refer to the manufacturer's instructions supplied with the RV for care and operation. DO NOT leave the fireplace unattended while in operation.

### MICROWAVE/CONVECTION OVEN

If equipped, microwaves operate on 120 volt power. Please refer to the manufacturer's instructions supplied with the RV for care and operation.

### REMOTE CONTROL SYSTEM

If equipped, the remote control fob will operate any or all of the following: slide-out, jacks, awning, ramp door, and lights. Use caution when operating these items with the remote and always watch the component being operated to be sure adequate clearance is available to open or close the component. Individual remote controls may also be provided with the stereo, TV, and DVD.

### ROOF VENTS (POWER/MANUAL)

If equipped, a powered ceiling vent fan runs on 12 volt. This equipment is an excellent tool to keep ventilated and help manage indoor air quality (See Chapter 3). Please refer to the manufacturer's instructions supplied with the RV for care and operation.



## **SOLAR PREP**

If equipped, a solar prep quick connect will be mounted on the exterior sidewall or roof. An aftermarket solar panel kit can be purchased to utilize this feature. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.furrion.com](http://www.furrion.com), [www.gpelectric.com](http://www.gpelectric.com), [www.futuresales.com](http://www.futuresales.com), [www.wesco.com](http://www.wesco.com), or [www.zampsolar.com](http://www.zampsolar.com).

## **SOLAR READY**

If equipped, a solar panel kit is provided with your RV. For care and operation, please refer to the manufacturer's instructions supplied with the RV and/or [www.futuresales.com](http://www.futuresales.com), [www.zampsolar.com](http://www.zampsolar.com), or [www.gpelectric.com](http://www.gpelectric.com).

## **SOLARFLEX**

All Solar Flex equipped models are equipped with a Zamp portable solar panel port located on the front or front side of the trailer. For care and operation, please refer to the manufacturer's instructions supplied with the RV and/or [www.zampsolar.com](http://www.zampsolar.com).

## **SOLARFLEX 200 (SF200)**

If equipped, one 200 Watt\* solar panel, a solar charge controller, and a single 120V circuit, prepped for inverter installation powering up to seven 120V receptacles, are factory installed.

SF200 can be expanded by adding one aftermarket 200W Solar Panel Kit installed with CS-2 PV Parallel Splitter, without adding another Solar Charge Controller. \*300W solar panel may be substituted IPO 200W solar panel.

## **SOLARFLEX 400i (SF400i)**

If equipped, two 200 Watt solar panels, a solar charge controller, a battery monitor (shunt), and a 2000 Watt inverter, with a built in transfer switch powering up to seven 120V receptacles, will be factory installed. One air conditioner 120V circuit is wired for future inverter installation.

A second roof mounted solar panel dock port and 10 gauge cable (+ and - conductor) is provided for installation of a second solar charge controller and solar panel(s).



It's important to know that aftermarket Solar Equipment is considered cargo which will reduce your Cargo Carrying Capacity (CCC) when installed. See pages 19 -21.

## **SOLARFLEX 600i-L (SF600i-L)**

Two 300 Watt solar panels, a solar charge controller, a battery monitor (shunt), a 3000 Watt inverter/charger, powering up to seven 120 volt receptacles, one soft start air conditioner, and one lithium-ion battery are factory installed. For more information on lithium batteries, see "non-Vented Batteries" on page 92.

A second roof mounted solar panel dock port with 10 gauge cable (+ and - conductor) is provided for installation of a second solar charge controller and solar panel(s).

## **SUPER SOLAR FLEX 1200i-L (SSF1200i-L)**

Super SolarFlex is a factory installed advanced Energy Management System (EMS). Two lithium batteries supply all the 12 volt power needed. A hybrid inverter powers all 120 volt appliances and combines with solar to recharge the batteries. This provides an "off-the grid" camping experience. For more information on lithium batteries, see "non-Vented Batteries" on page 92.

Keystone, working in conjunction with Future Sales, Inc. designed the SF200, SF400i, and SF600i-L systems to be able to expand solar capability. Your Keystone dealer can review the options with you and obtain the parts needed to upgrade solar capability. However, before making a decision to upgrade, be sure to consider these other factors:

- 1 | Will this upgrade give us the capacity to run everything we want as long as we want?
- 2 | Is the current battery capacity, in conjunction with the solar upgrade, enough to run everything we want for as long as we want?
- 3 | Is there adequate space on the roof to install additional solar panels? Answering these questions can help avoid spending money unnecessarily and the frustration of not getting what you were expecting from your upgrade.



If equipped, the Power Center/Converter Charger has a Dip Switch to change battery charging capability from Lead Acid Batteries to Lithium Batteries. Please refer to the manufacturer's instructions for care and operation. If your Power Center/Converter Charger does not support charging Lithium Ion Batteries, the maximum charge a Lithium Ion battery can receive is approximately 80% of the total battery capacity. Aftermarket all-in-one or stand-alone converter chargers are available in place of changing your Power Center/Converter Charger.

Consult your dealer for more information on making sure your batteries are sized properly to meet your specific camping needs.

For care, operation, and additional options for aftermarket expansion of all Solar Flex packages, please refer to the manufacturer instructions supplied with the RV and/or contact [www.futuresales.com](http://www.futuresales.com).

## EGRESS WINDOWS

Egress or "Emergency Exit" windows are labeled from the factory with the word EXIT. All egress windows can be distinguished by red operational handles or levers. Dependent upon the window type, an egress window may be a large section or an entire window. Review the locations and operational instructions posted on the windows with all people staying in the RV.

## WASHER/DRYER READY

If equipped, there are 3 ways this option can be plumbed to drain.

- 1 | It could be routed into a Gray water holding tank.
- 2 | It could be routed into a Black water holding tank.
- 3 | It could be routed directly to a termination valve and not to any holding tank.

This is determined based on floor plan so be sure to verify which scenario applies to you should you have a dealer install a Washer/Dryer in your RV. Some Washer/Dryers will cycle as much as 30 gallons of water for one load of laundry. Be sure to know your holding tank sizes and holding tank levels prior to operating the Washer/Dryer if routed into a tank. If routed directly to a termination valve, be sure the sewer hose is connected (to an approved dump station) and the termination valve is open before operating.



Operating a Washer/Dryer without opening the termination valve or without ample storage capacity in a holding tank can lead to the RV being flooded with gray water and damage to the RV, which is not considered warrantable.

## KEYLESS ENTRY

If equipped, keyless entry allows you to lock/unlock the deadbolt via a wireless keypad or in some cases key fob transmitters. Please refer to the manufacturer's instructions supplied with your RV for care and operation and/or [www.southco.com](http://www.southco.com), [www.trimarkcorp.com](http://www.trimarkcorp.com), or [www.lci1.com](http://www.lci1.com).

## CARBON MONOXIDE (CO) DETECTOR

  (SEE PAGE 50)

For your safety, a carbon monoxide (CO) detector is installed in every RV. Depending on the model, it may be operated by battery (9 volt, AA) or wired so that it will be powered by a RV battery (if equipped) or 12 volt power from the converter. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicusa.com](http://www.dometicusa.com), [www.qginc.com](http://www.qginc.com), [www.mtiindustries.com](http://www.mtiindustries.com).

Common sources of CO are malfunctioning or misuse of gas appliances, vehicle engines, generators, and many other fuel burning products.

Some indications of CO poisoning include (but not limited to) the following:

### Mild Exposure

Symptoms of the flu (minus a fever)  
Slight Headache  
Dizziness  
Fatigue

### Medium Exposure

Severe Throbbing Headache  
Drowsiness  
Confusion  
Fast Heart Rate

### Extreme Exposure

Unconsciousness  
Convulsions  
Cardiorespiratory Failure  
Death

**For your safety and to keep your CO detector in good working order, follow the steps below.**

- 1 | Verify the detector's lights and battery function by pushing the "Test" button weekly.
- 2 | Vacuum the CO alarm cover with a soft brush attachment once a month to remove accumulated dust.
- 3 | Instruct children never to play with the CO detector. Warn children of the dangers of carbon monoxide poisoning.
- 4 | Never use detergents or solvents to clean the CO detector.
- 5 | Avoid spraying paint, hair spray, air fresheners or other aerosols near the CO detector.
- 6 | Do Not paint the CO detector. Paint will seal the vents and interfere with the sensor ability to detect CO.
- 7 | DO NOT place near a diaper pail.
- 8 | Test the alarm, operation after your RV has been in storage, before each trip, and at least once a week during the camping season.
- 9 | Replace the CO detector when recommended by the manufacturer (typically every five years).

## BATTERY DISCONNECT

(Also see Giggy Box (TT)/Brock Box (FW) 12V Distribution Center on page 54.)

If equipped, the battery disconnect is designed to give you the ability to disconnect most, but not all DC (direct current) fuse panel loads at the converter from your 12 volt battery (not supplied by Keystone) without disconnecting the battery cables. Typically, this is used to prevent your battery from being discharged during storage. (See - What could be draining my battery when everything is off?)

Please refer to the manufacturer's instructions supplied with the RV and/or [www.davecarter.com](http://www.davecarter.com), [www.atcomp.com](http://www.atcomp.com), [www.patrickind.com](http://www.patrickind.com), [www.smosgood.com](http://www.smosgood.com) for care and operation.

## WHAT COULD BE DRAINING MY BATTERY WHEN EVERYTHING IS OFF?

- Parasitic drain/draw can be defined as any electrical device that draws electric current when the RV is not in use but the battery is still connected.
- Some electronics may be connected in front of the battery disconnect and create a parasitic drain/draw such as radio memory, LP/CO detectors, leveling panel, iN-Command, leveling jacks, and slide-outs.
- Inverters have their own battery disconnect and must also be shut off to avoid a parasitic draw.
- Tank heaters, antenna boosters (including KeyTV antenna booster) must be turned off to avoid a parasitic draw.
- If dry camping, refrigerators and water heaters (depending on the type), when on LP require 12 volt battery power to operate the boards.

A Normal Parasitic Draw Range = 300mA-700mA = meaning nothing may be wrong. Refer to "Batteries" in Chapter 13 for General Information on Use and Storage of Batteries.

"Couldn't be happier - great floorplans and great options!"


Andy & Stacey Washington



#### **FIRE EXTINGUISHER**

Each RV includes a fire extinguisher, which is located near the main entry door. The fire extinguishers are rated for Class B (gasoline, grease, and flammable liquids) and Class C (electrical) fires. Please refer to the manufacturer's instructions supplied with the RV for care and operation.

#### **SMOKE DETECTOR**

 (SEE PAGE 50)

For your safety a smoke detector is installed in every RV. Most detectors are powered by a 9 volt battery. Check the manufacturer's expiration date on the label, replace the batteries if needed, and clean dust away from the slots so that smoke can enter freely. Please refer to the manufacturer's instructions supplied with the RV for care and operation and replace when recommended by the manufacturer (typically every 10 years).

#### **EQUA-FLEX/ROAD ARMOR, E-Z FLEX**

These are ride enhancement features available on certain models. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com) or [www.dexteraxle.com](http://www.dexteraxle.com).

#### **PIN BOX**

Some models come equipped with a specialized Pin Box designed to reduce the stress and enhance the pulling experience. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com) or [www.morryde.com](http://www.morryde.com).

#### **LEVELING**

If equipped, 4, 6 or 7-point leveling is a hydraulic or electrical leveling system designed for towable RV's. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com), [www.norcoind.com](http://www.norcoind.com), or [www.equalizersystems.com](http://www.equalizersystems.com).

#### **UNDER MOUNT SPARE TIRE**

If equipped, the under mount spare tire is a cable hoist designed to stow the spare tire under the RV, typically behind the rear axle. An access hole in the lower skirt metal is provided to insert a crank handle to lower/raise the spare tire.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.

## ELEVATED BEDS AND ELECTRIC BED LIFT SYSTEMS

**STANDARD ELEVATED BEDS** – Various Keystone RV products are equipped with standard built-in elevated beds or bed loft areas. These beds can be upwards of 4 to 5 feet above the floor level and are often enclosed on one, two, or three sides and sometimes even partially on a fourth side. Because there are so many potential users and different types of elevated bed designs, elevated beds may not be equipped with bed rails.

**ELECTRIC BED LIFT SYSTEMS** – Many of the Keystone RV Sport Utility RVs/Ramp RVs come equipped with rear cargo area electric bed lift systems. (See the label in the Ramp RV for proper operation of the rear cargo area electric bed lift systems). The bottom beds in some floor plans also can be converted to dual sofas. Again, like the standard built-in elevated beds, because of the design and the various uses, the rear electric beds may not be equipped with a bed rail system.

**USE OF BED RAILS** – We feel that you, as the customer, are best equipped to determine if a bed rail system is necessary or best for you based on your intended uses, the actual users of the elevated beds, and the comfort level of the users. For those customers who would prefer using an elevated bed with a bed rail, there are numerous bed rail styles, sizes, heights, and designs available, even in the style of bumpers, which can be purchased at various retail locations and/or on the internet.

When installing a bed rail, please make sure that you follow the manufacturer's installation instructions carefully and that you take in to account the size and height of the mattress (either originally installed by Keystone RV or later replaced by you) so that the rails are the appropriate height above the top of the mattress. This is important because residential mattresses differ in size from the RV mattresses originally installed by Keystone RV. Please also make sure that the bed rail you select allows for adequate room to get in and out of the elevated bed after installation, especially in the event of an emergency.

### TIPS FOR SAFE USAGE:

- Please use sound judgment when allowing children to sleep in any style of elevated bed. Generally, it is not suitable for children under the age of 6 to sleep in an elevated bed or bed loft area.
- Discuss proper usage of any elevated bed/electric bed lift system with your children and make sure they are supervised if playing in the bedroom/sleeping area of the RV with elevated beds. Please do not allow horseplay on or under the elevated beds and no items such as hooks, belts, jump ropes, or towels should hang from any part of the elevated bed.
- Place a night light in the bedroom/sleeping area so users can see at night when getting in and out of the bed(s).
- No more than one person should be in an elevated bed at once and make sure you follow the weight restrictions posted on the warning label near the beds.
- Do not allow children to operate the rear cargo area electric bed lift systems in Ramp RVs. The lowering and raising of the electric beds should be only conducted by an adult. No person should be on the electric beds when being lowered or raised.

If you have any questions about elevated beds, Ramp RV electric bed lift systems, or bed rails please contact Keystone RV Customer Service. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com).



**"Keystone is the company to beat when it comes to bunkhouse floorplans."**

Sophia | Maine



## MURPHY BEDS

  (SEE PAGE 50)

**SUPERVISION** – For your safety do not allow any individual under the Murphy bed when lowering the bed. Likewise, do not allow an individual on the bed when it is being raised to its stowed position.

**PINCH POINTS** – Pinch points exist between the base of the bed, and the sofa when lowering the bed and between the base of the bed and the storage compartment when raising/stowing the bed. On certain Murphy bed designs, the footboard can also create a pinch point. Use caution when moving the bed from one position to another.

**CRUSH HAZARD** – Use care when lowering the bed to ensure no adult, child, or pet is underneath the bed base area when deployed.

**USER ENTRAPMENT** – Under no circumstances should an adult, child, or pet be on the bed when raising it to its upright, stowed position. There are two basic Murphy bed designs in use today. The first has a forward storage area and a piano hinge attachment to the bed base at the edge of the storage compartment in order to raise or lower the bed. There is no cavity cutout in the storage compartment with this design, and a portion of the bed does not rotate into the storage compartment. The only danger of entrapment in this design would be above the storage compartment and behind the bed base. In the second design, the full length of the bed rotates around a pivot point. When lowered the bed base functions as the ceiling of the storage compartment. On this design, Keystone installs a mechanism that automatically latches the bed in place when lowered. The mechanism has a red ball on the handle and is easy to spot next to the bed. Make sure the mechanism has engaged by attempting to lift the bed base after you have lowered it. It should not allow you to return the bed to its upright position without first releasing the handle. This mechanism is in place to prevent the bed from inadvertently raising up if enough weight were forward of the pivot point, potentially trapping an individual inside. In that event, a person could become trapped and serious personal injury or death could result.

### MURPHY BED SETUP AND STORAGE

- 1 | Using two people, take up a position on either side of the Murphy bed. Before lowering the Murphy bed, make certain the sofa is folded down and that no person is beneath the bed area.
- 2 | Use one hand to brace the bed and pull the barrel latch pins installed on both sides of the bed. This will unlock the bed and it will be free to move. Make sure you have it held steady at this point.
- 3 | Slowly lower the bed, taking care to ensure the footboard has unfolded and swung down to support the bed in its horizontal position. Beware of pinch points. The bed should be resting on the foot board in the horizontal position.
- 4 | Verify the automatic latch mechanism has engaged and the bed cannot be returned to its upright position. If your RV has the second version of murphy bed design, you will see a red handled knob next to the bed.
- 5 | Bed is now ready for use.
- 6 | To stow the bed, again using two people, first pull the red handle on the release mechanism (if equipped) to free the bed to move.
- 7 | Ensure no individual or pet is on the bed.
- 8 | Slowly lift the bed to its upright, stowed position. Beware of pinch points whenever the bed is in motion. While holding the bed steady in the upright position latch the barrel latch pins on either side of the Murphy bed. Verify the bed is securely restrained by the barrel latch pins.



The head of the bed rotates into the storage compartment when stored. Make sure the storage compartment is clear of objects that could potentially interfere with this rotation.



## APPLIANCE AND EQUIPMENT DANGER

### **Furnace.** pg. 38, **Refrigerator.** pg. 42

All pilot lights, appliances and their ignitors (see operating instructions) shall be turned off before refueling of fuel tanks and/or propane containers. Failure to comply can result in death or serious injury.

DO NOT store gasoline or any other flammable vapors or liquids in the vicinity of any appliance because a fire or explosion can result.

### **Antenna Booster.** pg. 39

DO NOT raise TV antenna near overhead electrical wires as contact can cause injury or death.

### **Generator (Optional).** pg. 40

Carbon monoxide is poisonous and can cause unconsciousness and death. Follow all instructions in this section as well as the ones outlined in the generator operator's manual.

### **Oven or Cook Top (Range).** pg. 42

DO NOT use cooking appliances for comfort heating. This can lead to carbon monoxide poisoning which can lead to death or serious injury.

### **Carbon Monoxide (CO) Detector.** pg. 46

If the alarm sounds, exit the vehicle immediately. The carbon monoxide build-up may dissipate before help arrives, but may be only temporarily solved. It is crucial that the source of the carbon monoxide is determined and repaired.

Gasoline generators, LP generators, and appliances produce carbon monoxide. Carbon monoxide can be fatal! When the device detects carbon monoxide in the air, it will sound. Consult the individual detector's user manual for specific instructions and/or audible warning meanings.

### **Murphy Bed.** pg. 49

Improper use of the murphy bed could lead to injury or death.



## APPLIANCE AND EQUIPMENT WARNING

### **Furnace.** pg. 38, **Generator.** pg. 40, **Oven or Cook Top (Range).** pg. 42, **Outside Range/Cook Top.** pg. 42, **Refrigerator.** pg. 42

We recommend that the diagnosis and repair or replacement of you RV's appliances be performed by a dealer or properly certified RV technician. Improperly diagnosed, repaired or replaced appliances and/or their parts, could lead to an increased risk of death or serious injury.

### **Awning, Slide-Out (Optional).** pg. 40

Do not attempt any repairs to any awning. The awning roller tube is under extreme spring tension. Repairs should only be performed by an authorized dealer repair center.

### **iN-Command.** pg. 40

DO NOT operate any moving parts (including, but not limited to, awnings, jacks and slides), unless you have a clear line of sight to the moving part. The mobile application, display commander or body control module may be used only if you are giving instruction to, and receiving instructions from another person, 18 or older, who can clearly see the moving part. Failure to follow these instructions could result in serious personal injury or property damage.

### **Generator (Optional).** pg. 40

Test the operation of the carbon monoxide detector as follows: after the vehicle has been in storage; before each trip; at least once per week during use; and immediately before sleeping with the generator operating. Failure to do so could result in death or serious injury.

### **Refrigerator-Residential Style.** pg. 42

Care must be taken when working on a residential refrigerator that all power has been disconnected. The inverter typically has a power switch on the RV that can be turned off, or a battery disconnect can be used if one is present, or the battery itself can be disconnected. Shoreline power must also be disconnected. Failure to disconnect shore power could expose you to electric shock.

### **Outside Range/Cook Top.** pg. 42

When using outdoor cooking appliances, the vehicle must be level and stabilized. DO NOT violate manufacturer's instructions on required clearances for cooking appliances during use. DO NOT store cooking appliances until cool to the touch. Improper use could lead to a fire and explosion and result in death or serious injury.

DO NOT leave the cook top unattended while in use. If windy conditions cause the flame to invert into the cook top, stop using immediately. Continued use could result in heat build up in the cook top causing damage to the cook top and increase risk of fire.

DO NOT use oversize cookware. The cookware should not be more than one inch larger than the burner grate. The maximum size cookware is 10 inches in diameter. Oversize cookware could result in heat build up in the cook top causing damage to the cook top and increased risk of fire.

DO NOT use cookware that covers more than one burner at a time. Oversize cookware could result in heat build up in the cook top causing damage to the cook top and increased risk of fire.

Follow all warning labels on the cook top and in the manufacturer's instructions supplied with the RV.

### **Smoke Detector.** pg. 45

Test smoke alarm operation after vehicle has been in storage, before each trip, and at least once per week during use. Failure to comply could result in serious injury.

### **Carbon Monoxide (CO) Detector.** pg. 47

Test the operation of the carbon monoxide detector as follows: after the vehicle has been in storage; before each trip, and at least once per week during use. Failure to comply could result in serious injury.

### **Murphy Bed.** pg. 49

Maximum capacity of the murphy bed is two average-sized adults. Under no circumstance, should you exceed a maximum rating of 500 pounds.

## COMPONENT AND APPLIANCE CONTACT INFORMATION

For your convenience, we have provided contact information for the most common component and appliance suppliers.

➤ Denotes the possibility of additional consumer warranty (beyond the base and structural warranties) direct from the component supplier.

Air Conditioners			
➤	Coleman (RVP)	1.316.832.4357	<a href="http://www.airxcel.com">www.airxcel.com</a>
➤	Dometic	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
➤	Midwest Sales & Service (GE)	1.574.287.3365	<a href="http://www.mwss-inc.com">www.mwss-inc.com</a>
	Furrion	1.800.789.3341	<a href="http://www.furrion.com">www.furrion.com</a>
	Collins & Company-Window AC	1.574.848.1118	<a href="http://www.collins-n-co.com">www.collins-n-co.com</a>
Awnings			
	Dometic	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
	Carefree of Colorado	1.303.469.3324	<a href="http://www.carefreeofcolorado.com">www.carefreeofcolorado.com</a>
	Lippert Components	1.574.537.8900	<a href="http://www.lci1.com">www.lci1.com</a>
Axles			
➤	Dexter Axle	1.574.295.7888	<a href="http://www.dexteraxle.com">www.dexteraxle.com</a>
➤	Lippert Components	1.574.537.8900	<a href="http://www.lci1.com">www.lci1.com</a>
Central Vacuum			
➤	HP Products	1.330.875.5556	<a href="http://www.h-pproducts.com">www.h-pproducts.com</a>
➤	Intervac	1.888.499.1925	<a href="http://www.intervacdesign.com">www.intervacdesign.com</a>
Converter/Inverter			
➤	Progressive Dynamics	1.269.781.4241	<a href="http://www.progressivedyn.com">www.progressivedyn.com</a>
➤	WFCO/CHENG- Arterra	1.877.294.8997	<a href="http://www.wfcoelectronics.com">www.wfcoelectronics.com</a>
	Future Sales (Magnum)	1.574.262.3688	<a href="http://www.futuresalesrv.com">www.futuresalesrv.com</a>
Entrance Steps			
	Lippert Components	1.574.537.8900	<a href="http://www.lci1.com">www.lci1.com</a>
	MORryde	1.574.293.1581	<a href="http://www.morryde.com">www.morryde.com</a>
Fiberglass			
➤	Crane	1.800.435.0080	<a href="http://www.cranecomposites.com">www.cranecomposites.com</a>
	Better Way - Front Cap	1.574.538.4037	<a href="http://www.betterwayproducts.com">www.betterwayproducts.com</a>
Fireplace			
	Furrion	1.800.789.3341	<a href="http://www.furrion.com">www.furrion.com</a>
	Way Interglobal (Greystone)	1.574.971.4490	<a href="http://www.wayinterglobal.com">www.wayinterglobal.com</a>
	Dave Carter	1.574.642.0627	<a href="http://www.davecarter.com">www.davecarter.com</a>
	LaVanture	1.800.348.7625	<a href="http://www.lavanture.com">www.lavanture.com</a>
Flex Pex Plumbing			
	ESCO	1.800.456.3726	<a href="http://www.escousa.net">www.escousa.net</a>
	Dave Carter	1.574.642.0627	<a href="http://www.davecarter.com">www.davecarter.com</a>
	LaSalle Bristol	1.574.295.8400	<a href="http://www.lasallebristol.com">www.lasallebristol.com</a>
➤	Wesco	1.412.454.2200	<a href="http://www.wesco.com">www.wesco.com</a>
Flooring (Decking)			
➤	Dyna Span (Decking)	1.800.288.3802	<a href="http://www.dyna-bilt.com">www.dyna-bilt.com</a>

<b>Flooring (Linoleum)</b>			
	LaSalle Bristol	1.574.295.8400	<a href="http://www.lasallebristol.com">www.lasallebristol.com</a>
	Shaw Industries	1.800.722.7738	<a href="http://www.shawfloors.com">www.shawfloors.com</a>
➤	Syntec Industries	1.800.526.8428	<a href="http://www.syntecind.com">www.syntecind.com</a>
<b>Fuel Delivery System</b>			
	ECI Fuel Systems	1.877.685.8602	<a href="http://www.ecifuelssystem.com">www.ecifuelssystem.com</a>
➤	Standard Technologies	1.419.332.6434	<a href="http://www.standardtechn.com">www.standardtechn.com</a>
<b>Furnace</b>			
➤	Dometic/Atwood	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
➤	Suburban	1.423.775.2131	<a href="http://www.airxcel.com/suburban">www.airxcel.com/suburban</a>
<b>Generator</b>			
➤	Onan	1.800.286.6467	<a href="http://www.power.cummins.com">www.power.cummins.com</a>
<b>Graphics</b>			
➤	BGS	1.262.554.8808	<a href="http://www.burlingtongraphics.com">www.burlingtongraphics.com</a>
	Vomela	1.574.522.6016	<a href="http://www.vomela.com">www.vomela.com</a>
	Sharpline	1.800.888.4888	<a href="http://www.sharpline.com">www.sharpline.com</a>
<b>iN-Command</b>			
	ASA Electronics	1.800.688.3135	<a href="http://www.in-command.net">www.in-command.net</a>
<b>Leveling &amp; Stabilization &amp; Tongue Jacks</b>			
	Lippert	1.574.537.8900	<a href="http://www.lci1.com">www.lci1.com</a>
	Norco/BAL	1.574.262.3400	<a href="http://www.norcoind.com">www.norcoind.com</a>
	Dave Carter	1.574.642.0627	<a href="http://www.davecarter.com">www.davecarter.com</a>
	Equalizer (Days Corp)	1.800.846.9659	<a href="http://www.equalizersystems.com">www.equalizersystems.com</a>
	Domar Products	1.574.295.8791	<a href="http://www.domarproducts.com">www.domarproducts.com</a>
	Wesco Distribution	1.574.206.1517	<a href="http://www.wesco.com">www.wesco.com</a>
	Bastion Distribution	1.574.304.7738	<a href="http://www.gobastion.net">www.gobastion.net</a>
<b>Microwave</b>			
➤	Dometic	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
	Way (LG)	1.800.243.0000	<a href="http://www.lg.com">www.lg.com</a>
	Midwest Sales & Service	1.574.287.3365	<a href="http://www.mwss-inc.com">www.mwss-inc.com</a>
	Collins & Company	1.574.848.1118	<a href="http://www.collins-n-co.com">www.collins-n-co.com</a>
	Furrion	1.800.789.3341	<a href="http://www.furrion.com">www.furrion.com</a>
<b>Pin Box</b>			
➤	MORryde	1.574.293.1581	<a href="http://www.morryde.com">www.morryde.com</a>
	Lippert Components	1.574.537.8900	<a href="http://www.lci1.com">www.lci1.com</a>
<b>Power Fan, Range Hoods &amp; Roof Vents</b>			
➤	Dometic/Fantastic Fan	1.800.521.0298	<a href="http://www.fantasticvent.com">www.fantasticvent.com</a>
➤	Maxx Fan	1.316.832.3400	<a href="http://www.airxcel.com">www.airxcel.com</a>
➤	Ventline	1.574.848.4491	<a href="http://www.ventline.com">www.ventline.com</a>
<b>Propane Regulators, Tanks, and Fittings</b>			
	Dehco	1.574.294.2684	<a href="http://www.dehco.com">www.dehco.com</a>
	Fairview	1.877.459.0700	<a href="http://www.fairviewfittings.com">www.fairviewfittings.com</a>
	Service Distribution(UFP)	1.574.266.3603	<a href="http://www.ufpi.com">www.ufpi.com</a>

Refrigerator			
	Norcold	1.800.543.1219	<a href="http://www.norcold.com">www.norcold.com</a>
	Midwest Sales & Service (GE)	1.574.287.3365	<a href="http://www.mwss-inc.com">www.mwss-inc.com</a>
➤	River Park (Samsung)	1.800.442.7717	<a href="http://www.riverparkinc.com">www.riverparkinc.com</a>
➤	Dometic	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
Roofing Material			
➤	Alpha	1.800.462.4698	<a href="http://www.alphasystemsinc.com">www.alphasystemsinc.com</a>
Rubberized Suspension			
➤	Mor/Ryde	1.574.293.1581	<a href="http://www.morryde.com">www.morryde.com</a>
Satellite			
➤	Winegard	1.800.288.8094	<a href="http://www.winegard.com">www.winegard.com</a>
	Furrion	1.800.789.3341	<a href="http://www.furrion.com">www.furrion.com</a>
Solar			
	Valterra Power (Go Power)	1.866.247.6527	<a href="http://www.gpelectric.com">www.gpelectric.com</a>
	Zampotech	1.541.728.0924	<a href="http://www.zampsolar.com">www.zampsolar.com</a>
	Future Sales	1.574.262.3688	<a href="http://www.futuresalesrv.com">www.futuresalesrv.com</a>
Stove/Oven/Cooktop			
➤	Dometic/Atwood	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
➤	Suburban	1.423.775.2131	<a href="http://www.airxcel.com/suburban">www.airxcel.com/suburban</a>
	Furrion	1.800.789.3341	<a href="http://www.furrion.com">www.furrion.com</a>
Tires			
	Tredit	1.855.8.TREDIT	<a href="http://www.tredittire.com">www.tredittire.com</a>
	Americana	1.574.522.9450	<a href="http://www.americanatire.com">www.americanatire.com</a>
	Lionshead	1.574.533.6169	<a href="http://www.lionsheadtireandwheel.com">www.lionsheadtireandwheel.com</a>
	HiSpec	1.574-807-8588	<a href="http://www.hispecwheel.com">www.hispecwheel.com</a>
Toilet			
	Thetford	1.800.543.1219	<a href="http://www.thetford.com">www.thetford.com</a>
➤	Dometic	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
TV Antenna			
	Furrion	1.800.789.3341	<a href="http://www.furrion.com">www.furrion.com</a>
➤	Winegard	1.800.288.8094	<a href="http://www.winegard.com">www.winegard.com</a>
Water Heater			
➤	Girard	1.866.559.1221	<a href="http://www.girardgroupcompanies.com">www.girardgroupcompanies.com</a>
➤	Dometic/Atwood	1.800.544.4881	<a href="http://www.dometic.com">www.dometic.com</a>
➤	Suburban	1.423.775.2131	<a href="http://www.airxcel.com/suburban">www.airxcel.com/suburban</a>
Water Pump			
➤	Flo-Jet	1.949.859.4945	<a href="http://www.xylemflowcontrol.com/flojet">www.xylemflowcontrol.com/flojet</a>
	Shurflo	1.800.854.3218	<a href="http://www.pentair.com">www.pentair.com</a>
➤	WFCO/CHENG- Arterra	1.877.294.8997	<a href="http://www.wfcoelectronics.com">www.wfcoelectronics.com</a>

# 08 ELECTRICAL SYSTEM

The electrical system in your RV is a combination 12 volt DC (Direct Current) and 120 volt AC (Alternating Current) system. In simpler terms, the 12 volt system is what an automobile uses and the 120 volt system is what most households use. Every facet of the electrical system is built to the Recreational Vehicle Industry Standard (RVIA), which complies with the "American National Standard #A119.2" and the "National Electric Code."

## 12 VOLT SYSTEM - DC

The 12 volt system can be powered in four different ways: a RV battery (not included by Keystone), the converter changing 120 volt AC to 12 volt DC, by a Solar System (some Solar packages supply Lithium Ion battery(s)), or by the tow vehicle's 12 volt system. Almost all equipment except the microwave and roof air conditioner operate using 12 volt.

\*Lithium battery(s) are supplied by Keystone on select Solar Flex Packages, see pages 44 and 92.

## 12 VOLT DISTRIBUTION BREAKER BOX

(For Travel Trailers (TT) aka Giggy Box and 12V Distribution Breaker Box for Fifth Wheels (FW) aka Brock Box) If equipped, the 12 volt DC Power Distribution Box houses all of our connections that require power from the battery. The 7-Way Connections and Cord are color matched to SAE Standard. Circuit breakers (and an optional Battery Disconnect) are typically found on the front of the chassis and accommodates 2-5 breakers. Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where you will discover a variety of helpful information including FAQs and "How To" videos that will assist in our goal of providing you the Ultimate Ownership Experience.

**GIGGY BOX (TRAVEL TRAILERS)**



**BROCK BOX (FIFTH WHEELS)**



## RV BATTERY

Your battery is essentially a storage device for electrical energy. The heart of the 12 volt system is the RV battery, so choose yours wisely. Keystone RV recommends at minimum group 24- 12 volt deep cycle batteries. There are a variety of battery types that may be utilized to achieve your camping needs such as, AGM, Gel, Lithium, (See note on the next page), etc. and can be purchased and installed by your local dealer. Please check the convertor's manual placed in your Keystone packet to determine if the charge capabilities meet the requirements of the battery being selected. Before you select your battery, define your camping needs thoroughly.

For example, if you will typically camp with access to 120 volt to plug in the shoreline cord, a standard deep cycle battery should suffice. If you will be camping without access to 120 volt and will rely heavily on battery to run the many features in your RV, you need to consider a deep cycle battery that has considerable amperage available or possibly installing 2 batteries for your needs.

A well charged and maintained battery is critical for proper operation of the appliances and features within your RV. A battery which is not well charged and maintained can cause complete failure of operation in most of the 12 volt components in your RV. Follow the charging and maintenance instructions closely for the battery you select.

Your Keystone RV will charge your RV battery when plugged into the tow vehicle and when the shoreline cord is plugged into a 120 volt power source.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.



If equipped, the Power Center/Converter Charger has a Dip Switch to change battery charging capability from Lead Acid Batteries to Lithium Batteries. Please refer to the manufacturer's instructions for care and operation. If your Power Center/Converter Charger does not support charging Lithium Ion Batteries, the maximum charge a Lithium Ion battery can receive is approximately 80% of the total battery capacity. Aftermarket all-in-one or stand-alone converter chargers are available in place of changing your Power Center/Converter Charger.

### AMPERAGE (AMP) HOUR RATING

The amp hour rating is how many amps and hours the battery can deliver 12 volt power before the battery is discharged. It is determined by multiplying the amps being consumed (by usage of 12 volt components) by the number of hours the battery can sustain this 12 volt usage. For example, if a battery can deliver 5 amps for 20 hours (5 amps x 20 hours) before it is discharged, the amp hour rating would be 100 amp hours. Below there is a chart that outlines the amperage consumption of the most typical 12 volt components.

**12 VOLT AMPERAGE CHART**

APPLIANCE	AMPERAGE CONSUMED
CO/LP Detector	1
Furnace	10-12
Power Roof Vent	2.5
Refrigerator (LP Gas Mode)	1.5-2
Radio/Stereo	4
Range Hood Fan and Light	2-3
Refrigerator (12 volt only)	4
Security System	1
TV (12 volt)	4-5
TV Antenna Booster (12 volt Output)	1
Water Pump	3-4

**APPROXIMATE CAPACITIES OF A 12 VOLT RV/MARINE DEEP CYCLE BATTERY**

Accessory Amp Draw	Power Provided
5	16.0 Hours
15	4.6 Hours
25	2.5 Hours

**APPROXIMATE OPEN CIRCUIT VOLTAGE**

Voltage	State of Charge
12.6	100% or at, full charge
12.4	75%
12.2	50%
12.0	25%
11.7	0%

**Removing (or using) amperage, depletes the overall voltage of a battery. Voltage is the means in which amperage is pushed out of the battery to power RV components. The higher the amperage, the more voltage required to supply the demand. Therefore, if there is not enough voltage to push/send the amperage, your components will not operate.**

DISCLAIMER: Product information is as accurate as possible with regard to the date of Owner's Manual publication. The charts provided are not exact as various items can affect amp draw, overall voltage, and battery reserve capacity.

## 120 VOLT SYSTEM - AC

The 120 volt system is supplied by plugging the shoreline cord (power cord) into an outside power source (campground, house, etc.) or running the generator if equipped. Once connected or powered, the RV is furnished with power to operate the roof air conditioner(s), microwave, and 120 volt receptacles throughout the RV. If equipped, some refrigerators and water heaters can run from 120 volt power in addition to 12 volt and LP. If your RV is equipped with an inverter, you have 120V power to a specific number of outlets depending on your units design. This will afford temporary power from your units batteries thru an inverter equipped in the unit.

## SHORELINE CORD/POWER CORD

The shoreline cord is a heavy-duty cable with a 3 or 4 prong grounding plug on one end and connects directly to the power converter inside the RV on the other end. This cord is used to plug into an external 120 volt source. Depending on the application, we use a 30 amp (3 prong) or a 50 amp (4 prong) shoreline cord. Your RV is equipped with a heavy duty power cord to connect to an external 120 volt 30 or 50 amp (depending on model) rated AC service. The cord and plug are a molded, weatherproof assembly. The cord provides a correct ground connection to the site service. Do not alter or cut the cord in any way. Do not remove the ground pin from the plug, or defeat the ground circuit in the RV. If you have to use an adapter to plug into an electrical service, make sure the ground is maintained through the adapter.



**BEFORE CONNECTING THE SHORE CORD TO THE CAMPSITE RECEPTACLE TURN OFF THE MAIN BREAKERS OF THE RV AND CAMPGROUND AS IT COULD LEAD TO AN INCREASED RISK OF SERIOUS INJURY OR PROPERTY DAMAGE.**

Depending on model, the power cord is either permanently wired to the RV electrical system, or is detachable. For permanently wired, remove the plug end and cord from its storage location and plug in to the appropriate campsite receptacle. See Figures 1 and 2. For detachable cords, align the pins, insert the end straight into the RV inlet, twist the end right until seated (about 1/2") and screw the locking ring on the end to the RV inlet until tight and secure. See Figures 3-5. The locking ring provides extra strain relief, weather-resistant seal and prevents the connector from losing connection or becoming detached by accident. Then plug the other end into the campsite receptacle. See Figures 1 and 2. Also see Electrical Hookup page 57.

**FIGURE 1**

50 Amp 2 Legs of 120V



30 Amp 1 Leg of 120V



**FIGURE 2**

Park Pedestal-50 Amp & 30 Amp Service



**FIGURE 3**

50 Amp Shore Cord Inlet End



**FIGURE 4**

Inlet to RV



**FIGURE 5**

Connected to Inlet







**NEVER USE A TWO-CONDUCTOR EXTENSION CORD OR ANY CORD THAT DOES NOT ASSURE CORRECT AND ADEQUATE GROUND CONTINUITY. NEVER PLUG THE 120 VOLT CORD INTO AN UNGROUNDED RECEPTACLE. FAILURE TO FOLLOW THESE DIRECTIONS COULD LEAD TO FIRE AND/OR PERSONAL INJURY.**

### **ELECTRICAL HOOKUP**

Before connecting to the electrical supply, check the supply rating. Be sure it is a single leg of 120 volt AC for 30 amp service or 2 legs of 120 volt for 50 amp service.

#### **TO CONNECT TO SHORE POWER:**

- 1 | Be sure the site power source breakers are OFF (both legs on 50 amp service).
- 2 | If the site power source breakers are not accessible, turn OFF the main breakers inside the RV.
- 3 | Insert the plug of the cord into the site source receptacle, seating the connector squarely and completely.
- 4 | Turn site source breakers ON.
- 5 | Turn RV main breakers ON.

#### **TO DISCONNECT:**

- 1 | Turn RV main breakers OFF.
- 2 | Turn site source breakers OFF.
- 3 | Pull the plug end of the cord straight out of the source receptacle.
- 4 | Coil and stow the shoreline power cord.

### **30 AMP SERVICE**

30 amp service is the most common in the RV industry and used widely on campgrounds. 30 amp service is 120 volt service limited to a total of 30 amps of power at a time when your shoreline cord is plugged into a 30 amp service. With this service, you will be able to run any single appliance in the RV, however, you might not be able to run a certain group or equipment/appliances at the same time. See video at [www.keystonerv.com](http://www.keystonerv.com) for more information.

For instance, most air conditioners will draw up to 15 amps and a microwave about 10 amps. If you turn on the microwave while running the air conditioner, it may blow a breaker either in the RV or at the pole. This is because the air conditioner and the microwave combined draw 25 amps and the converter (which runs continuous) is drawing an additional 5 - 13 amps depending on the 12 volt load (battery charging, lights, etc.). Also, consider common loads such as the refrigerator, water heater, coffee maker, and other appliances.

- DO NOT plug your RV 30 amp shoreline cord into any receptacle that is not wired to National Electric Code for 30 amp 120 volt configuration. Doing so will supply the RV with the incorrect electrical power causing extensive damage to the electrical system and 120 volt components which would not be warrantable.

- DO NOT plug in or unplug the shoreline cord while under load. Make sure all 120 volt components are turned off prior to connecting or disconnecting the shoreline cord or damage to the 120 volt systems may occur. Turn off the breakers at the pedestal first before connecting or disconnecting the shoreline cord to prevent damage.



**FAILURE TO PLUG YOUR SHORELINE CORD INTO A PROPERLY WIRED 30 AMP RECEPTACLE COULD LEAD TO AN INCREASED RISK OF DEATH, SERIOUS INJURY OR PROPERTY DAMAGE.**

### **50 AMP SERVICE**

If equipped with 50 amp service your shore cord has 2 lines of 120 volt power, 1 neutral wire and 1 ground wire to feed your trailer with 50 amp service. For maximum use from your power supply ensure to use a campground pedestal wired for 50 amp service. This will ensure adequate safe power to your unit.

- DO NOT plug your RV 50 amp shoreline cord into any receptacle that is not wired to National Electric Code for 50 amp 120/240 volt configuration. Doing so will supply the RV with the incorrect electrical power causing extensive damage to the electrical system and 120 volt components which would not be warrantable.

- DO NOT disconnect the 50 amp plug connection by pulling up on the cord. This will cause a loss of neutral and 240 volts AC will be supplied to the electrical system and 120 volt components causing extensive damage which would not be warrantable. Always pull straight out on the head of the cord so all 4 prongs disengage the receptacle simultaneously.

- DO NOT plug in or unplug the shoreline cord while under load. Make sure all 120 volt components are turned off prior to connecting or disconnecting the shoreline cord or damage to the 120 volt systems may occur. Turn off the breakers at the pedestal first before connecting or disconnecting the shoreline cord to prevent damage.



**FAILURE TO PLUG YOUR 50 AMP SHORELINE CORD INTO ANY RECEPTACLE THAT IS NOT WIRED TO THE NATIONAL ELECTRIC CODE FOR 50 AMP 120/240 VOLT CONFIGURATION COULD LEAD TO AN INCREASED RISK OF DEATH, SERIOUS INJURY OR PROPERTY DAMAGE.**

The following is a reference chart to show typical amperage draw on common appliances. It is recommended to operate the water heater on gas only when using other high amp draw appliances to prevent tripping of breakers.

### 120 VOLT AMPERAGE CHART

APPLIANCE	AMPERAGE CONSUMED	APPLIANCE	AMPERAGE CONSUMED
120 Volt Light	1	Refrigerator (Shore Power)	3 - 4
Ceiling Fan (Variable Speeds)	3 - 5	Residential Refrigerator	12.2 - 15
Coffee Maker	7	Roof Air Conditioner (Each)	13 - 15
Converter 55 amp Output	5 - 13	Space Heater	10 - 15
Curling Iron	3 - 4	Toaster (2 Slice)	7 - 13
DVD Players	1 - 2	TV (120 volt)	1 - 2
Electric Water Heater	10	Washer/Dryer	10
Hair Dryer	9	Window Air Conditioner	6
Microwave	10		

#### AVAILABLE POWER

The power system in your RV is only as good as the power supply feeding it. If the campground has only 30 amp service available, an RV with 50 amp service will only be able to use 30 amps of service. Some campgrounds have only 15 amp service available which is not adequate to properly run an air conditioner or certain other appliances. The best way to know what amperage is available is to call ahead to the campground. There are special adaptors available through your local Keystone dealer to make these connections to campgrounds with lower service ratings.

#### ADAPTERS/REDUCERS

These devices connect to the shoreline cord to allow it to plug into a lesser power supply. When using adapters, your available electrical power for the entire RV is reduced to the rating of the adapter. 50 amp to 30 amp, 30 amp to 20 amp and 30 amp to 15 amp are the most common. Use the reference chart supplied (See page 55 and chart above) to manage what you can effectively use in your RV at one time should you choose to utilize this type of after market equipment.

#### EXTENSION CORDS

If it is necessary to use an extension cord to extend your RV shoreline cord to the available campground electrical outlet, the correct size of the extension cord must be utilized i.e. 30 amp service - 30 amp 10 gauge extension cord not to exceed 50 feet. Adapters/Reducers are not to be used when using an extension cord and do not plug multiple extension cords together.

Your local Keystone dealer can assist you in obtaining the proper extension cord for your needs.



**THE USE OF THE INCORRECT SIZE OR LENGTH OF EXTENSION CORD AND/OR OVERLOADING THE EXTENSION CORD, ADAPTERS OR REDUCERS COULD INCREASE THE RISK OF FIRE, PERSONAL INJURY OR PROPERTY DAMAGE.**

**THE USE OF SHORELINE CORDS, RECEPTACLES, EXTENSION CORDS, ADAPTERS OR REDUCERS WITH LOOSE, MISSING, DAMAGED, DEGRADED OR CORRODED TERMINALS/CONNECTIONS COULD INCREASE THE RISK OF FIRE, PERSONAL INJURY OR PROPERTY DAMAGE.**

#### POWER CENTER/CONVERTER

Once connected to a power source (Shoreline/Generator), the Power Center/Converter serves 3 primary purposes:

- 1 | Power distribution - all the incoming power is distributed to the RV through the 120 volt circuit breakers and 12 volt fuses within the Power Center.
- 2 | Converting 120 volt to 12 volt power - In essence, utilization of the converter will reduce the usage of the RV battery.
- 3 | Battery charger - It will charge the RV battery. When plugged in to a power source for long periods of time, it will be necessary to maintain your RV battery more frequently. Because the battery is being charged constantly, checking battery water levels (if applicable) is critical to properly maintain your RV battery.



If equipped, the Power Center/Converter Charger has a Dip Switch to change battery charging capability from Lead Acid Batteries to Lithium Batteries. Please refer to the manufacturer's instructions for care and operation. If your Power Center/Converter Charger does not support charging Lithium Ion Batteries, the maximum charge a Lithium Ion battery can receive is approximately 80% of the total battery capacity. Aftermarket all-in-one or stand-alone converter chargers are available in place of changing your Power Center/Converter Charger.

## INVERTER

If equipped, an Inverter does just the opposite of a Converter. The Inverter converts 12 volt DC power into 120 volt AC power. Therefore, an Inverter will allow you to use some 120 volt items from battery power. Before you plan a camping trip without shore power, there are some things to consider, such as, what components and outlets can be powered by the Inverter. Make sure that you do the research and know just how much power you are going to need. When using an inverter without the unit plugged in, you will have to be selective as to what is really needed and be conservative with your power.

Your camping style may require a visit to your local authorized dealership for assistance in achieving your specific needs.

## MINI POWER CONTROL SYSTEM

If equipped, the Mini Power Control System (PCS) monitors the total amp draw of a RV and prevents circuit breakers from tripping by momentarily shedding (turning off) designated appliances as determined by the manufacturer. As additional appliances such as a microwave, coffee pot, or toaster are turned on, the Mini PCS will turn off the appliances it controls such as the water heater or air conditioner(s), (compressor only, fan may continue to run).

As the additional appliances are turned back off the controlled appliances will begin to turn back on as power consumption decreases. Please refer to the manufacturer's instructions for care and operation at [www.precisioncircuitsinc.com](http://www.precisioncircuitsinc.com).

## POWER SHARE

If equipped, a Power Share Switch affords you the ability to wire two air conditioners into a single circuit breaker. The Primary A/C never loses power and the Secondary A/C is allowed to run as long as the Primary is not drawing any current. Please refer to the manufacturer's instructions for care and operation at [www.precisioncircuitsinc.com](http://www.precisioncircuitsinc.com).

## 120 VOLT CIRCUIT BREAKERS

The 120 Volt circuits are protected by circuit breakers and can handle from 15 to 30 amps depending upon the circuit. The most common cause of a circuit breaker tripping is an overloaded circuit. For example, when a space heater is plugged into the same outlet as the toaster, the circuit would be overloaded. The circuit is protected by a 15 amp breaker and the combined amp draw of the space heater and toaster is at least 17 amps. If this happens, reduce the load on the circuit and reset the breaker.

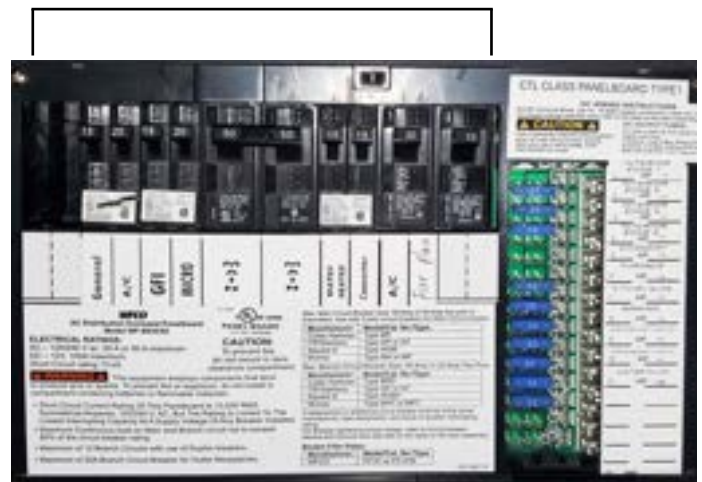


**NEVER REPLACE CIRCUIT BREAKERS OR FUSES OF HIGHER CURRENT RATING THAN THOSE ORIGINALLY INSTALLED. THIS COULD OVER HEAT THE WIRING AND START A FIRE.**

## 12 VOLT FUSES

The fuses that protect the 12 volt system are located in the distribution panel next to the 120 volt breakers. Typically, the fuse panel is labeled to indicate fuse size and which components are on each circuit.

### 120V BREAKERS



### 12V FUSES

### GFCI – (Ground Fault Circuit Interrupter)

The bathroom, kitchen and exterior receptacles are protected by a highly sensitive device, known as a "Ground Fault Circuit Interrupter", which is designed to sense the slightest electrical "short" at those receptacles and instantly disconnect the current before a person can be injured. This works like a circuit breaker and has a reset button on the face of the receptacle. Typically, they are located in the bathroom or kitchen.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.

**GFCI**



### GFCI - TESTING

The GFCI receptacle should be tested at least once a month or prior to every trip. To test the GFCI, push the TEST button. The RESET button will pop out. Power is now off at all outlets protected by the GFCI receptacle. Push in the RESET button to restore power. The test is complete when the reset button remains pushed in. If the RESET button does not pop out when testing, the GFCI is malfunctioning and no outlets should be used on this circuit, as protection is lost. Call your dealer if the GFCI malfunctions.

### BRAKES, ELECTRIC/HYDRAULIC

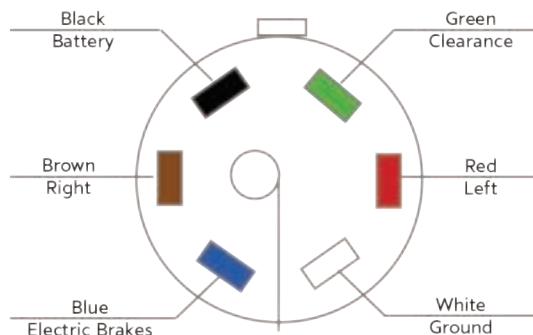
Keystone RVs are equipped with electric brakes or optional electric over hydraulic disc brakes. These brakes are designed to work in conjunction with a properly installed brake controller which would be installed in the tow vehicle. Please refer to the axle manufacturer's instructions supplied with the RV for care and operation and/or [www.dexteraxle.com](http://www.dexteraxle.com) or [www.lci1.com](http://www.lci1.com), [www.morryde.com](http://www.morryde.com).

### BREAKAWAY SWITCH

See page 27.

### 7-WAY TRAILER PLUG

A 7-pin plug supplies the electrical connection between the tow vehicle and the RV. This plug connects into a receptacle on the tow vehicle to allow operation of the RV's marker lights, tail lights, brake lights and electric brakes. When connected, the tow vehicle alternator will also charge the RV battery in the RV. Typically, the wires within the 7-Way trailer plug are color-coded as identified in the following graphics.



No.	Color	Item
1	White	Common Ground
2	Blue	Electric Brake
3	Green	Tail Lights and Clearance
4	Black	Battery Charge
5	Red	Left Stop and Turn
6	Brown	Right Stop and Turn
7	Yellow	Reverse (if equipped)



# 09 PROPANE GAS SYSTEM

Read all of the manufacturer's appliance literature, including the information on the propane bottles and regulator, provided within the RV manual packet and follow any instructions given.

## GENERAL INFORMATION

Propane gas is a clean burning dependable fuel for operating all propane gas appliances when utilized properly. Propane gas is highly flammable and is contained under high pressure. Improper use CAN cause fires and/or explosions. Propane gas is colorless and odorless in its natural state. An odorant, similar to rotten egg smell, has been added for consumer safety purposes to help detect leaks and provide warning. If a sulfur or "rotten egg smell" is detected in or around the RV, perform the following steps immediately:



### IF YOU SMELL PROPANE...

- 1 | EXTINGUISH ANY OPEN FLAMES AND ALL SMOKING MATERIALS.
- 2 | SHUT OFF THE PROPANE SUPPLY AT THE CONTAINER VALVE(S) OR PROPANE SUPPLY CONNECTION.
- 3 | DO NOT TOUCH ELECTRICAL SWITCHES.
- 4 | OPEN DOORS AND OTHER VENTILATING OPENINGS.
- 5 | LEAVE THE AREA UNTIL THE ODOR CLEARS.
- 6 | HAVE THE PROPANE SYSTEM CHECKED AND LEAKAGE SOURCE CORRECTED BEFORE USING AGAIN.



IGNITION OF FLAMMABLE VAPORS CAN LEAD TO A FIRE OR EXPLOSION AND RESULT IN DEATH OR SERIOUS INJURY.

PORTABLE FUEL-BURNING EQUIPMENT, INCLUDING WOOD AND CHARCOAL GRILLS AND STOVES, MUST NOT BE USED INSIDE THE RV. THE USE OF THIS EQUIPMENT INSIDE THE RV CAN CAUSE FIRES OR ASPHYXIATION.

"Off-roading with the family is the best!"

David | Florida



## PROPANE GAS SYSTEM

The propane gas system is a closed system made up of bottles (also referred to as cylinders), regulators, valves, supply lines and appliances. Propane tanks contain liquid under high pressure which is vaporized into a gas. The gas is regulated into a lower pressure and distributed through the supply lines to provide the fuel for propane appliances to burn.

Consumption of propane gas depends upon the frequency and duration of use of the propane appliances. The furnace and oven have the highest consumption rates. During cold weather, it is advisable to check the bottles often and always keep one full. Safety must be observed at all times when using the propane gas system.



**ALL PILOT LIGHTS, APPLIANCES AND THEIR IGNITORS (SEE OPERATING INSTRUCTIONS) SHALL BE TURNED OFF BEFORE REFUELING OF PROPANE CONTAINERS. FAILURE TO COMPLY CAN RESULT IN DEATH OR SERIOUS INJURY.**



**DO NOT FILL PROPANE CONTAINER(S) TO MORE THAN 80 PERCENT OF CAPACITY. A PROPERLY FILLED PROPANE TANK SHOULD CONTAIN APPROXIMATELY 80 PERCENT OF ITS VOLUME AS LIQUID PROPANE.**

**OVERFILLING THE PROPANE CONTAINER(S) COULD RESULT IN UNCONTROLLED PROPANE FLOW, WHICH COULD LEAD TO FIRE OR EXPLOSION AND RESULT IN DEATH OR SERIOUS INJURY.**

**DO NOT PLACE PROPANE CYLINDERS INSIDE THE VEHICLE. PROPANE CYLINDERS ARE EQUIPPED WITH SAFETY DEVICES THAT RELIEVE EXCESSIVE PRESSURE BY DISCHARGING PROPANE TO THE ATMOSPHERE.**

**PROPANE GAS IS HIGHLY FLAMMABLE. THE PRESENCE OF PROPANE COULD LEAD TO A FIRE OR EXPLOSION AND RESULT IN DEATH OR SERIOUS INJURY.**

## REGULATOR

The regulator is the heart of the propane system. Propane is under high pressure in the bottle and the regulator reduces this pressure to allow safe use with the appliances in RVs. The lower pressure is distributed to the appliances. The lever on the automatic gas regulator will point to the gas bottle in service. When the red flag appears in the inspection glass, this indicates that bottle is empty. The lever should then be turned toward the other bottle and the empty filled as soon as possible.

The regulator has a vent that allows it to breathe. Propane regulators must always be installed with the regulator vent facing downward. Regulators that are not in compartments have been equipped with a protective cover; make sure that the regulator vent faces downward and the cover is kept in place to minimize vent blockage that could result in excessive propane pressure, causing fire or explosion. Check the vent frequently to keep the vent clean and clear of any debris, corrosion or obstruction. A clogged regulator can result in higher pressures, loss of fuel and/or component failure. The vent can be cleaned by using a toothbrush and should be checked periodically for correct pressure output by a qualified propane service center.



**DO NOT ATTEMPT TO ADJUST OR REPAIR THE REGULATOR. ADJUSTMENTS AND REPAIRS REQUIRE SPECIALIZED TRAINING AND TOOLS. CONTACT A QUALIFIED PROPANE SERVICE TECHNICIAN. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN A FIRE, EXPLOSION AND/OR INJURIES, INCLUDING LOSS OF LIFE.**

### **SPLIT-BOTTLE SYSTEMS – (PRIMARYLY ON FIFTH WHEELS)**

Some fifth wheels use a split-bottle system where there is one propane bottle located on each side of the RV. There are some instances where this system may inadvertently activate the "excess flow device" located in the propane "pigtail" hose fitting.

The "excess flow device" is a safety feature that is designed to detect a large leak in the propane system such as a broken gas line and reduce the flow of propane from the bottle. It also activates when the propane bottle service valve is turned on and the propane system is not completely closed such as when the range burner is left on. The device is not designed to completely stop the flow of propane, but reduce it to approximately 20,000 BTUs/hr.

When activated, one appliance at a time may operate normally, however, when a large demand is placed on the system, such as, turning on several appliances or the furnace, they will not receive sufficient propane pressure to operate properly. Follow the procedure below to avoid inadvertently activating the "excess flow device" and to operate the split bottle propane system.

Follow this procedure for the following conditions: after refilling either or both bottles, after any part of the propane system has been disconnected, appliance burners are not operating correctly, and low operating pressure exists downstream from the regulator when operating heavy demand appliances such as the furnace.

- 1 | Verify both propane bottles contain sufficient propane - refill if necessary.
- 2 | Close both propane bottle service valves.
- 3 | Attach the propane pigtails to the service valve.
- 4 | Close manually operated gas valves on the range or water heater.
- 5 | Turn the indicator on the regulator to the bottle closest to it.
- 6 | Slowly open the service valve on the bottle closest to the regulator.  
This is typically the bottle on the entry door side. Open the valve all the way.
- 7 | Slowly open the service valve on the bottle that is furthest from the regulator until you can hear gas start to flow through. Do not open the valve all the way. Wait 1 minute.
- 8 | Re-close the service valve and then slowly re-open it all the way.  
The system is now ready to operate.

#### PROPANE GAS PIGTAILS

Keystone propane systems are equipped with the same Type I cylinder connection as you see on current gas grills. The Type I connection system uses the Excess Flow Pigtail Hose, distinguished by the large green nylon swivel nut. The green swivel nut attaches to the outside of the cylinder valve with right hand threads. Tighten the swivel nut by hand. DO NOT use tools.

The safety features of this system prevent gas from flowing unless the connection is tight and will limit excessive gas flow. In cases of extreme heat, 240° to 300°F, at the connection, the connection to the cylinder will be shut down.



## PROPANE GAS LINES

The primary manifold is a black pipe located beneath the RV. Copper tubing with flare fittings are used as secondary lines running to the gas appliances. If repairs are needed to these lines or any component of the propane system, DO NOT ATTEMPT to repair yourself and follow the steps listed under the warning "IF YOU SMELL PROPANE" on page 61.

Although your propane gas system was thoroughly inspected for leaks before delivery, the propane gas system should be inspected and checked for leaks by a RV dealer at least once a year or any time the system is opened.



**THE PROPANE PIPING SYSTEM IS DESIGNED FOR USE WITH PROPANE ONLY. DO NOT CONNECT NATURAL GAS TO THIS SYSTEM.**

## PROPANE GAS LEAK DETECTOR

Keystone RV installs a propane gas leak detector in every camper. It is a safety device that is permanently mounted near the floor and is powered by 12 volt (the RV battery and/or converter). The detector is operational only as long as 12 volt power is available. If the power is disconnected, the monitor will not operate.

Should a propane leak occur, the detector will sound an alarm and continue until the gas has dissipated or until a mute button is pressed. The mute button will only stop the alarm from sounding for 60 seconds and alarm will reoccur if gas is still present. The alarm may sound at times when no propane is present, such as, when household products are in use: aerosol hair spray, cleaners, adhesives, alcohol, etc. Be sure to air out the RV thoroughly after delivery and when using these products. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicusa.com](http://www.dometicusa.com), [www.mtiindustries.com](http://www.mtiindustries.com).

The propane gas leak detector has a self check circuit which runs continuously while receiving 12 volt power. In the event that the circuitry fails, a failure alarm will sound and the operating indicator will cease to light. Replace the detector when recommended by the manufacturer (typically every five years).

## IF THE ALARM SOUNDS...



- 1 | EXTINGUISH ANY OPEN FLAMES, PILOT LIGHTS AND ALL SMOKING MATERIALS.
- 2 | DO NOT TOUCH ELECTRICAL SWITCHES.
- 3 | SHUT OFF THE PROPANE SUPPLY AT THE CONTAINER VALVE(S) OR PROPANE SUPPLY CONNECTION.
- 4 | OPEN DOORS AND OTHER VENTILATING OPENINGS.
- 5 | LEAVE THE AREA UNTIL THE ODOR CLEARS.
- 6 | HAVE THE PROPANE SYSTEM CHECKED AND LEAKAGE SOURCE CORRECTED BEFORE USING AGAIN.

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



**PROPANE POWERED APPLIANCES PRODUCE CARBON MONOXIDE. CARBON MONOXIDE CAN BE FATAL! WHEN THE CARBON MONOXIDE ALARM DETECTS CARBON MONOXIDE IN THE AIR, IT WILL SOUND. CONSULT THE INDIVIDUAL DETECTOR'S USER MANUAL FOR SPECIFIC INSTRUCTIONS AND/OR AUDIBLE WARNING MEANINGS.**



**PROPANE GAS COULD BE PRESENT IN OTHER AREAS BEFORE IT CAN REACH THE DETECTOR'S LOCATION. THE DETECTOR ONLY INDICATES THE PRESENCE OF PROPANE GAS AT THE SENSOR. NEVER CHECK FOR LEAKS WITH OPEN FLAME.**



# 10 PLUMBING SYSTEM

Your RV plumbing consists of two primary systems: The fresh (potable) water system and the waste water system.

## FRESH (POTABLE) WATER SYSTEM

Potable fresh water is supplied to the RV in two ways:

- 1 | By filling the fresh water tank and pumping the water through the system with the water pump.
- 2 | Connecting a potable water hose to the "City Water Fill," (See page 66) which automatically pressurizes the system.



**USE POTABLE WATER ONLY IN THE FRESH WATER SYSTEM. SANITIZE, FLUSH AND DRAIN BEFORE USING. SEE INSTRUCTIONS UNDER HEADING "SANITIZING THE FRESH WATER SYSTEM" (SEE PAGE 67). FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.**

## WATER PUMP

The 12 volt water pump installed is self-priming and operates upon demand. Meaning, when you open a faucet, the pump will turn on and pump the water from the tank to that faucet. For the pump to operate, please note the following:

- 1 | The fresh water tank must have sufficient water in it.
- 2 | The pump on/off switch must be in the on position. Typically located on the monitor panel.
- 3 | There must be sufficient 12 volt power (battery or converter) to operate the pump.
- 4 | For Hot Water - The water heater has a by-pass valve that can prevent water from entering the water heater, typically for winterization or storing the RV. The tank must be filled and water heater operating. See page 68.
- 5 | The water pump should prime itself and stop running after the open faucet(s) is closed.
- 6 | Pump should run on demand when a faucet is opened, and stop when the faucet is closed.

Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.shurflo.com](http://www.shurflo.com).



Never let the water pump run while the fresh water tank is empty. Damage to the pump and/or a blown circuit may occur.

"We have been out almost every weekend with our 4 kids, ages 3-10, & our lab furbaby. It's big & beautiful!"

Clarissa | Delaware

## **FRESH WATER TANK**

All Keystone RVs are equipped with a fresh water tank. Tank sizes vary significantly by RV brand and model. Keystone RV uses 2 different methods to fill the fresh water tank depending on the brand and model.

**GRAVITY WATER FILL** - Remove the cap on the exterior connection labeled "Fresh Water Connection". Insert the hose from your water source and turn on the water. While filling the tank, periodically check the monitor panel to determine the level of water in the tank. When full, turn the water source off. If overfilled, water will "spit" back out of the gravity fill as there is no automatic shutoff. **DO NOT** leave the RV unattended while filling the fresh water tank. Overfilling the tank can cause damage to the system components which may not be considered warrantable.

**PRESSURE WATER FILL** - Hook a potable water supply to the city water fill valve, turn the valves to the tank fill position and turn on the water supply. While filling the tank, periodically check the monitor panel to determine the level of water in the tank. When full turn the water source off immediately. **DO NOT** overfill and **DO NOT** leave the RV unattended while filling the fresh water tank. Overfilling the tank can cause damage to the system components which may not be considered warrantable. All RVs are equipped with "Low-Point" drains that are designed to drain water from the water tank and all lines. These are located underneath the RV, typically, near the water tank. These drains must be closed or the water system will drain itself of any water entering.

Water should be drained from the fresh water system when not in use. Over time, water quality can degrade which can contaminate the plastic used in the water system and/or cause ill health effects.

Fresh Water is considered "Cargo", therefore, your Cargo Carrying Capacity (CCC) is reduced by the weight of the water you choose to carry.

## **CITY WATER FILL**

The city water fill allows a pressurized potable water line connection (water spigot) direct to the RV. Because the connection is pressurized, there is no need to use the water pump. This method also bypasses the water tank and feeds the entire water system directly.

- Connect the city water fill by using a hose manufactured for potable water use and turn on the source. When in need of water, open the desired faucet or spigot. Air will purge itself when the faucet is opened.
- Each time this connection is made, we recommend inspection of visible water connections for leaks. **DO NOT** leave the RV unattended when hooked to city water fill for extended periods of time. Always use a water pressure regulator to control the water pressure entering the RV.
- City water fills may be in a combination housing with the gravity water fill or stand alone.
- Although the fresh water system was thoroughly inspected for leaks before delivery, fittings can loosen over time and with normal use. Periodically check the fittings at the faucets and all other visible connections and tighten as necessary.

## **WATER SUPPLY AND ODOR**

Local water supplies (well or city) sometimes contain high levels of sulphur or other chemicals which can cause unpleasant odors. Some, like sulphur, can be very unpleasant. Sanitizing the water system, as described and allowing the sanitizing solution to remain for a few days, should eliminate the odor.

## SANITIZING THE FRESH WATER SYSTEM

Keeping the fresh water system clean and free of any potential contaminations should be a top priority. Sanitizing the system before initial use and annually thereafter, or whenever water remains unused for prolonged durations, is recommended. This will help keep the water system fresh and discourage harmful bacterial or viral growth. To sanitize your system, perform the below:

### GRAVITY FILL MODELS:

- 1 | Drain the tank by opening the low point drains. Close the drains after water has been drained.
- 2 | Prepare a chlorine bleach solution of  $\frac{3}{4}$  cup to one gallon of water for every 15 gallons of tank capacity.  
Example: Use 2  $\frac{3}{4}$  gallons of the solution for a 40-gallon tank. If using Ultra bleach concentrations, reduce bleach to  $\frac{1}{8}$  cup to one gallon of water.
- 3 | Add solution to tank through the gravity fill port and fill with water. Open each faucet fixture until a distinct chlorine odor is smelled. Close faucets and let stand 4 hours.
- 4 | Drain system and flush with fresh water until chlorine odor and smell is gone. (If a water filter has been added, change it at this time).

### POWER FILL MODELS:

- 1 | Drain the tank by opening the low point drains. Close the drains after water has been drained.
- 2 | Prepare a chlorine bleach solution of  $\frac{3}{4}$  cup to one gallon of water for every 15 gallons of tank capacity.  
Example: Use 2  $\frac{3}{4}$  gallons of the solution for a 40-gallon tank. If using Ultra bleach concentrations, reduce bleach to  $\frac{1}{8}$  cup to one gallon of water.
- 3 | Add solution to tank through the tank vent located on the side of the coach. This vent is an arched shape part with the words "tank vent" on the vent cover. The vent cover is removable and held in place by detents on either side of the vent. Remove the bug screen inside the vent. Using a funnel and tube, add the sanitizing solution. Reinstall the screen and cover when done.
- 4 | Open each faucet / fixture until a distinct chlorine odor is smelled. Close faucets and let stand 4 hours.
- 5 | Drain system and flush with fresh water until chlorine odor and smell is gone. (If a water filter has been added, change it at this time).

## WATER HEATER

Please refer to the manufacturer's instructions supplied with the RV for care and operation of the water heater. The water heaters used in Keystone products range in size from 6-12 gallons depending on the brand and model. There are 3 types used:

1 | Operates only on LP gas (utilizing 12 volt to light).

2 | Operates on LP gas or 120 volt electric. The on/off switch for the 12 volt is mounted inside the RV. The on/off switch for the 120 volt may be mounted inside or outside on the water heater itself. DO NOT start the water heater unless it has water in it. To verify there is water in the water heater, open the relief valve located on the outside of the water heater. If water is present at the relief valve, you can be sure there is sufficient water in the water heater to operate. Then verify the by-pass valve, located on the back side of the water heater, is set to the use position and open a "hot" water spigot on any faucet. The water will travel from the source, into the water heater and then present itself at the spigot when the water heater is full. Water heaters are equipped with a pressure relief valve designed to relieve water or air pressure therefore dripping may be normal.

3 | On-demand operates on LP gas (utilizing 12 volt to light). Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dometicusa.com](http://www.dometicusa.com), [www.airxcel.com](http://www.airxcel.com), or [www.girardgroupcompanies.com](http://www.girardgroupcompanies.com).



**ALL PILOT LIGHTS, APPLIANCES AND THEIR IGNITORS (SEE OPERATING INSTRUCTIONS) SHALL BE TURNED OFF BEFORE REFUELING OF FUEL TANKS AND/OR PROPANE CONTAINERS. FAILURE TO COMPLY CAN RESULT IN DEATH OR SERIOUS INJURY.**



**WE RECOMMEND THAT THE DIAGNOSIS AND REPAIR OR REPLACEMENT OF YOUR RV'S APPLIANCES BE PERFORMED BY A DEALER OR PROPERLY CERTIFIED RV TECHNICIAN. IMPROPERLY DIAGNOSED, REPAIRED OR REPLACED APPLIANCES AND/OR THEIR PARTS, COULD LEAD TO AN INCREASED RISK OF DEATH OR SERIOUS INJURY.**

## WATER HEATER BY-PASS KIT

If equipped, a by-pass kit allows winterization of the fresh water system without putting RV anti-freeze into the water heater. The by-pass valve(s) are located on the back of the water heater (which is inside the RV) and in by-pass mode, allow water to travel through a "cross-over" line connecting the input and the output lines of the water heater. BE CAREFUL, if in by-pass mode, turning on a "hot" water spigot, WILL NOT put water in the water heater and lighting the water heater with an empty tank could damage the tank which may not be warrantable.



## WATER HEATER STORAGE AND DRAINING

When not using the RV, drain the water from the water heater tank. Over time, water quality can degrade which can permanently contaminate the lining of the water heater tank. Also, drain the water heater during cold weather to avoid damage from freezing.

### TO DRAIN THE WATER HEATER:

- 1 | Turn off power to the water heater at the switch or the main breaker.
- 2 | Shut off the gas supply and the water pump.
- 3 | Open all fixtures, both hot and cold throughout the RV.
- 4 | Remove/open the exterior access door to the water heater.
- 5 | Remove the drain plug (or anode rod if equipped) from the tank.
- 6 | Open the pressure relief valve to allow air in and water will drain out tank.

## WINTERIZATION

RV components can be damaged from the effects of freezing. Protecting the plumbing system and related components is crucial. Damages due to weather are not covered under warranty at any time. Many RV owners choose to have their RVs winterized by their dealer while others choose to do it themselves.

Following are descriptions of two methods used to winterize:

- 1 | Compressed Air (Dry) Method - Uses compressed air to blow out any remaining water in the system after draining the system of all water. This method requires an air compressor and appropriate adapters.
- 2 | RV Anti-Freeze (Wet) Method - Uses RV approved, nontoxic, potable, anti-freeze in the system and does not require any special tools.

**"It's 'glamping', not roughing it kind of camping, with lots of creature comforts."**

**Stephanie** | Maine

Many Keystone products include an optional by-pass kit that allows the plumbing system to bypass the water heater reducing the amount of anti-freeze that will be needed (by-pass kits are available at most RV service centers for a reasonable expense and can be installed during winterization). Without a by-pass kit installed, an additional 6–10 gallons of anti-freeze will be required.

On the following page are the procedures for both methods. Your local dealer is best suited to answering any questions as well as providing information on winterization and storage that may be particular to the climate in your area. If using the compressed air method, a special adapter should be purchased to allow compressed air to be delivered through the city water fill. These adapters are available at most RV supply stores.



Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.

#### METHOD 1 - COMPRESSED AIR (WITH BY-PASS KIT INSTALLED)

- 1 | Purchase 1-2 gallons of RV non-toxic anti-freeze.
- 2 | Use compressed air (max 30 psi) to blow out the black tank flush system if equipped.
- 3 | Drain the fresh water tank and empty the waste water holding tanks.
- 4 | Turn off water heater, let water in tank cool and then drain.
- 5 | Turn water heater by-pass valve to by-pass position. (The by-pass valve is located near the water heater incoming lines – an access panel may have to be removed depending upon the model.)
- 6 | If installed, remove water filter from assembly and discard. Install diverter if included.
- 7 | Open all faucets, including shower head sprayer, toilet flushing device and water line drains. Remember the outside shower if equipped.
- 8 | Turn on the water pump for 30 seconds to clear out any water in the suction line.
- 9 | Connect an air hose with an adapter to the city water fill connection.
- 10 | Set the pressure no greater than 30 pounds and blow out the water lines until no water can be seen coming out of the fixtures and lines.
- 11 | Close all drains.
- 12 | Pour about one quart of RV anti-freeze into drains, p-traps, toilet, and tanks.

#### METHOD 2A - RV ANTI-FREEZE (WITH BY-PASS KIT INSTALLED)

- 1 | Purchase 4-6 gallons of RV approved, non-toxic, anti-freeze.
- 2 | Use compressed air (max 30 psi) to blow out the black tank flush system if equipped. An alternate method is to pump anti-freeze into the inlet with a hand pump available from your RV dealer.
- 3 | Drain the fresh water tank and empty the waste water holding tanks.
- 4 | Turn off water heater, let water in tank cool and then drain.
- 5 | Turn water heater by-pass valve to by-pass position. (The by-pass valve is located near the water heater incoming lines – an access panel may have to be removed depending upon the model.)
- 6 | If installed, remove water filter from assembly and discard. Install diverter if included.
- 7 | Pour an amount of RV non-toxic anti-freeze into the fresh water tank to fill the tank above minimum water pump operating level. (Use of a long funnel may be helpful). Add more, if necessary, during procedure. An alternate method is to install a by-pass hose on the suction side of the water pump and pull direct from the anti-freeze container. See your RV dealer for necessary hose and fittings.
- 8 | Turn on pump switch and open the cold water side of all faucet fixtures. Leave open until the anti-freeze comes out (generally pink in color). Repeat for hot water side. Remember the outside shower if equipped.
- 9 | Flush toilet until anti-freeze begins to flow into the bowl and then pour one quart of anti-freeze down the toilet to winterize the black tank. Leave a small amount of anti-freeze in the toilet to cover the seals.
- 10 | Pour about one quart of anti-freeze down each shower/tub, lavatory sink, and kitchen sink to fill p-traps.

**METHOD 2B - RV ANTI-FREEZE WITH EZ WINTERIZING SYSTEM - NOT INCLUDED ON ALL MODELS  
(WITH BY-PASS KIT INSTALLED)**

- 1 | Purchase 4-6 gallons of RV approved, non-toxic, anti-freeze.
- 2 | Drain all tanks, fresh water and sewage tanks.
- 3 | Turn water heater by-pass valve to by-pass position. (The by-pass valve is located near the water heater incoming lines – an access panel may have to be removed depending upon the model.)
- 4 | Drain water heater.
- 5 | If installed, remove water filter from assembly and discard. Install diverter if included.
- 6 | Locate the EZ winterizing system found near water pump or on some models in water management panel. Turn valve to close flow from fresh tank and allow flow from EZ winterizing hose. Place hose into supply of anti-freeze.
- 7 | Turn on pump switch and open the cold water side of all faucet fixtures. Leave open until the anti-freeze comes out (generally pink in color). Repeat for hot water side.
- 8 | Flush toilet until anti-freeze begins to flow into the bowl and then pour one gallon of anti-freeze down the toilet to winterize the black tank.
- 9 | Pour anti-freeze down each shower/tub, lavatory sink, and kitchen sink to fill p-traps.
- 10 | To winterize gray tank(s) pour one gallon down each related sink drain.



**DO NOT USE AUTOMOTIVE ANTI-FREEZE. AUTOMOTIVE ANTI-FREEZE IS POISONOUS AND NOT FOR USE IN POTABLE WATER SYSTEMS.**

**"The experience of a lifetime;  
seeing America post retirement."**

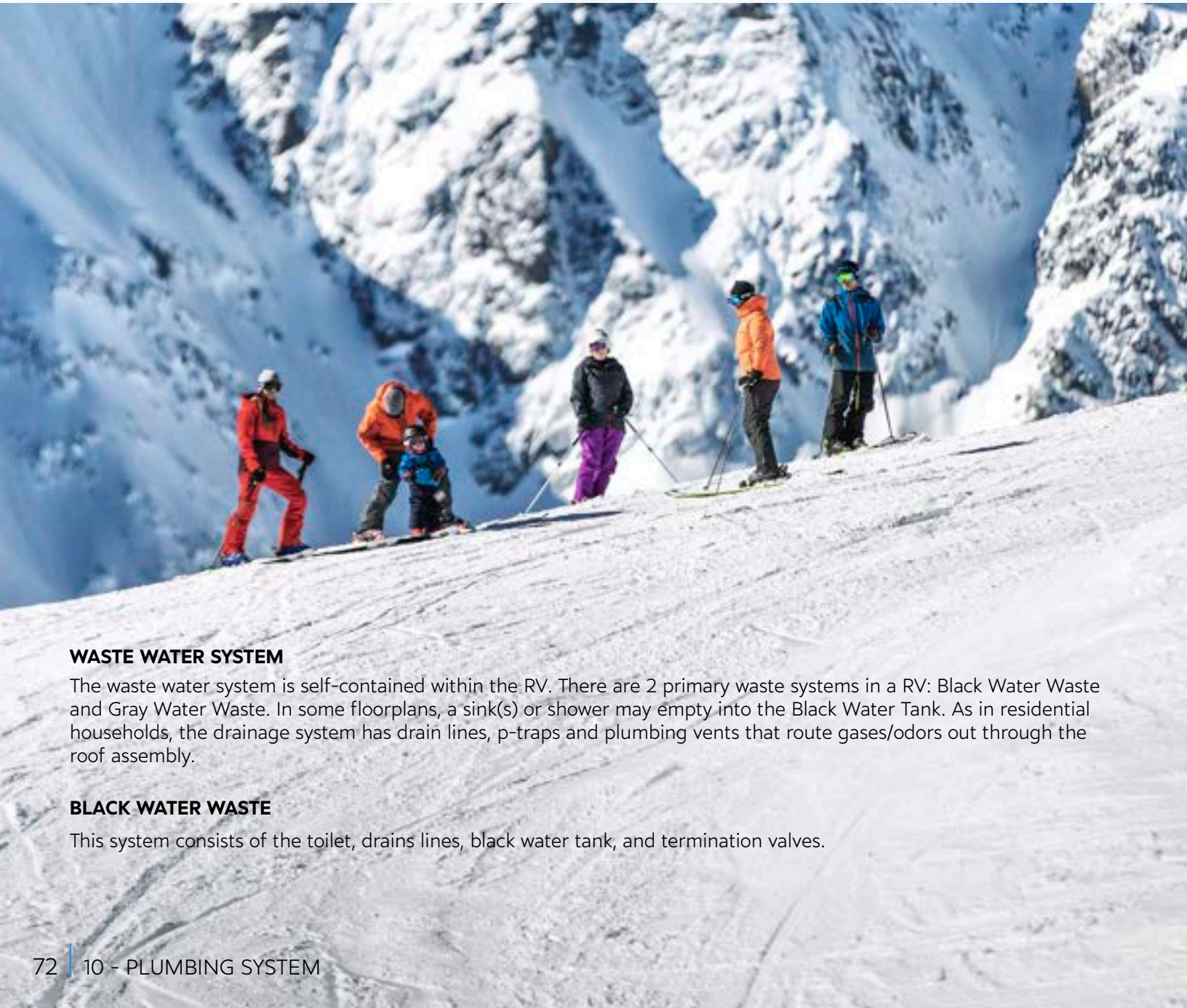
**Michael & Ann | Ohio**



## DE-WINTERIZATION/REMOVAL OF ANTI-FREEZE

If purchasing a coach that is winterized with RV anti-freeze or having had an existing RV winterized before winter storage, the plumbing system must be flushed and sanitized prior to use. Do not attempt to turn on water heater if system is winterized. Perform the following prior to attempting to operate the water heater or use the plumbing system.

- 1 | Drain all tanks, fresh water and sewage. Close the drains after water has drained.
- 2 | Attach garden hose to fresh water fill and fill tank.
- 3 | Turn on pump switch and open cold water side of all faucet/shower fixtures. Leave open until water runs clear. Repeat for hot water side.
- 4 | Flush toilet until clear water runs into bowl.
- 5 | Dump tanks again. Close the drains after water has drained.
- 6 | Sanitize water system. See page 67.
- 7 | If a water filter is installed, drain the lines, remove filter assembly, clean and reinstall with new filter.
- 8 | When ready to use the water heater, turn by-pass valve to open position to allow water to enter hot water heater tank and fill according to instructions.



## WASTE WATER SYSTEM

The waste water system is self-contained within the RV. There are 2 primary waste systems in a RV: Black Water Waste and Gray Water Waste. In some floorplans, a sink(s) or shower may empty into the Black Water Tank. As in residential households, the drainage system has drain lines, p-traps and plumbing vents that route gases/odors out through the roof assembly.

## BLACK WATER WASTE

This system consists of the toilet, drains lines, black water tank, and termination valves.



## TOILET

The toilet operates with fresh water supplied by the fresh water tank or city water fill. When flushed, the toilet drains into the black water tank. Please refer to the manufacturer's instructions supplied with the RV for care and operation.

## DRAIN LINES

The drain lines carry the waste from the toilet to the tank and from the tank to the termination valves where it will be drained from the RV.

## BLACK WATER TANK

The term "black water" refers to the by-products of using the toilet. Once the black water tank reaches the desired capacity, the contents can be dumped from the termination valve into an approved dump station. We recommend using a tank deodorizer to help control odors and breakdown solids, available from dealer.

## SOLID BUILD-UP IN THE BLACK WATER TANK

When camping and using a "Full Hook-up" (includes a dump station at the site), DO NOT leave termination valves open. When solids are flushed, the water will run into the dump station and the solids will stick to the bottom of the tank and build up. Leave the termination valves closed until the tank level warrants dumping.

Not using enough water when flushing solids can also cause build up. To prevent this from occurring, add plenty of water to the bowl prior to using/flushing the toilet when solids will be involved. Only use toilet paper approved for use in RVs. The product label will read, "Septic Safe" or "Made for RVs".

Should you ever have a build up of solids, close the valves, fill the tanks about  $\frac{3}{4}$  full with fresh water, drive a distance to agitate the solids and drain the tanks. If the problem continues, it may be necessary to purchase a waste water digester from your local RV dealer which can be added to the tank to help break down solids. Follow the instructions of the digester. Depending on the severity of the situation, it may be necessary to repeat this procedure.

## TERMINATION VALVE

Typically, there is a termination valve for each waste holding tank in the RV and they are located on the roadside. The termination valves are closed to hold waste in the waste tank and open to drain it. See page 74, "Dumping Instructions", to drain the waste water system. RVs with multiple bathrooms and/or dual gray/black tanks may have termination valves separated from the RVs primary termination valves/dumping location. The following caution label has been placed near the side-vented termination that reads:



**KEEP DRAIN VALVE CLOSED TO MINIMIZE THE PRESENCE OF SEWER GASES. SEWER GASES MAY BE PRESENT WHEN RV IS CONNECTED TO CAMPGROUND SEWAGE HOOKUP. MAY LEAD TO ILLNESS OR PERSONAL INJURY.**



### DO NOT PUT THESE ITEMS IN TOILET OR DRAINS

- 1 | Facial tissues, paper towels, sanitary products (including those labeled flushable).
- 2 | Detergents or bleach.
- 3 | Automotive anti-freeze, ammonia, alcohols, or acetones.
- 4 | Grease from cooking, table scraps, or other solids that may cause clogging.



## TANK FLUSHING

Periodically, for correct monitor panel function and to control odor, it is necessary to fill all waste water tanks (black or gray) with fresh water and repeat the dump procedure to help flush any remaining residue from usage. The intervals for this need vary based on amount of use, type of use, holding tank chemical usage, etc.

## GRAY WATER WASTE

Typically, this system consists of all sink/shower drains, gray water tank(s) and termination valves. Gray water is the wastewater from the sinks, tub/shower drains and is stored within one (or more) gray tank(s). Gray water is drained through a termination valve on the roadside of the RV. On some floorplans, some of the gray water waste will empty into the black water tank.

## NO FUSS FLUSH (OPTIONAL)

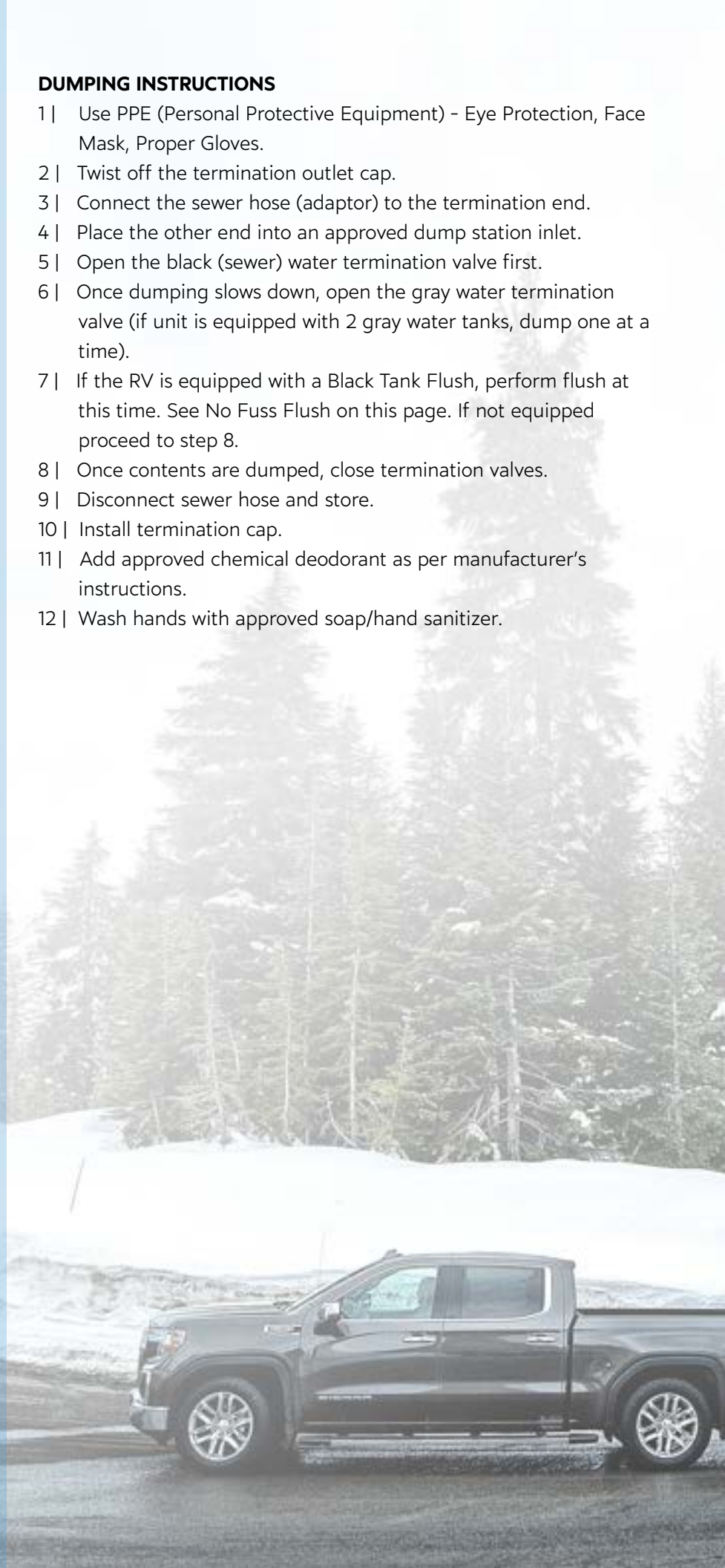
If equipped, the no fuss flush kit has been installed to assist in rinsing the black water tank after dumping. Similar to the city water fill, it is located on the exterior of the RV and a fresh water hose can be hooked to it. To operate, drain the black tank as outlined previously, connect a hose to the inlet labeled "Sewer Valve Must Be Open When Using This Inlet" OR "Black Tank Flush." Open the water supply to full pressure to flush tank. When water runs clear from sewer hose, shut off water supply and disconnect garden hose from source. Do not disconnect hose from flush inlet until water has drained from system.

## NOTICE

DO NOT leave the RV unattended during these processes and make sure the black tank termination valve is open and your sewer hose is connected to an approved dump station. Overfilling the black water tank will result in water overflowing into the interior of your RV from the toilet and the resulting damage is not covered by warranty.

## DUMPING INSTRUCTIONS

- 1 | Use PPE (Personal Protective Equipment) - Eye Protection, Face Mask, Proper Gloves.
- 2 | Twist off the termination outlet cap.
- 3 | Connect the sewer hose (adaptor) to the termination end.
- 4 | Place the other end into an approved dump station inlet.
- 5 | Open the black (sewer) water termination valve first.
- 6 | Once dumping slows down, open the gray water termination valve (if unit is equipped with 2 gray water tanks, dump one at a time).
- 7 | If the RV is equipped with a Black Tank Flush, perform flush at this time. See No Fuss Flush on this page. If not equipped proceed to step 8.
- 8 | Once contents are dumped, close termination valves.
- 9 | Disconnect sewer hose and store.
- 10 | Install termination cap.
- 11 | Add approved chemical deodorant as per manufacturer's instructions.
- 12 | Wash hands with approved soap/hand sanitizer.



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### ODOR CONTROL

The secret to good air quality in (and around) your RV lies with finding an effective holding tank chemical and applying the proper amount based on use and ambient temperature. It is important to note some brands work more effectively than others! If you are experiencing unpleasant odors from your holding tank(s), try switching brands to something proven to work before thinking something may be wrong with the plumbing. The gray tank, as well as the black tank, can produce offending odors. Follow the guidelines supplied with the chemical for usage directions.

### MONITOR PANEL

The monitor panel is designed to give approximate liquid levels of the fresh, gray and black water tanks at a given moment as well as a charge value (based on voltage) of the battery. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.atcomp.com](http://www.atcomp.com) or [www.precisioncircuitsinc.com](http://www.precisioncircuitsinc.com).

### OPERATION

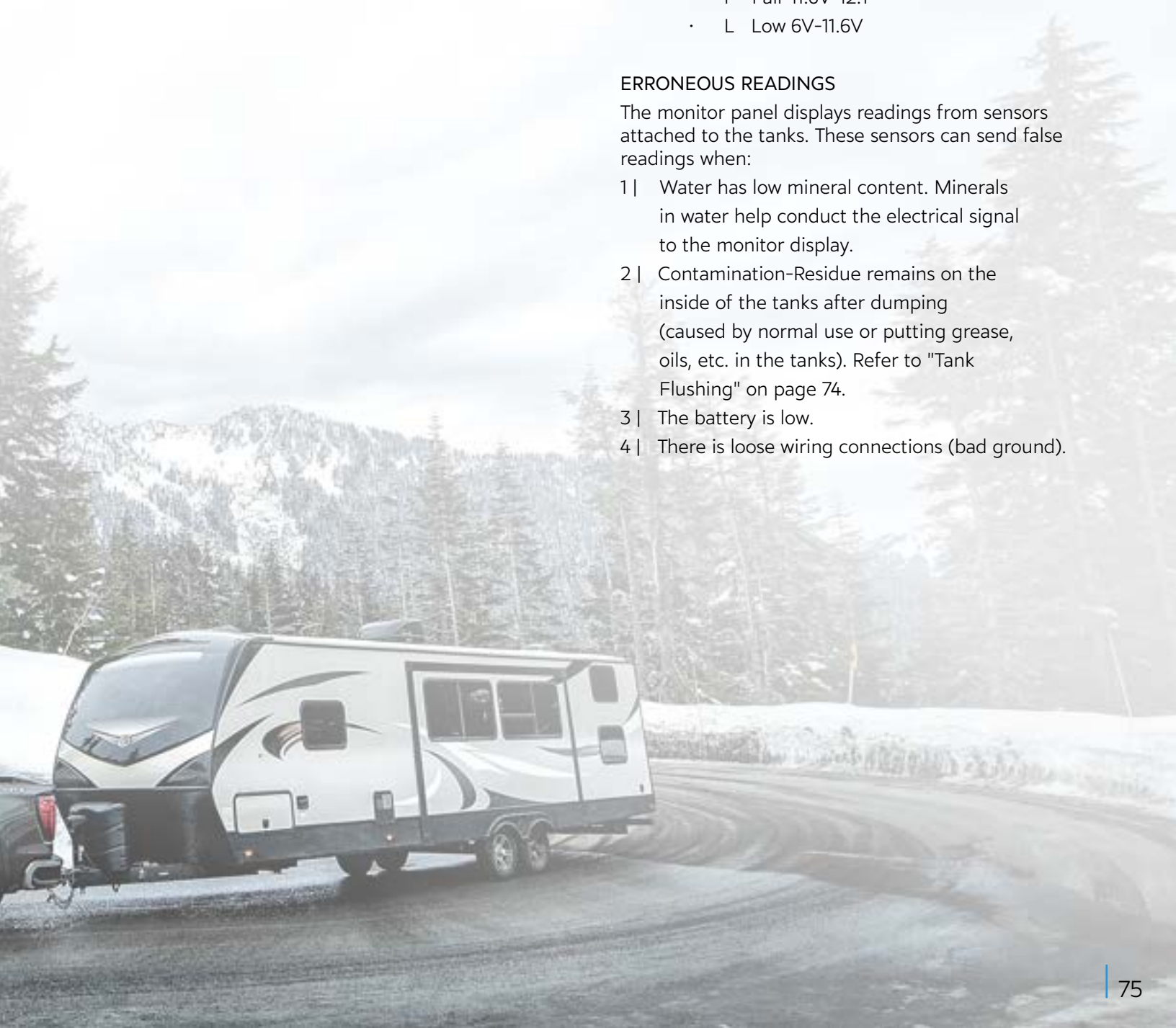
Depress the button for the desired reading (tank or battery). The level readout for the tanks will read at Empty (E), 1/3, 2/3, or Full (F). All lights will be lit when full. The battery conditions are as follows (+/- 5%):

- C Charge <12.7V
- G Good 12.1V-12.7V
- F Fair 11.6V-12.1
- L Low 6V-11.6V

### ERRONEOUS READINGS

The monitor panel displays readings from sensors attached to the tanks. These sensors can send false readings when:

- 1 | Water has low mineral content. Minerals in water help conduct the electrical signal to the monitor display.
- 2 | Contamination-Residue remains on the inside of the tanks after dumping (caused by normal use or putting grease, oils, etc. in the tanks). Refer to "Tank Flushing" on page 74.
- 3 | The battery is low.
- 4 | There is loose wiring connections (bad ground).



# 1 SLIDE-OUT SYSTEMS

"Two large slide-outs and a rear bath make long trips very enjoyable."

Thomas & Renea | West Virginia

Keystone uses two (2) basic types of slide-out systems depending on the product application, Electric and Hydraulic. Please refer to the manufacturer's instructions supplied with the RV for care and operation of the system in your RV.



**STAND CLEAR OF THE SLIDE-OUT'S INTERIOR PATH AND VERIFY THAT THERE ARE NO EXTERIOR OBSTRUCTIONS BEFORE EXTENDING OR RETRACTING THE SLIDE-OUT. ALSO, THERE ARE HARD, SHARP METAL EDGES UNDER THE SLIDE-OUT(S) AND IN THE SLIDE-OUT MECHANISMS. CHILDREN SHOULD BE MONITORED AT ALL TIMES, AND NOT ALLOWED TO PLAY UNDER THE SLIDE-OUT(S) WHEN EXTENDED. KEEP ALL PEOPLE, PETS AND OBJECTS AWAY FROM THE SLIDE-OUT ROOM AND MECHANISM DURING OPERATION. THE MECHANISM ASSEMBLY MAY CATCH LOOSE CLOTHING OR PINCH OR CRUSH APPENDAGES. FAILURE TO FOLLOW THESE WARNINGS COULD RESULT IN SERIOUS INJURY OR DEATH.**

## SLIDE-OUT TIPS

### BEFORE OPERATING ANY SLIDE-OUT:

- 1 | The RV must have a fully charged RV battery (having the shoreline cord plugged in may NOT be enough).
- 2 | Turn off all unnecessary lights and 12 volt components prior to extending/retracting.
- 3 | The RV must be leveled and stabilizer jacks extended.
- 4 | Make sure the room has clearance, inside and outside, to extend/retract.
- 5 | Make sure water and debris are removed from the top of the room's exterior before retracting.
- 6 | Avoid injury by keeping all body parts out of the way of the slide-out.
- 7 | Make sure other parties are clear of the slide-out before extending/retracting.
- 8 | DO NOT ride in the slide-out when extending/retracting.
- 9 | DO NOT step on the floor of the slide-out when the room is retracted. The slide-out floor is not supported by the main floor and stepping on the floor may cause structural damage to the slide room.



- Weather and atmospheric conditions will cause rubber to deteriorate over time. Inspect seals around slide-outs regularly and replace at the first sign of a problem.
- Periodically, during the normal course of operation, slide-out systems and rooms will require adjustment. This is covered under warranty the first ninety (90) days after original retail sale.
- Slide-out rooms should be stored retracted.
- Keep mechanical components clean of road debris, salt, etc. using a mild soap and water.
- Rooms that will be extended for long periods of time should be actuated monthly.
- Failure to follow these basic steps can lead to intermittent operation of the slide-out system, improper sealing, personal injury and damage to the RV which is not warrantable.

## ELECTRICALLY OPERATED SYSTEMS

Keystone uses 3 different styles of electric slide systems:

- 1 | Rack and Pinion.
- 2 | Cable driven.
- 3 | In-Wall.

For all systems, the RV battery drives the motor(s) to extend and retract the slide-out room. Please refer to the manufacturer's instructions supplied with the RV for the care and operation. For information concerning both Rack and Pinion and In-Wall systems by Lippert, please visit [www.lci1.com](http://www.lci1.com). For Cable Driven systems by Norco Industries, please visit [www.norcoind.com](http://www.norcoind.com). DO NOT apply any petroleum products (grease) to the slide system. This will attract dirt and can cause damage to the functional components of the slide system.

## HYDRAULICALLY OPERATED SYSTEMS

### SYSTEM OPERATION

The HydraGear™ Slide-Out System uses a 12 volt DC hydraulic pump which powers the double-acting hydraulic cylinder to move the room(s). Electricity for the pump assembly is supplied by the RV battery. Normal operation is performed by pressing the wall mounted slide-out switch to extend or retract the room. Please refer to the manufacturer's instructions supplied with the RV for care and operation of the system in your RV. The pump is installed with Automatic Transmission Fluid (ATF). For purchase locally, ATF with Dexron III® or Mercon 5® or a blend of both is recommended. The pump fluid should not be changed without completely flushing the system. In cold weather environments, an additive can be used to reduce popping and "stiction" (please visit [www.lci1.com](http://www.lci1.com) for details). For the best performance, use the see-through reservoir to maintain the fluid level within ½" of the top with the room(s) retracted (closed).

The system is designed so that the slide-out with the least resistance will extend/retract.

The Hydraulic pump is wired to an auto reset breaker that is typically within 18" of the RV battery. If overloaded, this breaker will interrupt the operation of the slide-out temporarily which can be perceived as intermittent operation.

### CAUSES FOR THIS TO OCCUR:

- 1 | Low Battery.
- 2 | Loose or corroded battery terminal or ground wire.
- 3 | Slide-out binding (RV not level, sticks/leaves or other debris wedged between the room and the wall).
- 4 | Slide-out/system out of adjustment.
- 5 | Something blocking extending/retracting the slide-out.

### INDIVIDUAL ROOM CONTROL (IRC)

If equipped, this control panel allows each room to be operated independently.

### MANUAL OVERRIDE TO RETRACT OR EXTEND THE SLIDE-OUT ROOM

These Systems can be manually overridden in cases of hydraulic/mechanical failure or when electrical power is either interrupted or unavailable. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com), [www.norcoind.com](http://www.norcoind.com), <https://support.lci1.com/slide-outs/>, <https://equalizersystems.com>, <https://norcoind.com/bal/products/oem/accuslide/index.shtml>, <https://in-command.net/>.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.



**THE SLIDE-OUT ROOM AND MECHANISM ARE A POTENTIAL CRUSH HAZARD. DISCONNECT THE BATTERIES TO DISABLE POWER TO THE SLIDE-OUT(S) BEFORE WORKING ON OR UNDER THE SLIDE-OUT(S). FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.**

# 1 SPORTS UTILITY 2 RECREATIONAL VEHICLES

This chapter deals with RVs equipped with cargo loading ramps and fuel transfer systems. These RVs are sometimes referred to as “ramp RVs” or “toy haulers.” These RVs combine RV living quarters with a large cargo area. Special consideration must be given to the topics in this chapter.

## BED LIFTS

See page 48 under the heading “Elevated Beds And Electric Bed Lift Systems” for complete information including use and safety. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com).

## RAMP RV WEIGHT DISTRIBUTION

All loaded RVs must remain within GVWR and GAWR limits. However, proper load distribution is particularly important for ramp RVs. These RVs are designed to carry a variety of vehicles and cargo in the cargo storage area. These cargo items are typically heavy and consideration must be given on how they are loaded. Because most storage areas are at the rear of the vehicle, the biggest concern is maintaining the correct hitch or pin weight percentage. Vehicles loaded incorrectly could have too little weight resting on the hitch or pin and could become unstable when towing. Keep the loaded tongue weight between 10% and 15% of the total weight for travel trailers and between 15% and 25% of total weight for fifth wheels. For example, if the loaded vehicle weighs 8000 pounds, the hitch weight for a travel trailer should be between 800–1200 pounds (10–15% of the 8000 pound total). For a fifth wheel, the same 8000 pound vehicle should have a pin weight of 1600–2000 pounds (20–25%). By maintaining the correct hitch percentage and staying within the limits of the GVWR and GAWR, you can help insure a safe towing experience with your RV.



**LOCATE AND SECURE CARGO AND VEHICLES TO MAINTAIN SAFE WEIGHT DISTRIBUTION IN THE CARGO AREA AND THROUGHOUT THE RV.**

**IMPROPER WEIGHT DISTRIBUTION OR OVERLOADING COULD LEAD TO LOSS OF VEHICLE CONTROL DURING TRAVEL RESULTING IN SERIOUS INJURY OR DEATH.**

**FOLLOW ALL GUIDELINES CONTAINED IN THIS MANUAL FOR LOADING AND WEIGHING PROCEDURES. MAINTAIN THE LOADED HITCH WEIGHT WITHIN THE PERCENT LEVELS STATED ABOVE. WHERE APPLICABLE, A HITCH WITH BUILT IN SWAY CONTROL IS RECOMMENDED. DO NOT EXCEED THE GVWR (GROSS VEHICLE WEIGHT RATING) OR THE GAWR (GROSS AXLE WEIGHT RATING) OF EITHER THE TOW RV OR TOW VEHICLE.**



## CARGO AREA LOAD RATINGS

Within your RV, you will find a maximum load rating label specifically for the cargo area. This is the maximum designed safe load rating for this area, however, the rating must be understood within the context of the GVWR of the RV. While the label specifies the maximum load the cargo area itself is designed and rated for, care must be taken not to exceed the overall available cargo capacity of the RV. In other words, even though a cargo area is rated at a certain capacity it does not necessarily mean you can load it to that capacity. The overall design of the RV and the GVWR must be considered. For example, if a travel trailer has a cargo area rating of 2000 pounds, a GVWR of 10000 pounds, and a UVW of 7500 pounds, but after loading the trailer with other cargo (and before loading the cargo area) the trailer weighs in at 8200 pounds (700 pounds of cargo added), then the available max load for the cargo area becomes 1800 pounds in order to remain within the overall capacity of the trailer. Similarly, if a fifth wheel has a cargo area rating of 3000 pounds and a GVWR of 17000 pounds, but after loading the fifth wheel with cargo (and before loading the cargo area) it weighs in at 14,500 pounds, then the cargo area cannot be loaded to more than 2500 pounds without overloading the vehicle. In cases where the GVWR is limiting the available capacity of the cargo area, consider removing other cargo (water, LP, personal items, food) in order to take full advantage of the cargo area (if needed). Certain models are designed where the GVWR limits the cargo area rating even without cargo being added. In those cases it is important to understand that while the cargo area rating defines the designed capacity of a cargo area, the overall design of a particular trailer can mean this rating cannot be achieved. The overall GVWR rating takes precedence over the cargo area rating in these cases.

## RAMP RV LOADING SAFETY

The cargo door/loading ramp gives you complete access to the RV cargo area. When lowered, the loading ramp allows you to easily load rolling cargo, bicycles, small motorcycles, ATVs, and small vehicles. This section outlines the safety precautions you should take when loading and unloading cargo and vehicles, as well as loading/unloading procedures, techniques and tips.

Use caution when using the loading ramp/door area of your RV.

This area has many uses and some things to be aware of are:

- Ramps and inclines.
- Dissimilar surfaces that may be wet and slippery.
- Awkward, heavy or unbalanced loads.

## CARGO PLACEMENT

Load any vehicles and heavy cargo items in the cargo area as far forward as possible. Big heavy items should be loaded where they can be securely tied down. Start with top heavy items if you have them. That's usually a good place to start because you must have plenty of room available to properly tie them down. Tying them straight down is not secure enough. They need to be tied off at several angles or they could fall over in an abrupt change of speed or direction. You need room to accomplish this. Smaller items can be used to fill the spaces around them later.

Once you have the heavy items in place, check the hitch weight. If the hitch weight is significantly more or less than the guidelines in section "Ramp RV Weight Distribution" on page 78, make the changes necessary to get close. Then, the smaller items can be placed bringing the hitch weight into the recommended range. They should be arranged so that they will not move during travel. Placing them next to items that have already been tied down helps, but your main concern should be to not lose the balance of the RV. Don't forget you can also make one side of a RV heavier than the other without planning to. This can cause tire failures from overloading an individual tire or tires. This can also cause a very serious problem when cornering, even causing the RV to turn over in a sudden turn.

Top heavy loads can cause problems not only in cornering but also in hard braking. They have a tendency to make the RV "dive" in hard braking conditions. This suddenly increases tongue weight and can decrease your vehicle's front axle loading just when you need steering and brakes the most. Arrange the remainder of the load to act as a counter weight to minimize this effect. Never place heavy objects on add-on devices hung on the rear bumper or placed across the tongue frame. This places heavy objects where they will dramatically effect handling in corners or bumps. Heavy weights placed well behind the axle can also reduce stability. A bicycle may be fine to hang out in back, but not a motorcycle. Use good common sense and always allow plenty of margin for safety.

Continuous attention to safety measures will help prevent accidents, possibly serious injuries, and property damage. You can help minimize these risks, avoid hazards, and enjoy your recreational activities safely by using an effective decision-making strategy as follows:

- 1 | Identify hazards or specific problems in your path. Equipment, materials, debris, other vehicles, children, pets, or any number of other items may be in your way when you load or unload cargo or vehicles.
- 2 | Predict what may happen and think of the consequences of your actions. Be sure you are physically capable of handling the load safely and keeping it under control.
- 3 | Decide what to do based on your capabilities and the capabilities of your equipment.
- 4 | Be sure your cargo does not exceed the capacity of your loading ramp and the RV.

### LOADING EQUIPMENT

The loading equipment furnished with your RV consists of the ramp door and tie down attachment points in the cargo floor area. The rated capacity of the ramp door is found on the capacity rating label attached to the interior edge of the door. Be careful to not overload the toy hauler area and to distribute the weight evenly throughout the RV. Our products offer a multitude of tie down attachment points with various ratings but the minimum for any one is 1200 pounds. Talk to your dealer about tie down straps, cables, hooks, chains, wheel chocks, blocks, etc., that are not supplied with your RV.

### CHOCKS AND BLOCKS

Wheel chocks are wedge-shaped blocks placed in front of and behind the rear tires of a RV to prevent the RV from moving while it is being loaded. Always hitch the RV to the tow vehicle and use wheel chocks or other vehicle-restraining devices when loading and unloading the RV. When chocking, use wheel chocks of the appropriate size and material to securely hold the vehicle.

Don't use lumber, cinder blocks, rocks, or other makeshift items to chock.

### TIE DOWNS

Use tie downs rated for the weight of the object being secured. Be sure to attach and secure each tie down so that it cannot come loose, unfastened, opened or released while the RV is in motion. Also, use edge protection whenever a tie down could be damaged or cut at the point where it touches an article of cargo.

**Note: Do not over tighten tie downs as this will cause damage to the attachment hardware, floor structure, and cargo.**

The working load limit of a tie down, associated connector, or attachment mechanism is the lowest working load limit of any of its components (including any tensioner device), or the anchor points to which it is attached, whichever is less. When you choose tie down hardware, choose items that are strong enough to hold the load you are securing. The load limit of each tie down used should be at least one-half the working load limit of each tie down that goes from an anchor point on the RV to an attachment point on an article of cargo. Check the tie down manufacturer's specifications to determine working load limits.

**Note: Tie down hardware is typically not supplied with your RV.**

When an article of cargo is not blocked or positioned to prevent movement in the forward direction, the number of tie downs needed depends on the length and weight of the articles. In all cases, use enough tie downs to secure the cargo from moving in any direction. Heavy tool chests or cabinets may require tie downs around bottom, middle and top to secure them. Be sure to lock or secure drawers in these chests or cabinets so they can't open while traveling. Keep handle bars, mirrors, etc. away from the RV interior walls. The walls can be damaged by contact with hard, sharp objects.



## LOADING RAMP OPERATION



**ALWAYS HOOK THE RV TO THE TOW VEHICLE BEFORE MOVING CARGO OR USING THE LOADING RAMP. FAILURE TO DO SO COULD CAUSE THE RV TO TIP BACK AS THE LOAD SHIFTS TO THE REAR OF THE CARGO AREA CAUSING PROPERTY DAMAGE, PERSONAL INJURY, AND/OR DEATH.**

- 1 | Hitch the RV to a tow vehicle before loading and unloading the rear cargo area. Select a parking site where the edge of the rear door/loading ramp will rest entirely on a flat, level surface, and the corners of the door will be supported. Avoid soft sand or mud surfaces. When the RV is loaded, the added cargo weight may cause the RV and/or tow vehicle to become stuck.
- 2 | Set the parking brake on the tow vehicle and install wheel chocks in front and behind the tires on one axle on each side of the RV. DO NOT use the emergency brake away switch on the RV.
- 3 | Lower the front and rear jacks on the RV to stabilize it.
- 4 | Unlock the rear door loading ramp and carefully lower it to the ground. If equipped, extend the ramp extension and install the supporting hardware.
- 5 | If equipped with a power bunk, raise both bunks fully.
- 6 | Move items out of the way of your cargo, whether you are loading or unloading. Have an idea where your cargo will be positioned after your loading/unloading activities.
- 7 | Use caution and proper lifting techniques when loading/unloading items from the cargo area.
- 8 | Use extreme caution when loading/unloading ATVs, motorcycles, or other vehicles ("motorized cargo" or "vehicle(s)"). These machines are generally heavy, and may be hot from operation and/or covered with dirt, oil, or other substances that may make them slippery. See the section "Loading and Unloading Motorized Cargo" below for more details.
- 9 | Make certain that the door seals and hinge area are free of any debris, such as sand or snow, before closing the rear door loading ramp.
- 10 | Inspect the hinges, assist springs, and latch mechanism before each trip for signs of wear or damage, and make any needed repairs for safe operation and towing.

## LOADING AND UNLOADING MOTORIZED CARGO

Many recreation ATV or motorcycle accidents and injuries happen while loading or unloading. Steep inclines, unstable ramps, a short stopping area and accelerating up the ramp can make loading motorized cargo difficult. There is no absolute safe way to drive your motorized cargo into the RV. Take the following steps to aid in reducing the risks associated with transporting, storing, or occupying the RV with motorized equipment and vehicles.

- Wear personal protective equipment while loading and unloading vehicles to/from the RV. This includes but is not limited to, an approved motor vehicle helmet, leather boots, appropriate gloves, and eye protection.
- Never stand in the path of equipment when loading/unloading with the ramp and keep bystanders away from the ramps.
- Keep body parts completely clear of the ramp door hinge pinch area at all times.
- Check parking brakes on the vehicle(s) you are loading/unloading, and on the tow vehicle.
- Inspect ramp and RV floor/loading area for cracks, damage, oil or other debris that may cause slippage.
- Remove carpet from section where fueled vehicles or motorized equipment will be stored.

## **DANGER**

VEHICLES AND EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES AND PLACED IN THE RV CAN CAUSE CARBON MONOXIDE POISONING OR ASPHYXIATION WHICH CAN RESULT IN DEATH OR SERIOUS INJURY.

THE FLAMMABLE LIQUIDS USED TO POWER THESE ITEMS CAN CAUSE A FIRE OR EXPLOSION WHICH CAN RESULT IN DEATH OR SERIOUS INJURY.

TO REDUCE RISK:

- 1 | DO NOT RIDE IN THE VEHICLE STORAGE AREA WHILE VEHICLES ARE PRESENT.
- 2 | DO NOT SLEEP IN THE VEHICLE STORAGE AREA WHEN VEHICLES ARE PRESENT.
- 3 | CLOSE DOORS AND WINDOWS IN WALLS OF SEPARATION (IF INSTALLED) WHILE MOTORIZED VEHICLES ARE PRESENT.
- 4 | RUN FUEL OUT OF THE ENGINES OF STORED VEHICLES AFTER SHUTTING OFF FUEL AT THE FUEL TANK.
- 5 | DO NOT STORE, TRANSPORT, OR DISPENSE FUEL INSIDE THE VEHICLE.
- 6 | OPEN THE WINDOWS, OPENINGS, OR AIR VENTILATION SYSTEMS PROVIDED FOR VENTING THE TRANSPORTATION AREA WHEN VEHICLES ARE PRESENT.
- 7 | DO NOT OPERATE PROPANE APPLIANCES, PILOT LIGHTS, OR ELECTRICAL EQUIPMENT WHEN MOTORIZED VEHICLES ARE PRESENT.

## **WARNING**

CARBON MONOXIDE GAS CAN KILL YOU. FUEL BURNING DEVICES, SUCH AS ATVS OR MOTORCYCLES THAT BURN GASOLINE, DIESEL, OR OTHER FUELS, PRODUCE CO WHEN THEY ARE OPERATING. CARBON MONOXIDE GAS IS INVISIBLE, ODORLESS, AND COLORLESS. DANGEROUS LEVELS OF CARBON MONOXIDE GAS CAN ACCUMULATE IN THE RV WHICH CANNOT BE DETECTED BY SIGHT, SMELL, OR TASTE. EVEN SMALL QUANTITIES OF CARBON MONOXIDE CAN CAUSE CO POISONING AND SUFFOCATION, WHICH WILL CAUSE DEATH, SERIOUS INJURY, OR PERMANENT DISABILITY. EXPOSURE TO HIGH CONCENTRATIONS OF CARBON MONOXIDE FOR EVEN A FEW MINUTES CAN ALSO CAUSE DEATH, SERIOUS INJURY, OR PERMANENT DISABILITY. DO NOT START ATVS, MOTORCYCLES, OR OTHER FUEL BURNING DEVICES WHILE THEY ARE LOCATED IN YOUR RV.

THERE IS A HAZARD OF SERIOUS PERSONAL INJURY WHEN USING A LOADING RAMP. IF THE MOTORIZED CARGO LOSES TRACTION AND SPINS SIDEWAYS, IT COULD SLIP SIDEWAYS OFF THE RAMP, TIPPING SIDEWAYS, AND POSSIBLY FALLING ON THE RIDER CAUSING INJURY. ALWAYS FOLLOW THE RAMP LOADING INSTRUCTIONS IN CHAPTER 12.

## **RAMP POSITIONING**

The ramp angle from the RV floor to the ground affects the risk when loading/unloading cargo. If the ramp angle is reduced, and all other conditions remain the same, risk is reduced. Always try to reduce the loading ramp angle; the shallower the ramp angle, the easier cargo loading will be. Position the RV to take advantage of any terrain features that will help reduce the ramp angle. In all cases, be sure the ends of the ramp door can be fully supported. Always position the loading ramp so the ends that are in contact with the ground are level or at the same height. An uneven ramp may cause the cargo to tip over sideways during loading/unloading.

## LOADING UNDER POWER

Always follow the instructions in the owner's manual for the motorized cargo. If not available, the following are generalized suggestions for loading motorized cargo. At no time should these instructions over-ride the instructions contained in the motorized cargo owner's manual.

- 1 | Shift into lowest gear before ascending ramps.
- 2 | Align wheels with ramps both loading and unloading.
- 3 | Approach straight on, not on an angle. If you are off to one side and the ground is uneven where the ramp touches, an unbalanced situation can occur.
- 4 | The operator should apply the throttle smoothly and climb the ramp at low speed. Too much or sudden increases in acceleration will cause the vehicle to be harder to control and may cause the vehicle to impact the front of the RV cargo area or over-turn.
- 5 | Stop when fully in the RV. Keep handle bars, mirrors, etc. away from the RV interior walls. The walls can be damaged by contact with hard sharp objects.
- 6 | After loading, close the fuel valve and run the engine until it stops (motorcycles and ATVs). Turn the ignition key off and remove it. Set the parking brake. For manual clutch machines, leave the machine in gear.
- 7 | Secure the vehicle with tie downs. The attachment points you select on your equipment must be strong enough to support the weight of the equipment. Usually, attachment points that are low and centered on the equipment frame will be good. An attachment to a decorative piece of chrome or plastic will usually not be a good tie-down point. Consider any leverage action that may occur. An attachment point past the center of the equipment could cause the equipment to either swing around or flip over, causing damage to the equipment, or personal injury. If you have any doubt about the attachment point you have selected, stop and find a better attachment point.

## SECURE THE LOAD

Install blocking devices in the front, back, and on both sides of the wheels to keep it from rolling. This block is strictly an additional safety precaution and does not reduce the need for strapping the vehicle in securely.

Use a minimum of three tie downs to secure the vehicle to the RV. Use one tie down to secure the front of the vehicle to the RV. Use two tie downs to secure the rear of the vehicle to the RV, four tie downs (one at each corner) are preferred.

Attach tie down hooks to the vehicle's frame, not to an accessory such as a mirror, handle bar, pedal, etc. Hooks on the other end must be attached to vehicle cargo anchors installed in the RV.

For transport, motorized cargo with manual transmissions should be left in first gear. Vehicles with automatic transmissions should be in the Park position. The vehicle's ignition key should be turned off and removed, the parking brake set, the run/stop switch in the stop (or off) position, and the fuel lever turned to the off position.



**FAILURE TO PROPERLY SECURE CARGO COULD CAUSE PROPERTY DAMAGE, INJURY, AND/OR DEATH.**



**"Tons of  
storage!"**

Jamie | Arizona



### UNLOADING MOTORIZED CARGO

The safest method of unloading is to push the vehicle down the ramp carefully, braking to ensure control of the vehicle. If you loaded your vehicle forward (front in), you will unload it in reverse. Driving a motorized vehicle in reverse down the ramp is not recommended. A slight turn of the handle or a slip of the wheel can cause your vehicle to fall, tip or roll sideways. If you are on or in the vehicle you can be injured or killed. Unload the vehicle safely as follows:

- 1 | Be sure the back tires of the vehicle are aligned with the ramp and there are no people, pets, or obstructions in the unloading area at the end of the ramp. Assure that the ground surface will support the vehicle, and that the vehicle cannot roll away uncontrolled.
- 2 | Stand at the front of the vehicle.
- 3 | Push the vehicle backward in line with the ramp.
- 4 | As the rear tires start down the ramp let it roll slowly backwards braking enough to control the speed but not so much as to skid and loose control.

### SIDE/REAR PATIO DOORS



**DO NOT EXCEED THE RECOMMENDED MAXIMUM CAPACITY RATING OF YOUR PATIO DOOR. WEIGHT CAPACITY WILL BE LOCATED ON THE PERIMETER FRAME OF THE DOOR.**



**IMPROPER USE OF THE PATIO SYSTEM CAN LEAD TO INJURY OR DEATH.**



Avoid high point loads when using the ramp door as a patio. High point loads are loads that put a lot of pressure on a small area and those can damage the ramp door. Items such as chair legs or table legs with a small footprint combined with a lot of weight run the risk of denting or puncturing the ramp door, which is not covered under warranty.

Return the patio to the stored position when unattended or in periods of inclement weather. The patio or steps may become slippery when wet. Damage to the patio/ramp door due to wind, rain, or any weather condition is not covered under warranty.

If equipped, some ramp doors can also be used as a patio. You will need to support the door with the supplied cables, engage the safety clips, extend the patio hand railings, and properly lock everything into place. Once in patio mode, if equipped, install the step into the retainer provided and lock into place. Keep the gate closed and properly locked at all times when not entering or exiting. Operating instructions for the LCI brand are available at [www.lci1.com/support/master-manuals](http://www.lci1.com/support/master-manuals). Videos for the MORryde brand of patio system are available at [www.morryde.com/](http://www.morryde.com/).

## FUEL TRANSFER SYSTEM



### NO SMOKING.

**BEFORE DISPENSING OF FUEL, TURN OFF ALL ENGINES, FUEL BURNING APPLIANCES AND THEIR IGNITORS (SEE OPERATING INSTRUCTIONS). CONNECT THE BONDING JUMPER WIRE TO THE VEHICLE RECEIVING FUEL. GROUND THE RV. DO NOT DISPENSE FUEL WITHIN 20 FEET OF AN IGNITION SOURCE OR WITHIN 10 FEET OF ANOTHER RV OR STRUCTURE. FAILURE TO COMPLY COULD RESULT IN FIRE, DEATH OR SERIOUS INJURY.**

A fuel transfer system allows you to store gasoline for use in motorcycles, snowmobiles, ATVs or other vehicles and equipment while at a campsite. This system consists of a fuel tank, fuel tank filler, fuel gauge, fuel transfer pump, fuel transfer valve and hose with fill nozzle. Some vehicles will be equipped with a switch at the battery and a switch at the pump. Other vehicles will be equipped with a timer switch allowing the pump to run for five minute intervals. A bonding jumper wire reduces the possibility of static electricity discharge between the fuel station and the equipment being fueled. To fill the tank, remove the fuel filler cap and fill the tank with the grade of gasoline required by your equipment. When replacing the fuel fill cap, be sure it seats squarely and turn it firmly to lock it on the fill pipe neck.

## FUEL TRANSFER SYSTEM SAFETY

Static electricity-related incidents when refueling are extremely unusual. They appear to happen most often in cool or cold and dry climate conditions. In rare circumstances, these static related incidents have resulted in a brief flash fire occurring at the fill point. You can minimize these and other potential fueling hazards by following safe refueling procedures.

A build-up of static electricity can be caused by reentering a vehicle during fueling, particularly in cool or cold and dry weather. If you return to the fuel fill pipe during refueling, the static may discharge at the fill point, causing a flash fire or small sustained fire with gasoline refueling vapors.

Here are some additional refueling safety guidelines when refueling your vehicle or filling up gasoline storage containers:

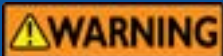
- Turn off vehicle engines. Disable or turn off any auxiliary sources of ignition: the RV furnace, water heater, cooking unit, and any pilot lights. Turn off main propane valve.
- Do not smoke, light matches or lighters while operating the refueling system or when using gasoline.
- Use only the refueling latch provided on the gasoline dispenser nozzle.
- Never jam or otherwise try to lock the refueling latch with the nozzle open.
- Do not re-enter your vehicle during refueling. If you cannot avoid reentering your vehicle, discharge any static build-up BEFORE reaching for the nozzle by touching something metal with a bare hand, such as the vehicle body or frame, away from the nozzle.
- In the unlikely event a static-caused fire occurs when refueling, leave the nozzle in the fill pipe and back away from the vehicle. Turn off the fuel pump master switch immediately.
- Do not over-fill or top-off your vehicle tank, which can cause gasoline spillage.
- Never allow children under licensed driving age to operate the pump.
- Avoid prolonged breathing of gasoline vapors. Use gasoline only in open areas that get plenty of fresh air. Keep your face away from the nozzle or container opening.
- Never siphon gasoline by mouth. Never put gasoline in your mouth for any reason. Gasoline can be harmful or fatal if swallowed. If someone swallows gasoline, do not induce vomiting; contact an emergency medical service provider immediately.
- Keep gasoline away from your eyes and skin; it may cause irritation. Remove gasoline-soaked clothing immediately.
- Use gasoline as a motor fuel only. Never use gasoline to wash your hands or as a cleaning solvent.



## FUEL TRANSFER SYSTEM OPERATION

To operate the fuel transfer system (also see the "Fuel Pump Owner's Manual" in your Owner's Information Package):

- 1 | Lower the tongue jack or fifth-wheel jacks to the ground. This will electrostatically ground the RV to reduce the possibility of static discharge while refueling.
- 2 | Set the master disconnect switch to ON. This will either be located at the battery or at the fuel pump area.
- 3 | Close the vents in the side of the RV to prevent fuel vapor from entering the RV.
- 4 | Attach the ground clip securely to a bare metal part of the equipment to be fueled (frame, handle bar, axle bolt, etc.)
- 5 | Turn the fuel transfer pump switch ON. For vehicles equipped with a timer, turn the timer to on and this will allow the pump to run 5 minutes. When the pump stops, turn on again, if necessary, for another 5 minute run.
- 6 | Remove the fuel hose and nozzle from its compartment. An automatic bypass valve prevents pressure buildup when the pump is on with the nozzle closed.
- 7 | Place the nozzle into the equipment fuel filler and squeeze the handle to allow fuel to flow. Be careful not to overfill the equipment fuel tank. Wipe up any spilled fuel.
- 8 | When finished release the nozzle handle and return the nozzle to its compartment and shut off the pump switch.
- 9 | When you are finished with all fueling, turn off the pump master switch either at the pump or at the battery if equipped.
- 10 | Lock the fuel transfer nozzle compartment to prevent unauthorized use. The nozzle compartment must be locked at all times when not dispensing fuel.



**IF A FUEL SPILL OCCURS IN THE STORAGE AREA OF THE RV, OPEN THE WINDOWS AND SIDEWALL VENTS, AND WIPE UP THE FUEL WITH CLOTH OR PAPER TOWELS. DISPOSE OF THE TOWELS IN A SUITABLE HAZARDOUS WASTE CONTAINER. DO NOT HOSE OUT THE RV WITH WATER. CLEAN THE FUEL SPILL AREAS WITH A GREASE/OIL DISSOLVING CLEANER SUCH AS 409®. THOROUGHLY DRY THE SPILL AREAS.**

**FUEL-SOAKED RAGS OR OTHER MATERIALS CONTAIN FLAMMABLE AND/OR EXPLOSIVE FUEL VAPORS AND OTHER HAZARDOUS SUBSTANCES. CLEAN UP MATERIALS SHOULD BE TEMPORARILY STORED IN A NONFLAMMABLE, VAPOR-TIGHT CONTAINER UNTIL PROPER DISPOSAL FACILITIES ARE AVAILABLE. DO NOT STORE FLAMMABLE CLEAN UP RAGS OR MATERIALS INSIDE THE RV, INSIDE ANY OTHER VEHICLE OR NEAR ANY SOURCE OF FLAME OR IGNITION BECAUSE A FIRE OR EXPLOSION COULD RESULT.**

**ALL PARTS OF THE FUEL TRANSFER SYSTEM INCLUDING BUT NOT LIMITED TO THE HOSES, PUMP, NOZZLE, FITTINGS, AND TANK HAVE BEEN SELECTED FOR THEIR QUALITY, SAFETY, AND INTENDED APPLICATION. ANY ALTERATION OR REPLACEMENT OF ANY PART OTHER THAN KEYSTONE ORIGINAL EQUIPMENT COULD JEOPARDIZE THE INTEGRITY OF THE SYSTEM AND COULD RESULT IN SERIOUS INJURY OR EVEN DEATH. IF YOUR FUELING SYSTEM IS NOT WORKING PROPERLY OR YOU NEED ADDITIONAL INFORMATION ON THE USE OF THE SYSTEM, CONTACT YOUR AUTHORIZED KEYSTONE DEALER IMMEDIATELY OR CALL KEYSTONE DIRECTLY.**

# 1 CARE AND 3 MAINTENANCE

The instructions and recommendations in this manual are meant to be used in conjunction with the individual component manufacturer's manuals accompanying the RV. Be sure to thoroughly review each component manual to avoid missing any specific requirement not reviewed here.

Care and maintenance of the RV is an important step in maintaining the safety, dependability, and appearance of both the interior and exterior of the RV. Keep good records of all maintenance performed as these may be necessary for warranty information or to assist in possible repairs needed.

Operational usage and climates may affect the frequency of maintenance needed on certain components. Preventative maintenance is important to the enjoyment and life of any RV as many problems can be caught before they occur. Please do not hesitate to call your dealer with a question on the care and maintenance of any item.

Please be sure to visit the "Owners" section at <https://www.keystonerv.com/owners/>, where we have supplied you with a variety of helpful resources, including FAQs and "How To" videos, to assist in our goal of providing you with the Ultimate Owner Experience.

## EXTERIOR

### FRAME/CHASSIS/ATTACHMENTS

It is normal for the frame and its components to corrode. When and how much they corrode depends on the environment the RV is subjected to, how often it is subjected to that environment, and the preventative maintenance performed. The more exposure to snow, rain, road salt, road chemicals, salt water, etc. the more accelerated and more severe the corrosion will be. Diligence on the part of the owner when a RV is subjected to these elements can significantly reduce the severity and how quickly this occurs.

When your RV is exposed to a known corrosive (road salt, road chemicals, salt water, etc.), take the time to rinse off the frame, frame components, under carriage, axles and running gear as soon as possible after reaching your destination. Then, wash the exterior. Taking these simple steps will greatly reduce the extent and slow corrosive action significantly.

Inspect the frame and its components periodically. If a spot of rust is developing or the frame was nicked or scratched by road debris, sand (or wire brush) then touch it up with rustproof enamel paint. Think of it as a tooth with a cavity developing. Take care of it before it gets too deep and causes bigger issues.



## STEPS

Keep clean of dirt, salt, mud, etc. and lubricate pivot points with a dry lubricant spray every 30–60 days.

### HITCH COUPLERS (TRAVEL TRAILERS)

Inspect prior to each trip. The ball socket and clamp should be cleaned and lubricated monthly with wheel bearing grease. If coupler or coupler components appear damaged or worn, contact your dealer immediately.

### PIN BOX (FIFTH WHEEL) AND HITCH EQUIPMENT

Inspect monthly or prior to each trip. The hitch plate and locking mechanism should be generously lubricated with a high temperature rated grease at all times. Consult the hitch manufacturer's manual for the brand you selected. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com) or [www.morryde.com](http://www.morryde.com).

### SAFETY CHAINS (TRAVEL TRAILERS)

Safety chains should be inspected before every trip and if damaged or weakened, replaced immediately. Never tow without use of the safety chains.

### TONGUE JACKS, MANUAL/POWER (TRAVEL TRAILERS)

When preparing to travel, inspect the jack for any damage and test operation. If jack is difficult to operate, clean and oil lightly (Manual). If jack is still difficult to operate or freezes, it should be serviced or replaced by a qualified RV technician. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com), [www.davecarter.com](http://www.davecarter.com), [www.domarproducts.com](http://www.domarproducts.com), [www.nationalsales.us](http://www.nationalsales.us), [www.norcoind.com](http://www.norcoind.com) or [www.wesco.com](http://www.wesco.com).

### FIFTH WHEEL JACKS

When preparing to travel, inspect the inner/outer arms (legs) and be sure they are not bent. Check the operation and if the jacks are difficult to operate, have them serviced by a qualified RV technician. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.lci1.com](http://www.lci1.com).

### SIDING AND SIDEWALL ATTACHMENTS

"Black streaks" are caused when pollution, rain, dirt and sealant deterioration mix. We are not aware of any way to prevent "black streaks". However, keeping your exterior washed and waxed often will make them much easier to remove. There are many products in the market that are effective in removing "black streaks". Consult you dealer for these products.

### RV GEL COAT FINISH - CARE AND MAINTENANCE

Fiberglass is a common term for fiber-reinforced plastic, or FRP, which is a plastic material, strengthened using glass fiber cloth and used on many RV's for sidewalls and caps. To give the fiberglass a smooth and shiny surface, a clear or colored gel resin material is applied to the outer surface. Gel coat is available in many colors and is very durable, but it can become dull or faded as it weathers. Sunlight, heat, and moist air combine to oxidize the gel coat surface, fading it and making the surface cloudy. So how do you keep your fiberglass looking good? Simple, you clean and apply a top quality wax twice a year or every 3 months in cases where the vehicle is in constant exposure to the elements.

### GENERAL MAINTENANCE

Normal maintenance of your gel coated fiberglass RV is similar to the care you would give your automobile. In general, automotive cleaners and waxes work well. Do not use caustic, highly alkaline (high pH) cleaners or those containing ammonia. These cleaning agents may darken white or off-white weathered gel coat surfaces. The staining that results is a chemical reaction within the weathered gel coat, and can be removed with a rubbing compound or by light sanding with 400 grit sandpaper followed by application of rubbing compound and waxing.





## CLEANING

Periodic cleaning with a mild detergent product is necessary to remove normal accumulations of soil. This soil is the result of regular use of your RV as well as environmental pollutants, soot, smog, etc. General washing as needed prevents soil build-up, staining, etc.

## WAXING

As the gel coat begins to lose its gloss from constant exposure to the natural environment and pollutants, it will require some special attention to restore the original gloss and color. After washing with mild soaps and detergents, a good polishing with a self-cleaning automotive wax will restore most of the original gloss. A fall and spring wax job is generally all that is needed to maintain the original appearance. If the surface has been allowed to weather badly, and cleaning and wax polishing does not restore the finish satisfactorily, then compounding will be necessary.

## COMPOUNDING

Polishing compound (fine abrasive) or rubbing compound (coarser abrasive) is recommended for use on fiberglass RVs to remove scratches, stains, or a severely weathered surface. Polishing or rubbing compound can be applied by hand or by mechanical means, such as an electrical or pneumatic buffer. After the scratched, stained or weathered surface has been removed, it should be waxed to enhance the gloss and color while providing a seal to retard staining or new soil accumulation.

## REMOVING THE DISCOLORATION

Discoloration of the gel coated fiberglass surface may occur if regular washing and waxing has been neglected. Discolored areas are very shallow in depth and are, in fact, on the surface. They can be removed by gently wet-sanding the affected areas with 600 grit "wet or dry" sandpaper to remove the blemishes. Always sand in one direction, using plenty of water. After sanding, dry the areas and ensure all the discoloration has been removed. If not, repeat the process. Once all discoloration has been removed the affected surface area will need to be buffed. Buffing, using an electrical or pneumatically operated buffer at low speed (1750 rpm-2250 rpm), will restore the luster to the sanded surface. Use a soft wool pad and apply a generous amount of rubbing compound using circular motion. When the buffing has been completed, wash off the rubbing compound with clean water. Dry the surface. Wax your RV with a high-grade automotive wax.

## OTHER ALTERNATIVES

Poli Glow Inc products provide several products that work well to clean, protect and restore a beautiful shine to your fiberglass cap. Poli Glow is not a wax and is easily applied. It wipes on without the need for rubbing or buffing. It will not wash off with soap and water and lasts for over 12 months! The website is [www.poliglow-int.com](http://www.poliglow-int.com) which has a video showing how to use and apply the Poli Glow products. The Poli Glow Kit along with Poli Ox is recommended for caps that have begun to oxidize. Manufacturer instructions must be followed for best results.

## METAL

The aluminum exterior has a baked on enamel finish. Washing frequently with an automotive or RV wash solution will help avoid staining from debris and soil build up. Always rinse the RV with clear water prior to washing to remove any loose dirt. Waxing two to three times a year with a good automotive paste wax will help preserve the finish.

## DO'S and DON'TS

- DO Use Automotive/Marine grade non-abrasive waxes.
- DO Use soft cloths to clean and wax.
- DO be careful around graphics. Wax and wash with the graphic, not against it.
- DO NOT use products containing ammonia or caustic harsh cleaners as they may cause discoloration to the fiberglass surface.
- DO NOT use high-pressure washers, rotating brushes, such as in car washes, and power buffers. Use of these products can damage graphics and/or paint finishes.
- DO NOT dry wipe surfaces.
- DO NOT use rubbing compounds.



## **ABS PLASTIC/MOLDED PARTS**

Some components are constructed with a strong ABS molded plastic. A mild solution of soap and water should be used when cleaning. When using any product, make sure the product is recommended for use on plastics. Avoid harsh abrasive cleaners, ammonia or citric-based products, as discoloration may result.

## **WINDOWS**

The seals/sealants used to seal the windows to the sidewall of the RV are subject to deterioration over time. Every six months, inspect the area between the window frame and the side wall for sealant gaps/voids, cracks, shrinkage, etc. and reseal as necessary. In addition, after a rain, inspect the interior of the RV around windows for any evidence of water penetration. If any interior leaks are noticed, contact an authorized dealer immediately. Catching it early may save you much time, frustration, and money.

To ensure window operation, adjust and lubricate latches and any moving parts annually. A light oil or powdered graphite can be used for lubrication. Periodically, use a vacuum attachment to clean any debris out of the window weep holes, which are necessary to drain any condensation or moisture from hard rains that may collect.

## **CORNER MOLDINGS**

A corner molding is the trim that covers the joint between a front/rear wall and a sidewall. The sealants used there are subject to deterioration in time. As sealants dry out and the RV twists and turns during normal operation, these areas are subject to leaks. This area is very important because a leak may not manifest itself inside the RV where it is easily identifiable. This type of leak may take time to be evident and, by then, there could be substantial damage. Every six months, inspect these areas for sealant gaps/voids, cracks, shrinkage, etc. and reseal as necessary. Please consult your local Keystone dealer for assistance if needed.

## **MOLDINGS**

There are a variety of other moldings used on the RV exterior that include but are not limited to floor line, awning rail, roof line, and flat trim with screw cover. Every six months, inspect these areas for sealant gaps/voids, cracks, shrinkage, etc. and reseal as necessary. Please consult your local Keystone dealer for assistance if needed.

## **OTHER WALL ATTACHMENTS**

These can include, but are not limited to, compartment doors, door holders, range vent, refrigerator vent, lights, awning feet, water fills, cable hatches, furnace vents, grab handles, speakers, receptacles, water heater, etc. Every six months, inspect these areas for sealant gaps/voids, cracks, shrinkage, etc. and reseal as necessary. Please consult your local Keystone dealer for assistance if needed.

## **SLIDE-OUTS**

Don't forget this important feature when it comes to maintenance. A slide-out has its own roof, end walls, rear wall, and floor with similar moldings and attachments as the rest of the RV. The sidewall opening moldings and all components of the slide-out room "box" should be inspected every six months for sealant gaps/voids, cracks, shrinkage, etc. and resealed as necessary. Please consult your local Keystone dealer for assistance if needed.



**BE CAREFUL WHEN SELECTING A SEALANT, AS IT IS NOT RECOMMENDED TO USE TWO DIFFERENT SEALANTS ON TOP OF EACH OTHER. IT MAY APPEAR SEALED, BUT WATER MAY BE ABLE TO SLIP BETWEEN THE TWO SEALANTS IF THEY DO NOT BOND TO EACH OTHER. IT IS RECOMMENDED TO USE THE SAME TYPE/BRAND SEALANT AS WAS USED ORIGINALLY OR TO REMOVE ALL OLD SEAL, CLEAN THE AREA/COMPONENT AND INSTALL ALL NEW FRESH SEALANT. PLEASE CONSULT YOUR LOCAL KEYSTONE DEALER FOR ASSISTANCE IF NEEDED.**

## ROOF

In most cases, the roof assembly consists of the interior paneling, a truss system, insulation, roof decking (plywood, OSB) and a roof material (TPO) is glued to the roof decking. Because of the manufacturing process, air pockets and/or visible spots may be seen in the roof material. These visible spots can be caused by debris (wood, staples, screws, etc.) that is between the roof material and decking or by imperfections occurring during the roof material's manufacturing. In most cases, these are considered cosmetic in nature and seldom require any corrective action.



**THE ROOFING MATERIAL COULD BE SLIPPERY WHEN WET. ALWAYS USE CAUTION WHEN WORKING ON TOP OF THE RV.**

Snow loads that exceed 2 feet or 30 pounds per square foot can lead to damage of the roof structure as well as to the axles and suspension. The roof should be free of snow prior to transporting the RV.



These roofs are not designed to accommodate chairs, coolers, multiple people, etc. They are designed only for the ease of an individual to perform routine maintenance.

Units with factory installed ladders have walkable roofs. Some units have walkable roofs but no ladder and others do not have a ladder or walkable roof. For more information about your specific year, make and model, please visit roof specifications under Standards & Options/Exterior on [www.keystonerv.com](http://www.keystonerv.com) or contact Owner Relations at 866-425-4369 or [ownerrelations@keystonerv.com](mailto:ownerrelations@keystonerv.com).



## ALPHA TPO ROOF MATERIAL

The TPO roof will not rust or corrode and is very strong and durable. Other than periodic washing, the roof material itself does not require maintenance or coatings. However, be advised that any attachments, seams or joints in the rubber roof requires maintenance every 90 days! Alpha sealants must be used on a RV with the Alpha system. These items can be obtained from your dealership.

Know the height of your RV and avoid contact with trees, overpasses, etc. This roof material can be punctured, snagged or cut by contact from objects. Whether it is a warranty or non-warranty repair, this material can be easily repaired utilizing a local company specializing in restoration (vinyl, rubber, leather, fabric, plastic repair of furniture, car seats, fabrics, dashboards, etc.) or with patch kits available from your local dealer. Seldom would a replacement of the entire material be necessary. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.alphasystemsinc.com](http://www.alphasystemsinc.com).

**"It's spacious and luxurious."**

Emma | Michigan

## ROOF SEAMS AND/OR JOINTS

Roof sealants will deteriorate which can lead to leaks. Deterioration can be accelerated by heavy sun exposure, changes in climate (expansion/contraction with aggressive temperature change), and cold climates. Once the RV leaves our manufacturing facilities, we can no longer maintain the sealants and this becomes your responsibility. Take this seriously because it can help prevent a very frustrating and expensive situation to remedy (damage from water leaks).

Inspect the roof at least every 90 days, paying close attention to all seams and/or joints and attachments where sealant is used. Look for cracks, shrinkage and/or gaps/voids in the sealants. These must be carefully cleaned and resealed. It is necessary to use the same sealant as originally installed if touching up cracks, shrinkage and gaps/voids. There is no way to know if two different brands of sealant will bond to each other. DO NOT use any type of silicone product on the roof material.

If there is any doubt in your mind before performing this maintenance, please contract with your local dealer to have it done. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.alphasystemsinc.com](http://www.alphasystemsinc.com).

## AXLE ALIGNMENT

Even with normal usage, axles may require periodic alignment which is not considered warrantable. Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dexteraxle.com](http://www.dexteraxle.com), [www.lci1.com](http://www.lci1.com).

## BRAKE ADJUSTMENT

Please refer to the manufacturer's instructions supplied with the RV for care and operation and/or [www.dexteraxle.com](http://www.dexteraxle.com), [www.lci1.com](http://www.lci1.com), [www.morryde.com](http://www.morryde.com).

- DRUM BRAKES - The electric brakes are of the drum and two-shoe type and adjust the same as most automotive brakes. Adjust brakes after the first 200 miles. Every 3 months or 3000 miles, test the brake drag and adjust if required. Full procedures are outlined in the component manufacturer's guide, included in the RV's manual packet. Never adjust just one brake. When adjusting brakes on any vehicle, either replace or adjust all brakes at the same time, or at least both brakes on the same axle.
- OPTIONAL DISC BRAKES - Follow the recommendations for use and replacement of brake fluid per the manufacturer's instructions.

## BATTERIES

- VENTED BATTERIES - Batteries are not installed or warranted by Keystone RV. Please refer to the battery manufacturer's instructions of the product you selected for the detailed safety and maintenance requirements.



**BEFORE PERFORMING ANY MAINTENANCE ON THE BATTERY, ALWAYS DISCONNECT THE BATTERY, REMOVING THE NEGATIVE (-) CABLE FIRST AND THEN DISCONNECTING THE POSITIVE (+).**

**THE ACID IN BATTERIES IS HIGHLY CORROSIVE AND HYDROGEN GAS IS PRODUCED WHICH IS EXTREMELY FLAMMABLE. AVOID PLACING NEAR A POSSIBLE IGNITION SOURCE SUCH AS OPEN FLAME OR POTENTIAL SPARK PRODUCING WIRING.**

- NON-VENTED BATTERIES - The Lithium batteries installed in select Solar Flex packages are covered by the Keystone warranty. (See page 44.) For factory installed Lithium Batteries, the battery area/compartment is designed for the use of non-vented batteries only. Do not replace a non-vented battery with a vented battery into this area/compartment.



**THIS BATTERY AREA/COMPARTMENT IS DESIGNED FOR THE USE OF NON-VENTED BATTERIES ONLY. DO NOT PLACE A BATTERY THAT REQUIRES VENTING INTO THIS AREA/COMPARTMENT. VENTED BATTERIES COULD RELEASE POISONOUS AND FLAMMABLE GASES AND COULD LEAD TO A FIRE OR EXPLOSION AND RESULT IN DEATH OR SERIOUS INJURY.**



## GENERAL INFORMATION:

Never place batteries in any compartment or near anything that could spark, even a 12 volt switch. Never smoke or use open flames anywhere near the battery. Secure batteries in a battery box or in a compartment specially designed for battery storage. Wear safety glasses and appropriate clothing when performing any maintenance on a battery. In case of a spill or splash, immediately flush the affected area with cold water for 15 minutes and call the poison control center for further instructions.

If the shoreline cord will be plugged in for long periods of time, battery water will evaporate quicker and maintenance will be required more often (does not apply to maintenance free battery).

Keep battery terminals clean of corrosion and tightened.

When storing the RV for an extended period, fully charge the battery before storage. Batteries will self-discharge over time and are subject to freezing, especially if in a discharged condition. We recommend removing the fully charged battery and storing in a cool dry place. Periodically check the charge of the battery while in storage and recharge as needed.

## 120 VOLT ELECTRICAL

Before each use, inspect the shoreline cord, receptacles, extension cords, adapters or reducers for loose, missing, damaged, degraded or corroded terminals/connections. Any component found in these conditions must be replaced before use.



**THE USE OF SHORELINE CORDS, RECEPTACLES, EXTENSION CORDS, ADAPTERS OR REDUCERS WITH LOOSE, MISSING, DAMAGED, DEGRADED OR CORRODED TERMINALS/CONNECTIONS COULD INCREASE THE RISK OF FIRE, PERSONAL INJURY OR PROPERTY DAMAGE.**

**"We cherish the extra time spent with family."**

**Laura & Frank | Ohio**



## INTERIOR

### APPLIANCES: SEE CHAPTER 7

### BEDSPREADS

Refer to the label attached to the bed spread by the manufacturer. Dry-clean only unless the care instructions on the label indicate otherwise. Washing a dry-clean only bedspread could cause premature deterioration, fading, shrinkage, and/or possible damage.

### BLINDS AND SHADES

Venetian blinds and day/night shades should be vacuumed regularly with a soft brush attachment. Use of a soft cloth and mild cleaner on blinds will help keep them new looking. For fabric shades, upholstery cleaners are not recommended. Instead, spot clean when necessary using a mild soap and water solution on area.

### CABINET DOORS AND DRAWERS

The cabinet doors and drawer fronts should be cared for similar to the fine furniture in your home. Using a quality furniture polish will help maintain the beauty and luster of the wood as well as keep the wood from drying out. The accidental scratches can be covered to satisfaction with a good quality commercial furniture scratch remover.

### CARPETING

The carpeting installed is made of nylon and is easy to maintain. Vacuum regularly to remove abrasive grit. Water based spills and spots should be removed immediately with a damp cloth. Grease or oil based stains and spots should be spot cleaned with a good commercial spot cleaner made for this purpose. If complete shampooing is desired, it is best to have it done by a competent professional carpet cleaner. Never soak or water-log your carpeting. Whether a warranty or non-warranty repair, this material can be easily repaired utilizing a local company specializing in restoration (vinyl, rubber, leather, fabric, plastic repair of furniture, car seats, fabrics, dashboards, etc.)

### CEILINGS AND WALLS

Clean only with a mild detergent in warm water, using a damp cloth to clean the ceiling. Never use strong chemicals or excessive water/ moisture, as either can damage the ceiling or walls

## COUNTERTOPS

Most countertops are made of high-pressure plastic laminates and are highly resistant to normal spills and scuffs. Soap and lukewarm water or a mild, non-abrasive cleaner are recommended. Avoid use of abrasive pads and scouring powders, which can dull the surface and make it more stain-prone. Always use a chopping block or cutting board when using knives. Pots and pans straight from the burner or oven should be placed on lined hot pads and not directly on the counter surface.

### SOLID SURFACE COUNTERTOPS

The solid surface composite countertops can be cleaned with soap and mild detergents, which will remove most stains. DO NOT use products containing bleach. Stubborn stains may require the use of a white Scotch Brite pad and a non-abrasive cleaner like Soft Scrub. Most scratches and defects in solid surface countertops can be repaired without replacement. Pots and pans straight from the burner or oven should be placed on lined hot pads and not directly on the counter surface.

## DRAPERIES

Draperies and upholstery fabrics are treated with fire-retardants and are dry-clean only unless the manufacturer label indicates otherwise. When dry-cleaning, be sure to inform attendant of fire retardant items. Spots and stains should be removed with a non-water based commercial spot remover manufactured for this purpose.

## FABRIC, UPHOLSTERY AND FURNITURE

Do not laundry upholstery fabrics. Blot up stains promptly and use an upholstery cleaner or mild solvent, depending on the stain. Never soak the fabric and use as little water as possible. Blot rather than rub. Towel dry or have professionally cleaned. Upholstery can be vacuumed regularly using a soft brush attachment. Do not remove law tags from furniture, they are used to identify the products for part replacements. Whether a warranty or non-warranty repair, this material can be easily repaired utilizing a local company specializing in restoration (vinyl, rubber, leather, fabric, plastic repair of furniture, car seats, fabrics, dashboards, etc.)

## FAUCETS AND FIXTURES

To protect the finishes on your kitchen and bath faucets and fixtures, use only a damp soft cloth or sponge. Do not use abrasive cleaners or materials as they can damage the finish.

## FLOORING, VINYL

For routine cleaning, sweep or vacuum regularly. Follow by using a damp mop with warm water and clean a small area at a time. Rinse the mop frequently as to not redistribute the dirt picked up. If washing is needed, use a quality product designed for no-wax flooring. To polish the floor, do not use solvent-based waxes or polishes as damage to the flooring may result. Use only polishes recommended for no-wax flooring. Whether it is a warranty or non-warranty repair, this material can be easily repaired utilizing a local company specializing in restoration (vinyl, rubber, leather, fabric, plastic repair of furniture, car seats, fabrics, dashboards, etc.)



Door mats and throw rugs are commonly used in RV's, using the correct mat is important to prevent staining or discoloration in the vinyl flooring. Rubber backed mats should NOT be used. We recommend using a mat with a PVC, polyurethane or any textile backing, using anything other than these types of backed mats may create damage/staining that is not covered under warranty.

## GLASS AND MIRRORS

Clean glass and mirrors as you would at home using a cleaner designed for glass. To reduce "spotting" on outside windows, use a squeegee promptly after rinsing with water. For stubborn spots, cleaning with a mixture of vinegar and water is recommended and is safe for most finishes.

## SINKS, TUBS AND TOILETS

Many of these products are made of acrylics, plastics, or composite materials. Use of non-abrasive cleaners is recommended to protect the finish. Using harsh cleaning products can cause premature deterioration and/or yellowing of the surface finish.

## MAINTENANCE SCHEDULE

**Note: The intervals outlined below are based on typical recreational travel and family camping in moderate climates and weather conditions. Review Chapter 13 of your Owner's Manual in detail for more information regarding the specific maintenance requirements of each topic listed below. Use of your RV other than for recreational travel and family camping, as well as extreme conditions, may accelerate deterioration of components, seals, etc. and require more aggressive maintenance intervals.**

SAFETY	PRE-TRIP	AFTER EACH USE	MONTHLY	EVERY 3 MONTHS	EVERY 6 MONTHS	YEARLY
*Brakes (every 3 months or 3,000 miles)	Test			Adjust		
*CO Detector Test	Test					
Electrical (120V)						"Hot Skin" Test
Electrical Cords/Receptacles	Inspect					
Generator Exhaust	Inspect					
*LP Detector Test	Test					
Pin Box & Hitch Equipment	Inspect		Lube			
Propane System						Leak Test
Safety Chains	Inspect					
*Smoke Alarm	Test					
SERVICE	PRE-TRIP	AFTER EACH USE	MONTHLY	EVERY 3 MONTHS	EVERY 6 MONTHS	YEARLY
*Axels	●			●	●	●
*Battery Cables/Connections	Inspect					
Black Water System		Flush				
All Exterior Moldings					Inspect/Reseal	
Entry Steps			Lube			
Fiberglass/Gel Coat				Clean	Wax	
Frame					Touch-Up	
Fresh Water System		Drain				Sanitize
*Furnace						Clean
*Generator	Check Oil					
Grey Water System		Flush				
iNCommand System					Update	
*Jacks (A-Frame, Landing)				Clean/Lube		
Latches, Locks			Lube			
Metal Siding					Inspect/Reseal	
*Refrigerator						Clean
*Roof Air Conditioner			Lube			
Roof Seams & Joints				Inspect/Reseal		
Roof Vents					Inspect	
Slide-Out Box		Clean Roof			Inspect/Reseal	
*Slide-Out System			Actuate			
Tires	Inspect					
*Water Heater		Drain				Flush
Window Sealants					Inspect/Reseal	

Please refer to the manufacturer's instructions supplied with the RV for care and operation or the applicable website.

# APPENDIX

For assistance with this manual, warranty information or information on Keystone RV Products, please visit us online or contact Keystone Customer Service.

**ADDRESS:**

Keystone Customer Service

2642 Hackberry Drive | P.O. Box 2000 | Goshen, IN 46527

Fax: 574.534.9057 | Toll Free Phone: 866.425.4369 | Website: [www.keystonerv.com](http://www.keystonerv.com)

Owner Relations Hours: 8:00AM - 5:00PM (EST) Monday - Thursday | 8:00AM - 4:00PM (EST) Friday

"We have the perfect RV  
with beautiful features  
and space to share with  
our 4 grandchildren."

Tom & Joann | Wyoming





# GLOSSARY OF COMMON TERMS AND DEFINITIONS

**AC ELECTRICITY:** Alternating Current: Standard Household 120 volt is AC current.

**ANODE ROD:** Part of the water heater that attracts impurities in the water that cause corrosion.

**BLACK TANK:** The holding tank into which the toilet directly drains.

**BLACK WATER:** The term associated with sewage contained within the black tank.

**BRAKE CONTROLLER:** Device located in the tow vehicle that activates the RV brakes.

**BTU:** The measurement of the amount of heat required to raise the temperature of one (1) pound of water, one (1) degree Fahrenheit.

**BUSINESS:** Any particular occupation or employment engaged in for livelihood or gain.

**COLD INFLATION PRESSURE:** The pressure in the tire before it is driven.

**COMMERCIAL:** Connected with/engaged in or sponsored by or used in commerce or commercial enterprises.

**CITY WATER:** Refers to exterior water source, not water from the fresh water tank that you hook up to at campgrounds. "City Water" refers to pulling water from a central source (like in a city).

**CONDENSATION:** The result of warm humid air coming in contact with cold glass also known as 'Sweat'.

**CONVERTER:** Device that converts 120 volt AC to 12 volt DC.

**CURB WEIGHT:** The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

**CURBSIDE:** Term used to refer to the side of your coach, which faces the curb or shoulder when parked. Also called DOOR SIDE (the main entrance door) or OFFROAD SIDE.

**DC ELECTRICITY:** Direct Current: Also termed Battery Power. Used to run all 12 volt powered systems or lighting.

**DRY CAMPING:** Refers to camping using only the resources within your RV and without amenities often provided at commercial campsites; such as, city water hook-ups, electrical hook-ups, etc.

**DSI IGNITION:** Direct Spark Ignition – The method of lighting a main burner on a LP fired appliance.

**DUCTED A/C:** Air conditioning distributed through a ducting system.

**DUCTED HEAT:** Warm air distributed through a ducting system.

**DUAL ELECTRICAL SYSTEM:** RVs equipped with appliances and lights, which operate on 12 volt power when self-contained, and with a converter, on 120 volt AC when in campgrounds or run off of a generator.

**DUMP STATION:** Term used for locations to drain the waste holding tanks (gray and black tanks). In most states, it is illegal to dump your tanks anywhere except at dump stations.

**DUMP VALVE:** Another name for the T-Handle used to drain the black and gray tanks.

**EGRESS WINDOW:** Term for the emergency exit windows within RVs; usually identified by a red handles or levers.

**FULL HOOK-UP SITE:** A campsite that offers full amenities: city water, sewer, and electrical hook-ups; many have cable and phone available.

**GALLEY TANK:** A gray water holding tank used specifically for the kitchen waste water.

**GENERATOR:** Powered by gasoline, generates 120 volt power.

**GRAY TANK:** The waste holding tank into which water from the kitchen and bath sinks, shower and tub drains.

**GRAY WATER:** Water drained into the gray holding tank.

**GROSS AXLE WEIGHT RATING (GAWR):** Maximum amount of weight (in lbs.) that can be placed on the axle.

**GROSS COMBINED WEIGHT RATING (GCWR):** Maximum load weight (in lbs.) allowed for the coach and tow vehicle.

**GROSS VEHICLE WEIGHT RATING (GVWR):** Maximum load weight (in lbs.) allowed for the vehicle.

**HITCH WEIGHT:** Amount of a RV's weight that rests on the tow vehicle's hitch. See also pin weight.

**HOLDING TANKS:** Refers to the tanks typically known as fresh water, gray and black, where the water is held.

**HOOKUPS:** Where you connect to a campground's facilities.

**iN-COMMAND:** Commander to monitor and operate a host of features of your RV.

**LOAD RATING:** The maximum load that a tire is rated to carry for a given inflation pressure.

**LOW POINT/LOW POINT DRAIN:** Low point to drain hot/cold plumbing system.

**LP GAS:** Liquefied Petroleum Gas used to fuel appliances. Propane is a LP gas.

**MAXIMUM LOAD RATING:** The load rating for a tire at the maximum permissible inflation pressure for that tire.

**MAXIMUM PERMISSIBLE INFLATION PRESSURE:** The maximum cold inflation pressure to which a tire may be inflated.

**MODIFICATION:** The act of making something different.

**PILOT:** Small flame that is used to ignite the main burner of a LP-fired appliance.

**PIN WEIGHT:** The vertical RV load supported by the king pin of a fifth wheel hitch. Also called hitch weight.

**PRIMITIVE CAMPSITE:** Campsite that offers limited connections. May have city water or electrical available but not both.

**PULL-THROUGH SITES:** Camp sites that you can pull your RV through, eliminating the need to back in.

**RADIAL PLY TIRE:** A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the center line of the tread.

**RECOMMENDED TIRE INFLATION PRESSURE:** This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification/VIN tag.

**RENTAL:** Property that is leased or rented out or let.

**RESIDENTIAL:** The act or fact of residing, abiding, or dwelling in a place for some continuance of time.

**ROADSIDE:** Refers to the side of the RV that faces the road when parked. Also commonly referred to as "Off DOOR SIDE".

**RV:** Short for Recreational Vehicle.

**RVIA:** Recreational Vehicle Industry Association.

**SHORELINE:** The electrical cord that connects 120 volt from an exterior outlet (such as campgrounds) to the RV; also called 'Power Cord'.

**SHORE POWER:** The 120 volt outlet that connects to the Shoreline.

**SPEED RATING:** The speed rating denotes the maximum speed at which a tire is designed to be operated.

**TORQUE:** The amount of rotating force applied to a fastener, such as a lug nut.

**UNLOADED VEHICLE WEIGHT (UVW):** Weight of the RV without adding fuel, water, propane, supplies and passengers; also referred to as 'Dry Weight'.



Keystone RVs are built to carry you forward -  
a transport to the moments, memories and  
milestones that turn your aspirations into reality.

**LIVE IT OUT.**

# LIVE IT OUT.

## **THERE IS ANOTHER YOU.**

A you that will hike to the bottom and bike to the top. A you that will visit every state and take the family on the trip of a lifetime. A you that will see more, do more and live more – someday. For more than one million North Americans, someday arrived the day they became Keystone RV owners.

Keystone RVs are built to carry you forward – a transport to the moments, memories and milestones that turn your aspirations into reality. That's why we listen, learn and evolve. Keystone has been guided by more than 20 years of stories and insights from owners, dealers and the entire community. Your Keystone RV is a culmination of those influences.

A legacy, built by those who have chosen to stop dreaming and start doing – to live it out.