



**COLUMBIA NORTHWEST,  
INC.**

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This company was founded on the concept that camping should be easy, enjoyable, and practical. We are proud of our campers because they are proof that we have succeeded at taking these old concepts in new directions. In 1983, we pioneered the first solid wall, collapsible, “A” frame camper, and every year since, we have refined and developed it into a dependable product that will provide you with many years of satisfaction. We say this confidently because our employees use our campers to do field research and testing, which advances Aliner development.

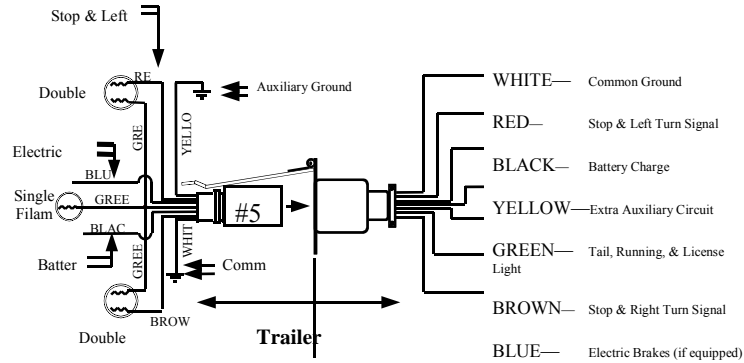
Although imitators copy our original designs, nobody can duplicate the knowledge and experience that go into building every Aliner camper. Therefore, when you purchase an Aliner, you also receive the customer support that goes with it. To ensure that you have made a good investment, skilled workers assemble the carefully selected materials and appliances. Ultimately your dealership services your camper therefore; we are compiling shop manuals to aid the dealerships in providing factory quality maintenance, service, and appliance installation when possible.

To maintain the leading position in “A” frame camper manufacturing, we are always researching new technologies. We’re also in the process of developing new product lines. We welcome any comments and suggestions concerning our camper, and appreciate your postcards, letters, and photos. A lot of things have changed since our first Aliner in 1983, but the one thing that remains unchanged is our ongoing commitment, to provide you with the finest solid wall, “A” frame camper available. Thank you for purchasing our product.

Green Wire	Running or Side Marker Lights
Red Wire	Stop & Left Turn
Brown Wire	Stop & Right Turn
Blue Wire	Electric Brakes (if equipped)
Yellow Wire	Reverse Lights
Black #10 Wire	Towing Vehicle +
White #10 Wire	Towing Vehicle -

Typical Weights and Measurements							
	Length	Width	Height	Ship Weight	GVW	Frame Clearance	Axle Clearance
<b>Sportliner</b>	144”	79 3/4” *	102”	795 lbs.	1840 lbs.	12”	8 1/2”
<b>Aliner</b>	180”	79 3/4” *	116”	995 lbs.	1840 lbs.	12”	8 1/2”
<b>Aliner with Off-Road Package</b>	180”	79 3/4” *	122”	995 lbs.	1840 lbs.	18”	14 1/4”
<b>Aliner with Expedition Package</b>	216”	79 3/4” *					

## Trailer Hitch Wire Diagram



### Bulb Replacement Chart

Side Marker Lamps (red & yellow)	C194
Porch Lamp	1003 or 93
Interior Lamps	1141
Brake and Running	2057
License Plate	C194
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Part	Company	Phone Number
Countertop	Robert Weed	874-848-4408
Coupler	AL-KO Kober	219-294-6651
Demand Pump	Flojet	1-800-356-9538
Door Lock	Suburban Manufacturing	574-294-5681
Electric Brakes	Dexter	574-295-1900
Extrusions	Bonnell Company	1-800-846-8885
Fan-Tastic Vent	Fan-Tastic	1-800-521-0298
Flooring	Georgia Pacific	574-295-0214
Frame	Ligonier Metal Fabrications	574-533-9697
Gas Detector	CCI Controls	1-800-521-5228
Heater	Atwood	8145-877-5700
Hubs	QDS Henschen	937-596-6125
Icebox	Instafreeze	407-786-7479

## **Chapter 21:** **Important Phone Numbers**

<b>Part</b>	<b>Company</b>	<b>Phone Number</b>
Outside Shower	Cast Molded Plastics	219-294-2684
Paneling	Robert Weed	874-848-4408
Refrigerator	Dometic	1-800-544-4881
Roof Vents	Elixir	1-800-443-5473
Sink	Sterling	Xxx-xxx-xxxx
Skylights	Majestic Plastic	574-266-4599
Stabilizing Jacks	Norco	310-639-4000
Step	Elkhart Tool & Die	574-295-8500
Stove	Suburban Manufacturing	574-294-5681
Tires	Carlisle Tire	419-661-0200
Venting Skylights	ODL Inc.	1-800-288-1800
Water Heater	Suburban Manufacturing	574-294-5681
Water Pump	Atwood	8145-877-5700
Windows	Creation	1-800-862-3131
	Auto Safety Hotline	1-800-424-9393 or 366-0123 (Wash. D. C.)
Air Conditioner	Carrier	Xxx-xxx-xxxx
Axle	QDS Henschen	937-596-6125
Converter	Centurian	1-800-848-0558 or 1-888-849-4343

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## Aliner

### NEW RECREATIONAL VEHICLE LIMITED WARRANTY

Columbia Northwest Inc. will make repairs, necessary due to defects in workmanship or materials, free of charge **for one year from the retail purchase date, or for the first 10,000 miles of use**, whichever comes first. Because of design changes and improvements, we reserve the right to substitute parts, materials, or components with ones of equal value and quality. This warranty applies only to the original retail purchaser of a new product from an authorized Aliner Dealer.

The owner is responsible to maintain the camper in accordance with the instructions provided in the owners manual. Failure to follow proper procedures, and seasonal maintenance schedules may void your warranty.

To obtain warranty service contact an authorized Aliner Dealer or an Aliner approved service center. For locations of our approved representatives call the factory at (724)-423-7440. If your warranty is not registered, you will be asked to provide a sales receipt to document the date, and location of purchase.

#### Excluded from Coverage

- Tires, or any equipment, or parts, warranted by the original manufacturer separately.
- Damages resulting from misuse, abuse, collision, improper repairs, overloading, neglect, and improper maintenance.
- Damages resulting from alteration, or installation, of additional equipment, without proper authorization, to the electrical, gas, plumbing, or structural systems.
- Normal wear, fading, or deterioration of fabrics, flooring, and other materials.
- Normal wear of metal parts including, weathering, discoloration, surface corrosion of unpainted surfaces, and minor cosmetic blemishes occurring from normal use.
- Any product used outside of its intended customary purpose.
- Any product used as a rental.
- Any unregistered product not normally used in the United States of America or Canada.
- Any promises made by any person beyond those stated in this warranty.

Columbia Northwest Inc. shall not be liable for incidental or consequential damages, such as expenses for transportation, lodging, damage to personal property, loss of personal property, loss of use of your product, inconvenience, or loss of income. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

#### **Implied warranties, including any warranty of merchantability or fitness of a product for a particular purpose, are limited in duration to the term of this written warranty.**

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Columbia Northwest Inc. warrants this recreational vehicle to be in accordance with the provisions of chapter 74-169, Florida Statutes, for a period of twelve (12) months.

We want you to be satisfied with your new camper. For further help or information contact the factory.

Phone (724)-423-7440 Fax (724)-423-8485 email: aliner@wpa.net

or

Columbia Northwest Inc.  
One Main Street  
Mammoth, Pa 15664

**RV Antifreeze:** A non-toxic antifreeze approved for use in drinking water systems

**Sanitizing:** A process that disinfects the water system

**Shoreline Power Cords:** The 30' black wire that plugs into the electrical hookup at the campsite for the converter

**Stabilizer:** An adjustable jack that is used to make the camper sit securely on uneven ground

**Unloaded Vehicle Weight (UVW):** The weight of the trailer as manufactured at the factory. It includes all weight at the trailer axle(s) and tongue or pin. If applicable, it also includes full generator fluids, including fuel, engine oil, and coolants

**Winterizing:** A necessary process that prepares the camper for storage and freezing temperatures

## **Chapter 1:** **Tires, Axles, Hubs, Cups, and** **Bearings**

### **\*\*NOTE\*\***

**MECHANICAL MAINTENANCE SHOULD ONLY BE PERFORMED BY A QUALIFIED MECHANIC. IF YOU DO NOT HAVE THE EXPERIENCE OR THE TOOLS TO SAFELY COMPLETE MAINTENANCE PROCEDURES, PLEASE CONTACT YOUR DEALER. WE ASSUME NO LIABILITY FOR INJURIES OR DAMAGES INCURRED AS A RESULT OF IRRESPONSIBLE, UNAUTHORIZED SERVICING.**

### **Tires/ Air Pressure**

<b>Tires</b>	
Standard Axle	ST175180D13
Expedition Axle	P205175R14
Scout Axle	5.3R12

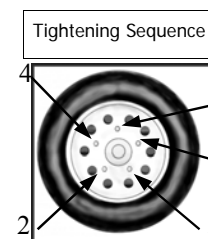
Air pressure is the most important factor determining tire life. Maintain recommended air pressure listed on the tire sidewall, and periodically inspect both tires for tread wear and damage from road hazards. Replace as

necessary. To avoid handling difficulties, always use an identical pair of tires. Periodically treat the sidewalls of tires exposed to direct sunlight with a UV protectant such as Armor All to prevent dry rot.

### **Wheel**

<b>Wheel</b>	<b>Lug Nut Size</b>
12" rim, 5 lug, 4.5 pattern	13/16
13" rim, 5 lug, 4.5 pattern	
14" rim, 5 lug, 4.5 pattern	

It is extremely important to maintain proper wheel mounting torque on your lug

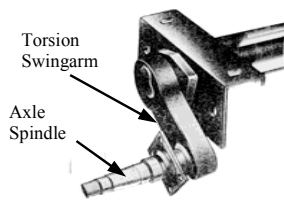


nuts. When possible, use a torque wrench to prevent loose wheels and broken studs. Start all nuts by hand to prevent cross threading. Tighten the lug nuts in stages. First, tighten to 20-25 ft./lb., then to 50-60 ft./lb., and finally to 85-90 ft./lb. Check lug nut torque before the first use, and after 25 and 75 miles. Check periodically thereafter.

## Axle

The one ton rubber torsion axle offers greater dampening than conventional spring suspensions, and allows each one to move independently. This feature gives a smoother ride and improved tracking and cornering over rough road conditions. In addition, this type of axle has no metal to metal contact or springs, shackles, hangers, or U-bolts to wear out.

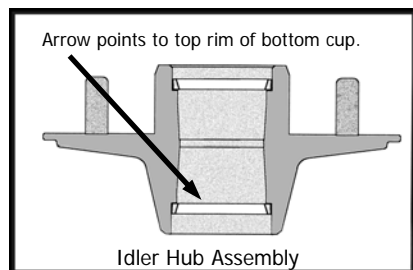
Campers equipped with the Expedition package have six inches of lift, so the ball should be about 20 inches from the ground for the camper to be level while towing.



## Hub Removal

Use the following procedure to remove the hub from the axle.

1. Loosen the lug nuts 1/4 turn counter-clockwise. **DO NOT REMOVE!**
2. Elevate the camper by positioning jacks under the frame 12" to 20" behind the axle. Use the jack stands under the frame to support the camper any time it is elevated.
3. **NEVER PLACE THE JACKS UNDER THE FLOOR OR USE THE STABILIZERS TO ELEVATE THE CAMPER.**
4. Continue removing the lug nuts and remove the wheel.
5. Remove the grease cap by carefully prying around the flange of the cap.
6. Remove the cotter pin from the spindle nut, turn the nut counter clockwise, and remove the nut and spindle washer.
7. Carefully remove the hub from the spindle. Do not allow the outer bearing cone to fall out. The seal will retain the inner bearing cone.



## Removing the Cup

1. Place the hub on a flat, sturdy surface, with the damaged cup on the bottom.
2. Using a brass drift pin punch, tap around the top rim of the bottom cup.
3. Continue tapping around in a circle until the cup is loose enough to remove.

**Dedicated Outlet:** An electrical outlet that is installed exclusively for a permanently mounted appliance

**Demand Pump:** An automatic, high pressure, high volume, self-priming, electric water pump for potable water

**Extrusion:** Metal forced or formed into a shape. All of our extrusions are made of anodized aluminum

**Filter:** A screen filter placed before the demand pump to remove debris from the water and increase pump life

**GFCI Receptacle:** *Ground Fault Circuit Interrupting Receptacle*, a device that protects electrical outlets from dangerous faults

**Gross Axle Weight Rating (GAWR):** The value specified as the load carrying capacity of a single axle system, as measured at the tire-ground interfaces

**Gross Vehicle Weight Rating (GVWR):** The maximum permissible weight of the trailer when fully loaded. It includes all weight at the trailer axle(s) and tongue or pin

**Hitch Weight:** The weight distributed to the hitch of the camper. *This is determined by the way the camper is loaded*

**Hitch Wire:** A multi-conductor cable connecting the signal lighting from the towing vehicle to the signal lighting on the camper. This cable also supplies the camper with power from the battery of the towing vehicle

**In Line Fuse:** A fuse holder and fuse that's designated to be used where a permanently mounted holder wouldn't be practical

**Potable Water Tank:** A holding tank for drinking water

**Power Ventilator Fan:** A thermally controlled fan that increases the efficiency of the Dometic 2310 refrigerator

**Regulator:** A safety device that mounts either directly to the LP tanks or between the tanks and the camper, used to limit the gas pressure to the appliances

**Remote Camping:** Use of the camper without external power sources or pressurized city water hookups



## **Chapter 19:**

### **Appendix**

**12 volts DC:** Direct current, the type of power produced by a battery

**120 volts AC:** Alternating current, the type of power used in residential homes to power larger appliances such as refrigerators, air conditioners, and televisions

**“A’s”:** The hinged triangle-shaped walls that lock into the roof

**“A” Latch:** A flat lever that locks the “A’s” into the roof

**Anodized:** Metal that has been chemically treated to give it an extremely durable thin protective coating

**Appliance:** An electromechanical or LP gas operated device that performs a specific function or provides a certain comfort

**Axle Weight:** The combined weight of the left and right tires

**Base Camper:** A camper equipped only with a basic system. No optional equipment (used as a reference and for comparison)

**Battery:** A rechargeable alternative power source that can operate most of your camper’s appliances. This type of battery is best suited for occasional use

**Bearings:** A mechanical device designed to minimize friction of rotating objects. Roller bearings consist of a cone and a cup. *Sometime referred to as bearings and race*

**Cargo Carrying Capacity (CCP):** Equal to GVWR minus each of the following: UVW, full fresh (potable) water weight (including water heater), and full LP gas weight

**Centrifugal Pump:** An economical electric pump for potable water

**City Water Hookup:** The connection for the hose that supplies pressurized water to the camper

**Converter:** A circuit that turns 120 volts AC into 12 volts DC

### **Replacing the Cup**

1. After cleaning the hub bore, place the hub so you can insert the cup from the top.
2. Seat the cup by tapping it into place with a brass drift pin punch.
3. Make sure the cup seats completely to the retaining shoulder in the hub.

Bearing Replacement Chart		
Cup	Cone	Seal
Bearing #L44610	Bearing #L44649	
Part #31-31-1	Part #31-31-2	Part #STD 10-9

### **Bearing Inspection**

Wash all grease and oil from the bearing and cone using a suitable solvent. Dry the bearing with a clean, lint free cloth and completely inspect each roller. If there are any signs of pitting, wear, spalling, or corrosion, replace the bearing cone and cup. Repeat the inspection procedure for the inner bearing cone.

**\*\* ALWAYS REPLACE THE BEARING CONE AND CUP AS A PAIR.**

### **\*\*NOTE\*\***

**DO NOT MIX LITHIUM, CALCIUM, SODIUM, OR BARIUM COMPLEX GREASES DUE TO POTENTIAL COMPATIBILITY PROBLEMS. WHEN CHANGING FROM ONE TYPE OF GREASE TO ANOTHER, IT IS NECESSARY TO INSURE THAT ALL OF THE OLD GREASE HAS BEEN REMOVED.**

## **Bearing Lubrication**

Proper adjustment and adequate lubrication of the bearings are essential to the longevity and performance of your trailer axle. The bearings should be lubricated every 12,000 miles or 12 months.

<b>Recommended Wheel Bearing Lubrication Specification</b>	
Thickener Type	Lithium Complex or Equivalent
Dropping Point	230 C, 446 F minimum
Consistency	NLGI No. 2
Additives	EP, Corrosion & Oxidation Inhibitors
Base Oil	Solvent Refined Petroleum Oil
Base Oil Viscosity	40 C, 104 F, 150 cSt (695 SUS) minimum
Viscosity Index	80 minimum
Pour Point	-10 C, 14 F minimum
<b>Approved Sources</b>	
Mobile Oil	Mobilegrease 532
Exxon/Standard	Ronex MP
Kendall Refining Co.	Kendall L-427
Ashland Oil Co.	Valvoline Val-plex EP Grease
Pennzoil Product Co.	Premium Wheel Bearing Grease 707L

## **Procedure for Repacking Bearings**

1. Place grease in the palm of your hand.
2. Press the widest edge of the bearing cone into the edge of the grease. Force the grease into the bearing interior.
3. Repeat this process as you rotate the bearing from roller to roller.
4. Continue with this procedure, filling the entire bearing with grease.
5. Apply a light coat of grease to the cup before reinstalling the hub.

## **Chapter 18:** **Optional Equipment Weight** **Breakdown**

### **Aliner Floor Plan Options**

#### **Rear**

Flexsteel Sofa	105 lbs.
36 lbs.	
Standard Sofa	61 lbs.
52 lbs.	
Dinette	85 lbs.
80 lbs.	

#### **Front**

Dinette	64 lbs.
66.5 lbs.	
Bunk	103 lbs.
94 lbs.	
Wardrobe	145 lbs.
Shower	190 lbs.
Bunk	17 lbs.
LX/LXE Bunk	31 lbs.
6 lbs.	
90 lbs.	
87 lbs.	

#### **Appliances**

Icebox	7.5 lbs.
Dometic 2193	49 lbs.
Furnace	24 lbs.
2 lbs.	
Air Conditioner	47 lbs.
8 lbs.	
Coot Cat	70 lbs.
10.5 lbs.	
Water Heater (empty)	37 lbs.
25 lbs.	
Travel Toilet	7 lbs.
weight	
Auxiliary Battery	5 lbs.
Radio	7 lbs.
Demand Pump	6 lbs.
Extra Propane Tank	
(empty)	20 lbs.
(full)	40 lbs.

### **Tires & Axles**

#### **Tires**

12" Steel Belted Radials @ 18 lbs./
13" Steel Belted Radials @ 26 lbs./
14" Steel Belted Radials @ 40 lbs./

#### **Axles**

Non Braking Axle
Braking Axle

### **Water System Conditions**

Aliner Water Tank (empty)
Aliner Water Tank (full)
6 Gallon Water Heater (full)

### **Roof Options**

Small Skylight
Large Skylight
Small Opening Skylight
Large Opening Skylight
<i>An extra roof vent adds a trivial amount of</i>

### **Windows**

*No combinations deviated over 7 lbs.*

*Deviations not affecting product performance will occur due to varying densities of materials and engineering improvements. We make no guarantees to the future accuracy of these weights.*

- An air conditioner adds 5" to the overall width of the camper

## Chapter 17: Customer Checklist

### *Preparation for the first use and use after storage*

- Make sure you reconnected the water pump from last season (pg. 18)
- Sanitize and flush the water system (pg. 21)
- Fill the LP tanks if necessary and check the connections for leaks (pg. 18)
- Install the battery and recharge it if necessary (pg. 14)
- Wash and wax the camper. Applying a liquid automotive wax will help to keep the dirt from adhering to exterior surfaces (pg. 12-13)
- Check the tires for wear, UV damage, and proper air pressure (pg. 1)
- Check the lug nut torque (pg. 1)
- Inspect the foam seals and replace if necessary (pg. 7)
- Pre-chill the refrigerator before using it for perishable foods such as milk, eggs, etc. (pg. 15)
- Make sure the power ventilator fuse is installed in LX/LXE models (pg. )
- Fill the water system (pg. 23)
- **Every outing:** check the LP gas detector (pg. 11)

### *Preparing for storage or winter*

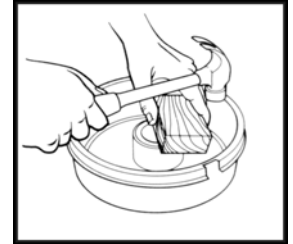
- Check for water in the bearing grease and inspect the bearings for wear (pg. 2).
- *This is the best time for axle maintenance because water in the grease during storage could corrode the axle spindle, and if you have to order parts, they will have plenty of time to arrive.*
- Sanitize and winterize the water system (pg. 21)
- Winterize the porta potti or the cassette toilet. See the manufacturer's instructions.
- Remove the battery (pg. 14)
- Under the camper, inspect the undercoating, seals, and wires (pg. 6)
- Inspect the roof shock guards (pg. )
- If the camper is stored with the roofs down, elevate the hitch so water runs away from the rear roof seal (pg. )
- Clean the refrigerator and prop the door open to prevent odors from accumulating (pg. 15)
- Remove and inspect the anode rod from the water heater (pg. 22)

### Seal Inspection

Whenever removing the hub, inspect the seal for nicks and tears. Replace it if necessary, using seal part #STD 10-9

### Procedure for Replacing Seals

1. Carefully pry the seal out of the hub with a screwdriver. **\*\*NEVER DRIVE THE SEAL OUT WITH THE INNER BEARING**
2. Apply the Permatex Sealant to the outside of the seal.
3. Tap the seal into place using a clean wood block.



### Bearing Adjustment and Hub Replacement

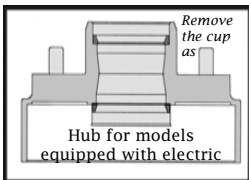
1. Reverse the order of the hub removal procedure (pg. ). Place the hub, bearings, washers, and spindle nut back on the axle spindle. Rotate the hub assembly slowly while tightening the spindle nut to approximately 50 lb./ft.
2. Without rotating the hub assembly, loosen the spindle nut slightly.
3. Finger tighten the spindle nut until snug, then back the spindle nut out only enough to insert the cotter key through the first available slot cut across the spindle nut, into the cotter key hole on the axle spindle.
4. Bend the legs of the cotter key apart to secure the nut. The nut should be free to move slightly, restrained only by the cotter key.

## Chapter 2: Electric Brakes

### **\*\*NOTE\*\***

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### Electric Brakes



The electric brakes on your camper are similar to the brakes on your towing vehicle, with the exception that the camper's brakes are electromagnetic, while your towing vehicle's brakes are hydraulic. When the brakes in the towing vehicle are activated, your controller determines how hard they are being pressed, and

sends the appropriate current through the hitch wire to the brake assembly. As you depress the brake pedal, the controller sends more current to the electromagnet, and the brake shoes press harder into the brake drums, forcing the wheel to resist rotation. Releasing the brake pedal decreases the current to the brake assembly, allowing the wheel to spin freely.

7 1/4" Electric Brakes	
Current Consumption at 12 Volts	2.5 amps per brake
Electric Brake Shoe Kit for 7 1/4" Hub	K71-045-000
Electric Brake Magnet Kit	K7-057-00
Maximum Bore of Hub Drum	7.09"

### Inspection

The brake linings and magnets are subject to wear and require inspection every 12,000 miles or annually. Replacement is necessary if the linings are worn (to within 1/16" or less), contaminated with grease or oil, or abnormally scored or gouged. It is important to replace all linings (both wheels) at the same time to maintain even braking action across the axle. Annually inspect the wires under the trailer and on the axle for broken insulation or faulty connections. Repair or replace as necessary.

## Chapter 16: Reporting Safety Defects

If you believe your vehicle has a defect that could cause a crash, injury, or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA), in addition to notifying Columbia Northwest, Inc.

If NHTSA receives similar complaints, it may open an investigation. If they find 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 Columbia Northwest, Inc.

To contact NHTSA, you may either call the Auto Safety Hotline toll free at 1-800-424-9393 or (366-0123) in the Washington D.C. area.

Or write to:

NHTSA  
U.S. Department of Transportation  
Washington D.C. 20590

### ***What is the best way to check the gas tanks and hoses for leaks?***

Do not smoke or test near open flames or sparks. Make sure all the valves in the gas system are off. Turn the gas bottle valve on to pressurize the lines, and turn it back off. Use a sponge or rag to apply soapy water on suspicious connections and watch for bubbles. If you see rising bubbles, the connection needs to be tightened. If the regulator is leaking at the seams or vents, replace the regulator. Consult a qualified RV technician if you have any questions. If you develop a leak inside the camper, do not operate any electrical devices. Go outside, turn off the gas bottle, and let the camper door open to air out. After all traces of gas are gone, arrange to have a qualified technician check your gas system.

### ***How can I tell how much gas is in the tanks?***

You can weigh your tank and subtract the tare weight. The tare weight is the weight of the empty tank; it will be stamped on the valve shield (ex. T.W. = 18lbs.). The actual weight for your tank may be different. Alternatively, your dealership can assist you to find a gauge that will show the liquid level remaining in the tank.

## **General**

### ***Can I mount a bike carrier to my camper?***

Yes, we recommend the Clamp n' Tow by Brophy. However, they may be able to suggest another carrier. Call Brophy at 1-800-637-82258

## **Chapter 3:** **Standard Aliner Features**

### **Frame**

The main frame members are 1/5" x 3.5" box channel steel. Steel this shape is stronger per pound than the C or L channel. An L channel piece of steel welded to the front of the box channel prevents the collection of road debris, water, and salt that will rust out the frame from the inside. Removable caps on the 4" x 4" rear bumper allow for convenient extra storage.

### **Roofs**

The roofs are made from the same composite material as the sidewalls. The anodized aluminum extrusions are bonded to the roofs and riveted to the hinges. A flexible waterproof material covers the hinge. The skylights and roof vents are riveted, bonded, and sealed to the roofs. All seals are made with a high quality silicone sealant.

### **Sidewalls**

The sidewalls, the hinged "A" sections, and the roofs are made from a composite material known as foam core lamination. At our factory, we laminate 3-millimeter paneling, 1" polystyrene foam, and .019 gauge aluminum together with a urethane adhesive. The lamination is then placed in a vacuum press. The resulting solid core product is lightweight, extremely strong, and thermally insulated. This rigid 1 3/16" material also eliminates the weight and wall thickness of the stud and bracing method. The exposed edges of the walls and roofs are capped with anodized aluminum extrusions. Exterior flanges, covers, vents, and baggage doors are affixed to the outside walls with silicone and screws before finishing with a sealing bead of silicone around the perimeter.

### **Floor**

Armstrong flooring covers the seamless, PerformMax wooden floor, manufactured by Georgia Pacific. A waterproof, woven, polyethylene fabric is glued to the underside of the floor. All holes in the floor are sealed with silicone to waterproof the exposed wood.

### **Stabilizing Jacks**

Two 750 lb. capacity galvanized scissor-screw jacks are used to level the rear of the coach. The front of the coach uses an adjustable 500 lb. capacity post jack. Oil the jack periodically to ensure smooth operation. As a factory installed option, you can have an additional pair of galvanized scissor-screw jacks mounted under the front of your coach.

**\*\* NEVER USE THE STABILIZING JACK TO RAISE THE CAMPER!**

### **Coupler**

This high quality coupler needs no adjusting and has a built in lock that locks on or off your towing vehicle. The coupler receives a 2" ball. Periodically oil the coupler to ensure smooth operation. For replacement of lost or broken keys, please contact Atwood.

**To Tow:** Position the receiver over the ball, and hold the handle of the hitch up as you lower the jack. After the ball is seated, allow the handle to return back down, parallel to the frame. It will click, indicating that it has locked onto the ball. Attach the safety chains, insert the camper plug into the towing vehicle receptacle, and test the signal lighting. Raise the jack as far as it will go by turning the crank handle clockwise. Turn the L bolt to the left to loosen the jack clamp, and raise the body to the full up position. Rotate the wheel to contact the inside of the frame. Tighten the L bolt and check every 250 miles.

**\*\* DO NOT TOW THE CAMPER WITH THE WHEEL JACK IN THE DOWN POSITION.**

**To Uncouple the Hitch:** Block the wheels, restore the wheel jack to the down position, unlock the coupler handle, depress the lock button, and raise the handle past the stop on the coupler body. Hold the handle up as you lift the coupler off the ball using the wheel jack. Disconnect the camper plug, as well as all cables and chains.

### **Extrusions**

All of the extrusions on your camper are anodized to resist weathering. This process deliberately oxidizes the surface of the aluminum to form a protective film that is impervious to corrosion under normal conditions.

### ***Will my battery provide power for an entire weekend without recharging?***

There are so many determining factors that there is virtually no way to determine exactly how long a battery will power a camper's appliances. However, there are ways to maximize the battery power available.

1. Choose a battery that provides the highest amp hours available and still fits in the battery box.
2. Make sure the battery has had ample time to trickle charge to its maximum capacity.
3. Run convenience lighting only when necessary.
4. Be aware of cold weather. The additional electrical load of the furnace will drain the battery faster than in the summertime.

According to a local battery retailer, there are multitudes of RV batteries ranging in amp/hours from 150 minutes at 23 amps to 220 minutes at 23 amps. If your style of camping still requires more battery power, take a fully charged spare battery in an approved container.

### **Plumbing**

#### ***How often should I clean my water filter?***

It depends how often the camper is used and the condition of the water in the storage tank. A visual inspection of the filter is the best way to determine if the filter needs cleaned. Inspect the filter for debris every one to three months, or anytime the water flow is reduced while running the Demand pump.

#### ***How can I tell how much water is in the water tank?***

If you look at the water tank, a dark line reveals the water level. There is an approximate ratio of one gallon of water for every inch of water depth.

### **Gas**

#### ***Why does it take so long to light my gas appliances after I fill my LP tanks?***

When you remove the tank, air gets into the gas line, and it must be purged from the line before your gas-operated appliances function properly.

#### ***I cannot keep my refrigerator lit while traveling. Does that mean there is something wrong with it?***

No. During transit, the refrigerators are designed to operate on 12 volts DC. When you stop for more than one hour, it is recommended that you switch the refrigerator to operate on gas or 120 volts AC.

## **Chapter 15:**

### **Frequently Asked Questions**

#### **Electrical**

##### ***Will my towing vehicle charge my auxiliary battery while I am driving?***

Yes, as long as your towing vehicle has been wired to supply 12 volts positive and negative to the camper socket.

##### ***Should I use my auxiliary battery to run my refrigerator for remote camping?***

No. The most efficient mode of operating the refrigerator is LP gas. Operating the refrigerator in the DC mode will draw 9.5 amps for the 2193 model and 10 amps for the 2353 model. This is an excessive load to a battery and will drain it quickly. However, Dometic recommends operating the refrigerator on 12 volts while driving. Many areas have regulations prohibiting the use of LP tanks while traveling, and the alternator will recharge the battery automatically when the motor is running. Installing an ignition-activated relay in the towing vehicle will prevent accidentally draining your car battery when the key is off. Do not operate the refrigerator on gas and electric power at the same time.

##### ***If I have a converter, why do I need a battery?***

A battery provides power to the 12 volt appliances so that they may run without plugging the converter into a receptacle.

##### ***Why doesn't my battery charge?***

Check the battery for the proper amount of fluids. Check the connections: black connects to positive and white connects to negative. Check the in line fuses in the battery box, and the #4 or rightmost fuse in the converter. (These fuses will be on the right hand side of the face of the converter). If the fuses are fine, check to make sure the left breaker is on. Turn on the right breaker and check to make sure there is power at the outlets. If there is no power, check the breaker on the power hookup at the campsite. If the battery still will not charge, contact your dealer.

#### **Seals**

Check the foam seals on the camper for tears. There is foam on the doorframe, the top of the sidewalls, the inside of the roofs, and the "A"s. If necessary, replacement weather-stripping foam can be purchased from your dealer. There are several different sizes, so be sure to specify which one.

#### **Lights**

There are two separate lighting systems in your camper. The convenience lights require power from the converter, battery, or the battery of the towing vehicle. The trailer signal lights receive power from the towing vehicle's brakes, turn signals, running lights, and reverse lights. Before every outing, you should test the trailer and towing vehicle lighting systems. You can find replacement bulbs at your RV dealer or at an automotive parts store.

#### **Fire Extinguisher**

Test your fire extinguisher once a month by following the manufacturer's directions on the extinguisher.

#### **Faucets**

Because the hot/cold sink and shower faucets are standard item, there are no special instructions for use. To prevent damage, winterize the water systems before exposure to freezing temperatures.

For detailed information regarding the operation and maintenance of hand pump faucets, see the manufacturer's instructions.

#### **Door Lock**

There is a key that will unlock the bottom door. However, if the privacy lock is engaged from the inside, the key will not open the door. Make sure that the lever is not engaged when exiting the camper.

## **Chapter 4:** **Windows, Skylights, and Vents**

### **Windows**

The Plexiglass windows in your camper are tinted to increase your privacy and keep the heat out by reducing UV infiltration.

### **Skylights**

Standard skylights on your camper are made of polycarbonate. Compared to glass, polycarbonate is lighter, less fragile, and shatterproof. Periodic cleaning and a coat of non-abrasive car wax will minimize any visible weathering and help to preserve the original luster.

### **Venting Skylights**

Turning a crank operates the acrylic venting skylights. On hot days, use the skylights to direct airflow into the camper from shaded areas.

### **Roof Vents**

The roof vents are mainly for cooking ventilation, but they can also be used to help keep the camper more comfortable on hot days. Open the roof vent by turning the crank counter-clockwise. Never tow your camper with the roof vents opened.

### **Fan-tastic Vent**

This roof vent features a fan and thermostat to evacuate the hot air that collects inside the roof peak. Best results can be achieved by closing all other roof vents and opening a window on the shaded side of the camper. The roof vent must be open approximately 3" before the motor will operate.

*\*\* For maintenance instructions, please refer to page 12 of your owner's manual*

*\*\* Be sure to consult the manufacturer's directions for all appliances and trailer parts*

## **Chapter 14:** **Tips**

Here are some tips from our customers, employees, and magazines. Some of them are very clever, and some are entertaining. If you have some tips of your own, please share them with us. Maybe you will see them in a future newsletter.

- Before storing your camper under a tarp, place a soft, clean cloth over the skylights to keep them from weathering prematurely.
- You can gauge the fluid level in an LP gas tank by pouring a glass of water over the tank during use. Look for the line where the water evaporates slowly, and you will find the fuel level.
- Some of our customers report that peanut butter is handy to clean skylights.
- They say that it gives them a nice shine. Please rinse them thoroughly afterwards, however, because many creatures in the wild have a fondness of peanut butter.
- If your car is blowing fuses randomly while towing, check the socket on the car and test the plug for the camper.
- Many lighting problems can be attributed to plugs not inserted completely and poor ground connections. If you suspect that water is causing problems with the molded plug, silicone spray will dry things up.
- Keep your upholstery looking like new. Scotchguard fabrics before the first stain sets in.
- Wax your camper occasionally to prevent dirt from bonding to the surfaces.
- If you are traveling from a cold location to a warm destination, do not fill the LP tanks until you arrive at the warm destination. LP gas expands 1.5 times for every 10 degrees, and if it gets warm enough, the automatic pressure release valve will vent excess pressure into the atmosphere. This is not necessarily a dangerous condition, however, it can mislead you into thinking that you have a leak.



## **Chapter 13:** **Camping Conditions**

The Aliner line of products has been designed for use in virtually all environments. However, some conditions may require extra caution or care to prevent damaging your camper.

Some of our customers use their campers in extremely low temperatures. The Aliner's insulated walls are perfectly suited for this type of use. However, if extreme temperature differences cause a buildup of condensation in the weather stripping that insulates the camper, the weather stripping can freeze to the extrusions and become damaged when collapsing the camper.

We recommend that if using your camper under these conditions, you should spray the foam weather stripping and extrusions with a silicone spray, or Rain-X. These product will prevent the foam from holding the condensation and freezing to the extrusions.

The Aliner Expedition's added axle clearance makes it more at home in the woods. However, this camper may be damaged by collision with trees, underbrush, rocks, and other objects.

**\*\* DAMAGES RESULTING FROM THIS TYPE OF ABUSE OR MISUSE ARE NOT COVERED UNDER THE WARRANTY.**

Because our campers feature solid wall construction, they are far more tolerant of windy conditions than tent campers. However, we do not recommend setting up the Aliner in high winds. The hinged panels can be damaged during setup, and there is an increased risk of personal injury under these circumstances.

**\*\* WE WILL NOT BE HELD RESPONSIBLE FOR DAMAGES OR CLAIMS AS A RESULT OF CARELESSNESS AND POOR JUDGEMENT.**

Use caution and common sense in high wind conditions.

## **Chapter 5:** **Standard Electrical Features**

### **Dedicated Outlets**

Any camper with a refrigerator, or Sportliners equipped with an air conditioner will have a dedicated outlet. Dedicated outlets do not require GFCI protection.

**\*\* NEVER PLUG ANYTHING INTO THIS OUTLET EXPCET THE APPLIANCE THAT IT SERVES.**

### **Converter.**

Centurian Model CS 2000 XL

A converter changes standard household electrical power into the type of electrical power necessary for the operation of RV appliances and recharging RV batteries. The Centurian 2000 is a switching converter. It is much lighter, smaller, and more powerful than the old "transformer design" converters. Do not block the small, automatic cooling fan on the face of the converter while the converter is running. The left circuit breaker supplies 120 volts A.C. to the converter circuit and possibly other circuits, depending on the application. The circuit breaker on the right supplies 120 volts A.C. to the outlets. The exact wiring depends on the model and equipment selected.

**\*\* TO AVOID CONVERTER DAMAGE, DO NOT REVERSE THE BATTERY POLARITY! THE SHORT LINE POWER CORD MUST BE PLUGGED IN TO OPERATE THE CONVERTER.**

### **Ground Fault Circuit Interrupt (GFCI)**

In accordance with RVIA standards as well as the NEC, your camper is equipped with a ground fault circuit interrupt (GFCI). The GFCI receptacle is a safety device designed to protect against shock hazards.

Test the GFCI monthly by pressing the test button on the outlet. After testing, press the reset button to restore power to the receptacle and the branch circuits. The GFCI outlet is mounted on the front face of the sink component. In LX/LXE models equipped with an air conditioner, there is an additional GFCI outlet located on the front face of the door side bench seat. The refrigerator uses a dedicated outlet, and therefore does not require GFCI protection. Never use a dedicated outlet for anything other than the appliance that it serves.

If you lose power to your outlets, check the GFCI to see if it needs reset. If the GFCI will not reset, check to see if a breaker has tripped. There may also be a problem with the shore power. GFCI's usually trip the moment a faulty appliance is plugged in or turned on. If the GFCI fails the manufacturer's recommended testing, replace it before using the 10 volt outlets in your camper.

### **Optional LX/LXE Bunk Installation**

1. Start in the front of the camper with the "A's" and roofs locked in place.
2. Open the bunk so the hinge is on top.
3. Set the flat part of the bunk on top of the refrigerator countertop and slide the bunk as far to the left as it will go.
4. The brace will sit on top of the sink countertop between the sink and the stove.
5. The right edge of the bunk will sit over the top of the wardrobe or shower countertop.
6. Place the cushions on top of the bunk
7. To store the bunk, fold it in half and place it on the floor inside the sofa storage.

Red Tape	Heater
Blue Tape	Refrigerator
Green Tape	Auxiliary Battery
Yellow Tape	Water Pump Circuit
Orange Tape	Radio
White Tape (ONLY WHEN AN EXTENSION IS	Gas Detector NEEDED FOR CONNECTION)

### Collapsing Tables

1. To raise the table, simply lift it up until the supports lock into place.
2. To lower the table, lift the table slightly and push both supports toward the wall, then lower the table.

### Front and Rear Dinettes

1. Bed: Set the free-standing table on top of the bunk rails and place the cushions on top.
2. Dinette: Use the two center cushions as backrests and extend the legs on the table.

### Flexsteel Sofa

1. Bed: Grasp the sofa just under the front of the seat cushion and lift up while pulling slightly forward.
2. Sofa: Lift up the front of the sofa and push it to the back of the camper. When lowering the sofa, it may help to push down at the back of the seat cushion.
3. Storage under the sofa: Slightly lift up the sofa. Then lift up the handle until you can remove.

### Sofa

1. Bed: Lift the front of the sofa slightly and pull forward.
2. Sofa: Move the cushions and locate the panel with a finger hole. Lift slightly at the finger hole while pushing the front of the sofa in.

### Drawers

1. To open a drawer, lift slightly and pull the drawer out.
2. To remove a drawer completely, open the drawer and lift gently when it stops. Release the lock by inserting a pencil between the plastic center guide on the bottom of the drawer, and the metal track beneath it. Continue pulling the drawer out.

## Chapter 6: Gas Detector and Stove

### Gas Detector.

CCI Model 7770

The gas detector is a safety device that sounds a loud alarm and lights a red LED when it detects 20% propane in the atmosphere. The detector is sensitive to other hazardous products, so to avoid false triggering, do not store or use any strong chemicals near it. When power is applied, a green LED lights on the face of the detector, and there is a 60-second delay until the detector is enabled. The mute button resets the 60-second delay. There is also a low voltage indicator LED. This device runs continuously from any 12 volt source, however, current consumption is low (typically .035 amps), and will not drain your battery during normal use. Consequently, if the camper is not going to be used for long periods, you can temporarily remove the fuse from the auxiliary battery (fuse #4 on the converter) to avoid unnecessarily draining the battery.

**\*\* BE SURE TO REPLACE THE FUSE BEFORE USING THE CAMPER.**

By law, the gas detector is a required appliance for recreational homes with LP gas systems. Test the detector after the power has been on at least one minute by aiming a butane lighter at the gas sensor on the front face while depressing the gas button.

**\*\* DO NOT LIGHT THE LIGHTER FOR TESTING.**

The detector should be tested weekly, any time power has been removed for more than one hour, or any time the camper is being used.

For more detailed information, please consult the manufacturer's instructions.

### Stove

**\*\* NEVER OPERATE THE STOVE FOR COMFORT HEATING!  
BEFORE LIGHTING THE STOVE, OPEN A WINDOW AND A ROOF VENT.**

Failure to observe these rules will result in potentially dangerous levels of carbon monoxide inside the camper.

For information regarding safe operating procedures and maintenance of this appliance, consult the manufacturer's instructions.

## **Chapter 7:** **Maintenance**

### **Window Maintenance**

Wash the windows with a soft, clean cloth and Plexiglass cleaner, vinegar-based glass cleaner, or mild, non-abrasive soap and water. For greasy dirt, clean with a diluted solution of non-abrasive citrus cleaner. Minor scratches may be buffed out with Plexiglass polish or toothpaste. If the windows are sticking, lightly spray the tracks with a silicone spray.

### **Skylight Maintenance**

1. Rinse the skylight with luke-warm water.
2. Wash the skylight with mild soap and luke-warm water.
3. Use a soft cloth or sponge to loosen any remaining dirt and grime.  
**\*\* DO NOT SCRUB OR USE BRUSHES OR SQUEEGEES.**  
**\*\* DO NOT CLEAN THE SKYLIGHTS IN DIRECT SUNLIGHT!**
4. Repeat, rinse, and dry with a soft cloth to prevent water spotting.
5. Apply a coat of non-abrasive car wax.

### **Weathered Skylight Maintenance**

1. Sponge or spray on 409\* household cleaner at its full strength.
2. Rinse with cold water.
3. Apply a coat of non-abrasive car wax. This will remove dirt and grime and restore gloss and clarity to the skylight.

### **Venting Skylight Maintenance**

Wash with a soft, clean cloth and Plexiglass cleaner, vinegar-based glass cleaner, or mild, non-abrasive soap and water.

### **Extrusion Maintenance**

To clean extrusions, use the same methods as for washing walls and roofs. Never clean the extrusions with abrasive pads, cleaners, or polishes.

### **Balance Across the Axle**

Handling can also be affected by uneven loading across the axle. Most of the appliances are mounted on the sink side of the camper, so stowing a proportionate amount of your camping gear on the door side helps to equalize the weight across the axle. Failure to balance the load will promote uneven tread wear.

### **Hitch Height**

The height of the hitch can make a big difference in the towing performance of the camper. Ideally, when in transit, the frame should be parallel to the road. Differences in the height of towing vehicles, tire sizes, camper hitches, the loading of the camper, and the loading of the towing vehicle can affect this factor. Avoid setups and situations that angle the camper more than necessary. Failure to observe the recommended guidelines may result in decreased tire life and unpredictable handling. Any alteration of the coupler height may void your warranty.

**\*\* ALTERING OR ADDING TO THE ELECTRICAL SYSTEM MAY VOID YOUR FACTORY WARRANTY.**

- Factory installed appliance circuits are color coded at the ends with electrical tape to make troubleshooting easier
- Your camper may not have every available factory option, so all colors listed may not apply to you
- If there is not tape on the (black and white) wires, they are part of the lighting circuit for the porch light and interior lights

Additionally, there are colored wires converging at the converter from the towing vehicle plug to the exterior lights

Camper Model	Hitch Height (top of ball)
Sportliner and Aliner	14 Inches
Sportliner and Aliner Expedition	20 Inches

### **Sportliner Special Instructions**

The Sportliner is a true Aliner on a smaller scale. Therefore, the setup and tear down procedures are identical to the Aliner, with one exception. While towing, the table must be centered under the rubber foot on the sink side “A”. This provides support for the “A’s”, and maintains proper geometry so the windows will not scratch each other. If you are towing your Sportliner in extremely rough conditions, it is advisable to occasionally check the position of the table.

### **The Lift System**

The maintenance-free lift system consists of four large springs designed to balance the weight of the roofs and steel hinges at the pivoting ends of the roof. The shock cords at the top of the roofs prevent the roofs from overextending. There are no extravagant parts to wear out, and the system works amazingly well.

### **Load Capacity**

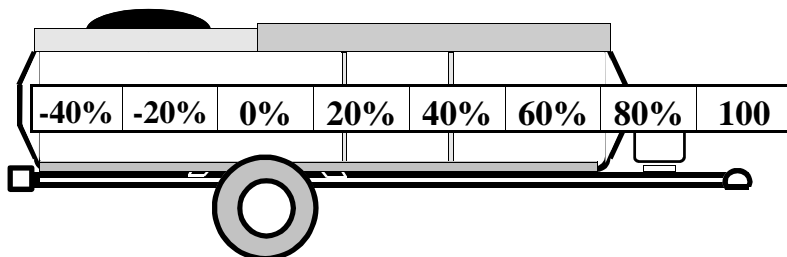
Base Campers	Shipping Weight	Gross Vehicle Weight
Sportliner	795	1840
Aliner	995	1840

### **Balance the Load**

Loading improperly can adversely affect handling while towing. Try to distribute your camping gear so the hitch weight is 10-20% of the gross vehicle weight (total weight of the loaded camper).

The diagram below shows how the position of objects will affect the hitch weight. For instance, if 50 lbs. of camping gear were loaded into the front of the camper, the hitch weight would increase by about 30 lbs. (50 lbs. X 60% = 30 lbs.) Ideally, whenever possible, the heaviest objects should be stored near the axle, directly over the frame members.

All Aliners and Sportliners have the water tank mounted in the rear of the camper behind the axle, so when the tank is full, there is a decrease in hitch weight.



### **Floor Maintenance**

You should clean the floor as you would any no-wax floor. Once a season, inspect the underside of the floor for damage, and check the condition of the silicone seals. If there are any trouble spots, spray the affected area with a rubberized undercoating, and make sure they are dry before re-gluing the fabric. If the silicone seals around the electrical and gas lines show signs of deterioration, repair them with quality silicone sealant.

### **Wall and Roof Maintenance**

Wash the exterior of the camper with a sponge or a soft, clean cloth and mild soap and water. Use a garden hose for rinsing, but avoid spraying or splashing water into the appliance vents. Never use brushes or a pressure washer to wash your camper, because they may loosen or destroy the stripes, or damage the exterior seals on your camper. An occasional coat of liquid automotive wax will help prevent dirt from sticking to your camper.

### **Paneling Maintenance**

The vinyl-coated paneling in your camper is easy to clean with a damp sponge with soapy water or Murphy's Oil Soap. Do not wash the electrical outlets or saturate the vinyl paneling with water. You can purchase vinyl oak grain tape in a variety of widths to cover scratches and blemishes.

Clean the white paneling in your camper using the same methods listed above. For tougher spots, scrub gently, using a toothbrush and a diluted household cleaner. White cloud tape is also available to cover minor scratches and stains.

### **Countertop Maintenance**

The countertop in your camper has a matte finish to help hide scratches. Clean the countertop the same as you would any laminated kitchen countertop.

### **Upholstery Maintenance**

The curtains and the covers for the cushions are machine washable using the gentle cycle, regular detergent, and cold water. To remove the curtains, unsnap them from their tracks. To remove the covers, unzip the cushions and remove the foam. Re-zip the covers before washing to prevent damaging the zippers or snagging the fabric. Best results are obtained by hanging the curtains and covers to dry, or if necessary, tumble dry in low heat.

### **Sink Maintenance**

The stainless steel sink can be cleaned using any kitchen cleaner. However, abrasive cleaners will scratch the strainer. When cleaning the sink, rub with the grain of the brushed finish. If it is necessary to inspect the trap for small missing objects, you can access it by removing the small thumbscrew under the sink strainer assembly.

## **Chapter 12:** **Interior Instructions**

### **Raising the Roof**

1. Undo the roof latches on both sides of the camper. The roofs will spring up slightly.
2. Lift the back roof. The roofs will elevate with little effort and lock into place.
3. Open the bottom door and lift the top door as you step into the camper. Carefully raise the door side “A”, making sure not to hit the top door extrusion on the roof extrusion. Lock the “A” into position using the “A” latch and sliding bolt lock.
4. Raise the sink side “A” and lock into position using the “A” latch and the sliding bolt.  
\*\* ALWAYS COMPLETE STEPS 3 AND 4.
5. Align the top door over the bottom door and latch the door halves together using the sash lock.

### **Lowering the Roof**

1. Make sure the interior lights are turned off, all flames are extinguished, all vents and skylights are closed, and the pump faucet is in the towing position.
2. Remove any foreign objects from the countertops and return all cushions to their designated places.
3. Starting with the sink side “A”, disengage the sliding bolt and the “A” latch.
4. Carefully lower the “A” until it stops
5. At the door side “A”, uncouple the top half of the door from the bottom half, unlock the door handle, and disengage the sliding bolt and the “A” latch.
6. Starting with the top half of the closed door, carefully lower the “A” as you simultaneously open the door to exit the camper. Do not scrape the top of the door on the roof extrusion.
7. Grasp the rear roof and tug downward to collapse the roofs. Buckle the roof latches.
8. As you buckle the roof latches, observe the rubber roof gasket and the front roof extrusion. The gasket should compress about 1/8”.
9. Adjust the roof latches by rotating the buckle clockwise to tighten.

## **Chapter 8:** **Adding Options**

### **Campers Equipped with Water Heaters and Demand Pumps**

1. From outside, drain the potable water tank by opening the petcock under the tank.
2. Go inside, open all faucets and showers, and run the pump until you purge any remaining water. Let the faucets open.
3. Turn the pump off.
4. Use a pan and a sponge to catch water remaining in the lines as you disconnect the input and the output from the pump.
5. Turn the pump on until all the water is expelled. Turn the pump off. Do not reconnect the plumbing.

**\*\* MAKE A NOTE TO RECONNECT THE PUMP BEFORE USING.**

6. From the outside of the camper, remove the anode rod from the water heater.

### **Water Systems with Hand Pump Faucets**

1. From the outside, drain the potable water tank by opening the petcock under the tank. Unscrew the cap from the sink evacuation drain and allow all water to drain before replacing the cap.
2. Carefully pry the screen and gasket from the city water hookup, push in the check valve's plastic stem, and hold it in until the water stops draining out. Replace the screen and gasket.
3. Use RV antifreeze to winterize the pump faucet. Follow the directions on the bottle. It will take a gallon or less to complete winterization.
4. Inside the camper, remove the stopper from the sink drain and pour about eight ounces of RV antifreeze into the sink.

**\*\* DO NOT USE AUTOMOTIVE ANTIFREEZE! IT IS HIGHLY TOXIC!**

<b>Camper</b>	<b>Type of Faucet</b>	<b>Manufacturer</b>	<b>For Replacement Parts</b>
Aliners without Water Heaters	Delta Six Dual Flow Model #DS3700	J&C Water Systems	219-262-4707
Sport Utility Models	Low Boy Hand Pump	Leisure Components	562-924-5763
All Models with Water Heaters	Hot/Cold Sink Faucet		724-423-7440
LXE Models Exclusively	Hot/Cold Shower Faucet		724-423-7440

**\*\*** If you would like to add any options to your camper, please contact an authorized Aliner dealership. Any unapproved modifications to electrical, gas, plumbing, or structural systems may void your warranty. We will not assume responsibility for damages or injuries resulting from unauthorized alterations.

### **Heater,** **Model 7916-II**

The LP gas, 16,000 BTU, pilot-less heater is very effective at quickly warming your camper. It has a thermostat-controlled electronic ignition. If desired, you can set the anticipator on the thermostat to control the frequency of the heating cycles.

To operate the heater:

1. Make sure the gas tank valve is turned on.
2. Remove the heater vent cover by pulling the bottom out from the furnace and lifting up. Make sure the circuit breaker on the heater is switched to the "on" position, then replace the cover.
3. Adjust the lever at the top of the thermostat to the desired temperature setting. Under the thermostat, flip the switch to the right.
4. After about 30 seconds, the fan will begin to run. After another 30 seconds, the igniter will start the furnace.

To turn the heater off, flip the switch under the thermostat to the left. Use caution around the outside vent.

For detailed information, see the manufacturer's instructions.

### Auxiliary Battery

#### **\*\* TO AVOID CONVERTER DAMAGE, DO NOT REVERSE THE BATTERY POLARITY!**

Caution: RV batteries contain sulfuric acid. Handle with care.

An auxiliary battery enables you to operate 12 volt D.C. appliances without draining your towing vehicle's battery or plugging your converter into a 120 volt A.C. receptacle. Use a deep cycle battery because its design gives maximum performance between recharging without damaging the battery. The tradeoff is that you cannot charge a deep cycle battery as quickly (high amperage) as you would charge a regular automotive battery. Secure the battery positive to the lug connected to the 20 amp in line fuse. The lug on the white wire connects to the battery negative terminal. If there is an electrical problem with the battery, check the 20 amp fuse at the battery, then check the 20 amp fuse in the converter. Do not replace battery fuses with anything other than 20 amp fuses. In cold weather, store the battery in a location where the temperature is above freezing. Do not allow the battery to freeze. Only store your battery in its proper enclosure.

### Ice Box

The 1.82 cubic feet, thermally insulated icebox has an adjustable shelf and a non-removable drain hose. For best results, store ice and perishables on the top shelf, and the cold air will settle down over remaining contents. You may also use the icebox to maintain the temperatures of hot foods, provided the hot containers do not directly contact the plastic interior.

**\*\* DO NOT REMOVE THE DRAIN HOSE FROM THE FLOOR.**

### Refrigerator

#### RM 2353 Model 4223

Operation by LP gas, 12 volts D.C., 120 volts A.C.

This refrigerator (exclusive to LX/LXE models) features a separate icebox for frozen foods, two wire racks, and spill resistant storage in the door. It is equipped with a piezo igniter for LP gas operation. On 12 volts D.C. it draws 10 amps. We strongly recommend only using this mode during transit. If possible, use propane, or 120 volts A.C. for overnight. If the power ventilator ceases to work in hot weather, check the one amp in line fuse behind the bottom vent. For proper refrigerator operation, the camper must be level. The basic operating instructions are printed on a sticker on the inside of the refrigerator. The LP gas mode is not intended for use while traveling.

### Winterizing

Serious damage may occur from water freezing in the plumbing system. Equipment failures of this nature will void your warranty. There are several methods for winterizing your water system.

**\*\* DO NOT ATTEMPT THIS PROCEDURE WITH HOT WATER IN THE WATER HEATER! TURN OFF LP GAS! DO NOT GET ANY OF THE ELECTRICAL APPLIANCES WET!**

### Winterizing a Centrifugal Pump

Purge all the water using the methods outlined above. Use RV antifreeze, following the directions on the bottle.

### Campers Without Water Heaters

#### Using the City Line

1. Connect a hose to the city water fitting by rotating the nut counter-clockwise until it threads onto the hose fitting.
2. Tighten the nut with a wrench so there are no leaks
3. Turn on the water supply. There may be air in the line when you first operate the faucet.

#### Filling Your Potable Water Tank

1. Remove the large clamp and place a clean hose into the potable water tank opening.
2. Turn on the water supply. Be careful not to overfill the tank.

### Campers Equipped with Water Heaters

#### Using the City Line

1. Connect a hose to the city water fitting by rotating the nut counter-clockwise until it threads onto the hose fitting.
2. Tighten the nut so there are no leaks.
3. Turn on the water supply and open the hot and cold faucets.
4. Allow the water to run until there are no air pockets or bubbles from the faucet. This will ensure that the water heater has been filled to capacity.
5. When using the city water hookup for your water supply, the water heater will automatically refill. Do not run the pump.

#### Filling Your Potable Water Tank

1. Remove the large cap and place a clean hose into the potable water tank opening.
2. Turn on the water supply.
3. When the water tank is almost full, turn off the hose, turn on the water pump, open the hot and cold faucets, and let them run until there are no air pockets or bubbles.
4. Turn off the pump and resume filling the water tank. Be careful not to overfill the water tank.

**\*\* NEVER OPERATE THE WATER HEATER WITHOUT WATER\*\***



# **Chapter 11:**

## **Water System Maintenance**

### **Water Systems**

Sanitize the water system before the first use, as well as before and after storage. Winterize all water system components before exposure to freezing temperatures. Failure to follow proper winterizing procedures can result in cracked pumps, faucets, and other plumbing hardware problems. Problems resulting from negligence are not covered under your warranty. Contact your dealer for winterizing assistance.

### **Sanitizing Water Systems**

All potable water systems (water suitable for drinking) should be sanitized before and after storage. Also, sanitize water systems with new equipment, or systems that have been subjected to contamination. Sanitizing disinfects the water system and helps to provide safe, clean water.

1. Multiply the potable water tank capacity (in gallons) by .13 for a four hour treatment, or by .26 for a one hour treatment. This will give the liquid ounces of common household bleach required for disinfecting the water system
2. Add the proper amount of bleach to a container with some water and mix.
3. Pour the solution into the water tank and fill the tank with potable water.
4. A. Operate the hand pump until you smell chlorine.  
Or  
B. Turn on the electric pump and open all faucets including showers. Shut off the faucets when you smell chlorine.
5. Allow the proper treatment time (as determined in step 1) before draining the tank and refilling with potable water.

#### **\*\* PURGE THE PLUMBING OF ALL BLEACH SOLUTION.**

The sanitizing procedure outlined above is in conformance with the approved procedures of RVIA ANSI A119.2 and the U.S. Public Health Service.

### **RM 2193**

Operation by LP gas, 12 volts D.C., 120 volts A.C. This refrigerator features two wire racks and a built in piezo igniter for LP gas operation. On 12 volts D.C. it draws 9.5 amps. We strongly recommend only using this mode during transit. Do not operate the refrigerator on the gas and electric modes at the same time. The LP gas mode is not intended for use while traveling.

For detailed information regarding the operation and maintenance of this appliance, see the manufacturer's instructions.

**\*\* WHEN POSSIBLE, IT IS ADVISABLE TO PRE-COOL THE REFRIGERATOR FOR A FEW HOURS BEFORE STORING ANY PERISHABLE FOODS PRONE TO SPOILAGE.**

**\*\* DO NOT STORE ANY HOT FOODS IN THE REFRIGERATOR UNTIL THEY HAVE COOLED.**

### **Air Conditioner**

Carrier air conditioners feature 6000 BTU cooling capacity.

1. Remember to remove the outside cover before operating the air conditioner.
2. Clean the filter, especially when using in dusty conditions.
3. Do not place any objects close enough to the air conditioner to impede the airflow during operation.

To prevent collecting road dust and debris, replace the outside cover before traveling. There will be condensation dripping outside the camper during operation.

*The model of camper determines the location of the air conditioner.*

### **Radio**

Please refer to the radio manufacturer's instructions.

### **Step**

The steel pullout step is a factory installed option. To use the step, lift up the bottom of the step slightly while pulling out. Lower it until it stops secure. Make sure the step is extended completely and solidly. To retract, lift the bottom of the step slightly and push the step under the camper.

## The Awning

The awning attaches using Velcro strips that run along the top edges of the roof extrusions on the door side of the camper.

### **\*\* DO NOT USE THE AWNING IN HIGH WINDS.**

1. Start with the roof down. Connect the short pole to the bracket at the rear of the front roof extrusion.
2. Find the approximate center of the awning and position the center at the rear edge of the front roof (the peak of the roof) and continue fastening the awning to the front roof.
3. Insert one of the long poles into the pocket at the front corner of the awning and attach the pole to the mounting bracket on the camper.
4. Raise the roof and lock it into place.
5. Attach the awning to the top edge of the rear roof extrusion. Use the remaining pole to adjust the awning and rub the Velcro where it is out of reach.
6. Insert the pole into the awning, attach the pole to the mounting bracket, and fasten the ends of the poles together using the supplied hardware.

*To remove the awning, reverse the procedure.*

### **\*\* DO NOT STORE THE AWNING WHEN IT IS WET.**

## Screen Room Installation

1. Place Velcro on the top edge of the top aluminum extrusion, pressing firmly to ensure good attachment.
2. With the top unlatched, but not fully raised, starting at the front of the trailer, unroll the screen room so the loop fastener of the screen room attaches to the hook fastener on the top.
3. When you are halfway, open the top completely and put up the sidewalls. Continue to unroll the screen room down the other side of the peak.
4. When finished unrolling, use eve poles to firmly secure the Velcro to the top.
5. Lower the poles, stake the guide rope, and adjust so the screen room is taut.
6. Attach the Velcro to the bottom edge of the trailer and attached skirt.
7. Attach the Velcro to the trailer sides and attach the screen to the sides of the trailer.
8. Stake down the screen room.
9. Place eve poles in the front sleeves and open to length.
10. Adjust the guy ropes.

To remove the screen room, reverse the procedure, letting the Velcro attached to the camper. Dry the screen room before storage.

## Chapter 10: Systems

All of the appliances in the camper function together. Here is a chart defining which systems work together. A ♦ indicates the type of power required for using the appliance.

If the black paint on your trailer becomes chipped or scratched, it can be repaired using any black paint made for metal.

Appliance	12v DC	120v AC	LP Gas
Converter (requires 120v AC to produce 12v DC)		♦	
Outlets		♦	
Stove			♦
Heater	♦		♦
Gas Detector	♦		
Radio	♦		
Water Heater			♦
Centrifugal Pump	♦		
Demand Pump	♦		
Air Conditioner		♦	
Refrigerator #2310	♦	♦	♦
Refrigerator # 2193	♦	♦	♦
Thetford Cassette Toilet	♦		

### **LXE Shower Curtain Installation**

1. Start inside the camper, at the front, and make sure the “A’s” and roofs are locked in place.
2. Locate plastic clips on the door and sink sides of the camper “A’s”. The clip for the sink side “A” will be approximately above the sink on the top of the “A” extrusion. The door side clip will be directly across from that.
3. Extend the shower curtain rod until it spans the width of the camper and insert it into the clips at each “A”.
4. Using the three hooks on the shower curtain, attach the curtain to the rod.
5. Step into the shower stall and face the front of the camper. Take the right side of the shower curtain and hook the grommet at the end of the curtain onto the middle hook screwed into the front roof. Continue around, working to the right, placing the grommets onto the hooks.
6. When complete, the shower curtain should surround the shower.

### **Using Your Shower**

If a holding tank is required at your campground, attach a garden hose to the exterior drain for the shower and run the hose into a bucket. This method also works for the sink drain. Using a bucket to catch the wastewater will also reduce the likelihood of accumulating mud around the door.

### **\*\* NOTE\*\***

**THE FURNACE, REFRIGERATOR, STOVE, AND WATER HEATER BURN LP (LIQUEFIED PETROLEUM) GAS DURING OPERATION. LP GAS IS A VERY RELIABLE, CONVENIENT, AND AFFORDABLE FUEL. HOWEVER, THIS GAS IS EXTREMELY DANGEROUS WHEN SAFETY PRECAUTIONS ARE IGNORED.**

### **LP Gas Tanks**

To remove the tanks (or bottles) for filling, turn the tank valves off. Make a note of the regulator vent position. Disconnect the hose or fitting to the tank valve. (This is a reverse thread) Loosen the wing nuts under the mounting bracket and lift the hold down rods out of the way. To transport or store the tank, install the plastic plug into the valve body. This prevents dust, dirt, and moisture from collecting in the valve. This plug also protects the threads. After filling the tanks, fasten them securely to the mounting bracket using the wing nuts and hold down rods.

### **Regulator Mounting Instructions**

Attach the regulator assembly to the service valve. Remember this is a left-hand thread. Use the proper wrench to draw the POL nut snug. Do not over-tighten or use sealant. Position the regulator assembly so the vent is angled down within 45 degrees of vertical. It is important to install the regulator so the cover does not become a receptacle for water or other foreign material. Install the plastic cover. Connect the flexible hose to the regulator first, then to the bulkhead fitting.

### **Checking for Leaks**

Before checking for leaks, make sure all LP gas appliances are turned off. Put out all flames and sources of sparks. If there is a constant hissing, the tank valve is turned on, there is a ruptured gas line, or a stove burner is on, in which case you should turn the tank valve off until you locate and fix the problem.

Turn the tank valve on and generously apply a mild soap and water solution to each connection. Bubbles will appear if there is a leak. If it leaks at a fitting, tightening may help. If it continues leaking after tightening, replace the fittings. Leaks around the seals or vents of the regulator will require replacing the regulator.

After testing for leaks, purge the air in the gas lines by opening a valve until you detect the odor of LP gas. Allow enough time for the gas to dissipate before lighting any appliances. Periodically inspect the tanks for dents, cracks, and corrosion. Inspect the mounting hardware and hoses for signs of wear, and replace if necessary.

- Always keep the valve on the tank closed when not in use or when traveling.
- Never fill a tank over 80%.
- Never test for leaks with a flame, or use products containing ammonia or chlorine to test for leaks.
- Do not store your tank in an enclosed place with extreme temperature changes.
- If necessary, you may repaint your tank (white only).

## **Chapter 9:** **Water Systems**

### **Water Pump, Centrifugal Pump**

When the switch and the faucet are on, the pump draws water from the potable water tank. For the pump to function properly, the water level in the water tank must be at least 1 1/2" deep and the camper should be level. The faucet handle must be in the pump position.

### **Demand Pump, Diaphragm Water Pumps**

If the water pressure in your water system is below the adjustable setting, the pump will automatically run, drawing water from the tank, and shut off when the desired water pressure is reached. Demand water pump systems are capable of pump pressures between 35-45 PSI. Clean the potable water filter periodically and do not operate the pump for extended periods without water.

For detailed information regarding the operation and maintenance of the appliance, see the manufacturer's instructions.

### **Water Heater**

The gas-fired water heater is capable of heating 6 gallons of water to 140 degrees. That is hot enough to cause serious burns quickly. Using a lower temperature setting will reduce the likelihood of injury.

- Make sure the water heater is full of water before lighting.
- Never light an empty water heater.
- Drain the water heater (by removing the anode rod) if it will be subjected to freezing temperatures. See page 22 for further instructions.

### **Outside Shower**

The outside shower operates the same as a regular faucet. Drain the faucet and the hose to the showerhead before exposure to freezing temperatures.