

OWNER'S MANUAL

**LAND YACHT
MOTORHOME**

By Airstream

*1000 Mile Check or 60 Day Check-Out

This card entitles you, under the exclusive Airstream Certified Performance Checkout Program, to a 1000 mile (or 60 day.....whichever comes first) Performance Check of your Airstream Land Yacht Motorhome.

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INTRODUCTION

The Owners Manual for your new Airstream Land Yacht Motorhome is designed to explain the operation, function and care of the many systems that make modern motorhoming a joy.

Airstream realizes our customers possess varying degrees of expertise in the area of repairing and maintaining the appliances in their motorhome. For this reason, the service and trouble-shooting information found in this manual is directed toward those with average mechanical skills. We also realize you may be more familiar in one area than you are in another. Only you know your capabilities and limitations.

We want you to use this manual, and hope you will find the information contained in it useful; however, should you ever feel you may be "getting in over your head" please see your dealer to have the repairs made.

The operation and care of component parts such as: chassis, refrigerator, furnace, water heater and others are explained in this manual. However, you will also find manufacturer's information supplied in a packet included with this manual.

All information, illustrations and specifications contained in the literature is based on the latest product information available at the time of publication approval.

Throughout this manual **CAUTION** and **WARNING** notations are used. Failure to observe "caution" can damage equipment. "Warning" notes the possibility of personal injury if not observed.

Note: If and when new materials and production techniques are developed which can improve the quality of its product, or material substitutions are necessary due to availability, Airstream reserves the right to make such changes.

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AIRSTREAM, INC.

LIMITED WARRANTY

AIRSTREAM LAND YACHT MOTORHOME

Warranty Coverage

When you buy a new Airstream Land Yacht Motorhome from an authorized Airstream dealer, Airstream, Inc. warrants the motorhome from defects in material and workmanship as follows:

Warranty Period

This warranty is for 12,000 miles (20,000 Kilometers) or one year, whichever occurs first, beginning when the vehicle is delivered to the first retail purchaser or first placed into demonstrator service. This warranty must have been started prior to the accumulation of 4,000 miles in order to be valid.

Items Covered

Any part of the motorhome or any component equipment installed by the factory is covered by the warranty except the following items which are not covered:

- * Tires
- * Battery
- * Fuses and Light Bulbs
- * Video Recorder
- * TV and Radio
- * Backing Monitor
- * Microwave Oven
- * General Motors Chassis
- * AC Power Plant

The above items will be handled by their respective service points and according to their written policy. This limited warranty does not include failure caused by accident, abuse, normal wear, overload or any cause not attributable to a defect in original material or workmanship of the motorhome or component equipment as installed by the factory.

Limitation of Implied Warranties

All warranties of merchantability and fitness for a particular purpose, whether written or oral, express or implied, shall extend only for a period of one year from the date of original purchase, or 12,000 miles whichever comes first. There are no other warranties which extend beyond those described on the face hereof and expressly excludes conditions resulting from normal wear, accident, abuse, exposure or overload. Some states do not allow limitation on how long an implied warranty lasts, so the limitation may not apply to you.

Airstream's Responsibility

The Airstream Limited Warranty applies for a period of one year from the date of original purchase, or 12,000 miles whichever occurs first, and the applicable date of all warranties is that indicated on the Owner's Identification Card. Defects in items covered under this warranty will be corrected without cost upon the return at the owner's expense of the motorhome or defective part to an authorized Airstream dealer.

Care and Maintenance

This warranty covers only defective material and/or workmanship; adjustments and checking are excluded. All adjustments are made at the factory prior to shipment, and rechecked by the dealer prior to delivery to the customer. An additional checkup, including adjustments, is given at the 1,000 mile or 60 day inspection. Adjustments thereafter become a customer responsibility.

The owner is also responsible for following all recommendations, instructions and precautions contained in the Airstream Owner's Manual and the individual manuals furnished by the chassis, appliance and other manufacturers.

Installations not Covered

Airstream, Inc. does not accept any responsibility in connection with any of its motorhomes for additional equipment or accessories installed at any dealership or other place of business, or by any other party. Such installation of equipment or accessories by any other party will not be covered by the terms of this warranty.

If Repairs are Needed

If your motorhome needs repairs under the terms of the Airstream Limited Warranty, you should:

1. Take your motorhome to your selling dealer or other Authorized Airstream dealer.
2. If the dealer is incapable of making the repair, request that he contact the Service Administration Department at Airstream, Inc. for technical assistance.
3. If repairs are still not made, the customer should contact Airstream, Inc. 419 w. Pike Street, Jackson Center, Ohio 45334, Attention: Owner Relations Department and furnish the following information.

- * The complete serial number of the motorhome
- * Mileage
- * Date of original purchase
- * Selling dealer
- * Nature of service problem and steps or service which have been performed. (The owner may be directed to another dealer at the owner's expense.)

4. If, after taking the above steps, repairs are still not complete, the Airstream owner may request the motorhome be allowed to be brought to the Factory Service Center at the owner's expense.

Dealer Representation Excluded

The full extent of Airstream's Limited Warranty is set forth in detail in this folder, and in the Explanation of Airstream Limited Warranty covered in the Airstream Motorhome Owner's Manual. Airstream, Inc. will not be responsible for additional representations or implied warranties made by any of its dealers to the extent those representations are not a part of, or are contrary to, the terms and conditions of the Airstream Limited Warranty.

Consequential and Incidental Damages

Airstream, Inc. will not be responsible for any consequential or incidental expenses or damages resulting from a defect. Incidental expenses include, but are not limited to, travel expenses, gasoline, oil, lodging, meals, telephone tolls, loss of work and loss of use of the motorhome. Some examples of consequential damages would be: stained curtains due to rain leaks or delaminated floor caused by a plumbing leak. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Warranty Transfer

This limited warranty is transferable to subsequent owners for the duration of the warranty period. Warranty transfer application forms are available from your dealer or the Airstream, Inc. Service Administration Department.

Changes in Design

Airstream, Inc. reserves the right to make changes in design and improvements upon its product without imposing any obligation upon itself to install the same upon its products theretofore manufactured.

Limited Warranty coverage on the CMA tag axle components, as listed below, is for 24 months or 24,000 miles from the date of purchase, whichever occurs first.

- | | |
|---|--------------------|
| * Tag Axle, up to and including spindle | * Compressor |
| * Air Bags | * Pressure Switch |
| * Air Lines and Fittings | * Air Relief Valve |
| * Leveling Valves | * Air Supply Tank |
| | * Check Valve |

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

Thor Industries
Airstream, Inc.
419 West Pike
Jackson Center, Ohio 45334

WARRANTY EXPLANATION

Along with your new Airstream motorhome you have purchased the Airstream Limited Warranty. Read your Limited Warranty carefully. It contains the entire agreement with respect to Airstream's obligation on the Limited Warranty on your new vehicle. The terms of the Limited Warranty, and only those terms, will define Airstream's responsibility. When you receive your Limited Warranty file it for safekeeping.

Upon proof of purchase date to any Airstream Dealer Service Center, defects in materials or workmanship will be repaired or replaced without cost to the owner for a period of twelve (12) months from the original purchase date, or 12,000 miles, whichever occurs first. Written warranties of some manufacturers of components of the motorhome will be honored by Airstream for the duration on that manufacturer's warranty.

Items such as motorhome chassis, engine, tires, batteries and generator are serviced by their respective manufacturers and will be handled by their service centers according to the terms of their written policy. Any warranty forms from these manufacturers should be completed promptly, preferably at time of purchase.

Your motorhome chassis is prechecked by its manufacturer before delivery to Airstream. All service to the chassis must be performed by the manufacturer according to the manufacturer's warranty and service policies. Literature is supplied with each Airstream motorhome which gives important information concerning its warranty coverage; however, the Airstream Limited Warranty covers the chassis heater, defrosters, speed control, windshield wiper blade, motor, washer, LP gas bottle and gas regulator.

Adjustments to your Airstream motorhome were made at the factory prior to delivery to the purchaser. An additional checkup, including adjustments, is made at the 1,000 mile or 60 day inspection. Any adjustments thereafter are the customer's responsibility and are not covered by the Airstream Limited Warranty.

Paint and appearance items which show imperfections should be brought to the attention of your dealer at the time of delivery and during pre-delivery inspection. Normal deterioration by use and exposure is not covered by the Airstream Limited Warranty.

Damage to enameled or porcelain surfaces resulting from abrasion, collision or impact, and broken window glass is not covered by the Airstream Limited Warranty.

The Airstream Limited Warranty Excludes:

Normal Wear:

Items such as water purifier packs, curtains, upholstery, floor coverings, window, door and vent seals may show wear within the one year Limited Warranty period depending upon the amount of usage, weather and atmospheric conditions.

Accident

Damage caused by accident is usually visible, and we strongly urge our dealers and customers to inspect the motorhome upon delivery for any damage caused by accident while being delivered to the dealer, or while it is on the dealer's lot. Damage of this nature becomes the dealer's or your responsibility upon acceptance of the motorhome. GLASS BREAKAGE, whether obviously struck or mysterious, is always accidental and covered by most insurance policies.

Abuse

Lack of customer care and/or improper maintenance, including failure to comply with the terms of the Owner's Manual, or failure to heed proper vehicle operation shown by the dash instruments are not covered by warranty.

Exposure

Deterioration by sunlight is possible to such items as tires, curtains or upholstery. Steel or metal surfaces are subject to the elements, causing rust and corrosion which is normal and beyond the control and responsibility of Airstream.

Overload

Damage due to loading beyond capacity or to cause improper balance is not covered by the Airstream Limited Warranty. The Airstream motorhome body is engineered to properly handle any normal load. There are limits to the amount of load that can be safely transported depending upon speed and road conditions. If these limits have been exceeded the Airstream Limited Warranty will not cover resulting damage. For additional information on the load capacity of your motorhome consult your Owner's Manual or gross vehicle weight rating plate. Each motorhome is aligned during the last quality inspection. These tolerances will only change if the motorhome is subjected to abuse, such as dropping off a sharp berm, striking a curb, or hitting a deep hole in the road. Such damage would be considered as resulting from an accident which risks are not covered under the warranty. Abnormal tire wear and/or wheel alignment resulting from such damage is not covered under the terms of the warranty.

SERVICE

The Airstream Silver Key Delivery Program is an exclusive Airstream program. Before leaving the factory each and every vital part of the motorhome is tested for performance. Each test is signed and certified by an inspector. After the motorhome arrives on your dealer's lot all of these vital parts and systems are again tested. When you take delivery of your new motorhome you will receive a complete checkout.

Silver Key Delivery does not stop here. After you have traveled with your motorhome for 1000 miles or 60 days (whichever comes first) you can make an appointment with any one of the Airstream dealers for still another checkout of your motorhome. At that time a specified list of performance checks on your motorhome equipment will be conducted and any deficiencies you have experienced since taking delivery will be corrected.

Please contact your dealer if you need service. Major service under your Airstream Limited Warranty is available through our nationwide network of Airstream Dealer Service Centers. An up-to-date list of Dealer Service Centers has been provided with your new motorhome. This list is current as of the date of publication.

Occasionally dealerships change, or new dealers are added who may not appear on this list. For this reason, it is suggested that you contact your local dealer from time to time and bring your list up to date. He can also provide you with additional copies if you need them.

ALL CENTERS OPERATE ON AN APPOINTMENT BASIS FOR THE UTMOST EFFICIENCY.

When you require service from the Airstream Factory Service Center or a Certified Dealer Service Center please contact the service manager for an appointment, and kindly inform him if you are unable to keep the appointment date or wish to change it.

Service may be arranged at the Factory Service Center by contacting the Service Coordinator at:

Airstream Factory
Service Center
419 W. Pike Street
Jackson Center, Ohio 45334
Phone: 513-596-6111

You Should Also be Aware of the Following:

Airstream is not responsible for any consequential or incidental damages incurred as a result of any defect. Consequential damages include, but are not limited to, travel expenses, gasoline, oil, lodging, meals, telephone tolls, loss of work and loss of use of the motorhome.

In the event of a defect, the owner must take all reasonable corrective action to lessen the damages which might result from such defect. Airstream will not be responsible for damages which could have been avoided.

Airstream's responsibility is defined solely by the Airstream Limited Warranty and Airstream is not responsible for or bound by representations or warranties made by any of its dealers.

Your Airstream Limited Warranty is transferable to subsequent owners of the motorhome, but only for the duration of the warranty period. Warranty transfer application forms are available from your dealer or the Airstream factory.

MAINTENANCE SCHEDULE

Note: See Chevrolet and appliance manufacturer's literature for further information.

EVERY 1000 MILES OR 30 DAYS

Escape Window	Check operation of latches and upper hinge
Smoke Alarm	Test and replace battery as required
Tires	Check tire pressure (70 psi front - 60 psi rear)
GFI Circuit Breaker	Test and record

EVERY 5000 MILES OR 90 DAYS

Exterior Door locks	Lubricate with dry graphite
Exterior Hinges	Lubricate with light household oil
LPG Regulator	Check bottom vent for obstructions
Main Door Striker Pocket	Coat with paraffin
Tag Axle	Add lithium bearing grease to tag axle
Wheel Lug Bolts	Torque to 90-95 ft. lbs.
Range Exhaust Hood	Clean fan blades and wash filter
Roof Vent Elevator Screws	Lubricate with light household oil
Main Door Step	Lubricate moving parts and check
* Rear Suspension Air Tank	Drain moisture at valve on bottom of tank

* In high humidity the air tank should be drained at 1200 mile intervals.

EVERY 10,000 MILES OR 6 MONTHS

Electric Brakes (tag axle)	Check magnets and shoes
Exterior	Clean and wax
Fuel System	Replace in-line filter at fuel tank

EVERY YEAR OR 12,000 MILES

Battery	Clean, neutralize and coat terminals with petroleum jelly
LP Tank	Have purged by LP supplier
Seams	Check seal on exterior seams, windows, lights, and vents. Reseal with Kool Seal or equivalent as needed.
Tag Axle Wheel Bearing	Clean, Repack

MAINTENANCE RECORDS

Date	Dealer	Service Performed

DRIVING

SAFETY CHECK LIST

Your Airstream motorhome should be given a thorough safety check before a trip. Regular use of the following list will provide safe operation of your motorhome and will help you spot any malfunctioning equipment and correct the problem as soon as possible.

Failure to heed many of the following items may cause damage to the vehicle or personal injury.

EXTERIOR CHECK LIST (BEFORE ENTERING VEHICLE)

1. Check condition of tires for proper inflation.
2. Turn off LPG valve on LPG tank.
3. Check that sewer connection, all external compartments and filler openings are properly stowed or closed and/or locked.
4. Check that items stored on exterior of vehicle are securely tied down.
5. Would any items stored on exterior of vehicle present a clearance problem?

INTERIOR CHECK LIST (BEFORE DRIVING OFF)

1. It is important that the main door and cab door be completely closed and locked during travel. As an added precaution we recommend the dead bolt also be locked on the main door.
2. Turn off living area water pump.
3. Check that refrigerator door is fastened.
4. Check that nothing heavy is stored in overhead or high cabinets which could fall out and cause injury. Heavy items should be stored in low cabinets.
5. Stow folding and pedestal tables.
6. Check that counter tops, range top, credenza tops and shelves are clear of even small items that could become projectiles in an accident.
7. Do not cook while under way. Hot food or liquid could scald due to a sudden stop or accident.

8. Be sure all LPG controls on furnace, range/oven and gas/electric refrigerator are turned off.
9. Check that any internal stowage is securely held in place.
10. Check that lights and switches are set in positions safe for travel.
11. Adjust the driver's seat so that you can easily reach and operate all controls. Make sure seat is locked in position. Do not adjust driver's seat swivel or fore and aft mechanism while vehicle is moving. The seat could move unexpectedly causing loss of control.
12. Check that front passenger's seat is locked in position - both fore and aft adjustment and swivel mechanism.
13. Check rear view mirror adjustment, inside and outside. Adjust curtains if necessary for maximum visibility.
14. Fasten lap belts.
15. Check that step light goes out and that electric step has retracted.

SAFETY SEAT BELTS

In the forward driver's area of the motorhome, safety seat belts are provided for the use of the driver and the right front passenger. Safety belts are available for other seats. It is strongly recommended that all occupants remain seated with their safety belts firmly attached while the motorhome is in motion. The driver should adjust his seat so that he is able to reach all controls easily with the belt on, especially able to use all the travel on the foot brake. The belt should be placed as low as possible around the hips to prevent sliding out from under them in case of accident. This places the load of the body on the strong hip bone structure instead of around the soft abdominal area. Two people should never try to use the same seat belt.

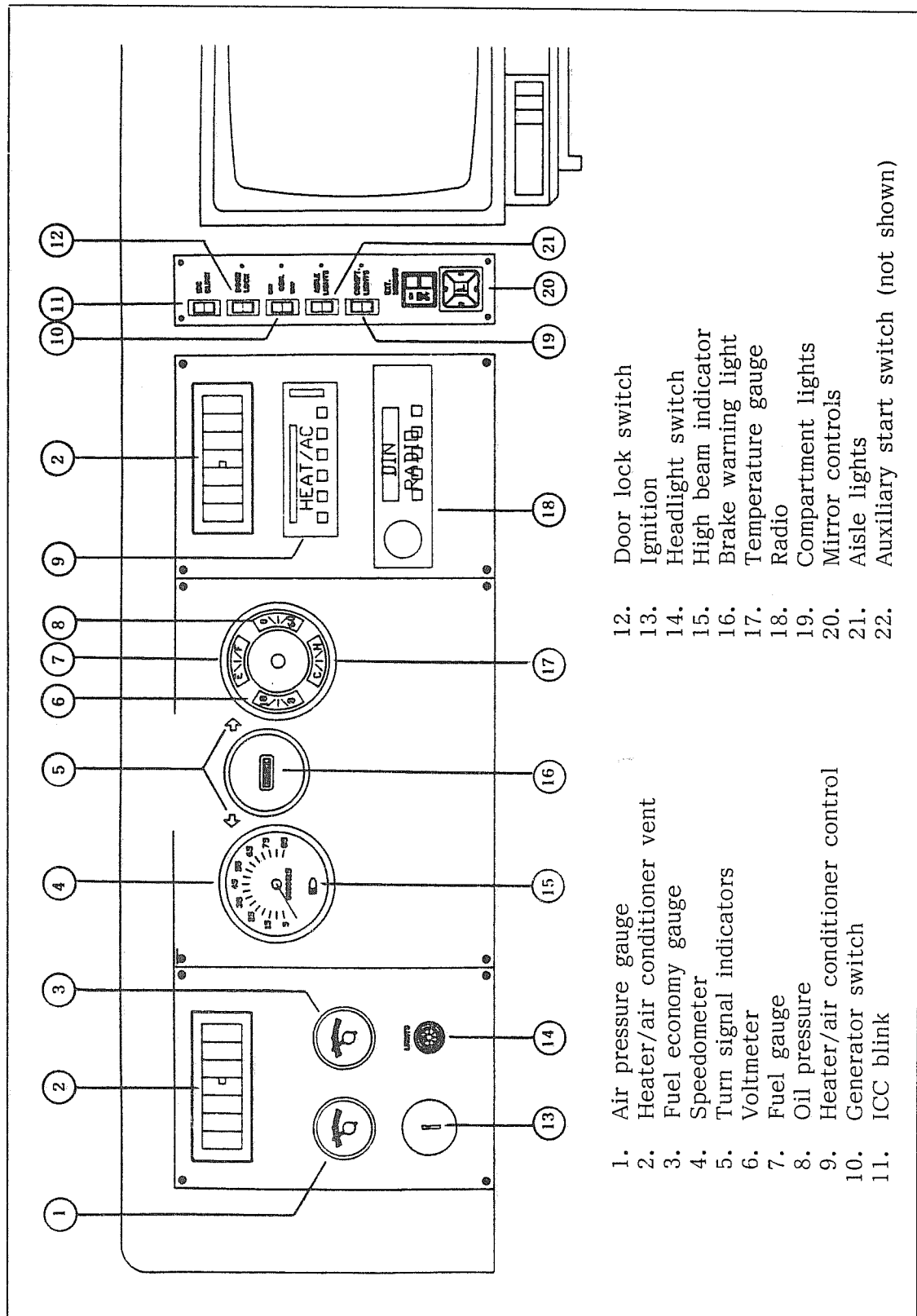
WARNING: Children must be secured in a Federally Approved Child Restraint Device. Failure to use proper restraints can result in severe or fatal injuries in case of accidents.

Child restraint devices are designed to be secured with lap or lap/shoulder belts. All instructions supplied by the restraint manufacturer must be followed. Statistics have shown children are safer when properly restrained in a rear seating position than in a front seating position.

Often the children traveling in motorhomes are grandchildren. There are times when our love for grandchildren makes us hesitate to properly supervise their actions. Don't hesitate when it comes to their safety. Make sure they are properly restrained.

CHILDREN HAVE LOVED ONES TOO.....IF YOU WON'T BUCKLE UP FOR YOURSELF, BUCKLE UP FOR THEM.

DASH CONTROLS AND INSTRUMENTS



1. **Air Pressure Gauge:** This gauge is only used on models with air bag suspension on the rear drive axle. The gauge monitors the pressure in the air bags. The system should be checked if the needle remains in the red on either end of the scale for more than a couple of minutes.
2. **Air Conditioner Outlets:** The vanes of the outlets may be directed right or left, and the vane assembly will also swivel up or down.
3. **Fuel Economy Gauge:** The best gas mileage is obtained when the fuel economy gauge is operating at the highest figure.
4. **Speedometer:** The speedometer indicates the speed of the vehicle in both miles per hour (MPH) and Kilometers per hour (km/h).
5. **Turn Signal Indicators.** The indicators should blink anytime the turn signal lever is operated. If the indicator does not come on or comes on and does not blink, the electrical system should be inspected.
6. **Voltmeter:** The volt meter shows the voltage available to the electrical system. Because of the many accessories in the motorhome it is possible to see the voltage actually drop while you are driving. If this occurs, accessory use should be reduced until the engine alternator has a chance to bring the batteries up to full charge. You may also start the generator so the converter system will provide current as well as the engine alternator.
7. **Fuel Gauge:** The fuel gauge shows the approximate amount of fuel left in your tank. As you become familiar with your particular motorhome you will have a better idea of how much fuel is actually left at any indicated level.
8. **Oil Pressure Gauge:** Oil pressure will vary with ambient temperatures and viscosity of oil used. Readings in the mid-range at moderate temperatures and average road speed is considered normal.

CAUTION: If oil pressure drops suddenly, or oil pressure is not indicated after starting, the engine must be shut off immediately to avoid damage.

9. **Dash Heater/Air Conditioner Control:** The operation of this control is the same as in most automobiles for a number of years.
10. **Generator Switch:** The remote generator switch on the dash allows the driver to start or stop the generator without leaving the driver's seat. It should be noted a built-in time delay allows the generator to reach full operating speed before 120 volt current is provided to the coach.
11. **ICC Blink:** With this switch it is possible to blink the clearance lights on the motorhome. It is most commonly used as a way of indicating your thanks for a courtesy shown to you by another driver.
12. **Door Lock Switch:** The main door dead bolt may be locked or unlocked from the driver's seat.

13. **Ignition Switch:** The ignition switch has four positions: Accessory: You can use some electrical accessories when the engine is not running. To engage this position turn the top of the square head key to the left. Off: Normal parking position. Used to turn off the engine and accessories. The key must be turned to "OFF" before it can be removed. Run: Key turned to right and released. Normal operation position. Start: Key turned to right as far as possible and held against spring tension. Do not crank engine more than 30 seconds without releasing key to allow starter to cool.
14. **Head Light Switch:** The head light switch is operated by pulling in and out. When the switch is pulled out to the first notch the running lights and dash lights will be illuminated. The intensity of the dash lights may be varied by rotating the switch. Pulling the switch out all the way turns on the head lights. The dimmer switch for the head light Hi-Lo beam operation is located left of the brake pedal. If the head lights are left on, and the ignition switch is turned off, a warning buzzer will sound.
15. **High Beam Indicator:**
16. **Brake Indicator:** The brake indicator serves a two-fold purpose. It lights up when the parking brake is applied or if there is a failure in either the front or rear hydraulic brake system.
17. **Temperature Gauge:** In normal conditions the temperature indicator will usually be around the center of the gauge. In city traffic or on long steep grades the needle will climb as you would expect. The engine should not be operated under load if the needle reaches the red warning band. See your Chevrolet driver's manual for detailed instructions.
18. **Radio/Tape Player:** Complete instructions for the operation of the entertainment center is furnished with each new motorhome.
19. **Compartment Lights:** This switch controls the lights in the exterior, lower storage compartments.
20. **Mirror Controls:** The lower control is a wobble stick. Move the switch to left or right position, then operate the stick in the direction you want the mirror to move. The upper control is the mirror heater used for defrosting. The switch should be turned off as soon as the mirrors are clear. A time delay device is built into the system that will shut the heater off automatically after about nine minutes. **CAUTION: Do not attempt to adjust the angle of the mirrors by hand. They must be adjusted using the dash controls.**
21. **Aisle Lights:** The aisle lights enable the driver to illuminate the aisle of the vehicle without turning on overhead lights in the passenger area that could hinder the driver's vision at night.
22. **Auxiliary Start Switch:** The auxiliary start switch is intended to be used if the engine battery becomes to discharged to turn the engine over. The switch is located under the lower edge of the dash on the left side. To operate, hold the switch in the start position, then use the ignition switch in a normal fashion. Operating the auxiliary start switch closes the points on a large solenoid, tying all three vehicle batteries together for increased starting power.

SMART STICK OPERATION

The turn signal lever on the left side of the steering column also controls headlight low-beam and high-beam, the windshield delay wiper/washer, and the cruise control.

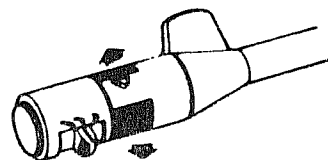
Turn Signal

Move the lever up to the second stop to signal a right turn. Move it down to the second stop to signal a left turn. When the turn is completed the signal will cancel and the lever will return to horizontal.

TURN SIGNAL

R.H. TURN - MOVE UPWARD

L.H. TURN - MOVE DOWNWARD



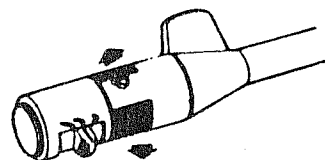
Lane Change Signal

In some turns, such as changing lanes, the steering wheel is not turned far enough to cancel the turn signal. For convenience you can flash the turn signal by moving the lever part way (ie: the first stop) and holding it there. The lever will return to horizontal when you release it.

LANE CHANGE

CHANGE FROM LEFT TO RIGHT LANE.
MOVE UPWARD TO 1ST STOP

CHANGE FROM RIGHT TO LEFT LANE.
MOVE DOWNWARD TO 1ST STOP



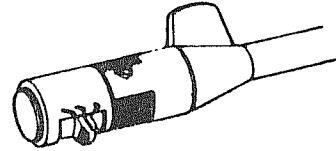
Headlight Beam Changer

With the headlights on, pull the lever toward you until you hear a click, then release it. The lights will change from low-beam to high-beam, or from high-beam to low-beam. When the high-beams are on, a light will appear on the instrument panel.

HEADLIGHT BEAM CHANGER

(HEADLIGHTS ON)

PULL LEVER TOWARD YOU



Delay Windshield Wiper

The delay windshield wiper system lets you vary the wiper speed from a 20 second delay between sweeps up to the normal low speed of the standard wiper.

For a single wiping cycle turn the band toward you. Hold it there until the wipers begin wiping, then release it. The wipers will stop after one cycle. For several cycles hold the band in place as long as needed.

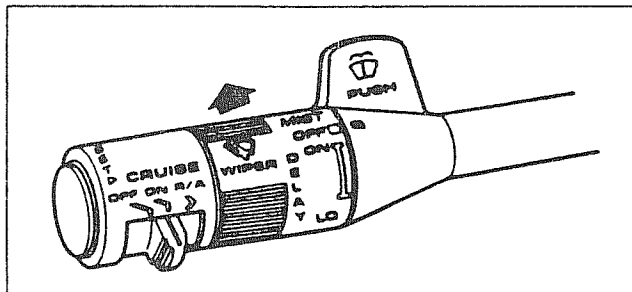
For steady wiping at low speed turn the band away from you to the first stop. For high-speed wiping turn the band to the next stop. Turn the band back to "OFF" to turn off the wipers.

To use the wipers with a delay between sweeps, turn the band on the turn signal lever to "ON". Turn the "Delay" band away from you to control the amount of delay. The wipers will move more often the closer the band is to "LO". Turn it fully to the first stop for a steady wiping at low speed.

Windshield Washer

To spray washer fluid on the windshield, push the "paddle" on top of the turn signal lever. (This will also turn on the low speed wipers.) The spray will continue as long as you hold in the paddle.

With the Delay wiper system, the wipers will stop (for return to the action for which they were set) after completing the wash cycle.



Operating Tips

Clear ice or packed snow from the wiper blades before using the wipers. Carefully loosen or thaw wipers that are frozen to the windshield.

Check the washer fluid level regularly. Do it often when the weather is bad.

Do not use radiator antifreeze in the windshield washer. It could cause paint damage.

In cold weather, warm the windshield with the defroster before using the washer to help prevent icing that may block the driver's vision.

CRUISE CONTROL WITH RESUME/ACCEL FEATURE

Cruise control is an optional speed control system. The system allows the vehicle to keep a constant forward speed during most normal driving without keeping your foot on the accelerator pedal, thus increasing driver comfort on long trips. The system can hold a speed of about 30 mph (50 km/h) or higher within the limits of your engine.

The system is also designed to resume a pre-set cruising speed after:

- * Braking without using the accelerator pedal.
- * Accelerating from a given set speed to a higher control speed.

The controls are part of the turn signal lever. The "Cruise" switch must be moved to "ON" before the system will work. The Set/Coast button is in the end of the turn signal lever.

To Engage at Cruising Speed

Accelerate to the desired speed, push in the Set/Coast button all the way and release it (or use the Resume/Accel (R/A) switch during first engagement only). Take your foot off the accelerator pedal and the set speed will be maintained up or down hill. The cruise control is designed to disengage when you apply the brakes. It will also disengage by moving the Resume/Accel (R/A) switch to off or by turning the ignition off. (To disengage the system without coming to a complete stop, push the brake pedal lightly; use just enough force to disengage the system without stopping the vehicle.)

To Change Cruising Speed

To reset the cruise control to a faster speed, accelerate to the speed you wish. Push in the Set/Coast button all the way (for less than a second) then release it.

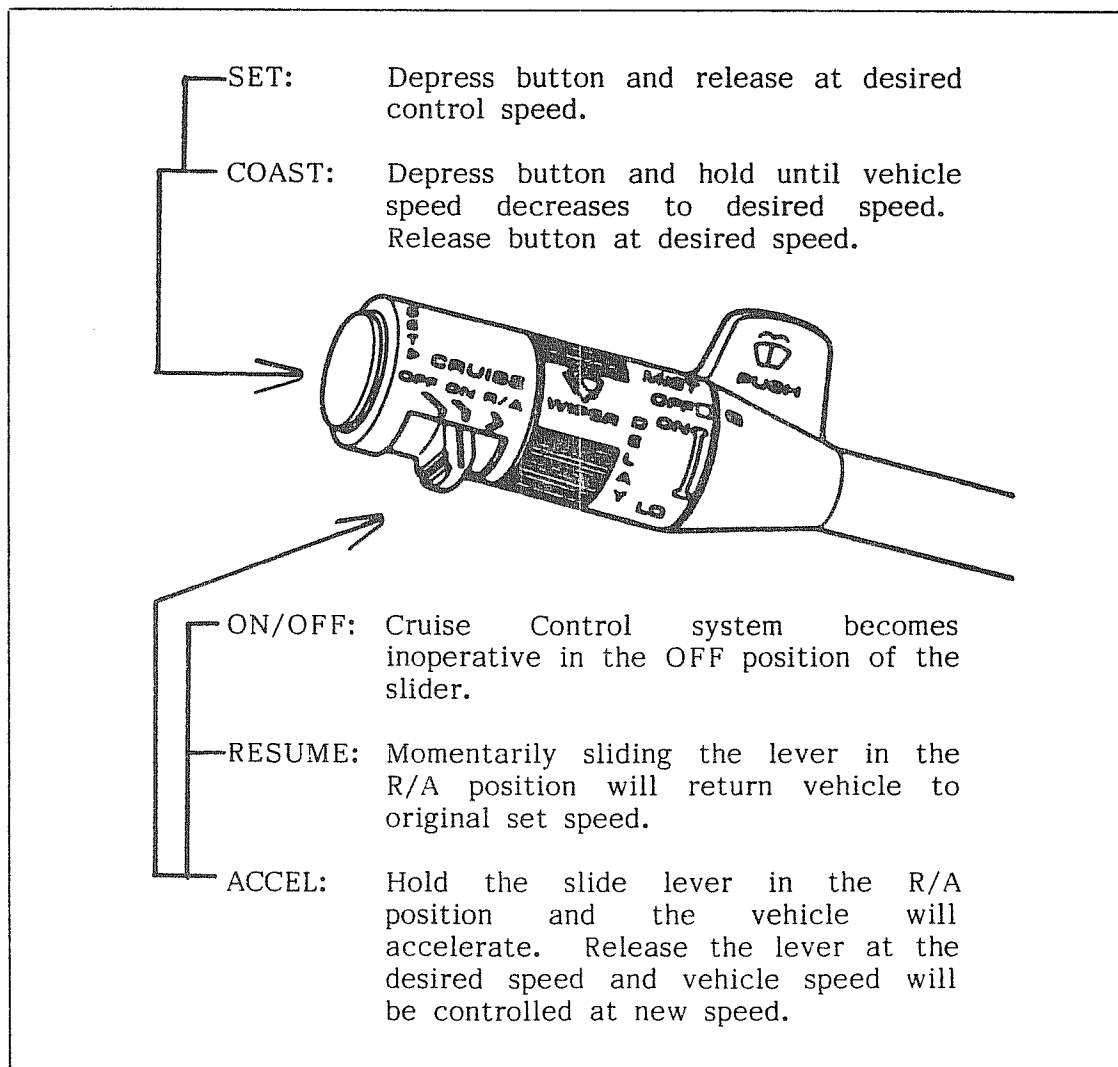
Or, use the Resume/Accel switch to accelerate and reset to the speed you wish. The Resume/Accel (R/A) switch must be held (over a second) in order to engage the accel mode.

To reset to a slower speed, push in the Set/Coast button all the way and hold it there. Wait until the vehicle slows to the desired speed, then release the button.

To "Resume" a Pre-Set Speed

After braking or stopping the vehicle without turning off the ignition, you can "Resume" to your last set cruising speed by accelerating to 30 mph (50 km/h) or more and sliding the cruise switch momentarily to Resume/Accel. When you release the Resume/Accel switch, your vehicle will accelerate to the cruising speed set before braking or stopping.

Sliding cruise switch to Resume/Accel position and holding the switch in longer than 1 second will accelerate the vehicle until the switch is released. The speed at which the switch is released will become the new cruising speed.



To Disengage

Disengage the cruise control by pushing the brake pedal. Though not usually necessary you can also turn off the system by moving the "Cruise" switch to "OFF".

Holding in the engagement button until vehicle speed falls below 30 mph (50 km/h) will also disengage the system.

To Pass a Vehicle

Use the accelerator pedal for more speed when passing. When you take your foot off the pedal the vehicle will slow down to the speed set before passing.

WARNING: We recommend that you **DO NOT** use your cruise control on **slippery road conditions or in congested traffic.**

FLOOD LIGHT

(Optional, not shown) Two switches control the operation of the search lights. The left hand switch controls the directional movement of the lights. Move it up or down, right or left, and the light will move in the same direction. The right hand switch illuminates the light in either spot light or flood light mode.

CAB SEATS

The cab seats will adjust three ways for maximum comfort. Three levers control the operation. Moving the upper lever on the right side rearward allows the seat to recline. The lower lever on the right side, when moved forward, allows the seat to swivel. Pushing the lever on the left side to the left allows the seat to slide forward or backward.

POWER SEAT CONTROLS

Power seat controls have three switches. The center switch moves the seat up and down, forward and back. The other two switches control the tilt of the seat. If the seat is run to the end of its movement in any direction a stall condition will exist and a 12 volt automatic circuit breaker will "kick-out" to avoid damage to the motors. If this occurs wait approximately 30 seconds and operate the switch in the opposite direction.

CAUTION: Revolving the power seat completely around will pull the wiring apart. The seats should only be swiveled toward the center of the vehicle. If the wires are loosened they can be reconnected by following the color code: Red to red, green to green, etc. On some models the wires will be on a plug that can be reattached.

TRAILER TOWING AND DRIVING TIPS

Since this vehicle is designed and intended to be used primarily as a load carrying vehicle, towing a trailer will affect handling, durability and economy. Maximum safety and satisfaction depends upon proper use of correct equipment and avoiding overloads and other abusive operation.

CAUTION:

The maximum loaded trailer weight which you can pull with your vehicle is 2,000 lbs. Vehicles should be properly equipped for towing trailers. Information on trailer hauling capabilities and special equipment required may be obtained from your Airstream dealer.

To assist in attaining good handling of the vehicle/trailer combination it is important that the trailer tongue load be maintained at approximately 10% of the loaded trailer weight, but not to exceed 200 lbs. Tongue loads can be adjusted by proper distribution of the load in the trailer, and can be checked by weighing separately the loaded trailer and then the tongue.

When towing trailers, tires should be inflated to the highest pressures shown on the information plate attached to the dash of your motorhome. The allowable passenger and cargo load (GVW) of this vehicle is reduced by an amount equal to the trailer tongue load on the trailer hitch.

Trailer brakes are required on axles of trailers over 1,000 lbs. loaded weight.

CAUTION:

Considerable damage will occur if the motorhome is improperly lifted for towing purposes. If it becomes necessary to have the motorhome towed, proper equipment must be used to prevent damage. Only qualified professional wrecker service companies should be used. The front bumper should be removed. A minimum of a 6 inch by 6 inch beam must be placed under Chevrolet's front crossmember for the tow straps to lift against. Further information is available in your Chevrolet Owners Manual.

SUGGESTED PRE-TRAVEL CHECK LIST

Interior

1. Turn off water pump switch.
2. Lock all interior cabinet doors.
3. Latch refrigerator door. (Seal containers first).
4. Hold down or stack securely all loose, hard and sharp objects.
5. Fasten sliding and foldette doors.
6. Drain toilet bowl.
7. Turn off interior lights.

Exterior

1. Disconnect and stow:
 - a. Electrical hookup cord
 - b. Sewer hookup hose (flush out)
 - c. Water hookup hose
2. Remove or stow leveling jacks and wheel chocks.
3. Check hitch (if you are towing)
4. Check clearance and stop lights
5. Check lug nuts
6. Check tires for correct pressure
7. Adjust mirrors
8. Pull forward some 50 ft., test brakes and check site for forgotten objects and cleanliness.

Home

1. Leave house key with your neighbor.
2. Store valuables and important papers in a safe place.
3. Discontinue newspaper, milk and other deliveries.
4. Ask the Post Office to hold your mail for you.
5. Arrange with the telephone company for discontinued or "vacation service".
6. Arrange care for your pets.
7. Have your lawn, garden and houseplants cared for.
8. Lock all windows and doors securely. Keep shades open for a lived-in look.
9. Cover all food to keep out mice and insects.
10. Eliminate all fire hazards. Place matches in a tin box or glass jar.
11. Store oil, gasoline and other flammables properly.
12. Destroy all newspapers, magazines and oily rags.
13. Notify police.

Trailer Equipment and Accessories

1. Water hose, 5/8" high pressure, tasteless, odorless, non-toxic.
2. "Y" connection - water hose.
3. Sewer hose with clamp.
4. Drain cap with hose drain.

5. Holding tank cleaner and deodorizer.
6. Power cord adapter - 30 amp capacity.
7. 50 ft. electric cord, 12-3 wire.
8. 25 ft. electric cord, 10-3 wire, 30 amp capacity.
9. Wood blocks for leveling.
10. Hydraulic jacks.
11. Cross type lug wrench.
12. Quality tire gauge.
13. Emergency road warning triangle.

Personal

1. Insurance to cover you and your family.
2. Avoid cash. Use travelers checks and credit cards.
3. Confirm reservations.
4. Have sunglasses for everyone.
5. Pack cameras and films.
6. Make a check list of clothing for everyone, and toilet articles.

Motoring Essentials

1. Display registration properly.
2. Carry an extra set of ignition and trunk keys in a separate pocket or in your wallet.
3. Keep an operating flashlight with fresh batteries in the glove compartment.
4. Pack so that you can reach the tools without completely unpacking.
5. Keep sharp or hard articles securely packed wherever they may be.
6. Do not pack things in the passenger seating area. You need the maximum space for comfort.
7. Wear easy-wash, drip-dry traveling clothes.
8. Do not make your vacation trips a mileage marathon. Stop and relax frequently.
9. Carry a first aid kit.
10. Carry your pet's dish, food, leash and health and registration papers.

NOTES

CHASSIS

The Airstream motorhome is built on a Chevrolet chassis. Operation of the Chevrolet engine and other related components is discussed in the Chevrolet Owners and Drivers Manual supplied with each coach.

If repairs are needed it can be difficult to determine which parts of the chassis are warranted by Chevrolet, and which are Airstream's responsibility. The following list shows the major components of the chassis and the company responsible for their servicing.

Chevrolet (P-30 Forward Control, Motorhome Chassis)


Engine	Turn Signals
Transmission	Front Suspension, Air Bags
Brakes (Except Tag Axle)	(Except Shocks)
Steering Assembly	Drive Axle and Hubs
Front Spindle, Bearings	Rear Shocks
Steel Wheels	Automotive Fuse Panel
Air pumps for Pollution Control	Radiator, Oil Cooler
Alternator	Parking Brake

Airstream

Tag Axle, Complete	Windshield Wipers
Rear Air Bag Suspension	Leveling Jacks
Drive Shafts	Fuel Tank and Fill
Front Shock Absorbers	Electric Fuel Pump
Auxiliary Heater	Aluminum Wheels
Cruise Control	Horn
Dash Air Conditioner/Heater	Isolator
	Automotive Accessory Fuse Block

The above list covers almost all of the chassis components. If you need further clarification or information your dealer should be contacted with the details.

REAR SUSPENSION

The rear suspension on the 36 ft. model is air suspension on the dual wheel axle, and a Dura-Torque  rubber torsion tag axle.

Two automatic leveling valves on the tag axle sense the weight changes on the rear suspension and increases or decreases air pressure in the air bags on the dual wheel axle. This prevents the load from being absorbed by the tag axle and robbing the drive wheels of traction.

AIR COMPRESSOR

The air compressor for the air bags is located on the curbside of the motorhome next to the LP tank. The high amperage power is picked up from a circuit breaker next to the isolator. Power to operate the solenoid when the ignition is on comes from the Airstream automotive fuse panel. The compressor is only supplied with power when the ignition key is "ON" or in the accessory position. As with any compressed air system, water is formed. At engine oil change intervals the air valve on the bottom of the reservoir tank should be depressed until all liquid has been expelled. In high humidity areas, and during winter months, the tank should be drained on a more frequent basis.

LOW AIR PRESSURE

If the air pressure gauge on the dash indicates a lower than normal pressure the system should be checked. First check the air pressure in the tank. The tank is located behind the drive axle and has a tire type valve on the bottom. This valve is used to drain moisture, check tank pressure and add air pressure in emergency situations. The normal pressure would be in the 75-100 psi range.

Also, check the height of the air bags (see illustration). A measurement of less than 9" would indicate a problem. If the height is more than 9 1/2" and the tank pressure is proper, continue on your trip; but, check the air bag height regularly. In an emergency air can be added directly to the reservoir tank. Do not exceed 120 psi.

WARNING:

If you must drive to a service location with the air bags deflated, keep speeds below 50 mph and cross any railroad tracks or similar hazards at the lowest speed possible to prevent damage to the tag axle.

TAG AXLE

The tag axle suspension is made by Henschen Industrial, a Division of Airstream, and has been used on Airstream trailers for more than twenty-five years with proven dependability. Since this suspension is within the axle tube, the only downward weight is from the spindle arm out. With the lack of force to push the tire down past its "relaxed" state the inside tag axle tire may be lifted clear of the pavement when traversing sharp corners at high speeds.

Normally there will not be any reason to adjust the brake controller for the tag axle. Occasionally though, after the surface of the brakes are worn in and mate perfectly, it may be necessary to reduce the braking slightly. The controller is mounted under the dash on the left side of the steering column. On the bottom of the controller is a knurled cap. Under the cap is an adjusting screw with arrows indicating the correct direction to turn for more or less brakes.

The "spring" of the Dura-Torque axle comes from four rubber rods extending into the axle tube on each end.

CAUTION: Do not allow heat to be applied to the axle tube. The rubber rods are not visible and will be damaged by excessive heat.

Alignment of this unique axle is accomplished by bending (cold) the axle tube. If realignment should ever be required your dealer can give you the location of the closest alignment shop with the correct equipment.

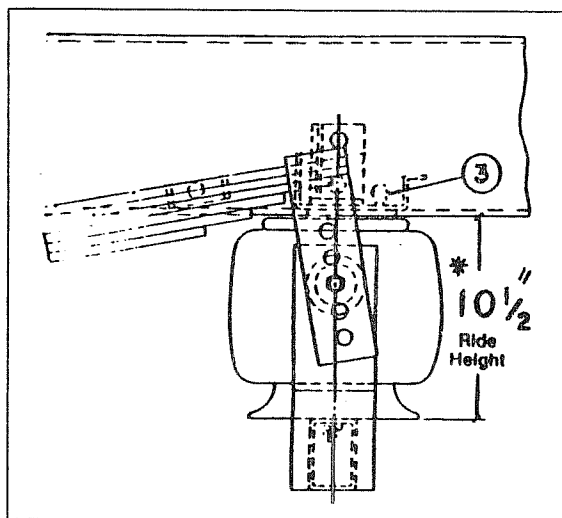
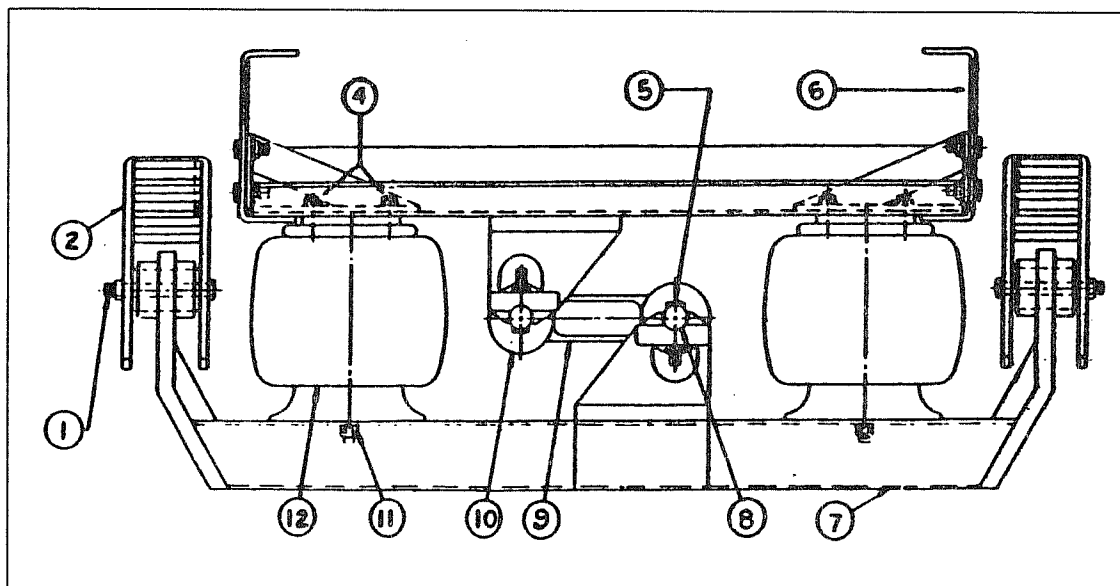
Lubrication

For your convenience all motorhomes with tag axles are supplied with a small grease gun and two cartridges of Lithium base grease.

Tag axles have a special Sure-Lube system to ease wheel bearing maintenance. At each oil change the center of the hub cover on the tag axle should be "popped out" to expose the grease zerk. Lithium base wheel bearing grease is then injected until grease flows from the small vent hole in the axle tube.

CAUTION: The Sure-Lube system is an added feature, but is not intended to replace normal wheel bearing maintenance. Complete wheel bearing cleaning, inspecting and repacking should still be done every year or 12,000 miles.

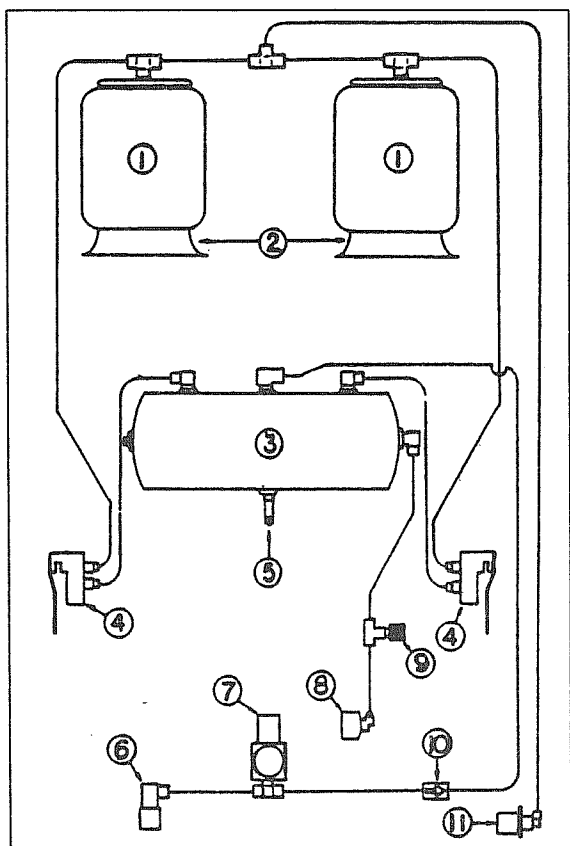
AIR BAG SUSPENSION ASSEMBLY - CHEVROLET CHASSIS



1. Rear Shackle Bolt
2. Stirrup
3. Air Fitting
4. Bolt, Bag Mounting, Upper
5. Bolt, $\frac{1}{2}$ x $2\frac{1}{2}$ NF (GR. 8)
6. Chassis Frame
7. Support Beam, Air Bag
8. Straddle Pin
9. Traverse Rod
10. Traverse Rod Bushing
11. Stud, Bag Mounting, Lower
12. Air Bag

The 10 1/2" ride height figure shown in the illustration is optimum. The actual measurement could be 9 1/2" to 10 3/4". A good rule of thumb is to not try to alter the height unless you have good reason to believe there is a problem. Each motorhome is weighed and the leveling valves adjusted and rechecked at the factory. The criteria is 3,000 lbs. total weight on the tag axle. Since the setting is made by actual weight instead of height, the height will vary to some degree. The bags are plumbed together. This means if you are parked so the motorhome is leaning, it is natural for the two bags to measure different heights.

AIR LINE SCHEMATIC



Below Floor

1. Air Bag
2. Cone, Air Bag
3. Air Supply Tank
4. Leveling Valve
5. Air Valve, Tire Type

Above Floor

6. Solenoid, Air Relief
7. Compressor
8. Switch, High Pressure
9. Coupler, Air Hose Fitting
10. Check Valve
11. Sender, Air Pressure

The logic of the air system is as follows: The compressor supplies air pressure through a check valve into the air supply tank. The air supply tank provides pressure to the intake side of the leveling valve. When the leveling valve is opened by the body of the coach lowering over the chassis, the air pressure is supplied to both air bags through a "T", raising the coach back to the proper height.

The high pressure switch controls the air pressure in the air supply tank. The switch comes "on" when the pressure drops below 80 psi and shuts "off" when the pressure reaches 100 psi.

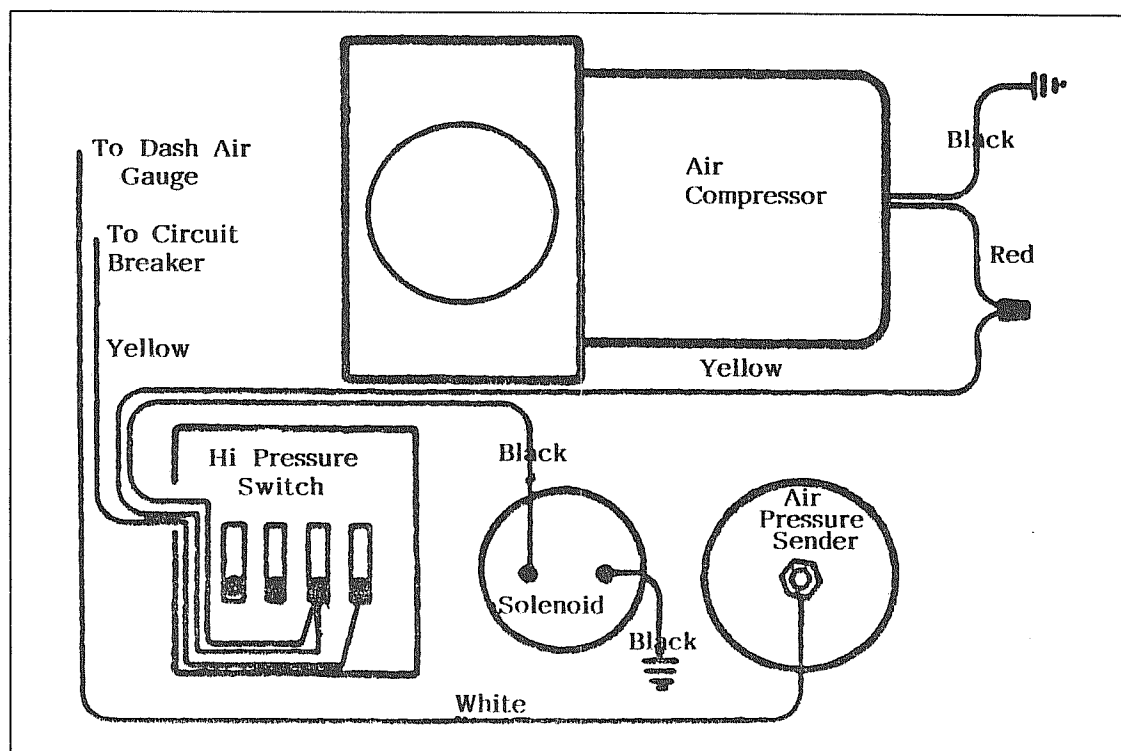
The sender monitors the pressure in the air bags and sends the appropriate signal to the air gauge on the dash.

The solenoid valve next to the compressor is a normally open valve. It is wired with the compressor. When power to the compressor is shut off by the high pressure switch, power is also shut off to the solenoid. Without power the solenoid opens and releases all air pressure from the check valve back through the compressor. When power is supplied to the compressor the solenoid closes. The reason for the solenoid is to allow the compressor to start under a "no load" condition.

The tire-type valve on the bottom of the air supply tank should be drained occasionally by depressing the valve stem. Hold it down until all moisture is drained. A good habit would be to drain the air tank at each oil change. In some high humidity areas you may want to do it on a more frequent basis.

The air compressor, solenoid, high and low pressure switches are all mounted in the curbside lower compartment next to the LP tank.

WIRING SCHEMATIC - AIR SUSPENSION - TAG AXLE



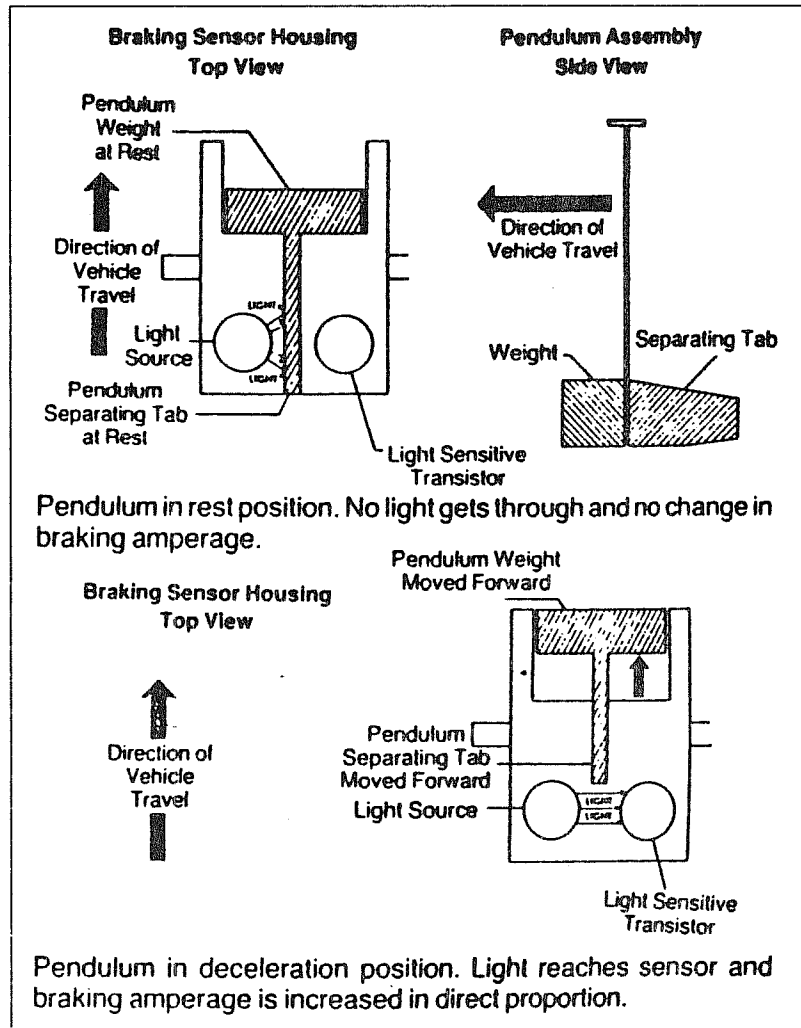
OPERATION

Twelve volt power is supplied from an automotive 12V circuit breaker located on the back of the coach battery box. This is the high amperage power required to operate the compressor. A second wire designed to open and close the solenoid is run forward to the Airstream automotive fuse panel. This wire is only hot when the ignition key is on.

If the pressure in the air supply tank drops below 80 psi the points in the high pressure switch close and power is then supplied to the solenoid (closing it) and to the compressor. When the pressure reaches about 100 psi the points in the switch open cutting power from the compressor and solenoid. The solenoid assumes its normally open position, which relieves air pressure from the compressor so it won't be starting under load during the next cycle.

The air pressure sender is plumbed to the air bags. It senses the pressure and sends the appropriate signal to the air gauge on the dash. On some units a small variable resistor is wired to the sender. If the bag height is correct the resistor may be adjusted so the gauge reads in the middle. Ground for it is picked up through the mounting clamp.

TAG AXLE BRAKES



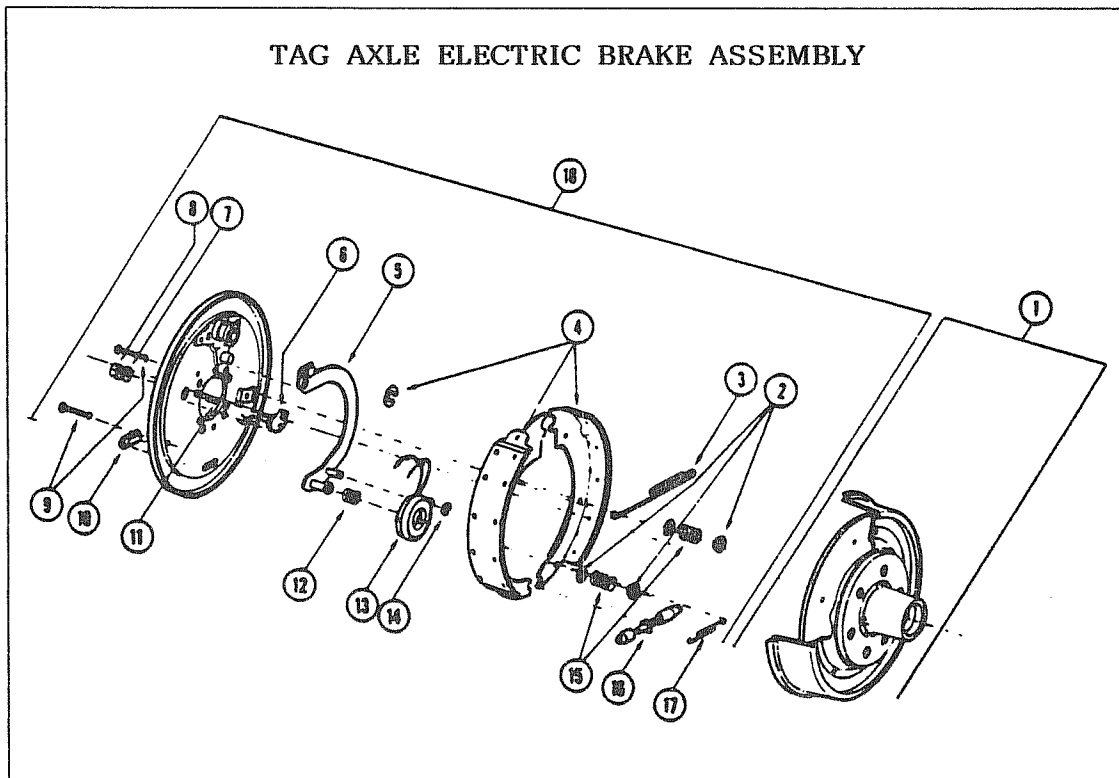
The electric brakes on the tag axle of the motorhomes may seem exotic to the automotive industry, but to the RV industry they are a standard. So standard that almost all RV travel trailer dealers keep a stock of parts and have mechanics totally familiar with the system.

On our motorhomes we've selected a pendulum type brake controller for its simplicity and dependability. It has been preset at the factory and further adjustments should not be necessary. Occasionally, as the mating surfaces wear into each other, it might be a good idea to reduce braking a little. The controller is mounted on the left side of the steering column support bracket. The adjusting screw is on the bottom of the controller.

Four wires are on the brake control. The black picks up power from a circuit breaker accessible through the front access door. The white is ground, blue goes to the brake magnets and the red is wired to the stop light switch.

OPERATION

1. When the brake lights are operated the electronics of the controller are activated and a small amount of current is supplied to the brake magnets.
2. As brake pedal pressure increases a pendulum in the controller starts to swing forward, and a directly proportional increase of power is supplied to the brake magnets.
3. When the brake pedal is released, and current to the brake lights senses the release, current flow to the brake magnet is stopped.



12" Kelsey-Hayes Brake Assembly

- | | |
|--|--------------------------------|
| 1. Unicast hub and drum | 10. Brake adjusting hole cover |
| 2. Hold down cups | 11. Brake mounting stud |
| 3. Retractor spring | 12. Magnet spring |
| 4. Shoe and lining (1 primary,
1 secondary) | 13. Magnet assembly |
| 5. Lever (RH,LH) | 14. Magnet retaining ring |
| 6. Connector (Magnet Leads) | 15. Hold down springs |
| 7. Brake mounting washer | 16. Adjusting screw assembly |
| 8. Brake mounting nut | 17. Adjusting screw spring |
| 9. Hold down pins | 18. Brake assembly (RH, LH) |

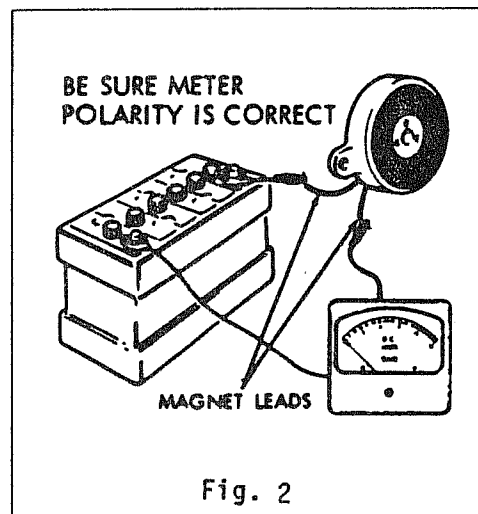
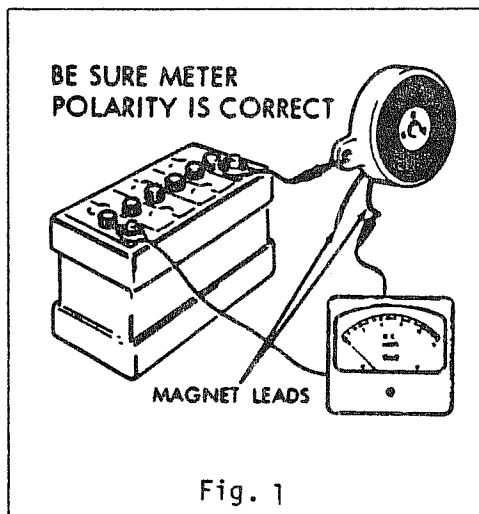
CHECKING ELECTRICAL BRAKE SYSTEM

1. To Check Complete Circuit

- A. Disconnect wire leads at brake backing plate and connect to volt meter.
- B. Apply brake. Low voltage should be indicated.
- C. Take controller loose from steering column bracket and point forward end down. Voltage should increase.
- D. Holding forward end of controller downward, bump it against the heel of your other hand. Volt meter should show increase in proportion to the distance the internal pendulum of the controller is swinging.

2. To Check Magnet

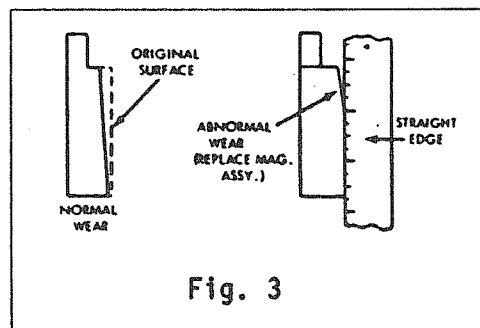
- A. Using a DC ammeter with a minimum range of 0 - 10 amps, connect as shown in Fig. 1.
- B. Wiggle magnet leads and rap on magnet.
- C. If ammeter shows any current, a short is indicated and magnet should be replaced.
- D. Reconnect magnet as shown in Fig. 2.
- E. Current reading should be 3.0 to 3.5 amps. If not, replace magnet.



CHECKING MECHANICAL BRAKE COMPONENTS

1. To Check Magnet

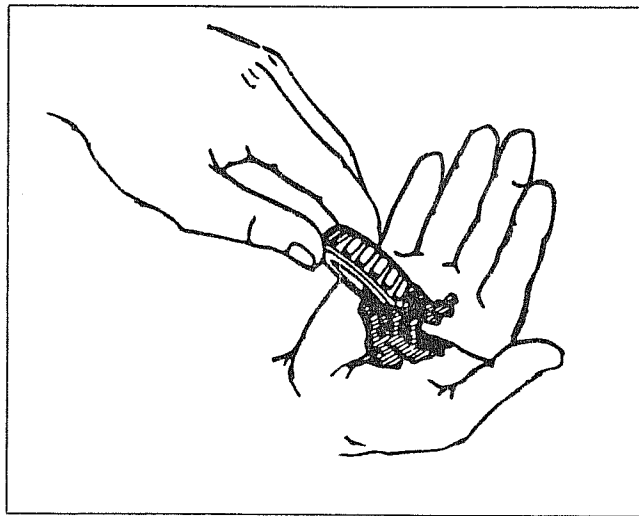
- A. Check angle of wear pattern as shown in Fig. 3 with a straight edge.
- B. If the magnet rubbing surface is flat it need not be replaced until the friction element shows signs of wearing through.
- C. A magnet that is not wearing flat must be replaced since it cannot function efficiently. Before replacing with a new magnet determine the cause of the improper wear. First check the magnet lever pivot. A worn pivot bushing can cause the magnet lever to cock, thus allowing the magnet to trip against the armature plate. If this condition exists, the lever assembly should be replaced. When reinstalling magnets be sure to install the loom (lead wires) properly, avoiding kinks and allowing ample clearance for the lever to move through its full travel. Operate the lever in both directions to be sure the loom moves properly without binding, kinking, or interfering with lever movement.



2. Wheel Bearing Maintenance

- A. Pull dual drive wheels up on ramp approximately 8" high until tag axle tires clear ground.
- B. Set hand brake and chock tires securely.
- C. Place index marks on wheel and drum so they can be mated back in the same position.
- D. Remove wheel from drum.
- E. Remove spindle cover, dust cap, cotter key, spindle nut and washer.
- F. Remove outside bearing and brake drum.

- G. Lay down drum with inside grease seal down. Knock out inner bearing and grease seal using wood or plastic dowel and hammer.
- H. Clean all parts thoroughly with kerosene.
- I. Check all bearings for chips or roughness of any kind. Always replace both bearing and race if damage is found on either.
- J. If bearing packing equipment is not available place a quantity of grease in the palm of one hand and push the large end of the bearing cone down into the grease.
- K. Rotate bearing and continue forcing large end down into grease until grease is extruded up through small end and completely around circumference of bearing. See Illus:
- L. Use No. 2 grade 265 ASTM penetration or equivalent grease.
- M. Liberally coat outside of inner bearing. Place in drum and install new grease seal with wooden or leather mallet.
- N. Carefully place drum on spindle to avoid damaging grease seal.
- O. Install packed and coated outer bearing, spindle washer and spindle nut.
- P. While rotating the wheel tighten the spindle nut with a 12 inch wrench until there is a slight tension. Then back off one notch and install cotter pin. There should now be from .001" to .010" end play in hub. If not, back off one more notch.
- Q. Align index marks and install tire and wheel, torquing lugs to 130-150 ft. lbs. Recheck or advise customer to recheck at 50 miles and again at 200 miles to assure tightness.



3. Armature plate (The surface the magnet contacts when brakes are applied.)

A. Under normal conditions the armature plate should last indefinitely. However, if an armature plate shows excessive galling due to contamination (mud, small stones, etc.) the complete drum must be replaced.

4. Brake Drum

A. Inspect the brake drum rubbing surface. This surface should have a dull grey appearance free from heavy scoring and/or excessive wear. One or two light score marks are not cause for reboring the drum. If the drum has heavy scoring, is worn more than .020" oversized, or has more than .015" runout, the drum should be rebored. A standard drum lathe may be used, taking care not to remove more than .060" from the original drum diameter (.030" per side). The drum should be discarded if it must be bored more than .060" over its original diameter to clean up the surface.

5. Brake Lining

A. Inspect the brake linings for wear. If a lining is worn to the rivets it should be replaced. Inspect for uneven lining wear patterns such as shown in Fig. 4, and replace if this condition exists. Wear patterns such as this may indicate improperly located flanges or a bent backing plate. Also, if lining is badly contaminated with grease, oil, etc., it must be replaced since contamination of this type cannot be sanded or dissolved out.

IMPORTANT: Always replace brake linings in sets. Both brakes on the same axle.

B. If the lining is worn to the rivets without evidence of uneven wear, simply replace with new Kelsey-Hayes factory ground shoe and lining assemblies.

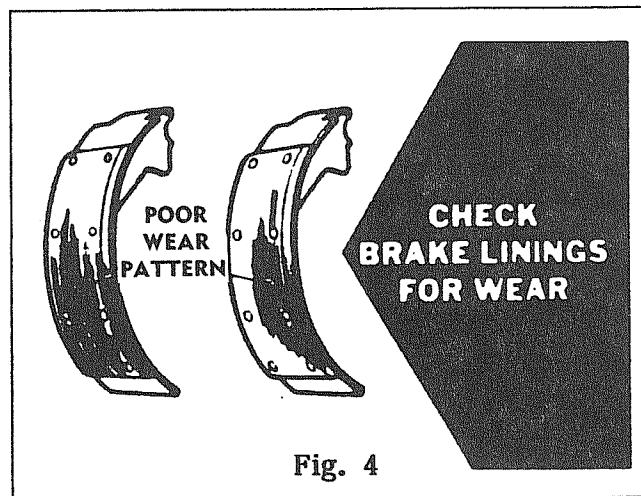
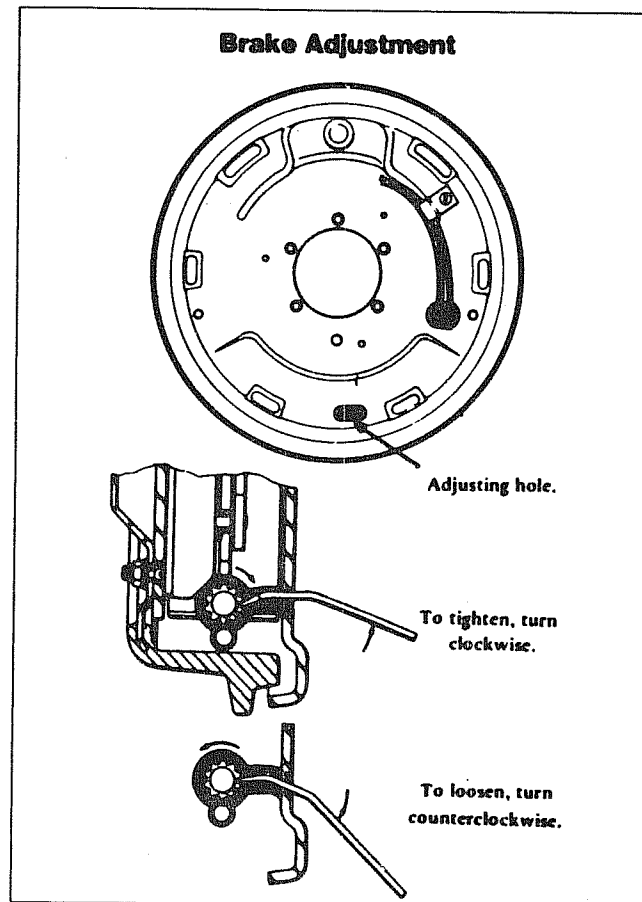


Fig. 4

BRAKE ADJUSTMENT

1. Pull dual drive wheels up on ramp approximately 8" high until tag axle tires clear ground.
2. Set hand brake and chock tires securely.
3. Remove rubber plug and tighten the brake adjustment screw while spinning the wheel until heavy drag is felt.
4. Back off adjustment until tire spins freely.
5. Repeat on other side.



TROUBLE SHOOTING BRAKES

PROBLEM: Grabby or locking brakes.

CAUSE/ REMEDY: Control voltage too high. Adjust controller to reduce power.

CAUSE/ REMEDY: Improper lining. Check lining. Replace if necessary.

CAUSE/ REMEDY: Grease on lining. Check for contamination. Replace seals and lining.

CAUSE/ REMEDY: Loose parts in brakes. Check for loose rivets, broken springs, etc. jammed in brakes.

CAUSE/ REMEDY: Rust in armature plate and/or brake drums. Caused by non-use. Usually corrected by normal continued use.

CAUSE/ REMEDY: Selective resistor setting incorrect. Readjust to increase resistance.

PROBLEM: Weak Brakes

CAUSE/ REMEDY: Poor connection. Check that all connections are clean and tight.

CAUSE/ REMEDY: Short Circuit, Check electrical circuit.

CAUSE/ REMEDY: Worn or defective magnets. Replace magnets.

CAUSE/ REMEDY: Poor brake adjustment. Adjust brakes.

CAUSE/ REMEDY: Backing plates bent or misaligned. Check backing plate and flanges. Correct if necessary.

CAUSE/ REMEDY: Greasy lining. Check for worn or damaged grease seals. Replace if necessary. Make sure bearings are packed with high grade bearing grease not cup grease or chassis lubricant.

CAUSE/ REMEDY: Using trailer brakes only. Use of trailer brakes only can cause early fade or loss of friction due to excessive heat.

CAUSE/ REMEDY: Control voltage too low. Adjust controller to increase power.

PROBLEM: No Brakes

CAUSE/ Open circuit. Check for broken wires, loose connections,
REMEDY: improper grounding.

CAUSE/ Improperly wired or inoperative controller. Check controller
REMEDY: operation.

CAUSE/ Poor brake adjustment. Adjust brakes.
REMEDY:

CAUSE/ Worn or defective magnets. Replace magnets.
REMEDY:

CAUSE/ Short Circuit. Check electrical circuit.
REMEDY:

PROBLEM: Intermittent or surging brakes.

CAUSE/ Out of round drums. Rebore drums if more than .015 out of
REMEDY: round.

CAUSE/ Broken magnet lead wires. Bench check magnets. Replace if
REMEDY: necessary.

CAUSE/ Loose wheel bearings. Check and adjust bearing.
REMEDY:

PROBLEM: Dragging brakes

CAUSE/ Brakes adjusted incorrectly. Check brake adjustment.
REMEDY:

CAUSE/ Electrical defect in controller. Insufficient gap between
REMEDY: controller contactor strip and coil may cause brakes to be on
continuously. Correct condition.

CAUSE/ Badly corroded brake assemblies. Check brake assemblies for
REMEDY: severe corrosion. Check to be sure magnet levers operate freely.
Clean and lubricate brake assemblies.

CAUSE/ Weak or broken shoe return spring. Check and replace if
REMEDY: necessary.

PROBLEM: Noisy Brakes

CAUSE/ Lining worn to rivets. Check and re-line linings.
REMEDY:

CAUSE/ Loose parts, rivets, broken springs, etc. Check and repair.
REMEDY:

CAUSE/ Bent backing plate. Check and repair if necessary.
REMEDY:

CAUSE/ Improper bearing adjustment. Check and adjust bearings. Check
REMEDY: for worn or damaged bearings. Replace if necessary.

CAUSE/ Poor adjustment. A certain amount of noise is normal when the
RMEDY: brake releases. Proper adjustment will minimize the noise.

FRONT SUSPENSION

The only alteration Airstream makes on the Chevrolet front suspension is to replace the shock absorbers with a double action shock.

The new shock is surrounded with a coil spring that is adjustable. We set the spring in a "no load" position. In other words, as the motorhome is sitting still there is no force on the spring, either up or down.

When Airstream aligns the front end the pressure in the air bag inside the coil spring is set at 55 psi. There is a tire-type fitting protruding down through the lower coil support plate so the pressure can easily be checked.

AUXILIARY HEATER

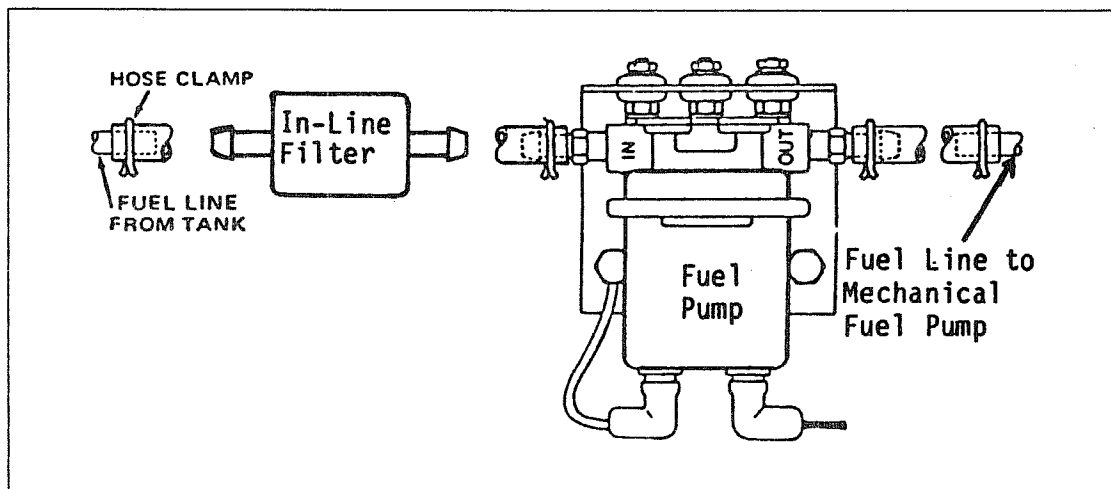
The auxiliary heater, located under the dinette, is plumbed into the radiator system. Two "tees" are located between the engine and the front heater. The water lines to the heater are routed under the floor. A shut off valve can be used to shut off the hot water circulation in the summer, or control the heat to some degree. By using the two speed dash fan, along with the water valve, the temperature output can be varied through a wide range.

WATER HEATER

Your motorhome uses a water heater with a motor aide feature. This feature circulates radiator cooling through an exchanger in the water heater as you drive. It is plumbed from the same hoses that supply hot water to the auxiliary heater. For further information on your water heater see the Appliance Section of this manual. The water heater with motor aide has caused some complaints. It seems that once you take your motorhome out for a long drive you can't light the burner of the water heater.....because the water is already hot!

FUEL SYSTEM CHEVROLET

The fuel system on the Airstream motorhome is "stock" from the electrical fuel pump forward. The electric fuel pump and in-line filter are mounted directly in front of the fuel tank. The wiring to the pump is Chevrolet's.



Replacement in-line filters can be purchased through Airstream, or at General Motors dealers they can be purchased under part number 854619. NAPA also carries this filter using their part number 3033.

It should also be noted the Chevrolet fuel system has a second in-line filter located along the main frame rail just forward of the step area. The Chevrolet part # is 25055347 or Delco GF 509.

TIRES

The tires installed on your Airstream motorhome are engineered to provide a proper balance of performance characteristics for normal vehicle operation.

This section contains some tips on how you can obtain the most benefit from these tires. Your Chevrolet drivers manual also contains important information on tires, and should be reviewed.

Incorrect tire inflation pressures can have adverse effects on tire life and vehicle performance. Too low an air pressure causes increased tire flexing and heat build-up. This weakens the tire and increases the chance of damage or failure and can result in tire overloading, abnormal tire wear, adverse vehicle handling, and reduced fuel mileage. Too high an air pressure can result in abnormal wear and harsh ride, and also increase the chance of damage from road hazards.

Tire inflation pressures should be checked at least monthly and when significantly changing the load you plan to carry in your motorhome. Always check tire inflation pressures when the tires are "cold".

Standard inflation pressures for tires are listed in the "Minimum Tire Inflation Pressure at Gross Vehicle Weight Rating Chart." Front and rear pressures are shown for each model and GVWR, and are based on the GVWR and front and rear axle ratings (GAWR's) printed on your vehicle VIN plate and Certification label. Tires must be inflated to these pressures when the vehicle is fully loaded or an axle GAWR is reached.

MINIMUM TIRE INFLATION PRESSURE (PSI)

Model		Tire Size	Front	Rear	Duals	Tag
32 ft.	16,000 GVWR	8:00-19.5	70 psi	70 psi		
36 ft.	18,000 GVWR	8:00-19.5	70 psi	60 psi		60 psi

The outer tire of a pair in dual wheel installations generally wears faster than the inner tire. When vehicles are driven continuously on high crown roads, an increase in air pressure of from 5 psi to 10 psi on the outside tire of each dual produces maximum tire life.

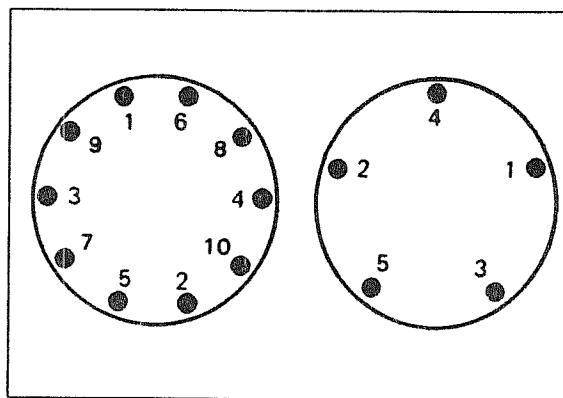
Proper FRONT END ALIGNMENT improves tire tread mileage. Your front end suspension parts should be inspected periodically and aligned when needed. Improper alignment may not cause the vehicle to vibrate. However, improper toe alignment will cause front tires to roll at an angle which will result in faster tire wear. Incorrect caster or camber alignment will cause your front tires to wear unevenly and can cause the vehicle to "pull" to the left or right. The Chevrolet front air bags are inflated to 55 psi when the motorhome is originally aligned. If this pressure varies excessively alignment will be affected.

TIRE CHANGING

When removing steel wheel rim to change a tires, loosen all wheel nuts approximately flush with end of stud, then tap clamp ring to loosen rim. Do not remove nuts until clamp rings are free or clamp ring may fly off of stud. When installing rim be sure pins on clamp ring face outboard. Then tighten attaching nuts alternately and evenly to avoid excessive wheel run-out. See torque values and sequence diagram. Aluminum wheels do not use the clamp ring and may be removed in the normal fashion.

LUG NUT TIGHTENING SEQUENCE

Chevrolet



Torque 130-180 ft. lbs.

WHEEL NUT TORQUE MUST BE CHECKED AT 100, 1,000 and 6,000 MILES, AND EVERY 6,000 MILES THEREAFTER.

To change front tires the jack should be placed under the control arm. Rear tires, both on dual and tag axles, may be changed by placing the jack under the dual wheeled axle close to the tires being changed.

TIRE ROTATION

Front and rear tires perform different jobs and can wear differently depending on the types of roads driven, your driving habits, etc. To obtain the longest tire life you should INSPECT AND ROTATE your tires regularly. (See Tire Rotation Illustration). Many GM dealers and tire dealers will perform a free tire inspection to look for uneven or abnormal tire wear.

Radial	First 6,000 Miles and at Least Every 12,000 Miles thereafter.
--------	---

For the longest tire life, any time irregular wear is seen have the tires checked and rotated by your truck or tire dealer and have the cause of uneven wear corrected. After rotation be sure to check wheel nut tightness and to adjust the tire pressures, front and rear.

WARNING:

Wheel nuts should be tightened at certain intervals. See Wheel Nut tightening Sequence.

There are three different tire rotations we recommend on the 32 ft. model. Rotation A and B, as illustrated on the following page, are to be used with steel wheels. (Rotation A should be done at approximately 6,000 miles and Rotation B at 12,000 miles.) Rotation C is to be used with aluminum wheels.

The 36 ft. model has two different rotation patterns: Use Rotation D if the wheels are steel, and Rotation E if you have the optional aluminum wheels.

Your local tire dealer, upon inspection of your tires, may have a tire rotation recommendation that better fits your driving habits and the characteristics peculiar to your vehicle.

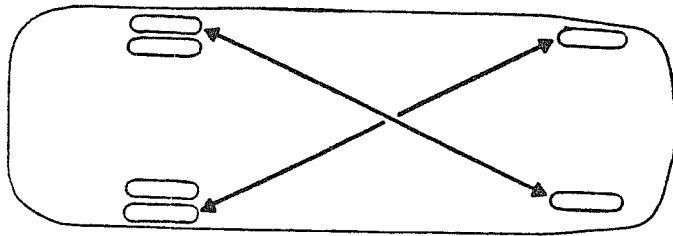
Note: It is recommended that disc brake pads be inspected for wear whenever tires are rotated.

TIRE ROTATIONS

Rotation A

32 Foot Model

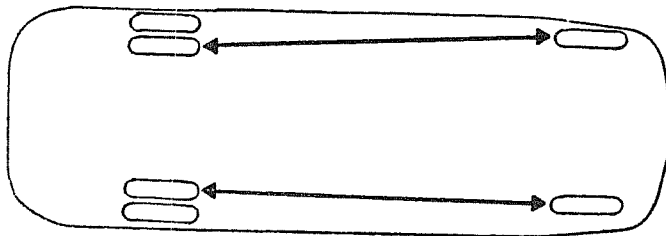
Steel Wheels



Rotation B

32 Foot Model

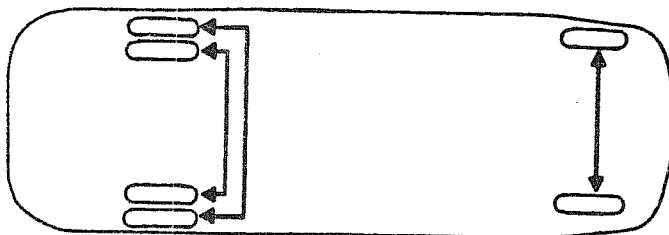
Steel Wheels



Rotation C

32 Foot Model

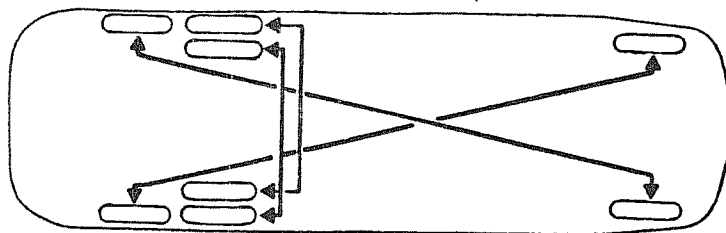
Aluminum Wheels



Rotation D

36 Foot Model

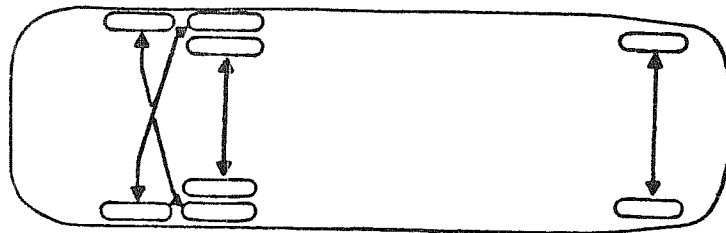
Steel Wheels



Rotation E

36 Foot Model

Aluminum Wheels



NOTES

CRUISE CONTROL

For Service Contact:

ARA Manufacturing
County Road 200 & M
P.O. Box 248
Orland, CA 95963
In California 800-822-8150
Outside California 800-824-4158

OPERATION GUIDE

The turn signal lever on the left side of the steering column also controls headlight low-beam and high-beam, the windshield delay wiper/washer, and the optional Cruise Control.

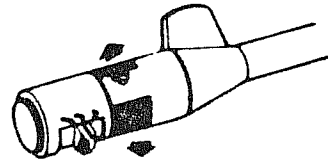
Turn Signal

Move the lever up to the second stop to signal a right turn. Move it down to the second stop to signal a left turn. When the turn is completed the signal will cancel and the lever will return to horizontal.

TURN SIGNAL

R.H. TURN - MOVE UPWARD

L.H. TURN - MOVE DOWNWARD



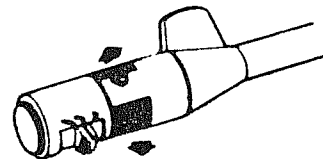
Lane Change Signal

In some turns, such as changing lanes, the steering wheel is not turned far enough to cancel the turn signal. For convenience, you can flash the turn signal by moving the lever part way (ie: the first step) and holding it there. The lever will return to horizontal when you release it.

LANE CHANGE

CHANGE FROM LEFT TO RIGHT LANE.
MOVE UPWARD TO 1ST STOP

CHANGE FROM RIGHT TO LEFT LANE.
MOVE DOWNWARD TO 1ST STOP



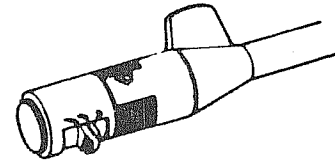
Headlight Beam Changer

With the headlights on, pull the lever toward you until you hear a click, then release it. The lights will change from low-beam to high-beam, or from high-beam to low-beam. When the high-beams are on, a light will appear on the instrument panel.

HEADLIGHT BEAM CHANGER

(HEADLIGHTS ON)

PULL LEVER TOWARD YOU



Delay Windshield Wiper

The delay windshield wiper system lets you vary the wiper speed from a 20 second delay between sweeps up to the normal low speed of the standard wiper.

For a single wiping cycle turn the band toward you. Hold it there until the wipers begin wiping, then release it. The wipers will stop after one cycle. For several cycles hold the band in place as long as needed.

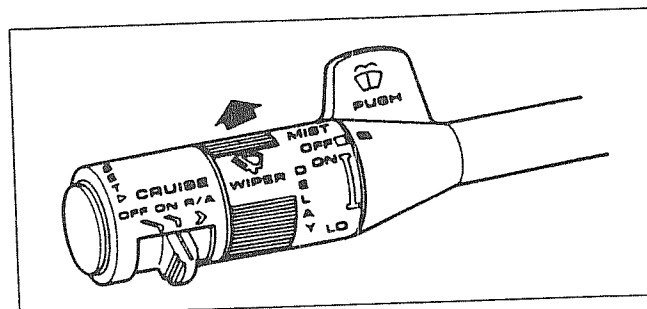
For steady wiping at low speed turn the band away from you to the first stop. For high-speed wiping turn the band to the next stop. Turn the band back to "OFF" to turn off the wipers.

To use the wipers with a delay between sweeps, turn the band on the turn signal lever to "ON". Turn the "Delay" band away from you to control the amount of delay. The wipers will move more often the closer the band is to "LO". Turn it fully to the first stop for a steady wiping at low speed.

Windshield Washer

To spray washer fluid on the windshield, push the "paddle" on top of the turn signal lever. (This will also turn on the low speed wipers.) The spray will continue as long as you hold in the paddle.

With the Delay wiper system, the wipers will stop (for return to the action for which they were set) after completing the wash cycle.



Operating Tips

Clear ice or packed snow from the wiper blades before using the wipers. Carefully loosen or thaw wipers that are frozen to the windshield.

Check the washer fluid level regularly. Do it often when the weather is bad.

Do not use radiator antifreeze in the windshield washer. It could cause paint damage.

In cold weather, warm the windshield with the defroster before using the washer to help prevent icing that may block the driver's vision.

CRUISE CONTROL WITH RESUME/ACCEL FEATURE

Cruise control is an optional speed control system. The system allows the vehicle to keep a constant forward speed during most normal driving without keeping your foot on the accelerator pedal, thus increasing driver comfort on long trips. The system can hold a speed of about 30 mph (50km/h) or higher within the limits of your engine.

The system is also designed to resume a pre-set cruising speed after:

- * Braking without using the accelerator pedal.
- * Accelerating from a given set speed to a higher control speed.

The controls are part of the turn signal lever. The "Cruise" switch must be moved to "ON" before the system will work. The Set/Coast button is in the end of the turn signal lever.

To Engage at Cruising Speed

Accelerate to the desired speed, push in the Set/Coast button all the way and release it (or use the Resume/Accel (R/A) switch during first engagement only). Take your foot off the accelerator pedal and the set speed will be maintained up or down hill. The Cruise Control is designed to disengage when you apply the brakes. It will also disengage by moving the Resume/Accel (R/A) switch to off or by turning the ignition off. (To disengage the system without coming to a complete stop, push the brake pedal lightly; use just enough force to disengage the system without stopping the vehicle.)

To Change Cruising Speed

To reset the Cruise Control to a faster speed, accelerate to the speed you wish. Push in the Set/Coast button all the way, (for less than a second) then release it.

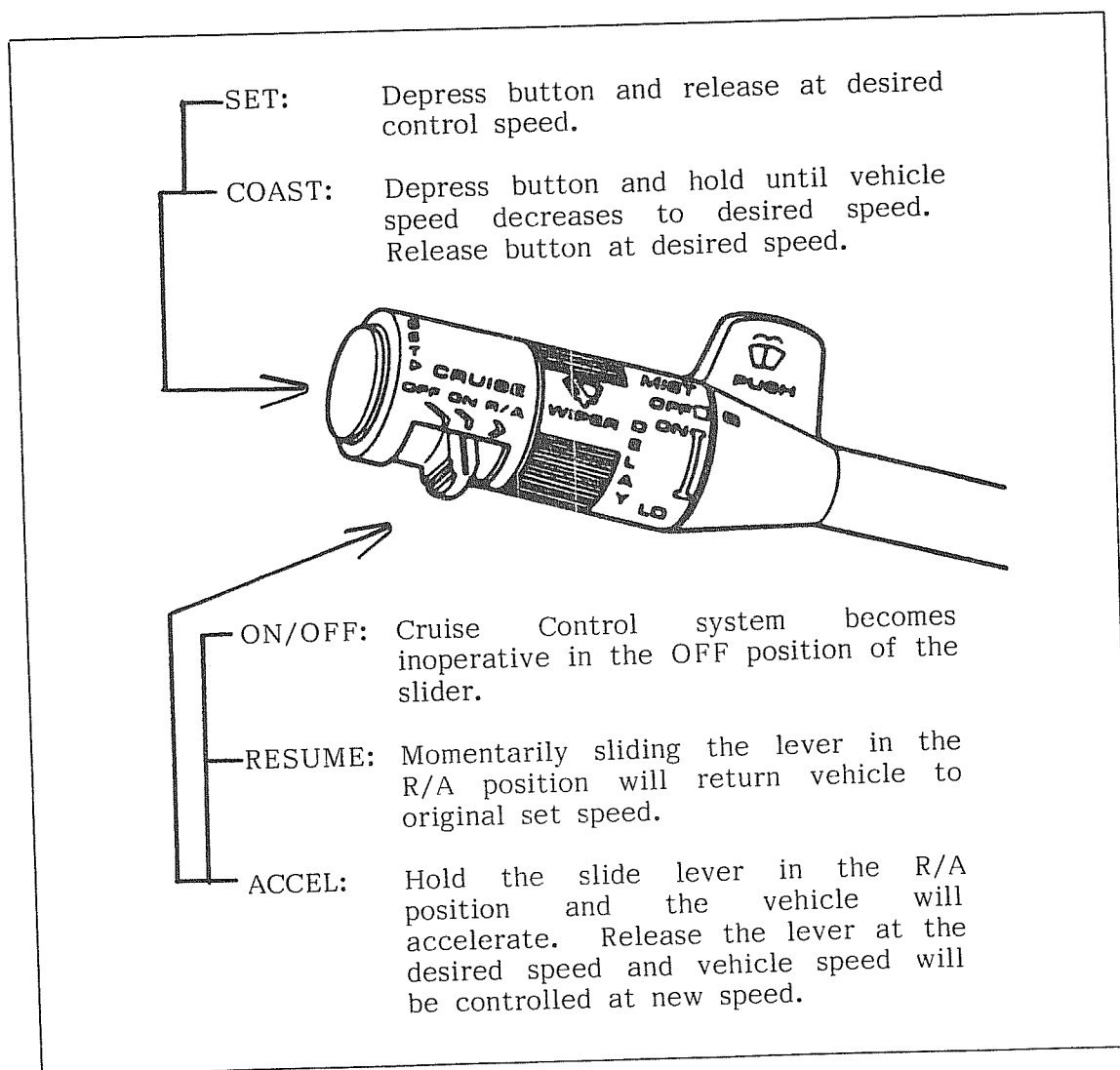
Or, use the Resume/Accel switch to accelerate and reset to the speed you wish. The Resume/Accel (R/A) switch must be held (over a second) in order to engage the accel mode.

To reset to a slower speed, push in the Set/Coast button all the way and hold it there. Wait until the vehicle slows to the desired speed, then release the button.

To "Resume" a Pre-Set Speed

After braking or stopping the vehicle without turning off the ignition, you can "Resume" to your last set cruising speed by accelerating to 30 mph (50km/h) or more and sliding the cruise switch momentarily to Resume/Accel. When you release the Resume/Accel switch, your vehicle will accelerate to the cruising speed set before braking or stopping.

Sliding cruise switch to Resume/Accel position and holding the switch in longer than 1 second will accelerate the vehicle until the switch is released. The speed at which the switch is released will become the new cruising speed.



To Disengage

Disengage the cruise control by pushing the brake pedal. Though not usually necessary, you can also turn off the system by moving the "Cruise" switch to "off".

Holding in the engagement button until vehicle speed falls below 30 mph (50 km/h) will also disengage the system.

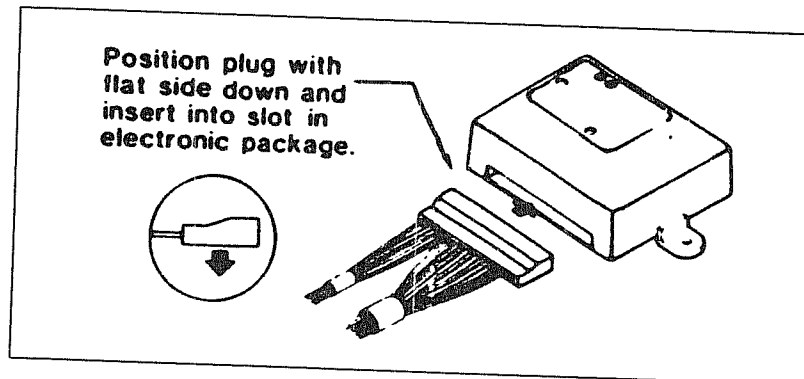
To Pass a Vehicle

Use the accelerator pedal for more speed when passing. When you take your foot off the pedal the vehicle will slow down to the speed set before passing.

CAUTION: We recommend that you DO NOT use your cruise control on slippery road conditions or in congested traffic.

INSTALLATION TEST

Attach the main wire harness to the electronics package as shown.



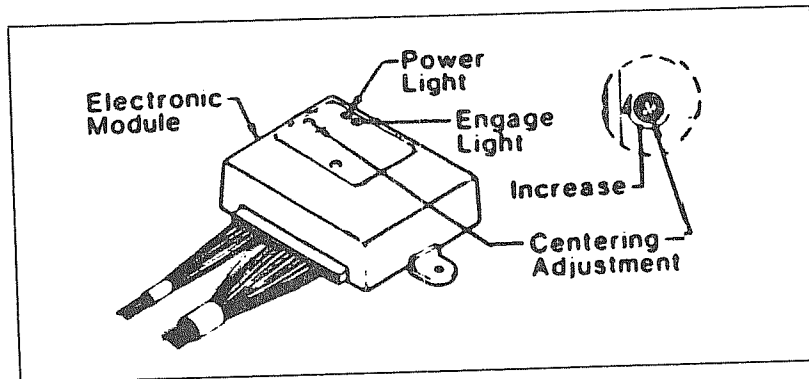
Note: For safety reasons it is suggested that you read this section completely before doing the road test.

Place the electronics package so the engage and power lights can be easily seen. Turn the ignition key on, but don't start the engine.

Move the control arm switch to the "on" position. The power light should go on. then depress the brake pedal and the light should go off. If not, see the trouble shooting guide.

Start the engine and drive to a level roadway where the legal speed limit is 55 mph. Slide the "On/Off" switch on the control arm to the on position. Now accelerate to about 35 MPH and momentarily push in and release the "Set/Coast" button. The cruise control is now in operation and the engage light should be brightly lit. Depress the brake pedal (press the brake just hard enough to activate the brake light switch). The cruise control should disengage and the engage light should go out.

Accelerate to 55 mph. Hold that speed and momentarily push in and release the "Set/Coast" button. The cruise control should hold the vehicle at the set speed. If not, adjust the centering screw either up or down until the vehicle speedometer reads 55 mph.



Tap the brake pedal to disengage the cruise control. Allow the vehicle to slow down to about 45 mph and then turn the control arm to the resume position. The cruise control should engage and accelerate the vehicle back to 55 mph.

Sensitivity Adjustment

Note: Normally no adjustment of the electronic sensitivity is required as it is preset at the factory. Sensitivity affects the cruise control accuracy and not the acceleration rate. If the vehicle has poor response, see the trouble shooting guide.

Sensitivity adjustment can be made if one of the following conditions exist.

Condition

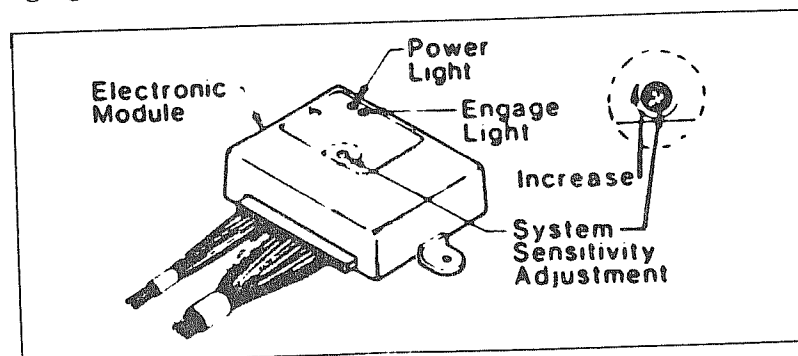
Vehicle is not holding speed on mild hills.

Vehicle is surging.

Solution

Sensitivity should be increased.

Sensitivity should be decreased.



TROUBLE SHOOTING - ARA CRUISE CONTROL

PROBLEM:

Unit fails to engage. Power light not on. Check all * procedures.

Engage light on electronic package does not turn on (Speed greater than 30 MPH).

CHECK/SOLUTION:

- I. Check between Pin 9 on main wiring harness and ground with an ohmmeter. Should be less than 1/2 ohm.
 - A. *If not relocate ring terminal to a good known ground.
- II. *Check between Pin 11 and ground with ignition key on. Should have 12 volts.
 - A. If not, check for blown fuse. If blown replace with 1 amp fuse only.
 - B. *If not, check for proper connection at 12 volt ignition switch source.
 - C. Check all electrical plug-in connectors for proper connection.
- III. *Check that power light on electronics package is on with brake pedal up, and off with brake pedal down.
 - A. *Check between Pin 16 and ground. Should have 12 volts.
 1. *If not, check for proper connection at "hot" side of brake switch.
 - B. *Check between Pin 17 and ground. Should have 0 volts with brake pedal in up position and 12 volts with brake pedal depressed.
 2. If 12 volts with pedal in up position, check brake switch adjustment. If adjustment is OK replace vehicle brake switch.
- IV. Check between Pin 5 and ground with control switch on. Should be 0 volts.
 - a. *If not, replace control switch. (See control switch tests for additional information.)
- V. *Check between Pin 5 and ground with the control switch off. Should be 12 volts.
 - a. *If not, replace electronics package.

- VI. Does not accelerate when RES/ACCEL switch is held in RES/ACCEL position.
- A. Check control switch. (Refer to control switch test instructions).
 - 1. If switch is okay, check linkage to throttle for any restriction, then conduct servo test (shown below). If all tests in this section check out, replace electronics package.
- VII. Does not resume to set speed when RESUME switch is momentarily placed in RESUME position.
- A. Check control switch.
 - 1. If switch is okay, check linkage to throttle for any restriction, then conduct servo test. If all tests in this section check out, replace electronics package.
- VIII. Does not coast when SET/COAST (or SET/DECEL) switch is held in SET/COAST (or SET/DECEL) position.
- A. Check control switch.
 - 1. If switch is okay, check linkage to throttle for any restriction, then conduct servo test. If all tests in this section check out, replace electronics package.
- IX. Servo motor runs with throttle at idle position, ignition key and control arm on.
- A. Check for excess slack in the servo throttle cable. Should be no more than approximately 1/16".
 - 1. If okay, replace servo.

PROBLEM:

Unit engages; however, unit does not operate properly.

CHECK/SOLUTION:

- I. Cruise control disengages.
 - A. Check for loose connections or shorting wires.
 - B. Check for improper brake switch adjustment. If brake switch is too far from the pedal arm, the brake lights may turn on when on rough, bumpy roads.

- II. Vehicle will not set to the desired speed within ± 2 .
 - A. Adjustment of centering control may be required. Refer to installation instructions regarding adjustment of "centering".
- III. Cruise control disengages when tail lights or turn signals are turned on.
 - A. Turn tail lights on. Check the cold (blue wire) side of the brake switch. With the brake pedal in the up position there should be less than 2 volts.
 - 1. Check for proper ground of cold side at tail lights. May require signal disengagement kit.
- IV. Cruise control has poor response. (Speed loss on hills or slow acceleration.)
 - A. Check cable casing clamp for slippage.
 - 1. See B. 1.
 - B. Check for throttle linkage restriction.
 - 1. If A and B check okay, replace the servo.
 - C. Check between Pin 11 and ground with a voltmeter. Should be at least 12 1/2 volts (engine running).
 - 1. If not, relocate power source or make needed repairs to vehicle's electrical system.
- V. Surging.
 - A. Check that engine rock under load is not pulling servo throttle cable at the carburetor.
 - 1. If still surges, replace servo.
- VI. Check between Pins 7 and 8 on electronic package.
 - A. Ohmmeter should read 100-135 ohms. Voltmeter should read 1-3 volts AC with vehicle moving at least 30 mph.
 - B. For automatic transmission vehicles equipped with an on-board signal generator and speedometer functions correctly, check all wire connections and make sure calibrate wheel is in proper position.
 - C. If all tests in this section check out, replace electronics package.

VII. Check between Pin 4 and ground. Should be approximately 7.5 volts.

A. If not, replace the electronics package.

VIII. When SET/COAST function is actuated, voltage between pin 4 and ground should be approximately 0 volts.

A. If not, replace the control switch. (See control switch test for additional information.)

PROBLEM:

Unit fails to engage, power light on. NOTE: Vehicle must be moving at least 30 mph.

CHECK/SOLUTION:

I. Engage light on electronic package comes on during road test, but cruise control will not engage.

A. Depress set button at desired speed. Remove foot from throttle. Allow vehicle speed to decrease at least 5 mph.

1. If speed decreases more than 3 mph before speed holds, then centering control may require adjustment. Refer to installation instructions regarding adjustment of "centering".

B. Check between pin 16 and ground. Should have 12 volts.

1. If not, check for proper connection at "hot side of brake switch.

C. Check cable casing and throttle hookup for mechanical failure.

D. Check servo (refer to servo test instructions).

1. If servo fails test, replace servo.

SERVO TEST (ENGINE MUST NOT BE RUNNING)

1. Disconnect the servo harness in the engine compartment.
2. Supply a ground to the orange and green wires.
3. Apply 12 volt to the blue and yellow wires.
4. With 12 volt applied to the blue and yellow wires, and ground supplied to the orange and green wires, the servo should pull the cable in.

CAUTION: It is not necessary to pull the servo full throttle when testing; a half inch to an inch is adequate. During this test the servo clutch is locked and will not disengage. By continuing to apply voltage, damage to the servo or the throttle linkage will occur.

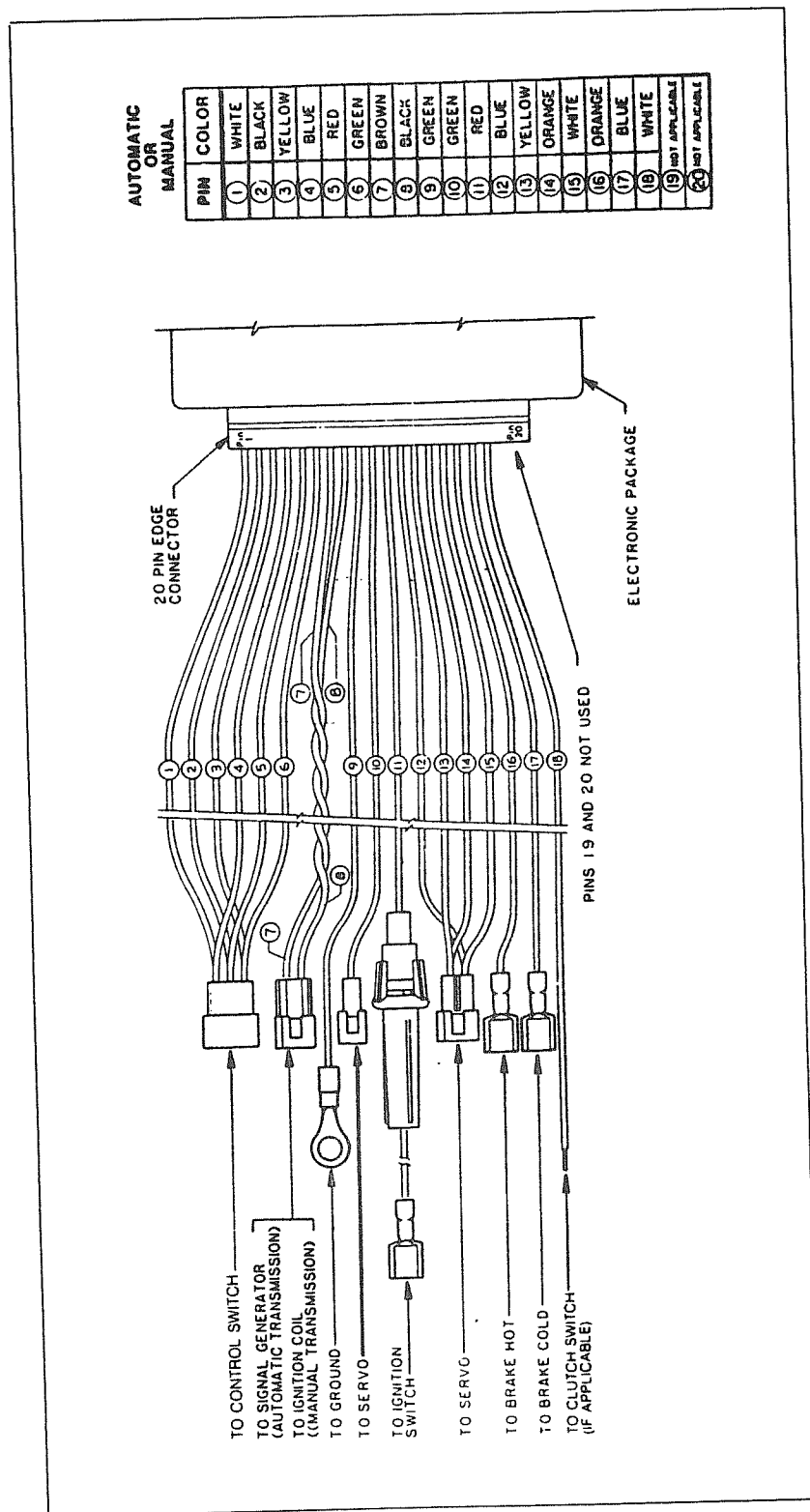
PLEASE USE EXTREME CAUTION WHEN PERFORMING THIS TEST!!

CONTROL SWITCH TEST

1. Remove electronics package.
2. Connect one lead of ohmmeter to Pin 6 of the connector.
3. Set the ohmmeter range to RX100.
4. Connect the other ohmmeter lead to pins 1 through 5 in turn (refer to table below).
5. With the corresponding switch not activated, the meter should read infinity (greater than 100 K ohms.)
6. With the corresponding switch activated, the meter should read 0 ohms (less than 100 ohms.)

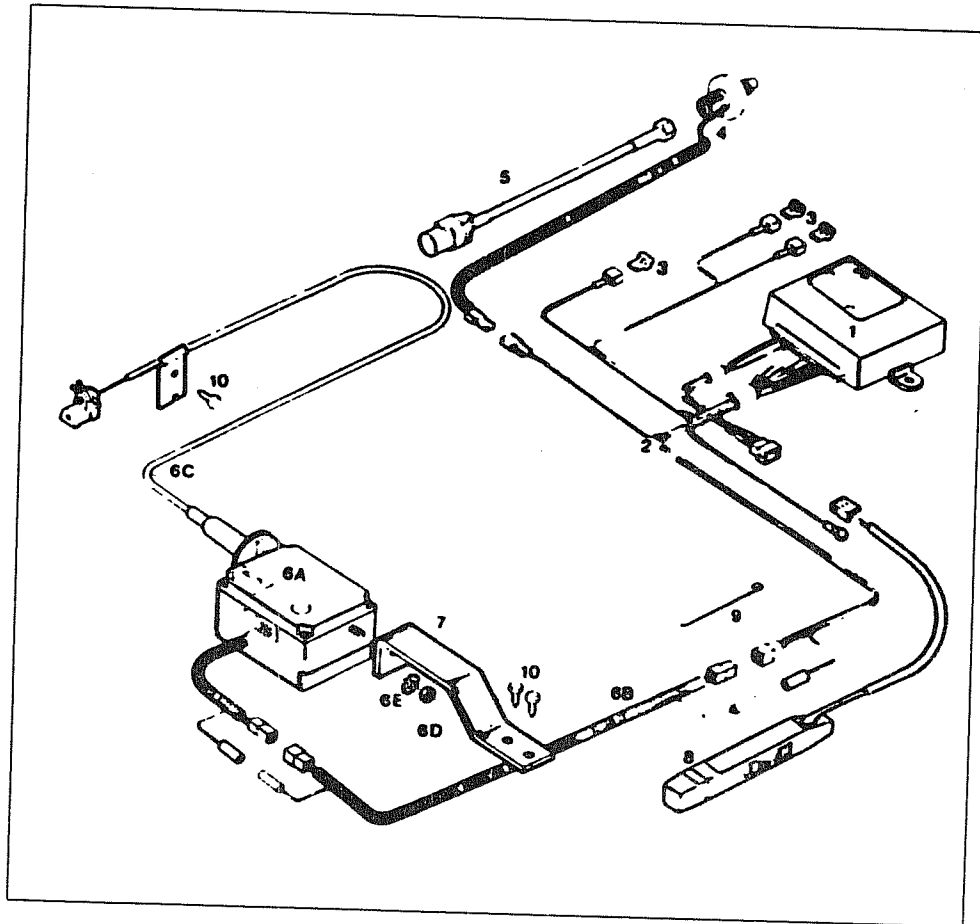
PIN NUMBER	SWITCH FUNCTION	SWITCH POSITION	
		OPEN (NOT ACTIVATED)	CLOSED (ACTIVATED)
1	RESUME/ACCEL	INF	0
2	RESUME/ACCEL	INF	0
3	NONE	INF	0
4	SET/COAST	INF	0
5	ON/OFF	INF	0
6	GND	—	—

WIRING HARNESS DIAGRAM



ELECTRIC SERVO SYSTEM

Component Parts List



1. Electronic Package
2. Main wire harness
3. T-Connector
4. Signal generator
5. Cable extension
6. Electric Servo Assembly Consisting of:
 - A. Electric Servo
 - B. Servo pigtail harness
 - C. Servo cable assembly
 - D. 1/4" Hex nut
 - E. 1/4" star washer
7. Servo bracket
8. Control arm
9. Wire tie
10. 1/4" self-tapping screw

"SMART STICK" TROUBLE SHOOTING GUIDE ARA

Important Note: Check all wire connectors and connections prior to trouble shooting the multi-function "Smart Stick" system.

PROBLEM:

Windshield wiper(s) do not operate (ignition switch in the "on" position).

CHECK/SOLUTION:

I. Delay and low speed modes.

- A. Check between Pin 11 and ground with an ohmmeter. Should be less than 1 ohm.
- B. Pin 7 on electronics module should have 12 volts. If not present, check for blown fuse or open circuit breaker in windshield wiper circuit.
- C. Pin 6 on electronics module should have 12 volts. If not present replace electronics module.
- D. Pin 10 on electronics module should have 12 volts. If not present, replace electronic module.
- E. Pins 8 & 9 on electronic module should have 12 volts.
 - 1. If present check red and green wires on external relay for good connections and 12 volts.
 - a. If present check for 12 volts at low speed terminals to motors. Pins 1 & 3. If present check motor windings and grounds.
 - b. If not present, replace external relay.
 - 2. If not present, replace electronics module.

II. Delay speed mode (adjust to minimum delay cycle for this test.)

- A. Pin 18 on electronics module should have 10-12 volts. If not present, replace "Smart Stick" switch.

III. Lo speed mode.

- A. Pin 15 on electronics module should have 12 volts. If not present, replace "Smart Stick" switch.

IV. High speed mode.

- A. Pin 14 on electronics module should have 12 volts.
- B. Check for 12 volts at high speed terminals to motor(s), Pins 5 & 13.
 - 1. If not present replace electronics module.
 - 2. If present, check motor windings and grounds.

PROBLEM:

Mist mode fails to operate.

CHECK/SOLUTION:

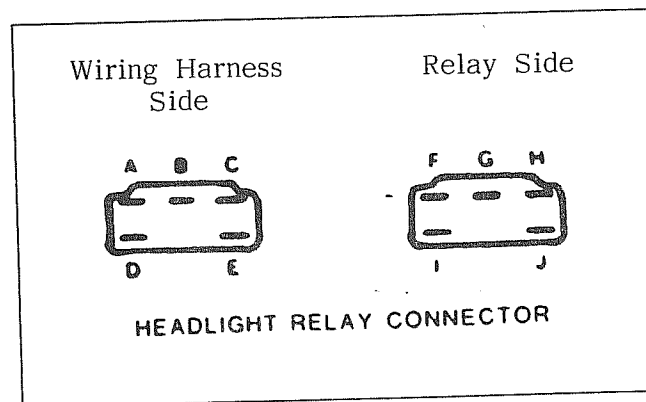
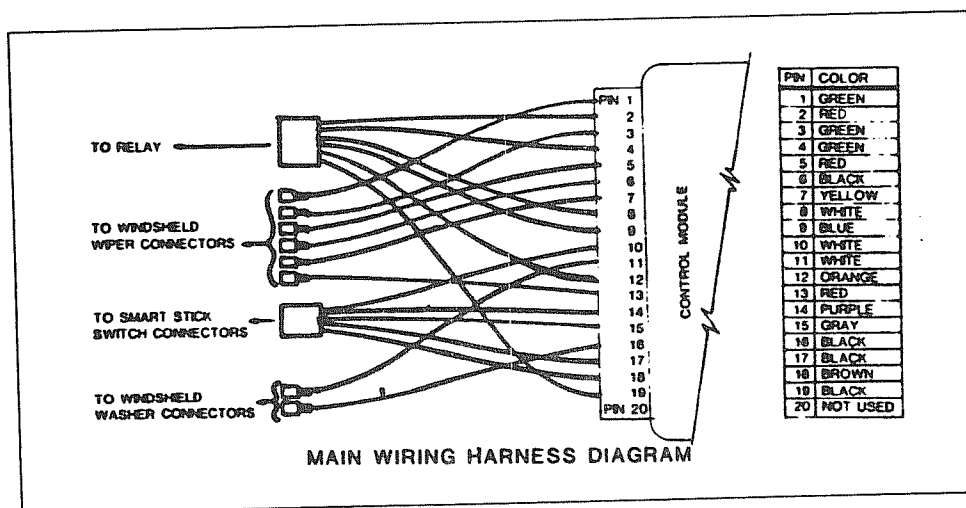
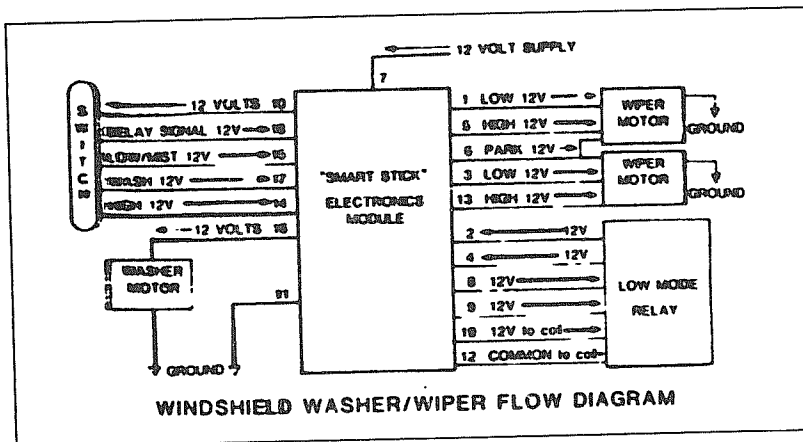
- I. Pin 15 on electronics module should have 12 volts.
 - A. If present, replace electronics module.
 - B. If not present, replace "smart stick" switch.

PROBLEM:

Wash cycle fails to operate or operates improperly.

CHECK/SOLUTION:

- I. Windshield washer does not pump and wipers do not work.
 - A. Pin 17 on electronics module should have 12 volts.
 - 1. If present, replace electronics module.
 - 2. If not present, replace "smart stick" switch.
- II. Windshield washer pumps water, but wipers do not work.
 - A. Verify Pin 17 has 12 volts.
 - 1. If present, replace electronics module.
- III. Windshield washer does not pump but wipers work.
 - A. Inspect for proper fluid level in washer bottle reservoir.
 - B. Check for proper ground connection at washer pump.
 - C. Check Pin 16 for 12 volts and good connections.
 - 1. If present, check for 12 volts at pump motor.
 - 2. If present, replace motor
 - 3. If not present, replace electronics module.

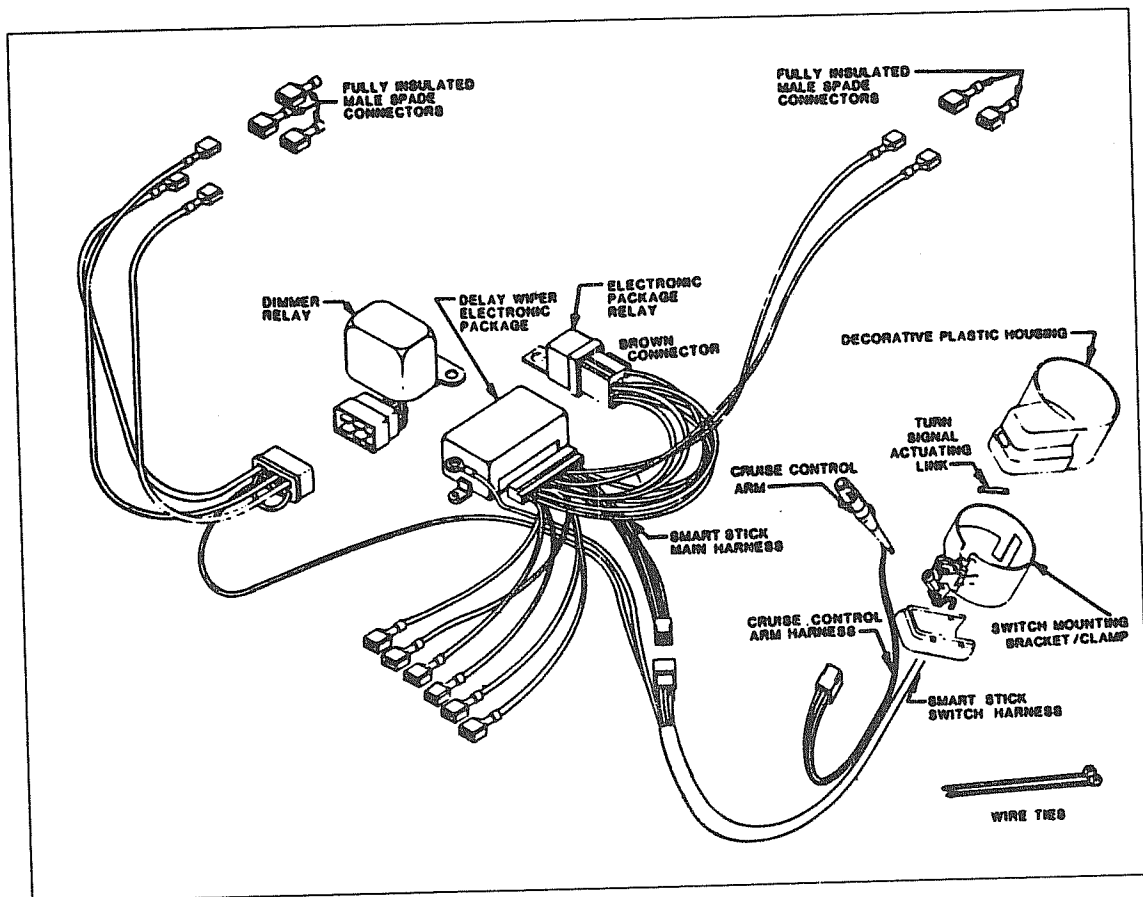


PROBLEM:

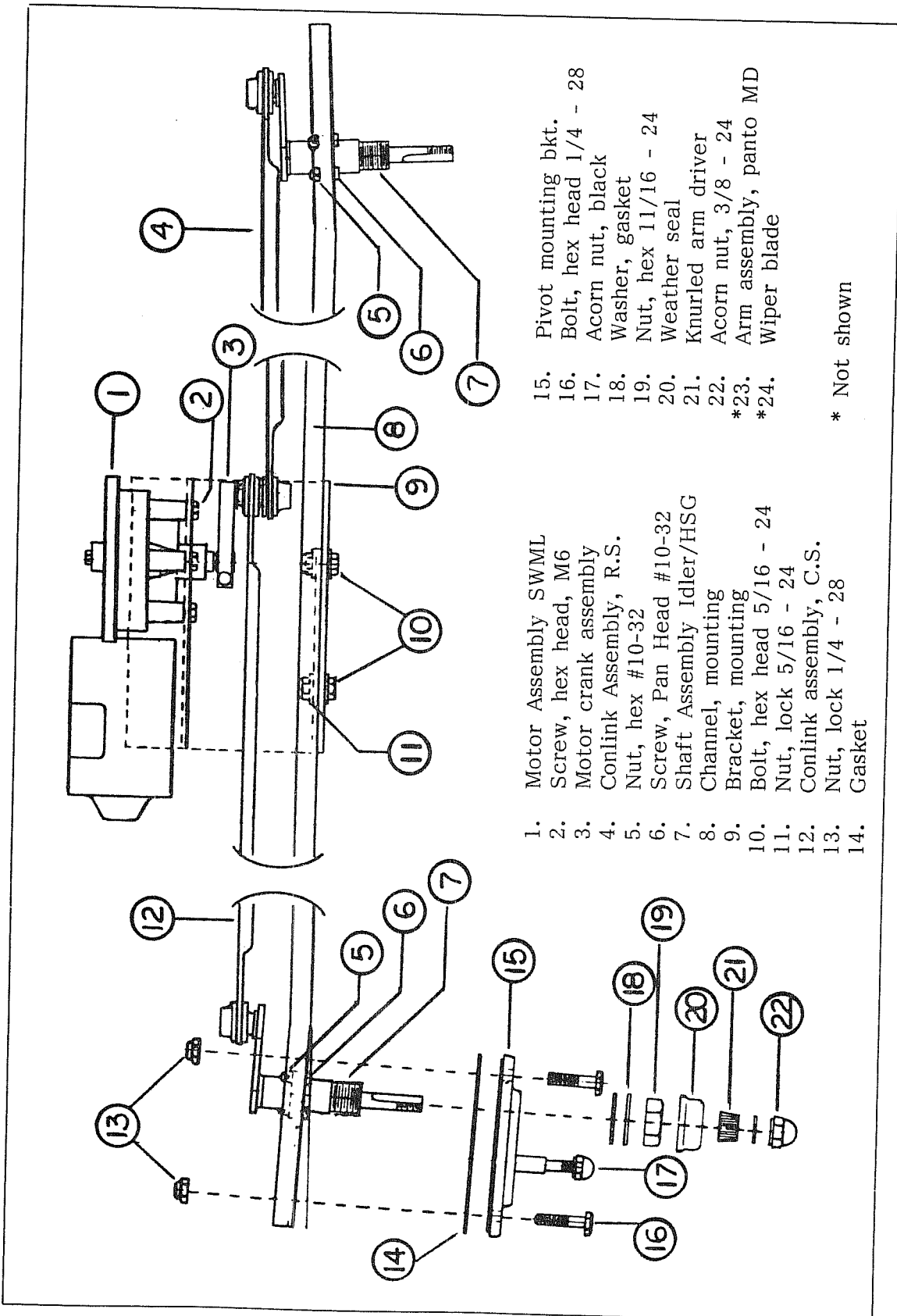
Headlight High/Low beam switch fails to operate. (Some tests may refer to Pin locations shown on diagram.)

- I. Listen for an audible "click" when operating the headlight High/Low beam switch.
 - A. If the relay does not acutate (Disconnect relay from wiring harness for the following tests.)
 1. Check for 12 volts at Pin C on the relay harness. If not present check for blown fuse in the headlight circuit, or headlight switch wiring.
 2. Check between Pin E and ground with an ohmmeter while actuating the headlight High/Low beam switch. When the switch closes, ohmmeter should read less than 1 ohm. If not, replace "smart stick" switch.
 3. Check between pins 1 & J with an Ohmmeter. Ohmmeter should read approximately 11 ohms. If not approximately 11 ohms, replace relay.
 - B. If the relay actuates (Relay must be connected to the wiring harness for the following tests).
 1. Check for 12 volts on the green wire at the relay harness connector.
 - a. If present, check headlight wiring and bulb(s).
 - b. If not present, replace relay.

SMART STICK - COMPONENT PARTS



WINDSHIELD WIPER ASSEMBLY



ELECTRIC STEP (KWIKEE STEP)

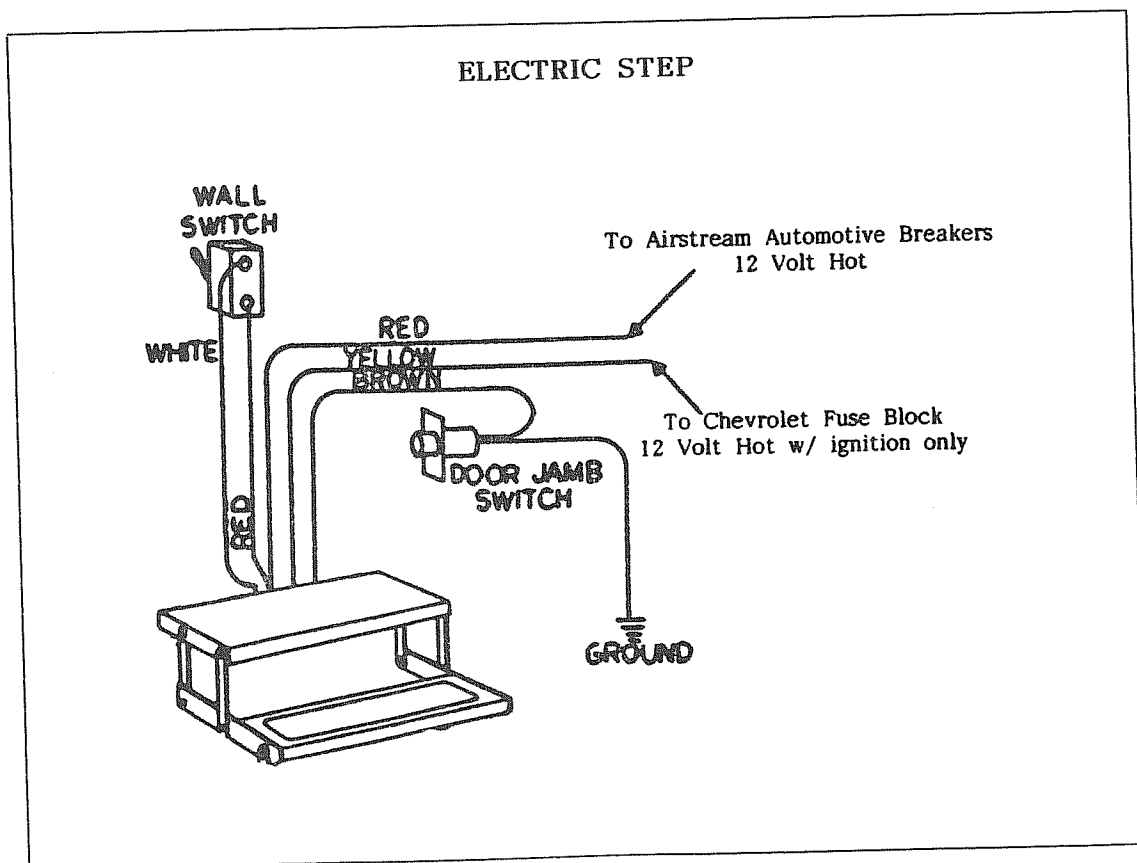
Manufacturer: Kwikkee Products Company
Division of Ashton Corporation
P.O. Box 638
Drain, Oregon 97435
Phone: 503-836-2126

The step is easy and convenient to operate. Just inside the main door is a wall switch for the step. When traveling leave the switch in the "ON" position. The step will lower when the door is opened and retract when the door is closed.

When parked, open the door so the step is lowered. Then shut the switch off. The step will remain in the lowered position and the "step" light on the dash will be extinguished.

If you forget and leave the switch off as you leave - No Problem! When the ignition is "ON" the wall switch is by-passed and the step will retract when the door is closed.

WARNING: If the wall switch is turned off, and the step is in the retracted position when the ignition is turned off, the step will not lower when the door is opened. Keep your passengers informed.



If the step does not work or operates erratically, such as extend part way and shut off, the first item that should be checked is the coach battery. The voltage across the battery terminals should be at least 12.7 volt DC to insure a well charged battery. A battery that reads below 12.7 volts DC may drop as low as 8 volt DC when a load is drawn, such as the engaging of the step motor. The control unit will shut off if the loaded voltage to it falls below 8.5 volts DC. The control unit will remember which function it was performing. It will wait between five and fifteen seconds (time depends upon temperature) and will try again to complete the original function. If the supply voltage is still below 8.5 volts, the control will go into another delay state. If the supply voltage remains above 8.5 volts DC, the original function will be completed. Should the supply voltage again fall below 8.5 volts DC the system will go into another delay state. It may take a couple of minutes to complete the original function. Low supply voltage may cause erratic operation of the step. Intermittent ground may also cause erratic operation of the step.

The step may also operate erratically if the step is being operated directly from a converter and the output from the converter is not adequate. The converter must be capable of producing a minimum of 30 amps for proper step operation.

If the control is hooked up electrically backwards the step will not operate. If ground to the control unit is lost, either between the control unit and the step frame (green wire from the control unit), the step frame and the coach chassis (the braided ground cable), or between the coach battery and ground (negative battery cable) the step will not function.

Make sure battery terminals and all wire connections are clean and tight.

Be sure all wires are of proper gauges or heavier as specified in the wiring diagram.

No other devices (heaters, fans, burglar alarms, lights, etc.) can be incorporated in the same circuit as the control unit or step. This may cause the step or control unit to malfunction.

Check the step for physical damage. If the step has been struck by some kind of road hazard, the step mechanism may be bent causing the step to bind. Check the tread, sliding rails, and extending arms for physical damage. Also check all pivot points for rusting. (SEE LUBRICATION AND MAINTENANCE SCHEDULE)

If the power switch is on and the step will not extend when the door is opened, and/or retract when the door is closed, but there is a clicking noise coming from the control unit (the engaging and disengaging of the relays in the control unit) the first item that should be checked is the motor. See MOTOR TESTING PROCEDURE. The relays will engage and disengage (the clicking noise) when the door switch is cycled if the motor is malfunctioning.

Basic Summary of Operation

Power is normally supplied to the system through the kill switch by the white wire. The red wire supplies a "stand by" power source which by-passes the kill switch in the "OFF" position. When the ignition switch is turn on, 12 volt DC is supplied to the yellow wire. This engages a relay that passes the "stand by" power into the system and retracts the step automatically when the door is closed.

When the door is open the door jamb switch makes contact to the ground, which operates certain relays in the control unit. One of the relays is sent into a down oriented position and the step extends. When the door is closed, the switch opens so the circuit to ground is interrupted. This puts a relay into an up oriented position so the step retracts.

The control unit is essentially a current sensor as well as a switching device. When the motor assembly moves the step tread to its extended or retracted position, or stops moving because of an obstruction, such as a curb or the binding of a damaged or bent step frame, the motor draws a larger amount of current. The control unit "senses" the larger current draw and shuts off power to the motor.

General Service Notes

The following general service notes pertain to steps with the #8 control unit (blue or yellow plastic control unit box).

If the power wire to the step is disconnected from its source and reconnected, a spark is common. This is caused by the momentary charging of the control unit and does not necessarily indicate the system is staying on, causing a drain on the battery.

If battery drain is suspected, observe the understep light (if so equipped) while the step is extending. The power switch must be on for the understep light to operate. When the step locks into the down position, the understep light should become noticeably brighter. If it does not, the control unit may not be shutting off. Unplug the four way plug between the control unit and the coach to prevent overheating of the motor.

To further determine that the control unit is not shutting off, strip a small section of insulation from one of the motor leads (orange wire or white wire with black tracer). Place a voltmeter between the stripped wire and the ground cable attached to the step frame, then reconnect the four way plug. Turn the power switch on. If any voltage is read, the control unit is not shutting off and may be defective. If this is the case disconnect the four way plug to prevent the motor from overheating. If zero voltage is present, the control has shut off and is normal.

These general service notes and the following test procedures cover the most common problems associated with Kwikkee electric steps. Due to the number of variable conditions available, you may experience symptoms other than those covered. Please feel free to contact the customer service department for further information or assistance.

TEST PROCEDURE - COACH WIRING:

Read the General Service Notes before starting any test procedure.

1. Unplug the four way plug from the control unit and the 90° molded motor plug from the motor (See Fig. 2)
2. Check the main power source by connecting a voltmeter between the Red wire from the coach half of the four way plug and the ground cable attached to the step frame (See Fig. 3). The reading should be about 12 volts DC. If the voltage is low there may be a corroded or loose connection, or low battery charge. If the voltage reading is zero, check the fuse/circuit breaker and all connections. Be sure there is a good ground connection from the step frame to the coach chassis. See Step #2 of the HOOKUP PROCEDURE. A good ground connection is a must. If the reading is approximately 12 volt DC proceed with the next test.

Figure 2

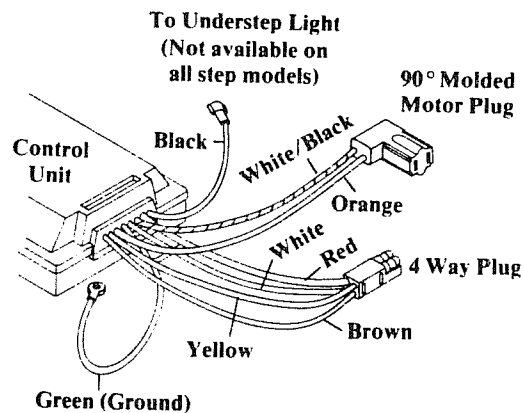
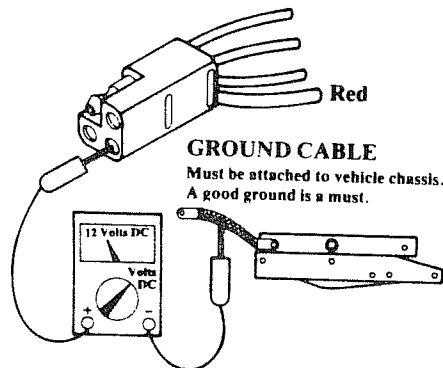
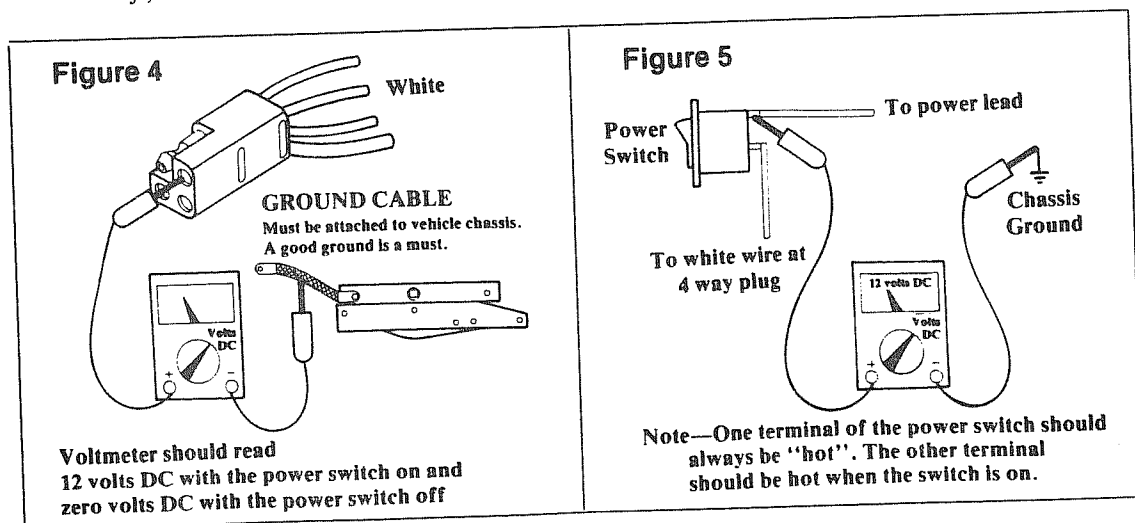


Figure 3



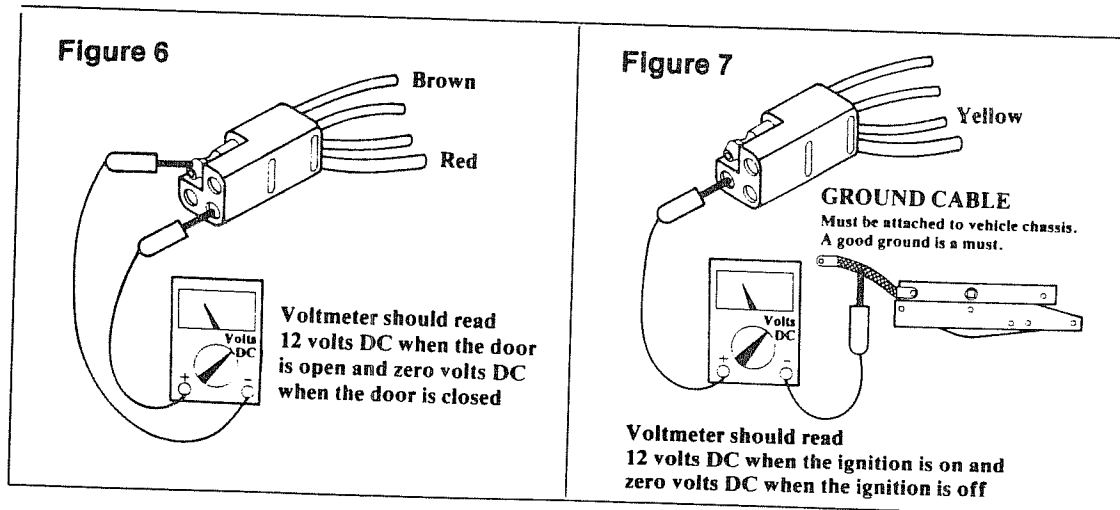
3. To check the power switch, connect the voltmeter between the WHITE wire from the four way coach plug and the ground cable. (See Fig. 4) The reading should be about 12 volts DC with the power switch ON and zero when the switch is OFF. If the voltmeter reads zero with the power switch ON, connect the voltmeter between the terminal on the power switch with the wire leading to the power lead (red wire) and ground. (See Fig. 5) If the reading is still zero, check the wire going to the power lead. There may be a loose connection or cut wire. If the reading is about 12 volt DC turn ON the power switch and check the other power switch terminal in the same manner, by connecting the voltmeter between the terminal and ground. If the reading is zero, replace the power switch. (**Note:** If your step has the #1 electrical pack, the coach manufacturer supplied the power switch or it was purchased separately.) If the reading was about 12 volts DC, there may be a loose connection or cut wire between the power switch and the four way plug.
4. To check the door jamb switch, connect the volt meter between the RED wire from the coach four way plug and the Brown wire in the same plug. (See Fig. 6) The reading should be about 12 volts DC when the door is open and zero when the door is closed. If the reading is zero with the door open, check the ground connection from the door switch. This connection should be clean and tight. See Step #8 of the HOOKUP PROCEDURE. An improper ground can cause intermittent or erratic operation of the step. If the step will not retract after being extended or extends with the door closed, the BROWN wire attached to the door switch may be touching a grounded surface inside the wall behind the door jamb, or the door switch terminals may be touching each other. If the step extends and retracts by itself while traveling, check the conditions previously described. Also make sure the door switch plunger is depressed at least two thirds of its travel when the door is closed. If the switch is not depressed at least two thirds of its travel, the switch may make intermittent contact as the coach's frame shifts slightly while traveling along the roadway. If all the previous conditions check okay, the door switch may be faulty.



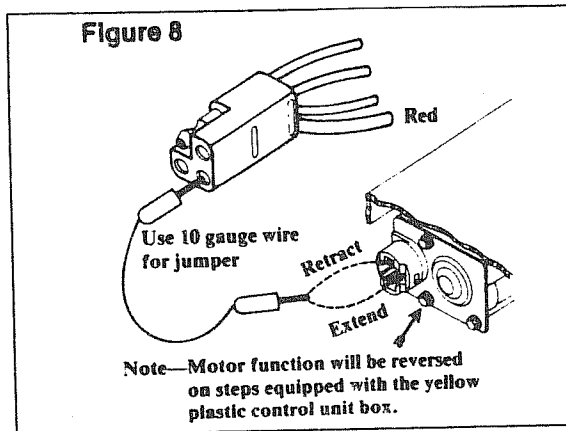
5. To check the ignition safety system connect the volt meter between the YELLOW wire from the coach four way plug and the ground cable. (See Fig. 7) The reading should be about 12 volts DC when the ignition is turned on and zero when the ignition is off. If the reading is zero when the ignition is on, check the connection of the YELLOW wire at the coach fuse panel. If connected at a fuse, check for a blown fuse. If the reading was about 12 volts DC when the ignition was off, the YELLOW wire is connected to a constant live source. If the YELLOW wire is connected to a constant live source, the step will always work with the door movement, even if the power switch and ignition are off.
6. When checking the motor be sure your hands are clear of the step mechanism. Also be sure the motor has a good ground connection to the step frame and the step frame is grounded to the coach chassis. To retract the step connect a 10 gauge minimum jumper wire for the RED wire of the four way coach plug to the motor terminal closest the top of the step. (See Fig 8) **Note:** The RED wire must have power. See Step #2 of COACH WIRING TEST PROCEDURE. To extend the Step, jump the RED wire from the coach four way plug to the motor terminal closest the ground. (See Fig. 8) **Note:** Motor function will be reversed on steps equipped with the yellow plastic control unit box.

CAUTION: Do not leave the jumper wire connected to the motor terminal for more time than it takes to extend or retract the step or damage to the motor will result.

If the motor fails to move, the motor may be defective. If the step has been struck by some kind of road hazard, the step mechanism may be bent and causing the step to bind. The control unit would then shut off power to the step as described in the BASIC SUMMARY OF OPERATION. Check for physical damage to the tread, sliding rails, extending arms, etc. Also check all pivot points for rusting. (See LUBRICATION AND MAINTENANCE SCHEDULE)



If the step doesn't move then power is applied to the motor terminals, but a dim spark is noticeable, there may be damage to the windings inside the motor, requiring replacement of the motor. A dim spark may also indicate a poor ground connection. A very bright spark usually indicates a shorted or burned out motor requiring replacement.



Further inspection of the motor should be done by removing one of the 1/4" bolts in the end of the motor near the plug. Remove the bolt shown in Fig. 8 with the arrow pointing to it. If the shaft of the bolt has a burned, tar like substance on it, the motor windings have overheated. The motor should be replaced, even if it still works. However, a clean bolt does not necessarily mean internal damage is not present.

If the motor is defective refer to the instructions for removing the motor assembly from the step frame and disassembly of the motor assembly to remove the motor.

TEST PROCEDURE - CONTROL UNIT TEST:

7. The motor must be operational to test the control unit using this procedure. See MOTOR TEST PROCEDURE.
 - a. Ground the negative (-) post of a well charged 12 volt DC battery to the ground cable attached to the step frame. **Note:** A well charged battery will read at least 12.7 volts DC when a voltmeter is connected between the battery posts. See GENERAL SERVICE NOTES.
 - b. The 90° molded motor plug must be connected.
 - c. The four way plug between the control unit and the coach should be disconnected. Install pigtail (four way plug - part #9336 - same plug as supplied with the step for connection to the coach) into the control unit half of the four way plug.
 - d. Touch the RED and WHITE wires to the positive (+) post of the battery. At the same time, touching the BROWN wire to the ground cable will cause the step to extend.

CAUTION: Keep hands clear of the step mechanism.

- e. When the BROWN wire is removed from the ground cable the step should retract.

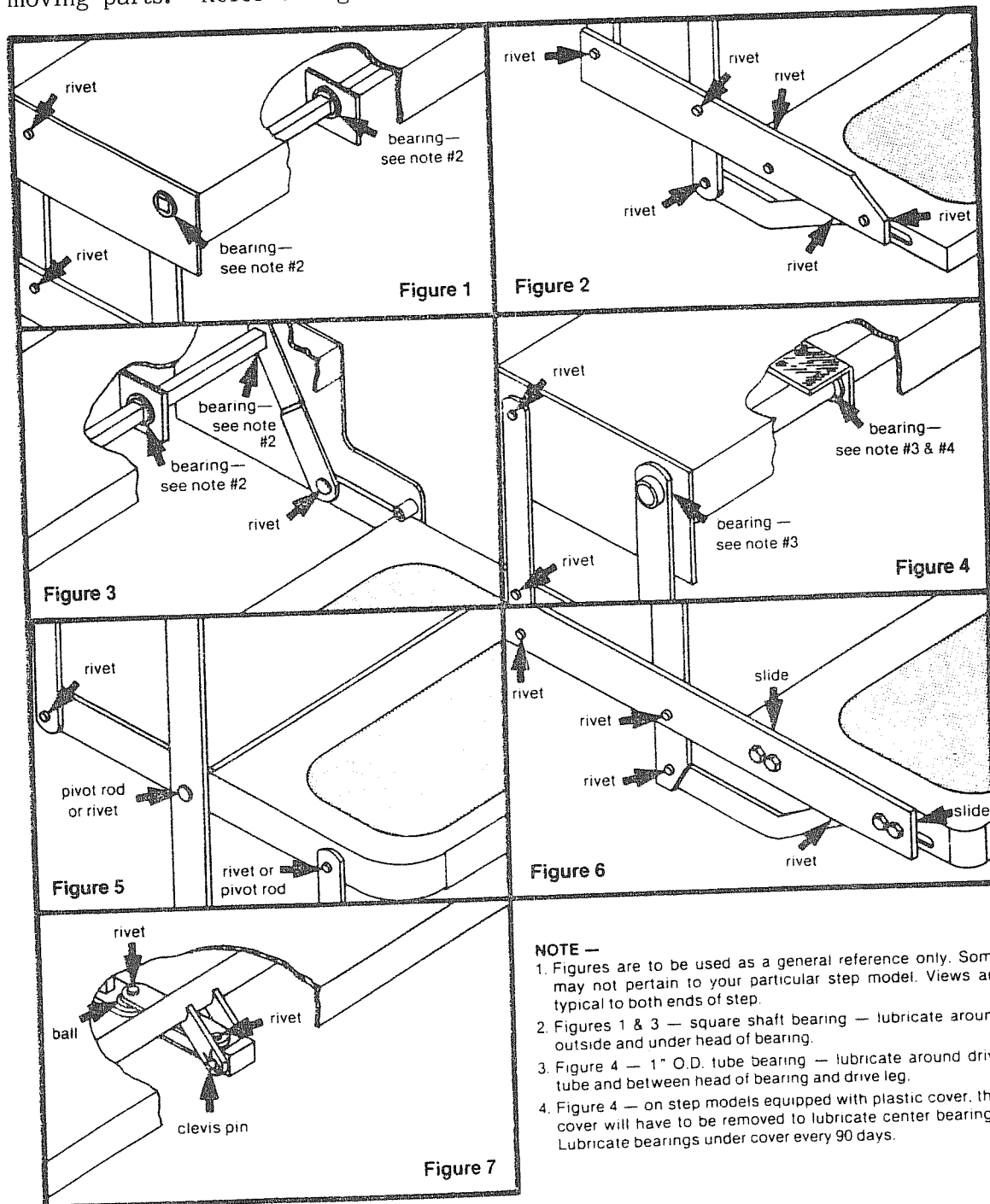
- f. Extend the step again by applying power to the RED and WHITE wires and grounding the BROWN wire to the ground cable. Remove the RED and WHITE wires from the battery before removing the BROWN wire from ground. This will cause the step to remain extended.
- g. To test the ignition safety system circuit, apply power to the RED and YELLOW wires at the same time and the step should retract.
- h. To test the "last out feature" remove the YELLOW wire from the battery without removing the RED wire. Ground the BROWN wire to the ground cable and the step should extend. If the RED wire is removed from the battery before grounding the BROWN wire, Step #7f and #7g must be repeated before testing the last out feature. This test will only work if performed immediately after the ignition safety system test.
- i. If the control unit tests okay, then recheck all wire and ground connections. If the source of the trouble cannot be found, feel free to contact the customer service department for further information or assistance.
- j. If the above tests do not check out, the control unit may be defective and should be returned to the factory for evaluation.

Note: All blue and yellow plastic boxed control units have the circuitry to perform all the above functions. Your particular connection to the coach may or may not use all these features, but all the above tests should be completed to fully test the control unit.

In most cases the control unit does not fail and problems can be traced to coach wiring or voltage problems.

LUBRICATION AND MAINTENANCE SCHEDULE

Clean all mud, salt and road grime from step before lubricating. Lubricate all moving parts (bearings, pivot points, slides, clevis pin, and drive linkage ball) every 30 days with a good quality moisture and heat resistant penetrating grease. Kwik-Lube Spray Grease is especially formulated to lubricate Kwik-ee electric steps and is recommended for lubricating all moving parts. Refer to figures below for lubrication locations:



INSTRUCTIONS FOR REMOVING THE SINGLE REDUCTION MOTOR ASSEMBLY FROM THE STEP FRAME AND DISASSEMBLY:

Read all instructions before starting any procedure.

Refer to the single reduction motor assembly exploded view drawing for the item numbers referred to in these instructions.

1. Unplug the control unit from the coach (four way plug.) Do not cut any wiring.
2. Unplug the 90° molded motor plug from the motor assembly.
3. It is easiest to remove the motor assembly from the step frame if the step tread(s) are in a partially extended position. Try to extend the step (or retract the step if it is locked in the extended position) by connecting a 10 gauge minimum jumper wire between the RED wire from the coach half of the four way plug to the motor terminal closest the ground (See Fig #8 in the TEST PROCEDURES- MOTOR TEST) **Note:** Motor function will be reversed on steps equipped with the yellow control unit box. Disconnect the jumper wire from the motor terminal after the step unlocks but before the step fully extends. If the step does not extend, go to Step #4.

WARNING: Do not step on a partially extended step or damage to the step frame and/or motor assembly may result.

Connect the 10 gauge minimum jumper wire to the motor terminal closest the step frame to try to retract the step (See Fig. #8 in the TEST PROCEDURES-MOTOR TEST) . **Note:** Motor function will be reversed on steps equipped with the yellow control unit box.

4. Remove the hair pin (Item #6) from the clevis pin (Item #7).
5. Remove the clevis pin (Item #7) from the cast block in the end of the linkage assembly (Item #8, #9 or #10.) Note which direction the clevis pin goes into the cast block. If the step is in its locked position, the clevis pin may have to be pried or driven out of the block. If the step is in the locked position, loosening the motor assembly mounting bolts may allow the clevis pin to be removed easier. The step tread(s) should swing freely when the clevis pin is removed. If the tread does not move freely, check for a bent step frame and for rusting at the pivot points.
6. If the step tread was removed on 30 and 33 series steps to remove the plastic splash cover, reinstall the tread and tighten the 1/4-20 x 1" long hex bolts. Be sure to reassemble the tread and sliding blocks the same way they were removed. Be sure the step moves freely.
7. Remove the motor assembly from the step frame.
8. Set the motor assembly on its flat mounting plate and remove the 3/8-16 socket head screw (Item #1) from the bearing bracket (Item #2) and lift off the bearing bracket.

9. Remove the bearing (Item #3) and the linkage assembly (Item #8, #9 or #10) from the gear case (Item #11). If the linkage assembly is jammed against the side of the gear case it may have to be pried out.
10. Turn the motor assembly over and remove the four (4) 1 1/4" long #10 self tapping screws (Item #13) from the gear case. Lift off the mounting plate (Item #16).
11. Remove the bearing (Item #3). Lift off the gear case cover (Item #15) and lift out the gear (Item #14). Note which side of the gear goes up.
12. Remove the 1 1/4" long #10 self tapping screw (Item #13) and the 1/4-20 self tapping screw (Item #12) inside the gear case.
13. Turn the motor and gear case over and remove the 3/4" long #10 self tapping screw (Item #4) and remove the gear case from motor.

REASSEMBLY AND INSTALLATION OF THE SINGLE REDUCTION MOTOR ASSEMBLY ON THE STEP FRAME:

Read all instructions before starting any procedure.

Refer to the single reduction motor assembly exploded view drawing for the item numbers referred to in these instructions.

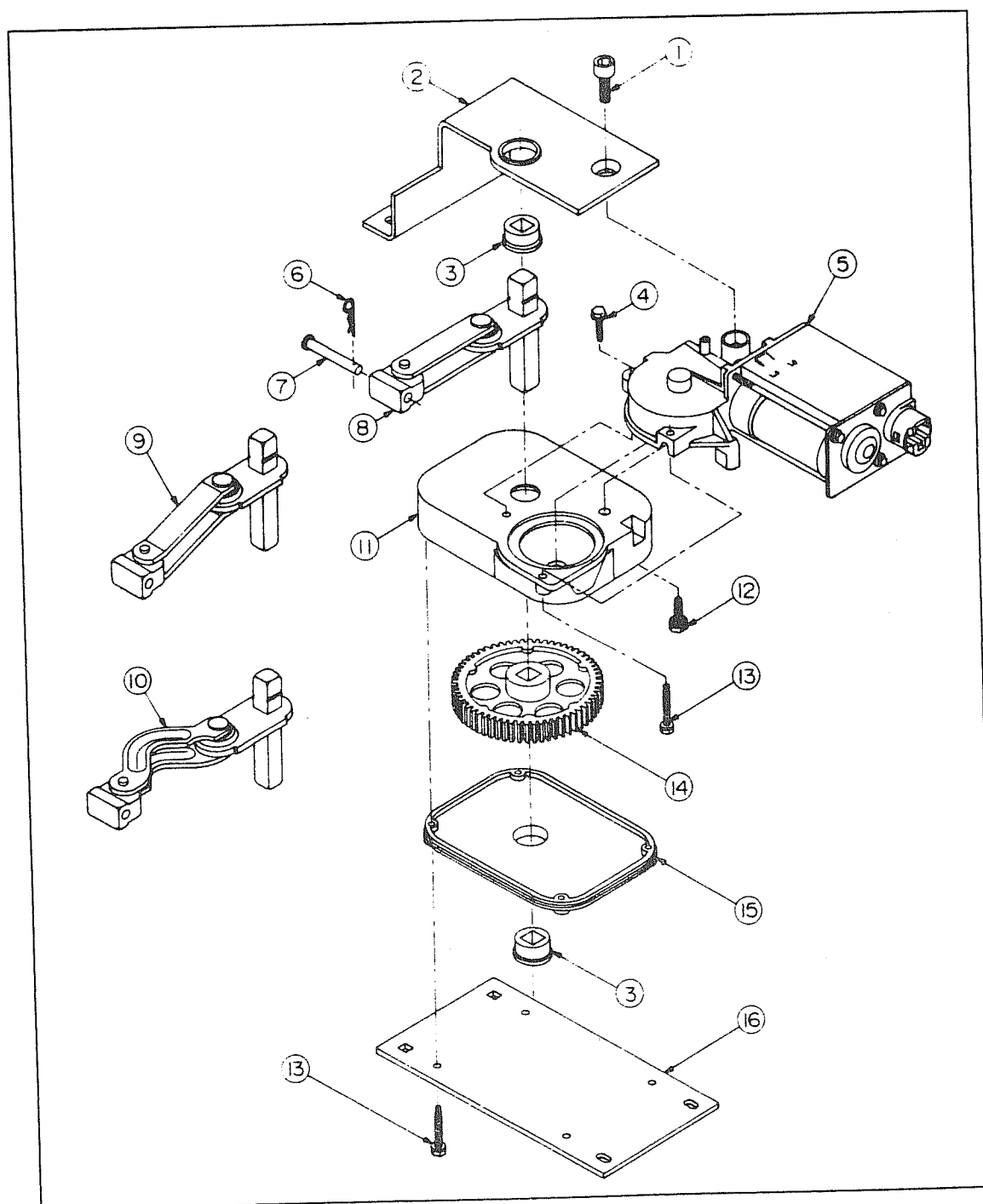
1. Place the motor with the gear head up. Remove the 1/4-20 self tapping screw (Item #12) and the 1 1/4" long #10 self tapping screw (Item #13) from the new motor (if present).
2. Set the gear case (Item #11) on the motor and start the 1/4-20 self tapping screw (Item #12). Do not tighten this screw.
3. Turn the motor and gear case over and install and tighten the 3/4" long #10 self tapping screw (Item #4).
4. Turn the motor and gear case back over and tighten the 1/4-20 self tapping screw (Item #12) in the gear case. Install and tighten the 1 1/4" long #10 self tapping screw (Item #13).

WARNING: Failure to follow the above sequence could result in the gear case not being positioned properly on the motor.

5. Install the gear (Item #14) in the gear case (Item #11). Be sure the gear is reinstalled the same way it was removed (with the penny sized depressions down).
6. Place the gear case cover (Item #15) on the gear case. Set the bearing (Item #3) in the center hole of the gear case cover (the flange of the bearing should be up) and align the square hole in the bearing with the square hole of the gear.

7. Place the mounting plate (Item #16) on the gear case cover (the square holes in the mounting plate should be away from the motor) and install and tighten the four (4) 1 1/4" long #10 self tapping screws (Item #13).
8. Turn the motor assembly over and set it on the flat mounting plate. Install the linkage assembly (Item #8, #9, or #10) into the gear case. Be sure the linkage assembly seats all the way into the gear and bearing or the bearing bracket (Item #2) will not set properly. The swivel ball and cast block should face the front of the motor assembly.
9. Place the bearing (Item #3) on the linkage assembly shaft. Place the flange of the bearing down.
10. Place the bearing bracket (Item #2) on the motor assembly and install and tighten the 3/8-16 socket head screw (Item #1).
11. Reinstall the motor assembly on the step frame and tighten all mounting bolts. **Note:** Be sure the motor assembly is positioned the same way the old one was prior to removal.
12. Install the clevis pin (Item #7) through the drive arms attached to the step frame and the cast block in the linkage assembly (Item #8, #9 or #10). Be sure to reinstall the clevis pin in the same direction it was removed. Install the hair pin (Item #6) in the clevis pin.
13. Plug the 90°molded motor plug into the motor assembly and connect the control unit to the coach (four way square plug).
14. Test step functions.
15. On 30 and 33 series steps, extend the step and reinstall the plastic splash cover. Be sure the four way square plug is fed out the notch in the rear of the plastic cover. Tighten all mounting nuts.

SINGLE REDUCTION MOTOR ASSEMBLY



- | | | | |
|----|---|-----|--|
| 1. | 3/8-16 Socket head cap screw | 10. | Linkage for Motor Assy #8279 |
| 2. | Motor Bearing Bracket | 11. | Gear Case |
| 3. | Bearing | 12. | 1/4-20 Self Tapping Hex Washer Head Screw 5/8" |
| 4. | #10 Self Tapping Hex Washer Head Screw 3/4" | 13. | #10 self Tapping Hex Washer Head Screw 1 1/4" |
| 5. | Motor | 14. | Gear |
| 6. | Hair Pin | 15. | Gear Case Cover |
| 7. | Clevis Pin | 16. | Motor Mounting Plate |
| 8. | Linkage for Motor Assy #8002 | | |
| 9. | Linkage for Motor Assy #8278 | | |

NOTES

CAMPING

SAFETY

As always, safety should be one of your top priorities. Make sure you, and everyone traveling with you, can operate the main door and exit window rapidly without light.

WARNING: The escape window (which is the rear, center window) is opened by pulling in and down on the red release bar. Push out on the glass and it will swing clear. The window operation should be checked each trip.

WARNING: At each campsite make sure you have not parked in such a manner as to block the operation of the escape window by being too close to trees, fences or other impediments. Scenic views are one reason for traveling, but don't park so the beautiful lake or steep cliff is just outside your escape window.

WARNING: Read the directions carefully on the fire extinguisher. If there is any doubt on the operation, you and your family should practice, then replace or recharge the extinguisher. You will find your local fire department will be happy to assist you and answer any questions.

WARNING: DON'T SMOKE IN BED!

KEEP MATCHES OUT OF REACH OF SMALL CHILDREN!

DON'T CLEAN WITH FLAMMABLE MATERIAL!

KEEP FLAMMABLE MATERIAL AWAY FROM OPEN FLAME!

We have all heard these warnings many times, but they are still among the leading causes of fires.

Other safety information on the LPG system of your motorhome is located in the Plumbing Section of this manual.

SMOKE DETECTOR

A smoke detector is centrally located in the ceiling of your motorhome.

The alarm horn and the indicator light on your detector lets you know whether your detector is working right.

When the indicator light, which you can see through the clear push button of the test switch, flashes once a minute, the detector is operating normally. (Model 83P has a white push button and does not flash.)

When the alarm is sounding the detector has sensed smoke or combustion particles in the air, the alarm will automatically turn off when the smoke in the air is completely gone.

If the alarm horn beeps once a minute the detector's battery is weak and needs to be replaced immediately.

How to take care of your detector.

Your smoke detector has been designed to be as maintenance free as possible. To keep your detector in good working order you must:

Test the detector regularly (weekly is recommended) by pressing on the test switch for up to 10 seconds until the alarm sounds. It's a good idea to test the detector after storage and before each trip. Make sure your family hears the detector and knows how to react.

Replace the battery once a year or immediately when the low battery "beep" signal sounds once per minute. The low battery signal should last at least 30 days.

This detector uses standard nine volt batteries. The detector will work properly with the following batteries.

Eveready #522, #1222, #216
Duracell #MN1604
Gold Peak #1604P, #1604S

Eveready and Duracell batteries are available at any retail store that sells batteries.

WARNING: Do not use any other kind of battery. The detector may not operate properly with other batteries.

Vacuum the dust off the detector sensing chamber at least once a year. This can be done when you open the detector to replace the battery. Remove the battery before cleaning. Use a soft brush attachment and carefully remove any dust on the detector components, especially on the openings of the sensing chamber. Replace the battery after cleaning.

Clean the detector's cover when it becomes dirty. First open the cover and remove the battery. Then hand wash the cover with a cloth dampened with mild soapy water, rinse it with a cloth dampened with clear water, and dry it with a lint-free cloth. Be careful not to get any water on the detector components. Replace the battery and close the cover.

Test the detector after closing the cover whenever you have opened it to replace the battery or clean it.

LP GAS ALARM

A LP gas alarm is mounted low on the wall in the galley area. This position keeps it near the majority of gas appliances.

Operating Instructions

Turning on Power

Switch the unit's on/off switch to the "on" position, thus activating the red indicator light. Wait for the unit's alarm to sound. When this happens, the alarm will beep for approximately one minute while the sensor stabilizes to the surrounding atmosphere. When the alarm stops the unit is activated and on guard.

CAUTION:

Do not paint the unit. Do not spray directly onto the unit any chemicals such as cleaners, air fresheners, hair sprays, insecticides, etc.

DO NOT DIRECT ANY FLAME OR OTHER INTENSE HEAT SOURCE AT THE UNIT.

When powered by a vehicle battery that has been off automatic charge for a period of more than a week, it is advisable to turn the unit off.

The presence of dangerous fumes will activate the buzzer, warning the user of potential danger. The following steps should be taken IMMEDIATELY:

1. Extinguish all cigarettes and other open flames.
2. Have proper extinguisher ready.
3. Turn off all gas outlets and safety valves.
4. Use forced ventilation to reduce the concentration of gas or vapor level. The alarm will stop when a safe level of fumes is reached.

5. Evacuate the area.

6. Call for professional help (Fire Department).

EXPLOSION AND FIRE PREVENTION IS SOUND COMMON SENSE. PUT IT INTO PRACTICE. PREPARE YOUR OWN SAFETY CHECK LIST AND FAMILIARIZE OTHERS WITH IT.

OVERNIGHT STOP

In time you will develop a knack for spotting wonderful little roadside locations by turning off the main highway and exploring. There are many modern recreational vehicle parks including State, County and Federal parks with good facilities, where you may obtain hookups of electrical, water and sewer connections. Directories are published which describe in detail these parks and tell what is available in the way of services and hookups.

Overnight or Weekend Trips

On overnight or weekend trips chances are you will not use up the capacity of the sewage holding tank, deplete the water supply or run down the batteries which supply the living area 12 volt current.

Longer Trips

On a longer trip, when you have stayed where sewer connections and utility hookups were not available, it will be necessary for you to stop from time to time to dispose of the waste in the holding tank and replenish the water supply. Many gas stations (chain and individually owned) have installed sanitary dumping stations for just this purpose. Booklets are available which list these dumping stations.

When you stop for the night your Airstream motorhome is built to be safely parked in any spot that is relatively level and where the ground is firm. Your facilities are with you. You are self-contained. Try to pick as level a parking spot as possible.

Hydraulic Leveling Jacks

Some models are equipped with hydraulic leveling jacks that can be deployed. Complete instructions are included with the Owners Packet. Be sure to read the directions completely prior to operating the jacks. The jacks will be able to level your unit in most modern campgrounds. However, their capabilities are limited, and in some situations you will have to use planks to level the coach.

TV Backing Monitor

The optional TV backing monitor can be extremely helpful, especially when traveling alone. The Owners Packet includes complete instructions on use. Practice with the monitor in a safe place will make it much easier for you to use when it is really needed.

All you need to do to enjoy the self-contained luxury is to:

1. Turn on LP gas supply and light appliance pilots if required.
2. Turn on water pump and open faucets until air is expelled from the system.

Before moving on, turn off the LP gas and water pump, check your campsite, both for cleanliness and also be sure you haven't left anything behind. Make sure everything is properly stowed.

WINTER TRAVELING

Traveling in your motorhome during the cold winter months can be a most exhilarating experience.

There are, of course, certain precautions which must be taken as you would in your home in low temperatures.

WARNING: Always shut off the LP gas when gasoline is added to the fuel tank.

Some states do not allow LPG to be turned on while moving. While traveling in these states you must use your common sense. How cold is it? How long will it be before you can turn the heat back on? Is the temperature dropping or raising? Remember, the wind chill factor when driving 50 MPH will cause the interior of the motorhome to cool much faster than when it is parked.

1. You must have a plentiful supply of propane gas.
2. If your stay is longer than overnight you should endeavor to have 120 volt electricity available. The batteries, fully charged, will not last more than about 15 hours in freezing weather. Of course, you can run your generator to recharge the batteries, or even use the generator continually. Since the generator starts off the same battery as the engine, it is recommended to start the generator prior to shutting off the engine. This will prevent running the engine battery down should there be a difficulty in starting the generator in the cold temperatures.
3. Minimize use of electricity if 120 volt power source is not available.
4. Leave cabinet doors, bed doors and wardrobe doors slightly open at night to allow circulation of air in and around all furniture components.
5. Use propylene glycol type antifreeze in waste and drain water tanks to prevent freezing. Quantity of antifreeze needed will vary with ambient temperature and the amount of liquids in tank.
6. For extended stays in cold weather insulate the water line outside the motorhome. You should remember that low temperatures in combination with high winds cause an equivalent chill temperature much below what your thermometer is reading. For instance, with an outside temperature of zero degrees, and the wind velocity of 10 miles per hour, the equivalent chill temperature is minus 20°F.

Condensation

It is also important to guard against excessive humidity inside your motorhome during winter campouts. When windows and window frames fog up or "sweat", it means that there is too much moisture in the air. Moisture comes from water vapor and water vapor is the direct result of water evaporating.

Many things such as baths and showers, boiling foods, washing dishes, washing clothes, even breathing, contribute to evaporation. The inside air can only absorb so much of this moisture before it becomes saturated. At this point it can hold no more, and any additional water vapor condenses back to liquid water in the form of droplets on any available cool solid surface. Temperature has a direct effect on the air's saturation point. Cold air holds less moisture than warm air. For this reason, the air immediately adjacent to cold outside walls and windows cools down and causes water vapor to condense and form moisture droplets even though warmer inside surfaces are still dry.

The best way to keep condensation under control is to reduce moisture producing activities. It is important to provide adequate ventilation and keep the air circulating as much as possible.

Use your exhaust fans to remove moisture before water vapor mixes with the air. Open windows slightly once in a while, while operating fans, to bring in drier outside air and aid in overall air circulation. In extremely cold weather, when outside ventilation is not practical, it may be necessary to use a small dehumidifier to aid in reducing condensation.

There is no substitute for common sense in cold weather.

Note: The Airstream motorhome is built as a recreational vehicle and is not intended as a permanent dwelling or for more than temporary use in sub-freezing temperatures.

EXTENDED STAY

Making a long trip is not very different from making a weekend excursion. Since everything you need is right at hand you are at home wherever you go. When packing for an extended trip take everything you need, but only what you need.

Some models are equipped with **Hydraulic Leveling Jacks** that can be deployed. Complete instructions are included with the Owners Packet. Be sure to read the directions completely prior to operating the jacks.

When you plan to stay in the same place for several days, weeks or months, you will want your motorhome to be as level as possible. Check the attitude with a small spirit level set on the inside work counter. If a correction is necessary then you must first level from side to side. This can be done most easily by driving up a small ramp consisting of 2" x 6" boards tapered at both ends. **WE DO NOT RECOMMEND PLACING TIRES IN A HOLE FOR LEVELING.**

Hook Up to Water by attaching a 1/2" minimum high pressure water hose to the city water service, or the hose from the water reel if so equipped.

Plug the **Electrical Cable into the City Power Service.** Be sure you have the wire grounded and have the proper polarity. See Electrical Section for technical details.

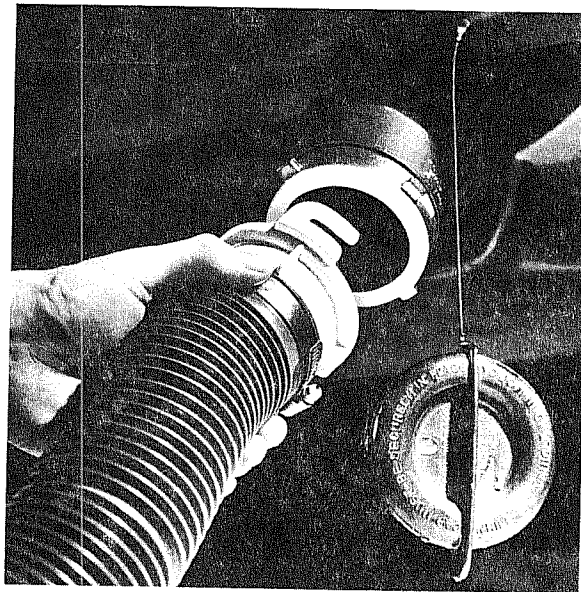
A **Cable TV Hookup** is located on the roadside rear corner of the motorhome. It is already wired into the existing system, so the exterior connection is all that is required.

To operate the **Generator** simply start the generator at the control panel. After the generator has run a couple of minutes an automatic relay will close and current from the generator will be supplied to the 120 volt circuit breakers. This is indicated by the AC power light on the control panel starting to glow. Operating the generator for about one hour each day will normally keep the battery charged.

Hook your **Waste Drain Hose into the Sewer Disposal Facility** and attach to the drain outlet in your motorhome. For details on this procedure see Drain and Waste System Section.

Turn on the gas supply and light the oven pilot. Lighting a top range burner to bleed any air from the system will make it easier to start other appliances.

When you stay for extended periods where electric or water hookups are not available, you must make regular checks on the condition of your 12 volt battery and the contents of your water tank. Carry drinking water in a clean bucket to refill your tank. When your waste tank nears capacity move your motorhome to a dumping location.



Sewage Outlet

EXTERIOR

The side walls and roof of your Airstream Land Yacht motorhome are laminated Fiberglas. The front nose section and rear bumper is made from Xycon, a material produced by Amoco. Xycon is similar to Fiberglas, but it is much more impact resistant.

There is no magic to caring for your motorhome. As a general rule of thumb we recommend the motorhome be washed about every four weeks and waxed in the spring and fall. To make sure your new unit is always protected you should wax it immediately or have your dealer wax it just prior to delivery. In industrial areas cleaning and waxing should be done on a more frequent schedule.

ALWAYS CLEAN YOUR MOTORHOME IN THE SHADE OR ON A CLOUDY DAY WHEN THE SKIN IS COOL. Oil, grease, dust and dirt may be removed by washing with any mild non-abrasive soap or detergent. Cleaning should be followed by a thorough clean water rinse. Spots and streaks may be prevented by drying the unit with a chamois or a soft cloth.

After cleaning and drying a good grade of non-abrasive automotive paste or liquid wax will increase the life of the finish, especially in coastal areas where the finish is exposed to salt air or in polluted industrial areas. It will also protect the shell from minor scratches and make subsequent cleaning easier.

It is important to remove sap, gum, resin, asphalt, etc. as soon as possible after they appear by washing and rewaxing. Sunlight and time will bake-harden these materials making them almost impossible to remove without heavy buffing. If asphalt remains on the motorhome after washing use a small amount of kerosene on a rag and wipe the spots individually, being careful not to scratch the finish.

It is recommended that the caulking and sealant used in external seams and joints such as window frames, light bezels, beltline and rub rail molding, etc. be checked regularly. If this material has dried out and becomes cracked or checked, or if a portion has fallen out, it should be replaced with fresh material to prevent possible rain leaks. Caulking and sealing material is available from your Land Yacht dealer.

Main Door Lock

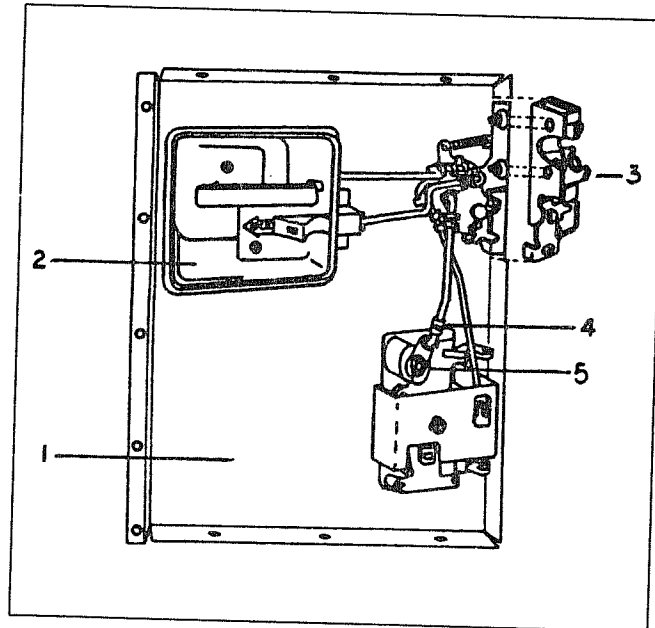
The door lock on your motorhome operates in the same manner as the locks used on most automobiles. Locking the latch actually disengages the linkage between the handles and the latch. This prevents forced entry by using large pliers on the lock handle.

We urge you to keep an extra set of keys for both the door lock and the ignition hidden somewhere on the exterior of the coach. We probably receive a dozen calls a year from people who have lost keys or locked them in the coach. Your keys will overcome the keyless lock system used on the dead bolt.

Occasionally you might find the latch catch, shown in the open position below, out of time. This simply means it has been bumped and has flipped to the closed position when the door is still open. To re-time, hold the door handle in the open position, then pull out and down on the latch catch. It should flip to the open position as shown in the illustration.

1. Mounting plate,
Door Lock
2. Lock Handle, Inside
3. Latch Catch
4. Keeper, Rod Linkage
5. "E" ring, Tumbler
Installation

(Lock assembly as viewed
from inside of door with
cover plate removed.)



Access to the linkage mechanism of the lock is gained by removing the two screws holding the lock handle and the center panel of the inside door skin. This will expose the door lock assembly as shown in the illustration.

Other than the tumbler, secured by an "E" ring, no other parts located within the door frame are replaceable. The spacing of the three major part groups are critical, and are only available premounted to the main plate. The main lock mounting plate is attached by pop rivets around the perimeter, and three screws going through the latch into the operating linkage assembly.

The tumbler is replaced by removing the inside lock handle and the center panel of the inside door skin so the lock assembly is exposed. Insert key into tumbler then remove the "E" ring (item #5 on Illus) being careful it is not lost.

Keyless Entry System

The dead bolt lock on your main door and the lock on the driver's door can be operated without keys. Just to the left of your main door is a numbered key pad. By entering the correct code numbers (which you have selected and programmed into the system) the door can be locked or unlocked. Optional is the main storage compartment locks that can also be locked or unlocked with the same code.

In the event you've forgotten the code, or the batteries become discharged, any of the locks can have the keyless feature over-ridden by the use of a key in the normal fashion. For this reason we strongly urge you to conceal at least one key on the exterior of the vehicle. Lost keys and memories happen; and, if you are in a strange community the peace of mind the one concealed key can give you is immeasurable.

Keyless Entry Programming Instructions

The "hidden program button" (as described below) is located in your galley cabinet toward the main door.

We suggest more than one person in your family or traveling companions become familiar with the system. When you have some time play with it. Change your codes around a few times until you feel comfortable with the system.

- * All codes must be 5 digits.
 - ** There will be a triple beep after entering "1-1-1-9".
 - *** IMPORTANT. DO NOT let more than 5 seconds elapse between any button push or system will reset.
- | | |
|--------------|--|
| MASTER CODE | To change this code press "hidden" programming button (not on keypad), enter "1-1-1-9", then enter NEW MASTER CODE. Wait 5 seconds |
| USER CODE #1 | To change this code enter MASTER CODE, then "1-1-1-9", then NEW USER CODE #1. Wait 5 seconds. |
| USER CODE #2 | To change this code enter USER CODE #1, then "1-1-1-9", then NEW USER CODE #2. Wait 5 seconds. |

Operation and Programming Instructions

- MASTER CODE a) Must be entered to change or set USER CODE #1.
- USER CODE #1 a) Unlock doors and trunk.
 b) Must be entered to change USER CODE #2
- USER CODE #2 a) Unlocks doors and trunk.
- * Pressing any button illuminates keypad for 5 seconds.
 - * Entering USER CODE #1 or USER CODE #2 will unlock doors and turn domelight on for 5 seconds.
 - * Pressing "5/6" button within 5 seconds of unlocking doors will unlock trunk (if this option is installed).
 - * Keypad will "beep" and reset 5 seconds after last key press.
 - * Pressing "5-5-5" anytime after reset will lock doors.

Security

- * Pressing 16 keys without entering a proper code will cause an alarm condition. The keypad will "beep" continuously for 20 seconds, and will not accept any codes.

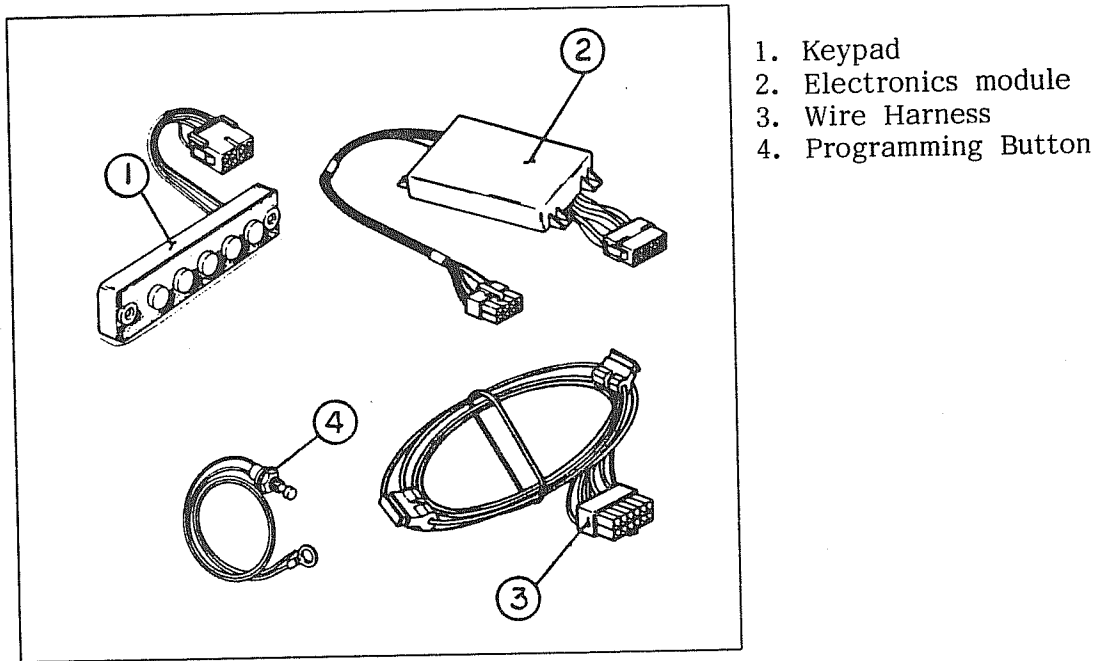
Programming Codes

- A. MASTER CODE This code does not operate doors or trunk. It only allows changing of USER CODE #1. THIS MUST BE SET FIRST.
- CHANGING CODE To change this code press "hidden" programming button (not on keypad). Enter "1-1-1-9", then enter NEW MASTER CODE. Wait 5 seconds.
- B. USER CODE #1 This will be the code normally used by vehicle owner to unlock doors and trunk.
- CHANGING CODE To change this code enter MASTER CODE, the "1-1-1-9", then NEW USER CODE #1. Wait 5 seconds.

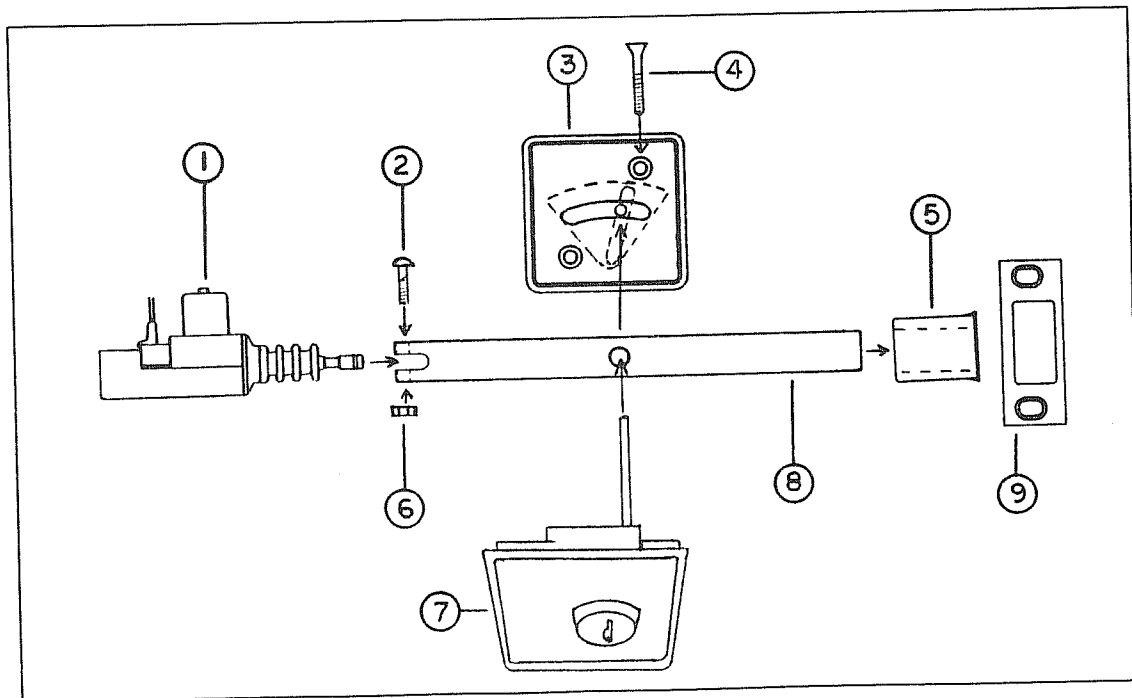
If you enter your 5 digit code and the door doesn't unlock, or there is no beep, your power to the unit has been lost and you will have to use your key. Once power is restored the lock will be functional and it won't be necessary to reset the master or user codes. A lithium battery powers the memory circuit, so codes are retained even if normal power is lost.

Detailed trouble shooting procedures and wiring diagrams are located in the electrical section of this manual.

ELECTRICAL COMPONENTS - KEYLESS ENTRY SYSTEM



DEAD BOLT ASSEMBLY (Used with Keyless Entry System)



- | | |
|-------------------------|-------------------------|
| 1. Motor and Plunger | 6. Nut , 8-32 |
| 2. Bolt, 8-32 X 1" | 7. Lock Plate, Exterior |
| 3. Lock Plate, interior | 8. Lock Slide Bolt |
| 4. Bolt, 8-32 x 1 5/8" | 9. Striker Plate |
| 5. Lock Bolt Guide | |

NOTES

INTERIOR

The luxurious interior of your Airstream motorhome has been designed for comfort, convenience, durability and appearance. An understanding of the operational procedures and maintenance techniques of the interior appointments will add to your pleasure as well as the long life of your motorhome.

Lounges

To convert the Deluxe Sofa into a bed is only necessary to grasp the top of the back rest and pull it toward the aisle of the motorhome. The back rest will raise and pivot out over the seat, becoming the front section of the bed.

Some models are equipped with electrical powered lounges. The switch is in the armrest, and works much like a power seat. Depress switch and hold until lounge is extended. To retract simply depress the opposite end of the switch.

Rear Bed

Many of the rear beds are designed so the top can be lifted to expose storage space around the water tank. **WARNING: Always lower the safety prop when working in this area.**

Dinette

Two different configurations of tables are used in the Land Yacht motorhomes.

One features a ***Corian table top** with two pedestal type legs. To make it into a bed the table is lifted clear of the tube legs and the legs are then removed from the floor sockets. A slight twisting motion will aid in removing the legs from their sockets. With the legs out of the way the table top can be lowered to the ledges on the dinette seats. The back rests of the dinette seats are then placed on the table top to complete the bed.

The second style of **dinette is hinged to the wall** and is supported by one folding table leg. To make it into a bed the front of the table is lifted slightly, the release latch is depressed on the leg bracket, and the leg is then folded up against the bottom of the table leaf. Velcro will hold it up in position. Raising the front of the table leaf further allows it to be unhooked from the wall. The leaf will then swing out and down onto the support ledges on the front of the dinette seat. The back rests are then laid on the table leaf to complete the bed.

*Corian is a trade name used by Dupont.

Cocktail Chairs

The cocktail chairs have two adjustments. As you sit in the chair one lever will protrude on the left side. Releasing this lever allows the chair to move forward and backward.

On the right side is another lever, but it is hidden behind the skirt and is tight up against the bottom of the chair. This lever has purposely been designed to prevent casual operation since the chair MUST be facing the aisle if it is to be used by passengers when in transit. Releasing the right lever enables you to rotate the chair.

Fabric Cleaning

All material should be professionally dry cleaned to remove any overall soiled condition. These materials may be spot cleaned, however, using the cleanability code instructions as listed. Sample swatches are furnished to our dealers. The dealer will be able to give you the cleaning code and part number for the fabrics used in your particular motorhome.

The following are the cleanability code instructions for the various fabrics used in the Airstream motorhomes:

Cleanability Codes

CODE W-S

Fabric care. Spot clean this fabric either with a mild solvent or a water based cleaning agent. When using a solvent or dry cleaning product follow instructions carefully and clean only in a well ventilated room. Avoid any product which contains highly toxic carbon tetrachloride. You may also use an upholstery shampoo product or the foam from a mild detergent. With either method, pretest a small area before proceeding. Use a professional furniture cleaner when an overall soiled condition is reached.

CODE S

Fabric care. Spot clean, using a mild, water-free solvent or dry cleaning product. Carefully follow instructions on such product. Clean only in a well ventilated room. Avoid any product containing carbon tetrachloride which is highly toxic. Pretest small area before proceeding. Use a professional furniture cleaner when an overall soiled condition is reached.

CODE W

Fabric care. Spot clean, using the foam only from a water-based cleaning agent, such as mild detergent or non-solvent upholstery shampoo product. Apply foam with a soft brush in a circular motion. Vacuum when dry. Pretest small area before proceeding. Use a professional furniture cleaner when an overall soiled condition is reached. The above code was designed by the manufacturer of the fabric.

CAUTION:

Never remove cushion cover for separate dry cleaning or washing. Any tumble cleaning method can destroy the backing, shrink or otherwise damage upholstery.

SMOKING WARNING

Keep your furniture and family safe from fires caused by careless smoking. Do not smoke when drowsy. Remove immediately any flowing ash or a lighted cigarette which falls on furniture. Smoldering smoking material can cause upholstered furniture fires.

Drapes

Use the following procedures to remove drapery panels for cleaning:

Front Wrap Around Drapes

1. Remove screw securing rear end of drapery track to wall, both roadside and curbside.
2. Slide draperies to the rear until they are clear of track.
3. After reinstalling drapes, replace screw in end of track.

Lounge Side Draperies, Roadside and Curbside

1. Remove one lower curtain track stop by drilling out rivet with 1/8" drill bit.
2. Remove screw from end of upper curtain track and slide curtains out end of track.
3. After reinstalling drapes replace stops.

Note: Easier access may be gained by removing the upper valance.

Bedroom Draperies, Roadside and Curbside

1. Remove rearmost screw attaching drapery track to rooflocker top and to side wall bottom.
2. Slide drapery panels to rear until they clear upper and lower tracks.
3. After reinstalling draperies, replace attaching screws.

CAUTION: All drapery materials and mattress covers must be professionally dry cleaned.

To prevent excessive wear to drapery linings, blinds must be secured at the bottom and slats turned vertically when driving long distances.

Shades

The shades are operated in the same manner as most venetian blinds. Pulling down on the rope raises the shade. Swinging the rope to one side prior to releasing it will secure the shade in position.

A feather duster, or the soft-bristled brush often found as part of vacuum cleaner attachments, are recommended for cleaning the wooden blinds. Furniture polish, used occasionally, will keep them looking new.

Carpet

The carpet can be cleaned with any good commercial carpet cleaner, or with a detergent and water. HOWEVER, BE CAREFUL NOT TO SOAK THE CARPET WITH WATER.

Counter Areas

The counter areas around the sink are of a high-pressure laminate and can be cleaned with soap and water, or you can use a common solvent on tough spots. Be sure no abrasive cleaner is used as there is the possibility it could scratch the surface. A protective pad should always be placed under hot utensils.

Optional Corian (a DuPont material) is used for the galley top and some tables. The color is consistent throughout the material, so it is possible to sand out surface damage. Once sanded out, a Scotch Brite pad will bring the surface back to its original luster.

Walls/Cabinets

The vinyl walls of the motorhome can be wiped with any mild household cleaner. The wood grain panel also has a vinyl covering for easy care. The cabinet doors and framework are hardwood, so any good furniture polish can be used.

CAUTION: Do not use any abrasive material on the vinyl covered walls.

Bathroom

CAUTION: The tub or shower pan in your bathroom is made of a special ABS long-wearing, light-weight, high-strength plastic material. When cleaning use soap or detergent only. **NEVER USE SCOURING POWDER.** The lavatory bowl and countertop, whether laminate or cultured marble should be cared for in the same manner.

Always re wax the ABS plastic surfaces after each heavy cleaning with a good grade paste wax (without solvents or cleaners). The wax will protect the surfaces from discoloration and stains. When you first purchase your motorhome Airstream recommends that you give all ABS plastic surfaces a heavy coating of paste wax. This will assure easier cleaning and lasting beauty.

Stainless Steel Sink

Stainless steel sinks are not harmed by boiling water. However, salt, mustard, mayonnaise and ketchup can cause pitting. Stubborn stains will yield to paste made of water and slightly abrasive household cleaner. Be sure to work in the direction of the polish lies on the steel to keep the original finish. Fingerprints are sometimes a problem. They can be minimized by applying a cleaner that leaves a film of thin wax: simply wipe it on and remove the excess with a dry cloth, or one moistened with a little wax cleaner. The surface should always be washed before wax is applied. Regular cleaning will prevent build up of scale and film. Ordinary soaps or detergents are best for routine cleaning of the stainless sinks. Rinse thoroughly with warm water and wipe dry with a cloth to avoid streaks and spots.



NOTES

PLUMBING

LPG SYSTEM

Your motorhome is equipped with a permanently mounted tank for LPG (Liquid Petroleum Gas). LPG burns with a clean blue flame. There are two basic types of LPG in common usage: Butane and Propane. Butane is widely used where temperatures are normally above freezing the year round, and Propane is used where subfreezing temperatures are common, since Butane freezes at 32°F as compared to -40°F for Propane. ALL OF THE ORIFICES IN THE LPG APPLIANCES ARE OF THE UNIVERSAL TYPE WHICH WILL BURN EITHER FUEL. How long a full tank of gas will last is dependent on usage. In cold weather, when you are using the furnace, large amounts of hot water, and cooking extensively, you will naturally use more than you will in warm weather when you may do limited cooking. On the average, with normal cooking and other appliance use, you can probably count on one month of usage from the tank.

If you have allowed the tank to run out, air may have gotten into the lines. In this event, the air must be forced out through the lines by gas pressure before you can light the pilots. Hold a match to the pilot of the appliance closest to the tanks until it lights and stays lit. Then move to the next closest, etc.

WARNING:

All pilot lights and appliances must be turned off during refueling of motorhome fuel tank and permanently mounted LPG tank. Gas lines should be checked periodically for leaks with ammonia free soapy water. Do not use open flame.

CAUTION:

Moisture in the LPG tank will cause a malfunction of the regulator in controlling proper pressure. This may result in the flame lifting off the burner, or the flame may go out frequently. Many refueling stations will add approximately 1/4 to 1/2 gallon of alcohol to lower the moisture temperature. Moisture will then pass through the regulator without the formation of ice crystals.

WARNING:

If gas can be smelled, appliance pilots fail to stay on, or any other abnormal situation occurs, shut off tank valve immediately and call on a qualified LPG service center or Airstream Service Center.

LPG Regulator

The LPG regulators used on Airstream motorhomes are designed for low pressure service with a normal outlet pressure setting of 11.5 water column. Only personnel trained in the proper procedures, codes, standards, etc. should service regulators.

Have the regulator inspected each time the tank is refilled. Make sure the regulator vent opening on both first and second stage regulators does not become plugged by mud, insects, snow, ice, paint, etc. Vents must remain open.

Replace any regulator that has had water in the spring case, or shows evidence of external corrosion, or corrosion inside the spring case. Closely examine regulators directly connected to the container valve by means of a solid POL adapter (horizontal mounting) for signs of corrosion. (An Airstream Service Center is recommended for this service.)

BASIC RULES FOR SAFETY

WARNING: DO NOT store LP containers within vehicle. LP containers are equipped with safety devices that vent gas should the pressure become excessive.

WARNING: DO NOT use cooking appliances for comfort heating. Cooking appliances need fresh air for safe operation. Before operation open overhead vent or turn on exhaust fan and open window.

A warning label has been located in the cooking area to remind you to provide an adequate supply of fresh air for combustion. Unlike homes, the amount of oxygen supply is limited due to the size of the recreational vehicle, and proper ventilation when using the cooking appliances will avoid dangers of asphyxiation. It is especially important that cooking appliances not be used for comfort heating as the danger of asphyxiation is greater when the appliance is used for long periods of time.

WARNING:

Portable fuel burning equipment, including wood and charcoal grills and stoves, shall not be used inside the recreational vehicle. The use of this equipment inside the recreational vehicle may cause fires or asphyxiation.

WARNING:

A Warning Label has been located near the LP gas container. This label reads: DO NOT FILL CONTAINER(S) TO MORE THAN 80 PERCENT OF CAPACITY. Overfilling the LP gas container can result in uncontrolled gas flow which can cause fire or explosion. A properly filled container will contain approximately 80 percent of its volume as liquid LP gas.

WARNING:

Do not bring or store LP gas containers, gasoline or other flammable liquids inside the vehicle because a fire or explosion may result.

WARNING:

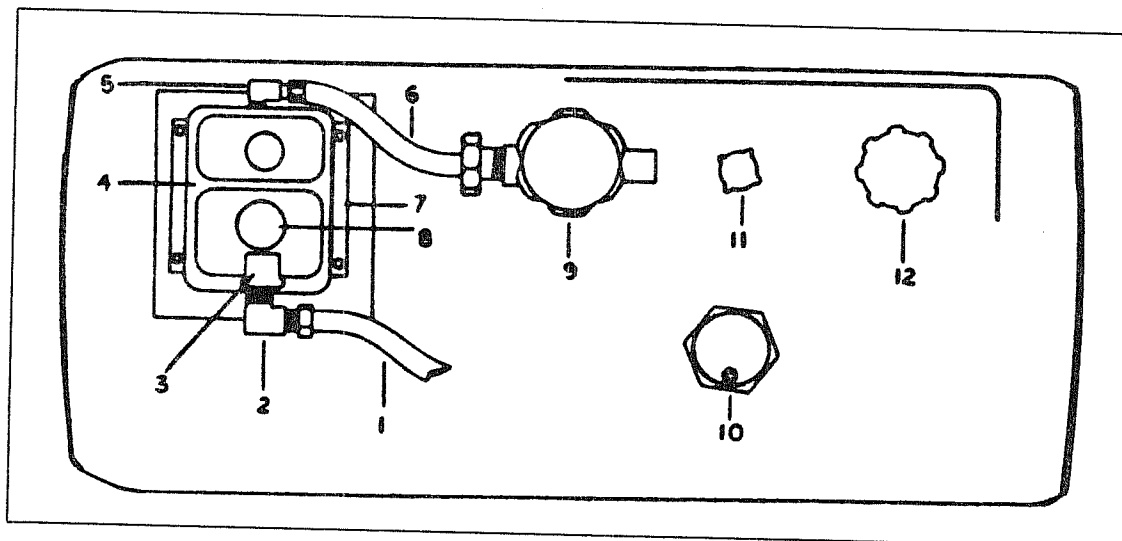
If you smell gas:

1. Extinguish any open flames, pilot lights and all smoking materials.
2. Do not touch electrical switches.
3. Shut off the gas supply at the tank valve(s) or gas supply connection.
4. Open doors and other ventilating openings.
5. Leave the area until odor clears.
6. Have the gas system checked and leakage source corrected before using again.

WARNING:

LP gas regulators must always be installed with the diaphragm vent facing downward. Regulators that are not in compartments have been equipped with a protective cover. Make sure that regulator vent faces downward and that cover is kept in place to minimize vent blockage which could result in excessive gas pressure causing fire or explosion.

LP TANK INSTALLATION



- | | |
|------------------------------------|--|
| 1. Hose regulator to main gas line | 7. Mounting bracket, regulator |
| 2. Street el 1/2 MPT | 8. Cap, second stage pressure adjustment |
| *3. Vent | 9. Valve, main shut off |
| 4. Regulator, two stage | 10. Gauge |
| 5. Street el 1/4 MPT | 11. 10% valve |
| 6. Hose, gas bottle to regulator | 12. Valve, fill |

***WARNING:**

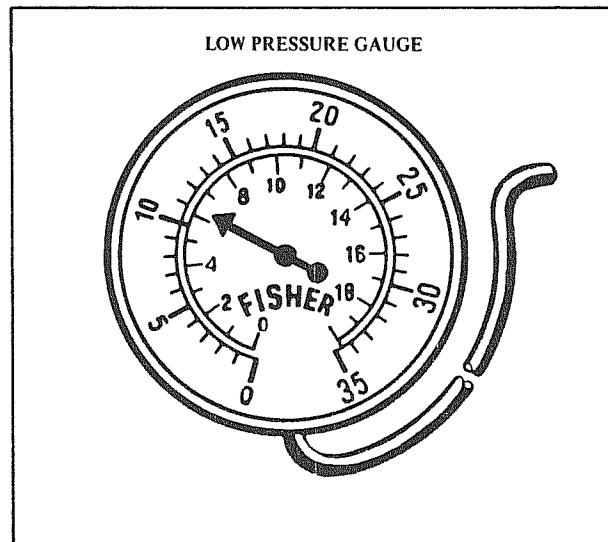
Check vent each time bottle is filled to make sure it is clear from obstructions.

Gas Regulator Removal/Replacement

1. Shut off main gas supply at the tank.
2. Remove the plastic protective cover from the regulator assembly.
3. Using two wrenches, one to hold the line fitting and one to turn the flare nut, disconnect the regulator from the flexible rubber line.
4. Disconnect the regulator from the tank fitting. Remove regulator.
5. To replace, reverse the removal procedures.

LPG System Pressure Check

Use a pressure gauge. (See Illustration Below)



This gauge is calibrated to read in "inches of water column pressure". It is a standard manometer reading and is colored red.

To take the test reading.

1. Shut main gas valve off at tank.
2. Gaining access through the exterior door remove the 3/8" gas line to the refrigerator burner.
3. Temporarily install a 3/8 gas shut off valve in line, then turn on main gas.
4. Place manometer hose on shut off valve and turn valve open.
5. The optimum pressure is 11.5 inches of water column. The pressure should never be less than 11.0, nor higher than 12.0 inches with all appliances operating or off.

WATER SYSTEM - SELF CONTAINED

Fill the water tank by opening the exterior access door, remove screw cap and pull the vent plug. A garden hose can now be inserted. It's a good idea to let the water run through the hose for a short time to flush it out. Experienced Rvers usually fill their tanks with "home" water to avoid strange water that may be distasteful to them.

The amount of water in the tank may be checked on the Monitor Panel, or you may fill the tank until water overflows out of the fill.

If your monitor panel has the optional "Auto Fill" feature you may fill your water tank in an even easier method. Whenever you are hooked into city water, simply depress the auto fill switch. The fresh water indicator lights will come on and the tank will fill until the indicator shows 3/4 full. At this point the water going into the tank will shut-off, but the lights will stay on to remind you the switch is still in the on position.

Turn water heater by-pass valve to the normal flow position. Access to the by-pass valve in the 36' model is in the bottom of the wardrobe just forward of the bathroom. The 32' basement model access is through the bottom access panel below the wardrobe's sliding doors.

Open the hot side of the galley or lavatory faucet and turn on the water pump switch located on the monitor panel. For some time the open faucet will only sputter. This is because the water heater is being filled and air is being pushed out through the lines. Once the water heater is full a steady stream of water will come from the faucet. Now open a cold faucet. It will sputter for a short time, but will soon expel a steady stream. All other faucets can now be opened until all air is expelled. Be sure to open your Insta-Hot water faucet if your trailer has this option.

Once the system is filled with water and the faucets closed, the water pump will shut off. When a faucet is opened the pump will come back on automatically. If the faucet is just barely open it is normal for the pump to cycle on and off rapidly.

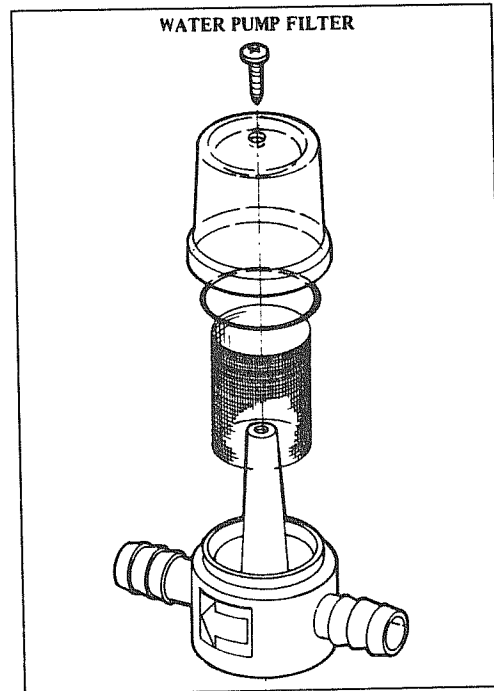
CAUTION: The water pump must be turned off when hooked up to city water supply and when you leave your Airstream unattended.

WATER PUMP AND FILTER

The water pump and filter are located under the rear bed next to the water tank. The filter screen should be cleaned periodically to prevent accumulation of dirt and sand. To remove the screen, disconnect the rubber hoses from both ends, separate the screen housing, remove the screen, clean and replace.

To Disassemble Pump Filter

1. Remove screw through top.
2. Pull top from base. Do not damage "O" ring seal.
3. Remove screen to clean or replace.
4. Lift "O" ring from its cavity. Lubricate with silicone grease.
5. Assemble by reversing above procedure.



Cleaning Water Storage Tank

1. Prepare a sodium hypochlorite solution using potable water and household bleach (5 1/4 to 6%) in the ratio of 1/4 cup bleach to 1 gallon of water. (Common household bleaches are Purex and Chlorox.)
2. Pour 1 gallon of hypochlorite solution for each 15 gallons of capacity into the empty water tank.
3. Add enough potable water to completely fill the water system.
4. Allow closed system to stand for three hours.
5. Drain the hypochlorite solution from the system and refill with potable water.
6. Excessive hypochlorite taste or odor remaining in the water system is removed by rinsing the system with a vinegar solution mixed in the ratio of 1 quart of vinegar to 5 gallons of water.
7. Drain the system and flush with potable water.

AUTO FILL VALVE (OPTIONAL)

The fresh water tank on the motorhome maybe equipped with an automatic filling device. Anytime you are hooked up to city water you can fill your fresh water tank by turning the switch, located on the monitor panel, to "ON". The system automatically stops filling when the 3/4 level is reached. The switch should then be turned "OFF".

The system is operated by a solenoid valve plumbed into the water system. When the switch is "ON" the solenoid opens and water from the high pressure lines will flow into the tank. When the tank monitoring system senses 3/4 full current to the solenoid is cut and the valve closes.

It is normal for the solenoid to be hot to the touch if it has been left on for a long period of time.

When operating the water pump the auto-fill valve must be in the off position. Otherwise the pump will simply pump water from the tank into the higher pressure lines and the auto-fill valve will allow the water to go back into the tank again.

Maintenance

The valve should be operated at least once a month when the motorhome is in use. Turning the switch on for just a few seconds will suffice. If the valve is sluggish (you should hear a good solid click), makes unusual sounds when the tank is being filled, or if it fails to shut the water off completely, it would indicate the valve needs cleaned. Procedures are given in the following text.

Causes of Improper Operation

1. **Faulty Control Circuit:** Check the electrical system by energizing the coil. A metallic "click" signifies that the solenoid is operating. Absence of the "click" indicates loss of power supply. Check for loose or blown fuses, open circuited or grounded coil, broken lead wires or splice connections.
2. **Burned Out Coil:** Check for open circuited coil. Replace coil if necessary. Check supply voltage. It must be the same as specified on nameplate.
3. **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.
4. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
5. **Excessive Leakage:** Disassemble valve and clean all parts. If parts are worn or damaged, replace valve.

Valve Disassembly for Inspecting and Cleaning

(Refer to Fig. 1)

WARNING:

Turn off electrical power supply and depressurize valve before inspecting and cleaning. Then proceed as follows:

1. Disassemble valve in an orderly fashion. Use exploded view for identification and placement of parts.
2. Disconnect coil lead wires.
3. Remove retaining spring by dislodging the top spring coil and prying the spring upward.
4. Slip coil off plugnut/core tube sub-assembly.
5. Remove mounting screws, cover, plugnut/core tube sub-assembly, gasket and core assembly with core spring.
6. All parts are now accessible for cleaning.

Valve Reassembly

1. Reassemble in reverse order of disassembly. Use exploded view for identification and placement of parts.
2. Lubricate gasket with Dow Corning 111 compound lubricant or an equivalent high grade silicone grease.

Note: If core spring has been removed from core assembly be sure to install small diameter end of core spring on core assembly first. The core spring should snap in place and remain engaged.

3. Replace core assembly, core spring, gasket, plugnut/core tube sub-assembly, cover and mounting screws. Torque mounting screws in a crisscross manner to 9 ± 2 inch-pounds.
4. Replace coil and retaining spring. Make electrical hookup and restore electrical power and line pressure.
5. After maintenance is completed, operate the valve a few times to be sure of proper operation.

Coil Replacement

(Refer to Fig. 1)

WARNING:

Turn off Electrical power supply. Then proceed as follows:

1. Disconnect coil lead wires.
2. Remove retaining spring by dislodging the top spring coil and prying the spring upward.
3. Slip coil off plugnut/core tube sub-assembly.
4. Install new coil and replace retaining spring.
5. Make electrical hookup and restore electrical power.

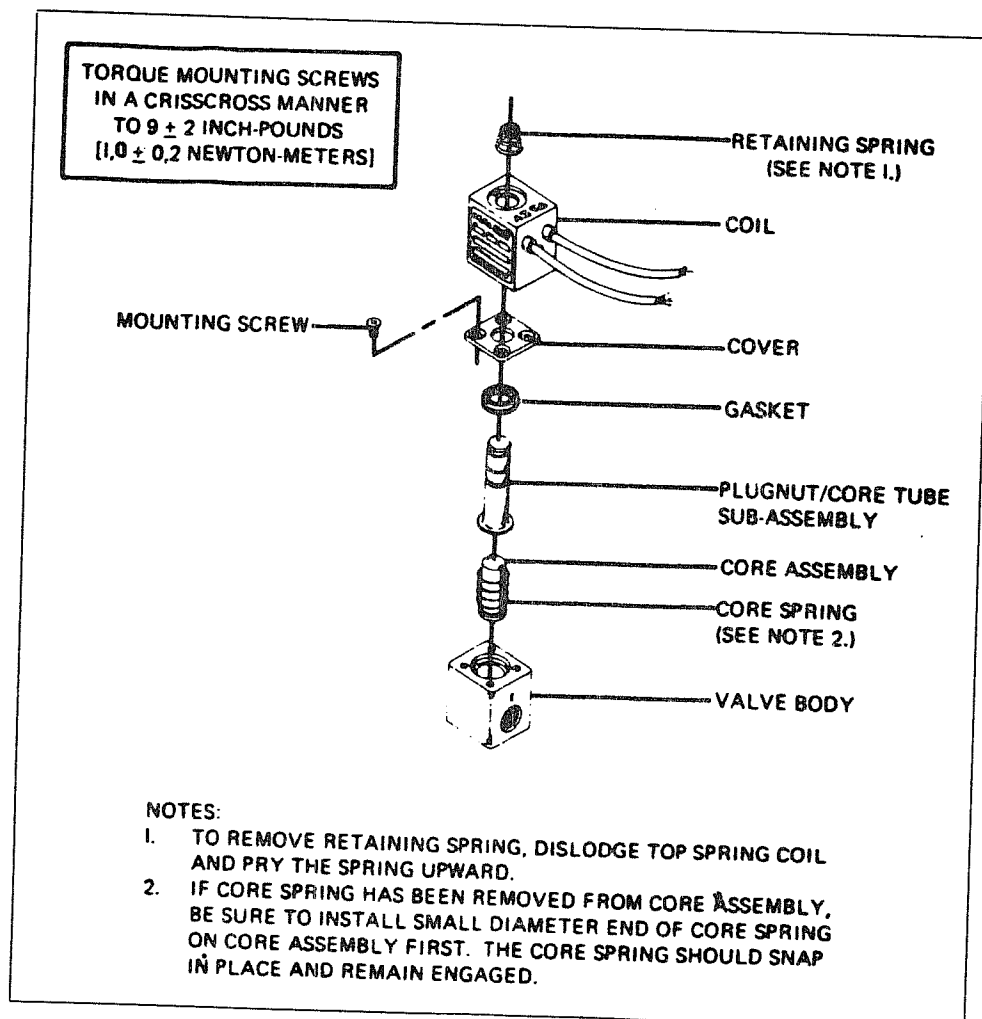
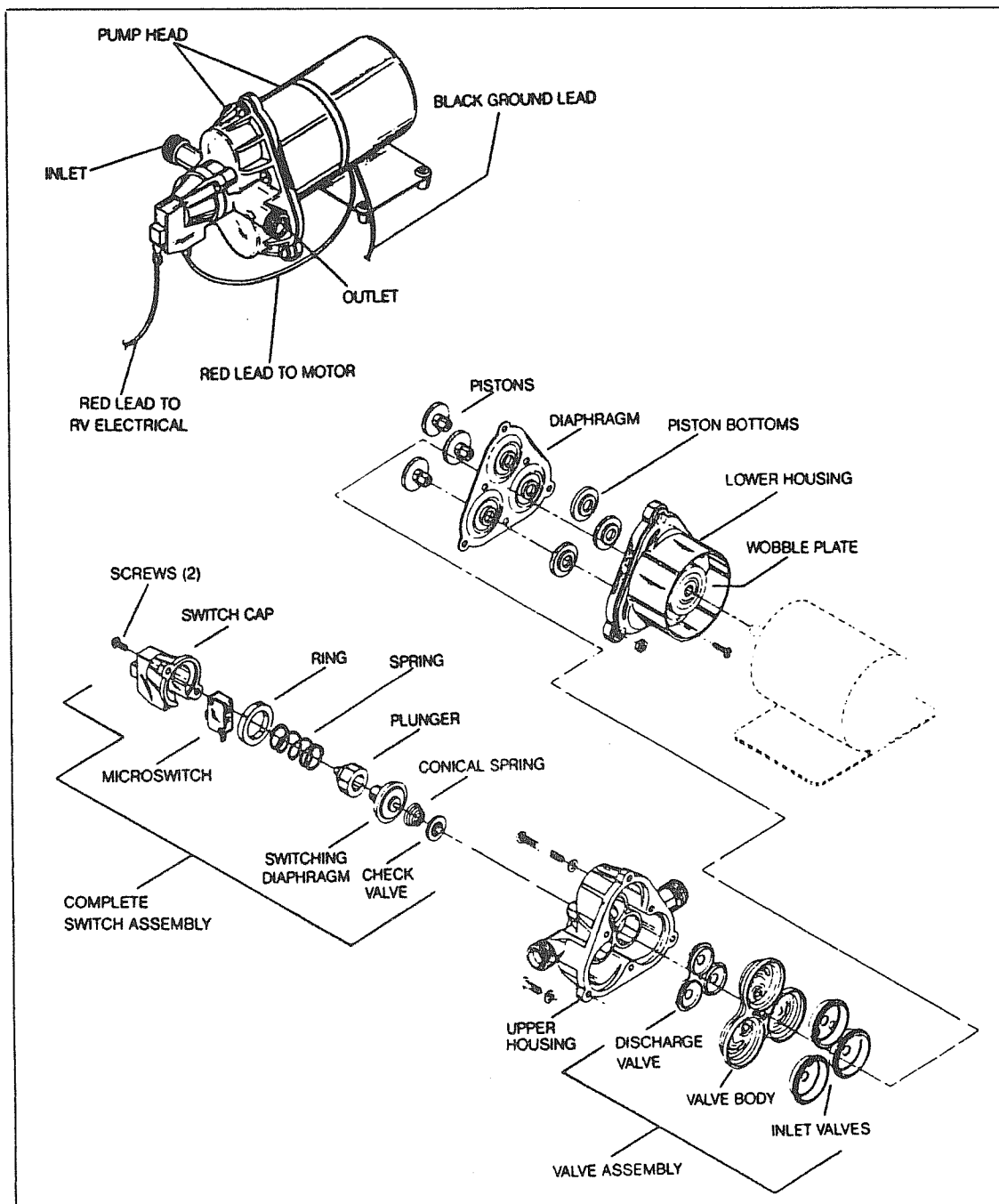


FIG. 1

WATER PUMP

Manufacturer:

Shur-Flo
1740 Markle Street
Elkhart, Indiana 46514
Phone: 219-294-7581



Switch and Check Valve Repair

The check valve, hydraulic switch mechanism and micro switch are accessible by removing the switch cover.

CAUTION: Care should be taken in removing the switch cover screws. Within the mechanism is a spring under compression.

Replacement of Micro Switch

Occasionally the micro switch fails or an electrode is broken off. Proceed as follows: Remove the two screws holding the cap to the main body. Remember, a spring under compression is retained by this cap. With both screws out, allow the spring to extend fully. Then carefully lift off cap and spring. If only the micro switch is at fault avoid disturbing the hydraulic elements remaining in the head. If examination of the hydraulic parts is required, remove them carefully by pulling. Be sure to note the order of removal.

To replace the micro switch remove the spring and pull out the black retaining ring. This will allow the micro switch to fall free. Replace parts in the reverse sequence: Micro switch, black retainer, and the spring.

Reassemble cover to the main body. Switch cap may be pointed up or down as desired, providing wire has not been shorted.

Having replaced the micro switch be careful to rewire correctly.

Note: If the positive wire from the battery is connected to the "B" terminal the switch is bypassed and the pump cannot shut off. Pressure will build up until the motor stalls. If the proper fuse has been used it will blow. If a larger fuse than recommended has been used the motor will stall and may burn out.

Check Valve Problems

Due to contamination from debris or lime build-up, the check valve may fail to properly seat. To correct, clean out the area and replace the check valve element. If checking the check valve with air be certain to moisten the check valve to get an accurate check. The rubber seals more effectively when wet.

Properly Installed, the Pump will:

PRIME: The pump will automatically prime itself.

AIR-LOCK: Pump will not air-lock as the compression stroke is powerful enough to pressurize the entrapped air and force the check valve open.

RUN DRY: Pump will run dry for extended periods without damage.

BATTERY DRAIN: At free flow the pump draws a mere 7 to 7 1/2 amps.

CHECK VALVE: Built-in check valve prevents back flow and can protect the pump from the dangers of high city water pressure (up to 200 PSI).

FULLY AUTOMATIC: The pump will automatically come on when the faucet or valve is opened. It delivers a smooth steady flow of water and shuts off automatically when the faucet is closed.

Trouble Shooting

MOTOR DOES NOT OPERATE.

- Is battery discharged?
- Are any wires disconnected?
- Are terminals corroded?
- Is switch in "ON" position?
- Is fuse good?
- Is water frozen in pump head?

MOTOR RUNS BUT NO WATER FLOWS.

- Is water tank empty?
- Are there kinks in the inlet hose?
- Is air leaking into inlet hose fittings?
- Is inlet line or in-line filter plugged?
- If using a filter, check the line just before the filter.
- Is outlet hose kinked?

MOTOR RUNS BUT WATER "SPUTTERS"

Check to be certain that air has been bled off the lines and water heater. Also check for air leaks in the input side of the pump.

PUMP CYCLES ON AND OFF WHEN ALL OUTLETS ARE CLOSED.

The pump will normally cycle (go on and off) when a faucet is partially opened. If, however, it cycles when all valves are closed, check for a leak in the lines. It may be a leaky toilet valve or a dripping faucet. Do not forget to check the outside city water entry valve. It may be leaking.

If no leak can be detected, shut pump off. Remove the output hose where it joins the system (not at the pump). Insert a plug in the hose and clamp it. (You can make a perfect plug from a barb fitting. 1/2" size with a cap tightly screwed on the threads.) Turn the pump switch on. The pump should come on, run a few seconds, and then shut off. If it remains off, the problem is NOT the pump. The problem is in the system. If, however, the pump goes on and off there may be a problem in the pump.

There may be an internal leak in the pump which allows water to escape from the high pressure area back into the low pressure area. Look for a pump valve held open or a crack in the plastic parts.

PUMP DOES NOT ACHIEVE SHUT OFF

The wall switch may be used for temporary control of the pump. A low battery charge may be the cause. Or the pump switch mechanism may be stuck. Try tapping the switch cap on the end of the pump with the handle of a screwdriver. If the pump appears in all other respects to run normally, but fails to shut off, you may have to replace the switch mechanism.

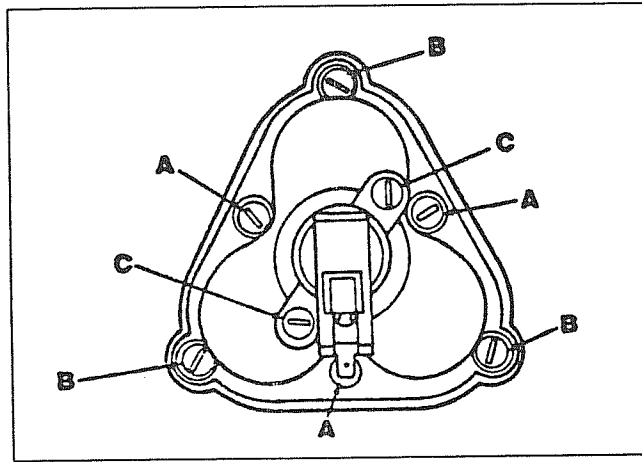
PUMP HEAD LEAKS

If the pump head leaks, first try to tighten the screws in the pump head assembly until they are snug.

CAUTION: Do not overtighten. The leak may be from a crack in the pump head assembly. If so, then replace.

One cause of the pump head cracking may be water freezing inside the pump head. If the leaking water is escaping back near the motor, check for a leaking or broken piston.

Pump Repair



Screws (A) hold the entire pump head assembly to the motor.

Screws (B) hold the pump head face to the pump head main body.

Screws (C) hold the switch assembly to the front of the pump head.

Screws (A) would be removed to correct a problem in the "drive train" between the motor and pump head.

Screws (A) and (B) would be removed to correct a problem in the pump head valves or pumping chambers.

Screws (C) would be removed to correct a problem in the automatic switch or check valve.

PUMP HEAD REPAIR

Motor and drive train area. Rarely does a problem occur in this area of the pump head. If a part does fail, it is quite easily replaced. Just be certain to follow closely the sequence of parts as shown in the figure. Also be careful to align the flat surface in the drive adapter with the flat surface on the motor shaft.

LUBRICATION

If the lubricant appears dried out it should be wiped off the bearing assemblies. A small amount of automotive wheel bearing grease should be applied to both sides of each bearing.

FAILURE TO PRIME

Failure to prime can be caused by the presence of some foreign matter lodged in the valve preventing it from seating. To correct, remove any such foreign bodies.

CAUTION: Do not remove the stainless steel screens. These filter screens should be cleaned without removing them from the plastic housing.

PUMP CHAMBER REPAIR

Replacement of broken piston.

To remove a piston, back out the screw holding the defective piston.

Now lift the corner of the diaphragm and remove the broken piston. Insert the new piston through the diaphragm and slide the retaining ring on. Rotate the piston until it drops into place in the drive plate. Replace the screw and tighten until snug.

CAUTION: Do not attempt to re-use a piston once it has been removed. The plastic stem, if used a second time, may not hold securely. The second thread path removes additional material and there is then no real bite.

REPLACE A DIAPHRAGM

To replace a diaphragm follow the procedure used in removing the pistons. After removing the three pistons the diaphragm is loose and easily removed.

Screws (A) hold the piston.

Screws (B) hold the drive mechanism and should not be removed when replacing piston.

INSTA-HOT WATER DISPENSER

Manufacturer: In-Sink-Erator Division
Emerson Electric Company
4700-21st Street
Racine, Wisconsin 53406
Phone: 414-554-5432

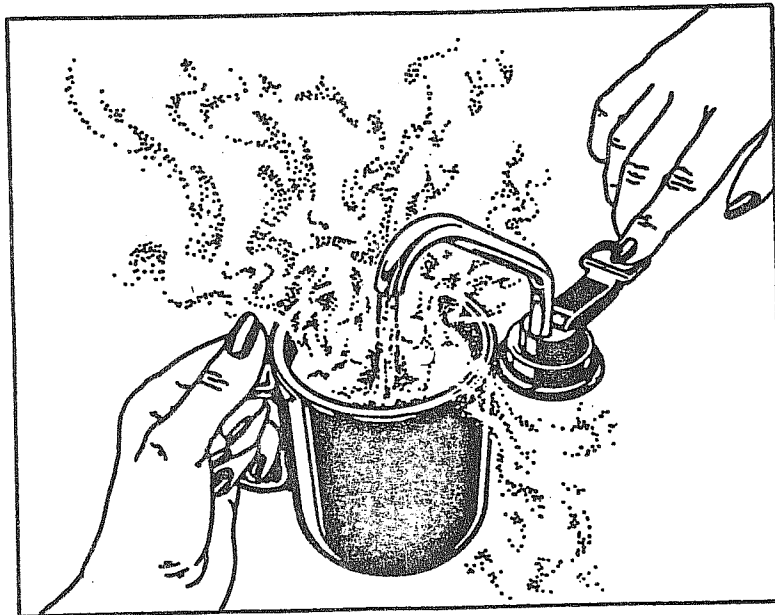
The optional Hot Water Dispenser is provided current through a wall switch above the galley. After the switch has been on a short while one third gallon of hot water is available for coffee, tea, chocolate and soups.

WARNING: This water is HOT. Contact to the skin will cause discomfort and may cause injury.

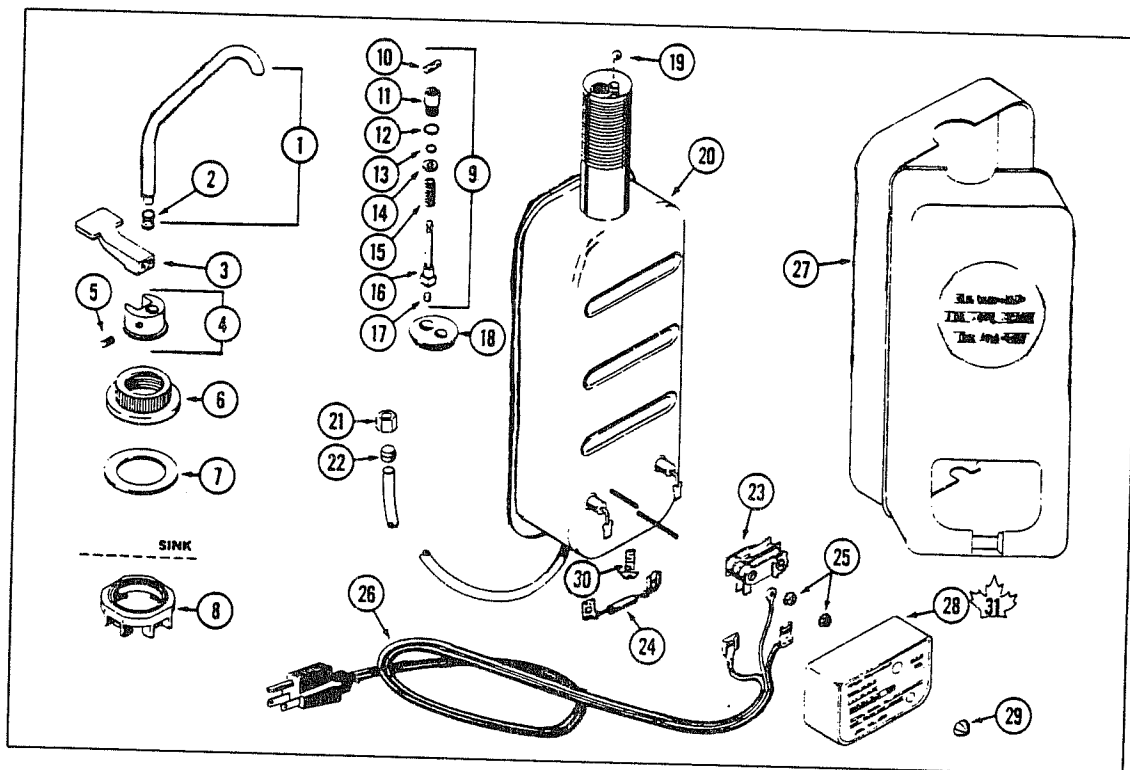
WARNING: Do not store paper towels or other flammable materials against the Insta-Hot Water Dispenser.

The water dispenser is filled by simply opening the faucet when water pressure is available from your pump or city water. The faucet will spit and sputter while filling until a steady stream of water indicates it is full.

CAUTION: Do not turn the dispenser on until you are sure it is filled with water.



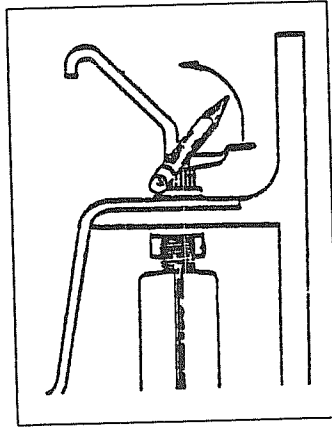
Parts Diagram - Insta-Hot Water Dispenser



- | | |
|----------------------------|----------------------------|
| 1. Spout Assy | 17. Disc, Valve Stem |
| 2. Gasket | 18. Gasket, Expansion Tube |
| 3. Handle | 19. Ball, aspirator |
| 4. Cover | 20. Tank Assy |
| 5. Screw, Set | 21. Nut compression |
| 6. Nut, mounting, upper | 22. Sleeve, ball |
| 7. Gasket, mounting | 23. Thermostat |
| 8. Nut, mounting, lower | 24. Thermal fuse assy |
| 9. Valve guide & Stem Assy | 25. Nut |
| 10. Nut, tee | 26. Plug & Cord Set |
| 11. Bushing, valve guide | 27. Case |
| 12. "O" ring 29/64 OD | 28. Electrical Cover Assy |
| 13. "O" ring 9/32 OD | 29. Nut, Cap |
| 14. Washer | 30. Plug, Drain |
| 15. Spring | CANADIAN |
| 16. Valve stem assy | 31. Electrical Cover Assy |

Handle Removal

1. Shut off water supply.
2. Place a 1/4" x 5/16" diameter dowel (a pencil will do) between the spout and the handle as shown below.



3. While holding the dowel firmly downward, pivot the handle upward to a vertical position. (See above.) The handle will snap away from the spout but remains secure.
4. With the handle in the vertical position, pull it firmly and straight up. The handle will snap free.

Reassembly

1. Locate the handle in a vertical position and directly over the Tee nut on valve stem. The Tee nut must be positioned to enter the slot in the handle. Push handle directly downward engaging the Tee nut into the slot in the handle. Engaging the handle will require some force, but will snap in place.
2. Return handle to normal operating position. Turn on water supply. If water continues to flow from spout, the Tee nut may need adjustment. Remove handle, turn Tee nut 180 degrees counterclockwise. Reassemble handle. Repeat procedure if necessary.
3. If water flow is not full but shuts off when handle is released, the tee nut is to be turned clockwise 180 degrees. Reassemble handle. Repeat procedure if necessary.

Valve Stem Assembly Removal

1. Turn dispenser on, drawing off all hot water. Shut off water supply. Disconnect electrical power supply.
2. Remove handle.
3. Remove top mounting nut.

CAUTION: The dispenser may drop thru the sink and should be supported from under the sink.

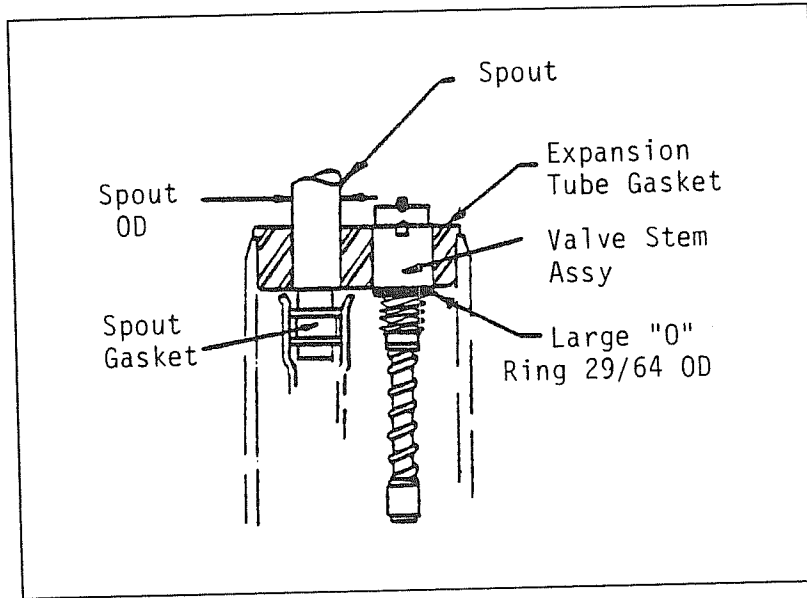
Suggestion: Turn the lower mounting nut further down (1" or more). This allows the dispenser to be pulled upward and held while removing the top mounting nut. Hold the dispenser and assemble another lower mounting nut flat side down in place of the top mounting nut.

CAUTION: DO NOT support dispenser by grasping spout.

4. The valve stem assembly is now exposed for removal.
5. Note position of tee from valve stem.
7. The valve stem assembly is screwed down securely and a special tool is used to remove it. The tool is 1/4" Hex x 7/8" long, and at one end has two tips 180 degrees apart. A magnetic 1/4" Hex screwdriver (or 1/4" socket wrench) must be used with the valve stem removal tool. Purchase from your hardware store.
8. Position the tool straight down over the valve stem assembly. Engage the two tips of the tool into the two mating notches in the valve stem bushing. Turn screwdriver counterclockwise unscrewing the valve stem assembly from the dispenser.

Note: Inspect the valve stem assembly for the large "O" ring (see diagram). If the "O" ring is missing, it became lodged under the expansion tube gasket. It need not be removed unless it needs replacing. Retrieving the "O" ring requires removal of the spout and expansion tube gasket. A very thin film of silicone grease applied to the spout OD (gasket end) and spout gasket will assure easier and positive reassembly. (See Diagram) REPEAT: USE ONLY A VERY THIN FILM OF SILICONE GREASE.

9. Reassemble in reverse. Turn on water supply. Turn on electricity.



Recovery Time/Hot Water Delivery

The recovery time of the hot water dispenser, that is the required time for the water in the tank to reach 190 degrees after drawing hot water, depends on:

- * Ambient temperature of the incoming water to the dispenser.
- * The amount of water drawn off at one time.

Some people find the taste from a hot water supply objectionable, and may insist on cold water supply. I-S-E suggests cold water supply.

A cold water supply requires an increase of recovery time while a hot water supply decreases recovery time.

You can expect up to forty 6 oz. cups of 190° water per hour by allowing a 1 1/2 minute recovery time between cups. If you draw three 6 oz. cups of hot water at once, there will be a noticeable drop in the next cup of water. After drawing 3 or 4 cups of water, a 4 (approx) minute recovery time is necessary. If all the water in the tank is drawn off, a 10 to 15 minute recovery time is necessary.

Temperature Checking

Water temperature should be checked immediately after the thermostat shuts off. (Draw off three cups of water. A rumble in the tank will be heard in a few moments. Wait (approx 3 1/2 minutes) until the rumble stops. You can hear the thermostat click open. Hot water is now ready for checking.

Place an accurate high quality thermometer (refrigeration type is suggested) in a styrofoam cup. Do not use any cup made of china, ceramic, clay or glass. They are normally cold and will cause a water temperature drop, resulting in an inaccurate reading of the hot water flowing from the dispenser.

Draw 6 oz. of hot water into the styrofoam cup. Allow the thermometer to remain in the cup approximately 15 seconds, then read the thermometer.

Adjusting the thermostat will increase or decrease the water temperature. Allow a few minutes for recovery and test water again if necessary.

Trouble Shooting

PROBLEM: No water or slow flow. (Normal flow is one ounce per second.)

**CAUSE/
REMEDY:** Main water supply off. Turn on main water supply.

Saddle valve not open. Open saddle valve.

Copper water line not punctured by self-piercing saddle valve. Close saddle valve completely to puncture copper water supply line. After turning valve in fully, open valve completely.

Saddle valve plugged. Close saddle valve completely. Disconnect 1/4" copper tube at saddle valve. Open saddle valve fully to assure a good strong flow of water. If good strong flow, close valve and reconnect 1/4" copper line. If flow is slow or not at all, saddle valve is plugged where it attaches or water supply line is not drilled or punctured completely.

Valve stem disc stuck to valve seat. Disassemble unit. Remove disc from seat area. Install new disc in valve stem. Reinstall and reassemble.

Dirt at dispenser valve seat. Shut off water at saddle valve. Disassemble and clean seat area. Reassemble and open saddle valve.

Tee nut not adjusted properly. Remove handle and adjust tee nut.

Handle broken. Will not raise valve stem. Replace handle.

PROBLEM: No water, or slow flow.

**CAUSE/
REMEDY:** Obstruction in tank fill tube at venturi hole. Disconnect electricity by removing plug, fuse, or open circuit breaker. Shut off water supply at saddle valve. Disconnect 1/4" water inlet supply line at saddle valve. Depress valve handle, and at the same time blow into spout outlet. Reconnect 1/4" water

supply line to saddle valve. Depress valve handle. If water flows, obstruction has been removed. If no water flows, replace complete assembly.

PROBLEM: Water is cold.

CAUSE/ REMEDY: Plug not installed in outlet. Install plug in outlet.

Circuit breaker open or fuse not installed. Close circuit breaker or install fuse.

Wire loose and/or disconnected at thermostat or heating element. Reconnect wire.

Thermostat not adjusted properly. Adjust thermostat.

Thermostat defective. Replace thermostat.

Thermal fuse open. Replace thermal fuse.

Open heating element. Replace complete assembly.

PROBLEM: Water not hot enough.

CAUSE/ REMEDY: Thermostat not set high enough. Turn thermostat adjusting screw clockwise to increase operating temperature.

Thermostat defective. Replace thermostat.

Tank hot water supply exhausted. Allow tank to recover to full operating temperature.

PROBLEM: Unit spits when drawing first cup of water.

CAUSE/ REMEDY: No aspirator ball. Install aspirator ball.

Aspirator ball stuck in tube. Dislodge and replace ball.

Thermostat set too high. Water boils. Adjust thermostat.

Thermostat set too high. Will not respond to adjustment. Replace thermostat.

No water in expansion chamber. Continued use will fill expansion chamber.

Air in water supply line. Correct household water supply.

- PROBLEM: Unit spits after drawing four or five cups of water.
- CAUSE/
REMEDY: Aspirator orifice not round. Replace complete assembly.
- Aspirator ball not round, flat spots. Replace aspirator ball.
- Aspirator ball tube not attached properly. Replace tank assembly.
- Note:** Some "spitting" is normal when drawing quantities of water.
- PROBLEM: Unit drips every 20 minutes when thermostat comes on.
- CAUSE/
REMEDY: Thermostat set too high. Adjust thermostat.
- Expansion chamber full. Check for low water pressure.
- Spout not fully seated. Loosen set screw, push spout down until it bottoms. Tighten set screw.
- Thermostat mounting stud bent. Not perpendicular to tank face. Straighten stud. Should be 90 degrees to tank face.
- PROBLEM: Water continuously drips from spout.
- CAUSE/
REMEDY: Valve not seated due to foreign object. Disassemble and remove foreign object.
- Tee nut not adjusted properly. Adjust tee nut.
- Valve disc missing. Install valve disc.
- Metal valve seat defective. Replace unit.
- PROBLEM: Water leaks around spout.
- Cause/
REMEDY: Valve stem bushing not tight. Tighten bushing.
- Large and/or small "O" ring damaged, cut, missing, etc. Install or replace both large and small "O" ring.
- PROBLEM: Water continues to flow for one to two seconds after handle is released.
- CAUSE/
REMEDY: Normal

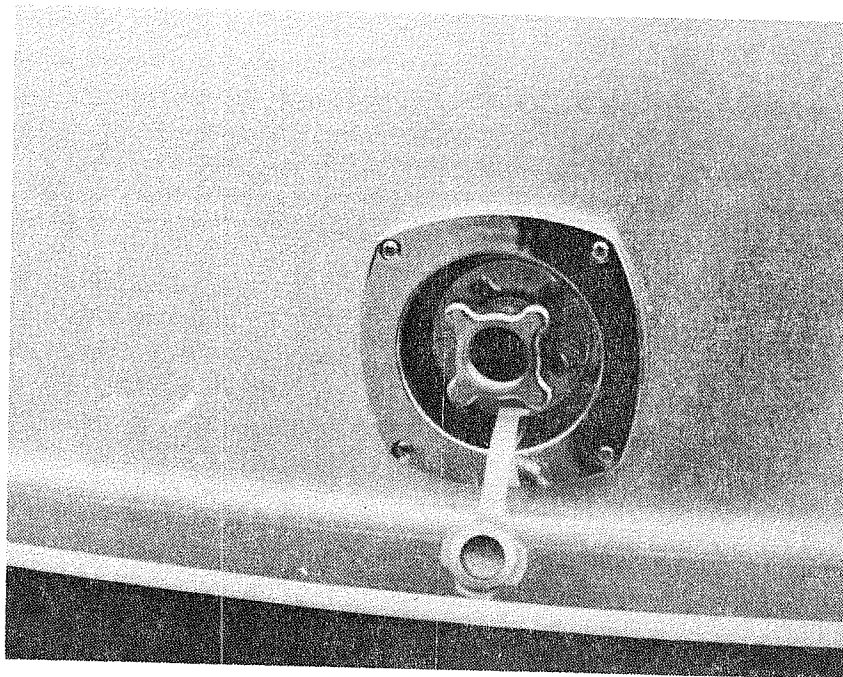
PROBLEM: Unit is loose in sink.

CAUSE/ REMEDY: Upper and lower nuts not tight. Loosen bottom nut. Tighten top nut firmly, then retighten bottom nut.

Top nut has bad threads. Replace top nut.

Expansion chamber tube threads not formed properly. Replace unit.

CITY WATER HOOKUP



Use a high pressure hose of at least 1/2" diameter. It should be one that is tasteless, odorless and non-toxic designed for RV use. The city water inlet is a standard garden hose thread. We suggest you carry two lengths of hose. This way you have the ability to reach hookups further away than normal, plus you have a spare hose should one fail or become damaged unexpectedly. *Turn the water heater bypass to the normal flow position.

After hooking up the hose and turning on the city water valve provided in the park, slowly open a faucet. There will be a lot of spurts and sputtering until all the air is expelled from the motorhome system. If the water heater is empty it will take some time before all the air is expelled and you get a steady flow of water at the faucet. Once a steady flow is achieved at one faucet the others should be opened long enough to expel the air in the lines going to them. Be sure to include the Insta-Hot water faucet if your motorhome has this option.

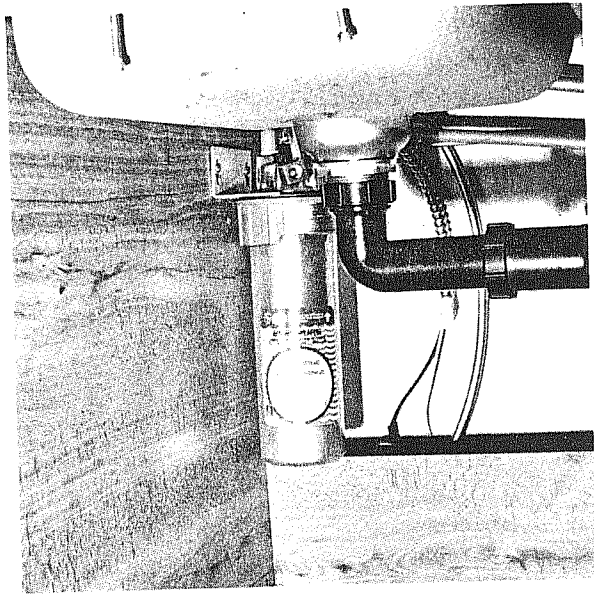
During city water operation the water pump switch should be in the off position. A check valve built into the pump protects it from city water pressure.

Your plumbing system has a built in pressure regulator to protect your lines and faucets from extremely high pressures on some city water systems.

*Access to the bypass valve in the 36 foot model is in the bottom of the wardrobe just forward of the bathroom. The 32 foot basement model access is through the bottom access panel below the wardrobe sliding doors.

EVERPURE WATER FILTER (OPTIONAL)

The filter is located under the galley sink. It will remove even very fine dirt and colloidal matter, and eliminates most chlorine, phenol and similar distasteful odors and tastes, while delivering sparkling taste-free water for drinking and cooking. The filter is connected to the cold water galley drinking faucet only. The filter will also remove iron and sulphur provided the water supply is chlorinated. super-chlorination will precipitate the iron and sulphur which will then be removed by the QC-2 Filter. To purify any questionable water fill the Everpure Chlorine Disinfectant Dispenser with liquid bleach and add 1/6 ounce (one teaspoonful) per 10 gallons of water in the water tank. The water will remain sparkling clear even to the end of the filter pack life, however, as the minute pores slowly fill up with impurities the flow rate will be gradually reduced. When it becomes too slow for convenience the cartridge can be very simply changed. Follow the instructions on the cartridge. We advise keeping a spare cartridge at all times.



Everpure Water Filter

To Remove Used Cartridge:

1. Shut off water by lifting valve handle counterclockwise as far as possible.
2. Turn colored ring all the way to the left. Ring will drop about 5/8".
3. Lift cartridge slightly and turn it further to the left until it can be disengaged.
4. Lower cartridge to disengage it from ring. Discard used cartridge.

To Install New Cartridge:

1. With colored ring in lowered position (turned all the way to the left), orient lug on cartridge with cutout under label on ring.
2. Insert cartridge straight up into ring as far as it will go. Holding colored ring steady, turn cartridge as far to the right as possible, without forcing.
3. The turn colored ring far to right to drive cartridge up into head.
4. To lock ring in place and turn water on, move valve handle down. Be sure handle leg engages ring locking-lug.

FAUCETS

Care and Cleaning

The surface of the faucets will stay bright and resist wear with a minimum of care. Strong detergents may tend to dull the finish, so when cleaning a faucet use only mild soap and water.

The finish on the faucets has been designed to retain its polished appearance without scouring. Stains and dirt remove easily without the use of scouring powders or abrasive polishes and cleaners. Use of such agents may cause scratches which mar the finish, and in time become dirt catchers and unattractive.

B & K FAUCETS

Manufacturer: B & K Industries, Inc.
655 Wheat Lane
Wood Dale, IL 60191

Repair of B & K faucets is relatively simple. One repair kit will repair all three faucets. The procedure for repairing all three is the same.

Included in the faucet repair kit is the cam, cam packing, ball assembly, and seats and springs.

If the Faucet Leaks from the Spout.

1. Shut off water and drain pressure from system.
2. Unscrew the chrome cap located under the handle.
3. Remove the handle and brass ball assembly.
4. Check for any scratches or gouges in the ball itself.
5. Check for any debris in the "seat and spring" area by removing both seats and springs, and inspect thoroughly.

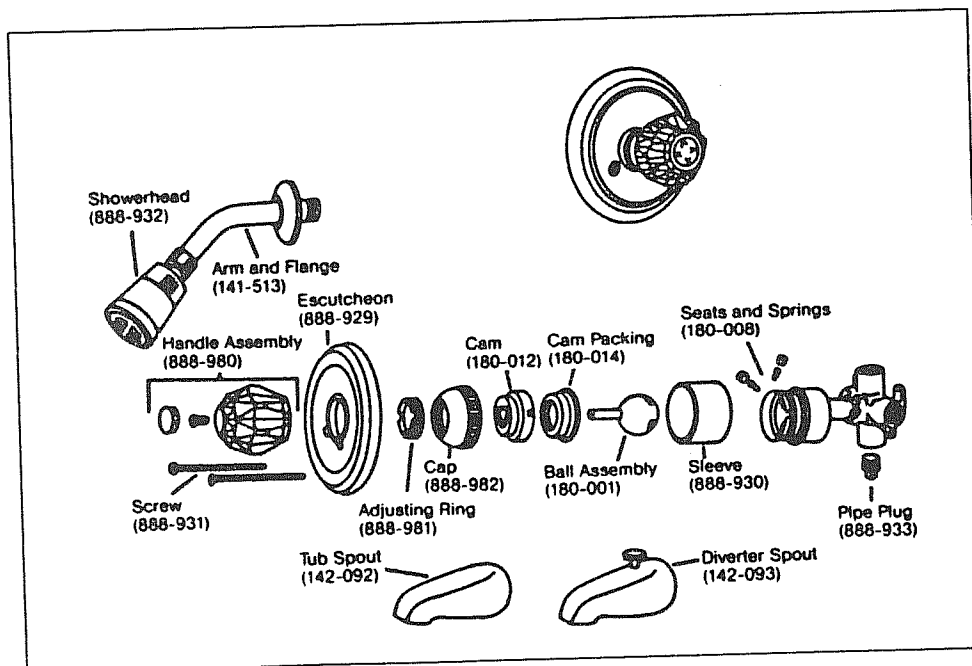
In most cases replacing the seats and springs will correct the leak. When reassembling, reverse the above procedure making certain the guide pin in the faucet body slides into the slot of the ball. **DO NOT FORCE THE BALL INTO THE BODY. IT WILL ONLY FIT ONE WAY.**

If Faucet Leaks from the Base or Under the Handle

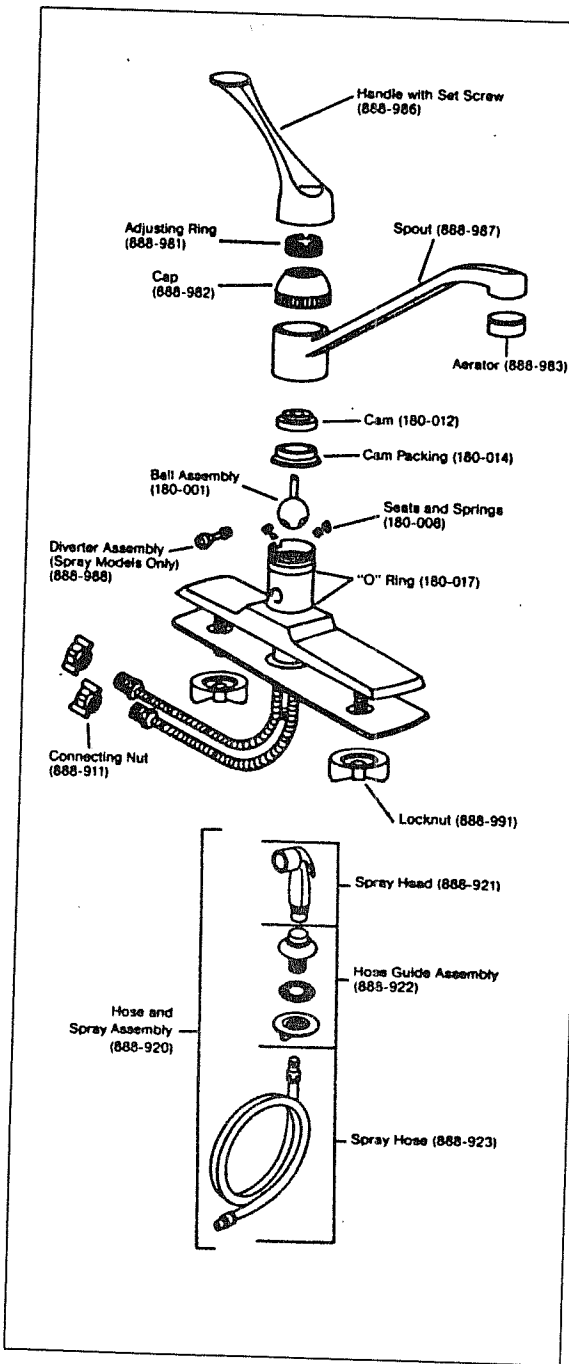
1. Shut off water and drain pressure from system.
2. Remove the handle and chrome cap.
3. Inspect the cam and cam packing.
4. Remove the spout on the kitchen model and inspect both "O" rings on the faucet body.
5. Replace any worn, damaged or defective parts.

Reverse the procedure above, making certain the guide pin in the faucet body slides into the slot on the ball. DO NOT FORCE THE BALL INTO THE BODY. IT WILL ONLY FIT ONE WAY.

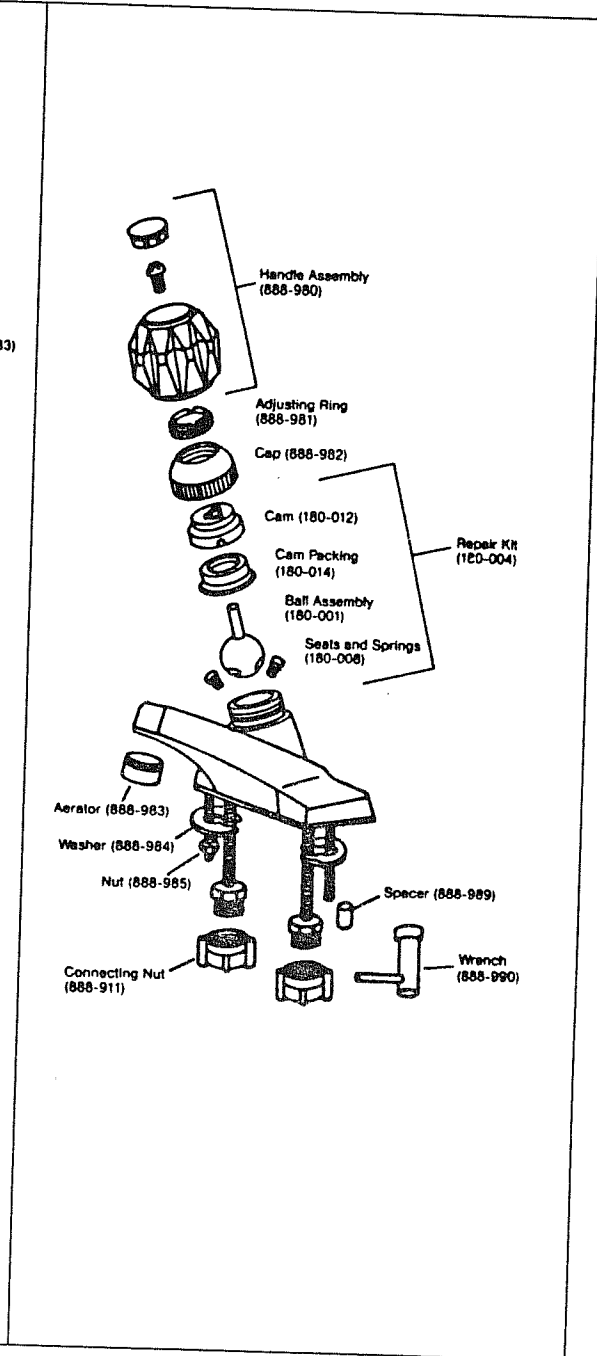
SHOWER FAUCET



KITCHEN FAUCET



LAVATORY FAUCET



TOILET

Manufacturer:

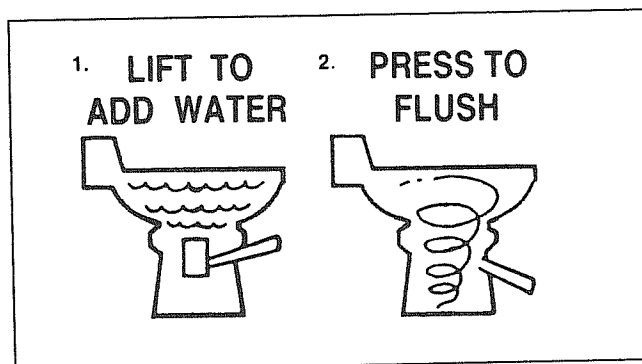
Sealand Technology, Inc.
P.O. Box 38
Fourth Street
Big Prairie, Ohio 44611
Phone: 1-800-321-9886
In Ohio 216-496-3211

Traveler Model 510/511

How to Use

1. To add water to the toilet before using, lift or raise the flush lever until desired water level is reached. Generally more water is required only when flushing solids.
2. To flush toilet, push lever all the way down until sewage leaves toilet.
3. Release flush lever.
4. A small amount of water should remain in bowl.

Note: Holding flush lever down longer than necessary results in excessive water usage. A good biodegradable tissue, available through RV dealers, is recommended.



Cleaning

The toilet should be cleaned regularly for maximum sanitation and operational efficiency.

Clean the toilet bowl with a mild bathroom cleaner. Do not allow caustic cleaners to set in the bowl for long period of time to avoid damaging seals.

If an odor is apparent from the toilet:

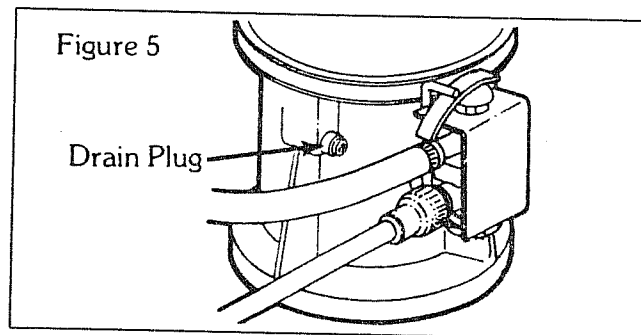
1. Clean out system.
2. Add odor control deodorant in amount specified for your holding tank capacity after cleaning and every few days during use.

Winterizing

At the end of each season the toilet should be winterized for storage.

The following procedure should be used:

1. Clean and flush toilet.
2. Shut off water supply, then remove inlet water line.
3. Remove drain plug. (See Fig. 5)
4. Remove water line and clean screen. (Refer to Fig 6 in Troubleshooting Section.)
5. Depress flush lever until all water drains from the system.



Preparing for Summer Use

To prepare the toilet for summer use, check to be sure drain plug is installed in side of toilet base. Turn on water supply and check system for leaks. Flush toilet and check for leaks. Repair any leaks as necessary. Toilet is now ready for use.

Parts Description

FIGURE 6

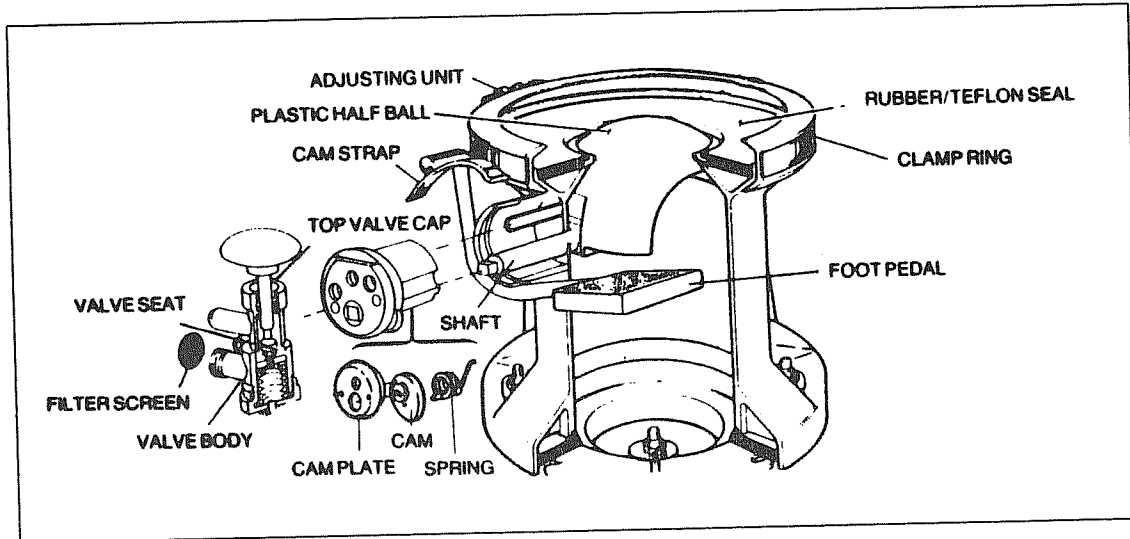
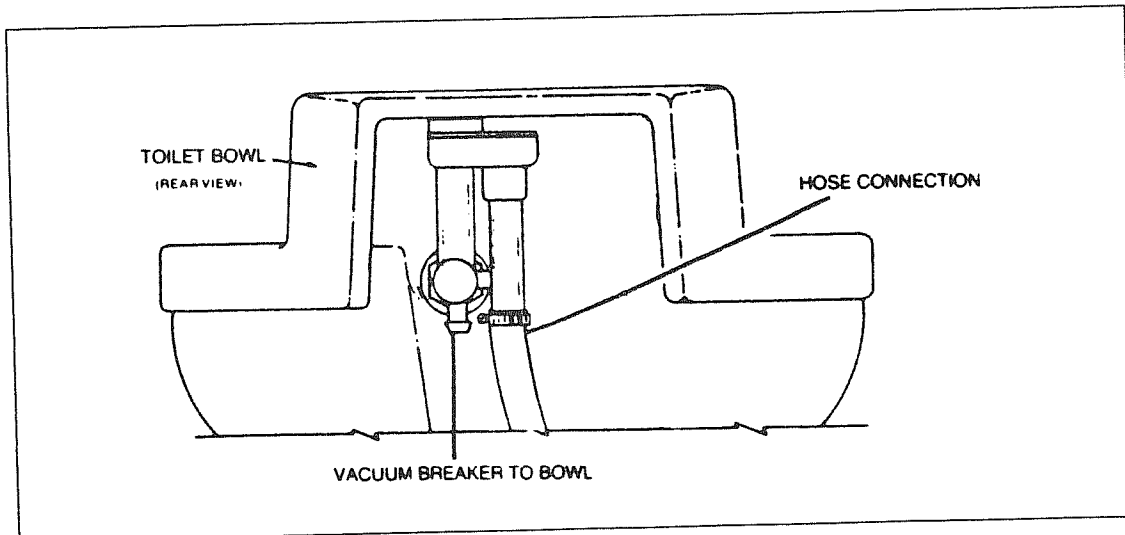


FIGURE 7



Trouble Shooting Guide

- PROBLEM: Water will not stay in bowl. (See Fig. 6)
- CAUSE/
REMEDY: Loose clamp ring. Tighten clamp ring adjusting nut.
- Improper seal around flush ball due to dirt or debris on underside of teflon ball seal. Inspect flush ball and under side of teflon seal for foreign objects.
- Worn or damaged flush ball. Replace flush ball.
- Cracked half clamps. Replace half clamps.
- PROBLEM: Plastic flush ball will not close completely. (See Fig. 6)
- CAUSE/
REMEDY: Clamp ring overtightened causing too much tension on seal and flush ball. Loosen clamp ring.
- Weak or defective spring. Check spring tension by letting up on flush lever suddenly. If lever does not "snap back" replace spring, cam and plate with new spring cartridge.
- Worn or damaged flush ball or shaft. If lever "snaps back" but flush ball does not close completely, replace flush ball and shaft.
- PROBLEM: Water doesn't shut off in toilet (toilet overflows). (See Fig. 6)
- CAUSE/
REMEDY: Dirt lodged in water valve seal. Disassemble and clean water valve.
- Cam strap bent down holding water valve open. Bend front of cam strap up about 1/16".
- Worn or defective water valve. Replace valve assembly.
- Worn or defective spring. Replace spring, cam and plate with new spring cartridge.

PROBLEM: Water does not enter toilet bowl properly. (See Fig. 6)

CAUSE/ REMEDY: Low water pressure. Check incoming water pressure.

Water valve clogged. Remove and clean filter screen located on inlet of water valve.

Water valve defective. Replace water valve.

Worn or defective flush lever. Replace flush lever.

Check vacuum breaker for leakage. Replace vacuum breaker.

Rim wash holes plugged. Clean holes.

PROBLEM: Water leaking from water valve. (See Fig. 6)

CAUSE/ REMEDY: Loose connection. Tighten bottom cap, inlet fitting and outlet hose clamp.

Worn or defective water valve. Replace water valve.

Stripped threads. Replace water valve.

Seal worn or missing. Replace water valve.

Valve body cracked. Replace water valve.

PROBLEM: Water leaking from bottom of toilet base. (See Fig. 6)

CAUSE/ REMEDY: Toilet loose. Tighten toilet mounting bolts.

Worn or defective toilet mounting floor seal. Replace sponge rubber seal between floor flange and toilet base.

Worn or defective base. Replace base assembly.

Worn or defective floor flange. Replace floor flange.

PROBLEM: Water leaking from rear of toilet bowl. (See Fig. 7)

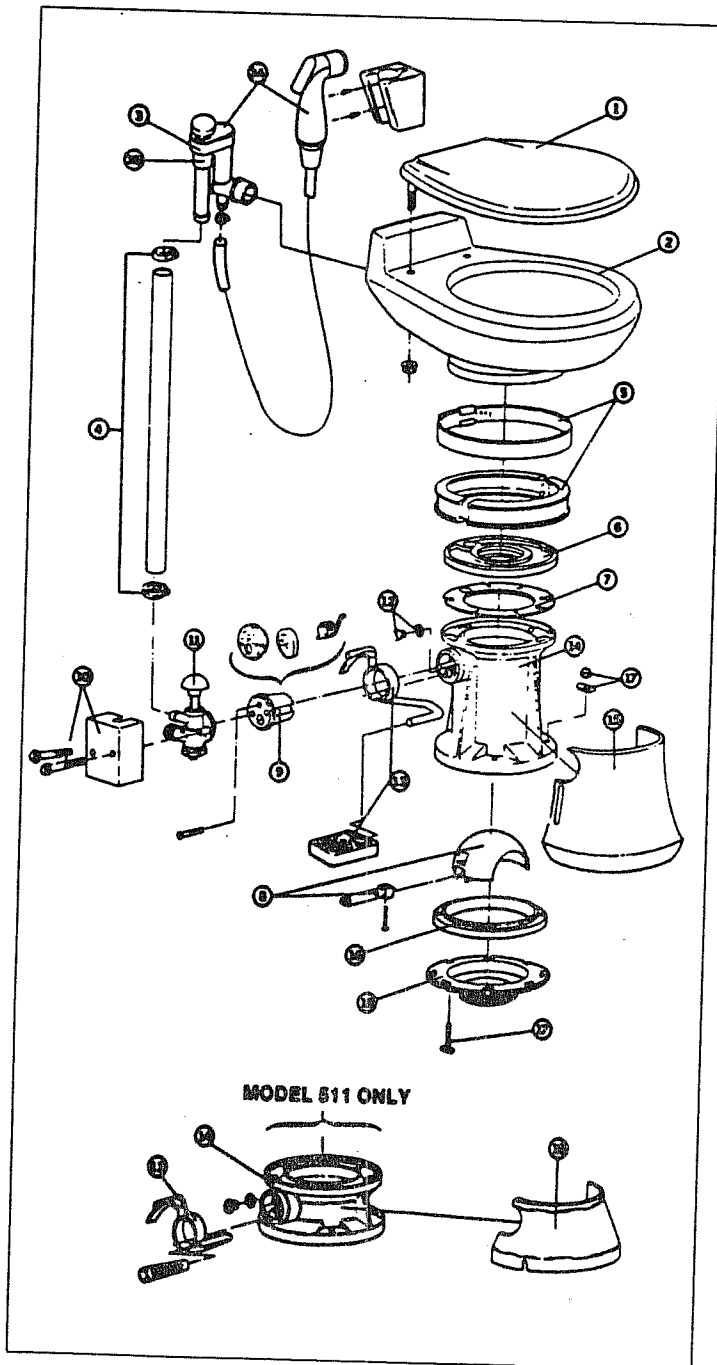
CAUSE/ REMEDY: Loose hose connection. Tighten hose connections.

Loose vacuum breaker. Tighten vacuum breaker to bowl connection.

Worn or defective vacuum breaker. Replace vacuum breaker assembly.

Cracked or defective toilet bowl. Replace toilet bowl.

Replacement Parts List (Models 510/511)



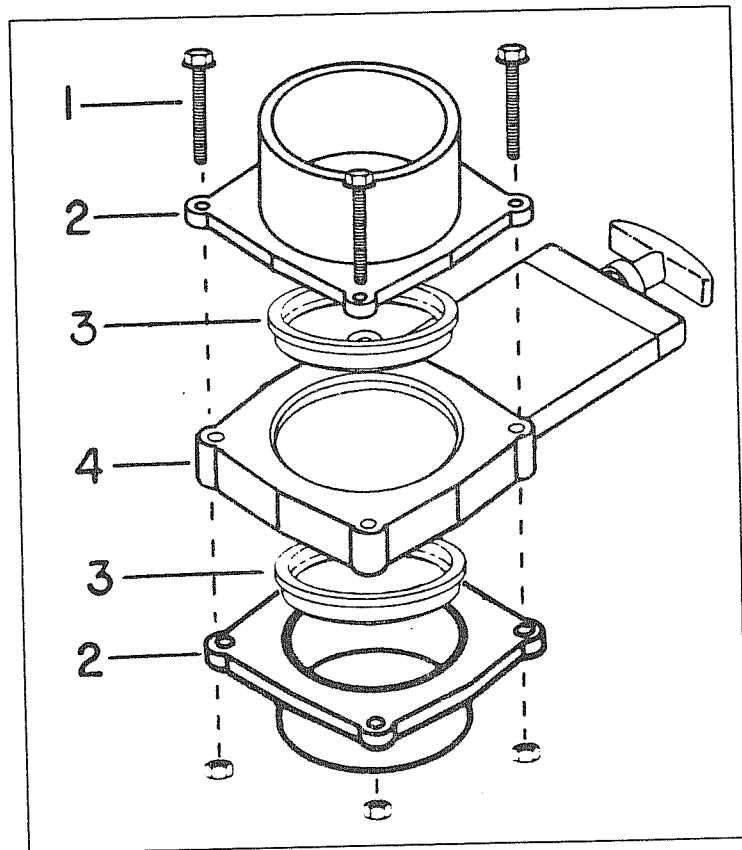
1. Seat Assy
2. China Bowl w/vacuum Breaker Kit
3. Vacuum Breaker Kit
- 3a. Vacuum Breaker w/ hand spray kit
- 3b. Vacuum Breaker w/ diverter valve assy
4. Universal Tubing Kit
5. Ring & Half Clamps Kit
6. Teflon & Rubber Seal Kit
7. Plastic Seal Support
8. Ball, Shaft & Cartridge kit
9. Spring cartridge assy
10. Valve cover w/screws kit
11. Water valve kit
12. Drain plug, cap w/seals kit
13. Flush lever w/cover
14. Base assy kit
15. Shroud
16. Floor flange seal
17. Floor bolt kit
18. Floor flange w/ 3" MPT

GATE VALVE REMOVAL AND REPLACEMENT

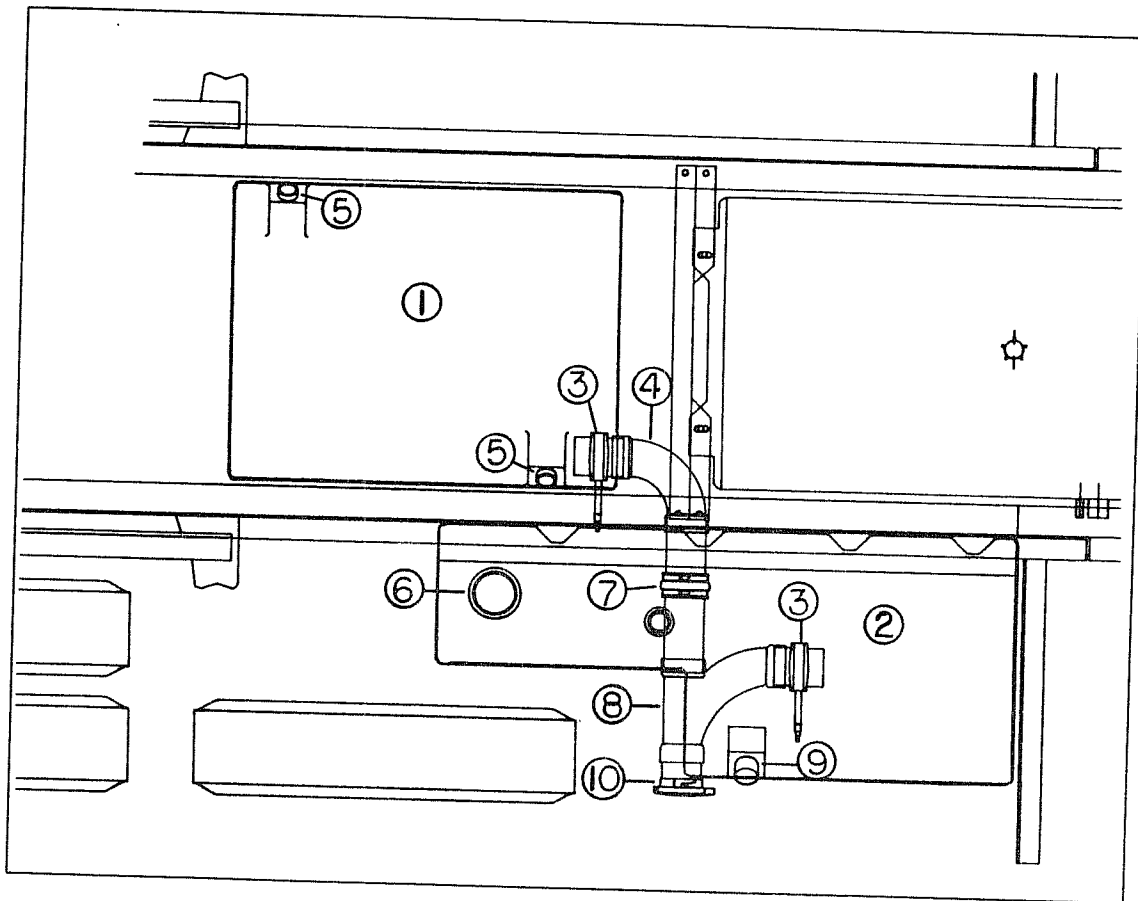
1. Make sure both tanks are empty.
2. Drill out rivet attaching extension handle to shaft.
3. Remove four bolts holding slide mechanism to adapters.
4. Pry adapters away from slide and pull seal clear.
5. Slide mechanism will now be free to come out from between adapters.

Most repairs will only require replacement of seals. Using a small mirror and flashlight to make sure they are properly positioned before installing the bolts can save time in the long run.

1. Mounting Bolts
2. Adapters, Line to Slide
3. Seals
4. Slide Mechanism



DRAIN LINES, BELOW FLOOR



1. Gray holding tank
2. Black holding tank
3. Gate valve, 3"
4. Elbow, long sweep 3"
5. Drain water inlet
6. Toilet flange inlet
7. Caulder coupling, 3"
8. Tee, long sweep, 3"
9. Adapter, vent pipe
10. Outlet

STORAGE AND WINTERIZING

When storing your motorhome for a short or long period use the same precautions as you would in your own home in regard to perishables, ventilation and rain protection. In addition, for prolonged storage periods, flush out all the drain lines and the holding tanks. Also, drain the entire water system including the water heater and the water storage tank. Instructions for draining the water system are explained in the following paragraphs on winterizing.

Twice a year, or after a long storage period, we suggest you take your unit into your Airstream dealer for a check-up and cleaning of the gas operated appliances

Living Area

The main consideration in winterizing is to guard against freezing damage to the hot and cold water systems, the waste drain system (including the traps), the waste holding tanks, the water heater and the batteries. To completely winterize your motorhome follow this procedure:

1. Level the motorhome from side to side and front to rear. Open all faucets.
2. Turn the water pump switch to the OFF position.
3. Open all drain valves. One drain valve on all models is located on the water heater exterior and is accessible through the water heater access door.

The 36 foot model has drain valves for the water tank, hot water lines and cold water lines located under the rear bed. BE SURE TO USE THE SAFETY PROP WHEN WORKING IN THIS AREA.

On 32 foot basement models the drain valve for the water tank is in the lower compartment on the curbside, forward of the rear wheels.

The water line drain valves, both hot and cold, are in the lower compartment on the roadside behind the rear wheels.

If your motorhome is equipped with the optional ice maker, an additional drain valve will be located in the water supply line. The valve is found in the cabinet just to the rear of the ice maker.

4. The toilet water valve should be left in open position while draining water. It is located in the lavatory cabinet. Remove the toilet drain plug, the water line and screen. (See diagram under TOILET section of this manual.) Then depress flush lever until all water drains from the system.
5. While the water is draining from the system depress hand spray thumb button on the telephone shower head and drain all the water. Unscrew the head on spray unit and store.
6. After the water has stopped running from the drain lines, apply at least 60 lbs. of air pressure at the city water inlet. Be sure the toilet valve and all drain valves and faucets are open and pump outlet hose is disconnected. This can be accomplished at a service station and will force any remaining water from the water heater and remove any water which may be trapped in low areas.
7. Pour a cup of non-toxic antifreeze into the lavatory, sink and tub drains to prevent freezing water in traps.
8. Be sure to open the waste holding tank drain valves, and drain and flush the tanks thoroughly. (This is very important as the sewage in the tank, if frozen, could seriously damage the tank.)
9. Remove water filter canister and dump.
10. Remove the batteries from your motorhome and store in a cool dry place where there is no danger of freezing. It is very important for optimum life of your battery to check it periodically and to keep it fully charged. This is especially true in winter months when the temperature may drop below freezing. If the period of storage is for 30 days or less you may turn off the "kill" switch rather than remove the batteries.

CAUTION: Make sure you turn the kill switch on prior to operating any appliances or accessories in the motorhome.

Please refer to the battery section for more information on battery maintenance.

11. **With Optional Ice Maker**

- A. After the water system in the motorhome has been drained, disconnect the water line where it enters the solenoid valve in the unit compartment. Allow the machine to run for one hour so that all water is drained.
- B. Leave disconnected until re-using.

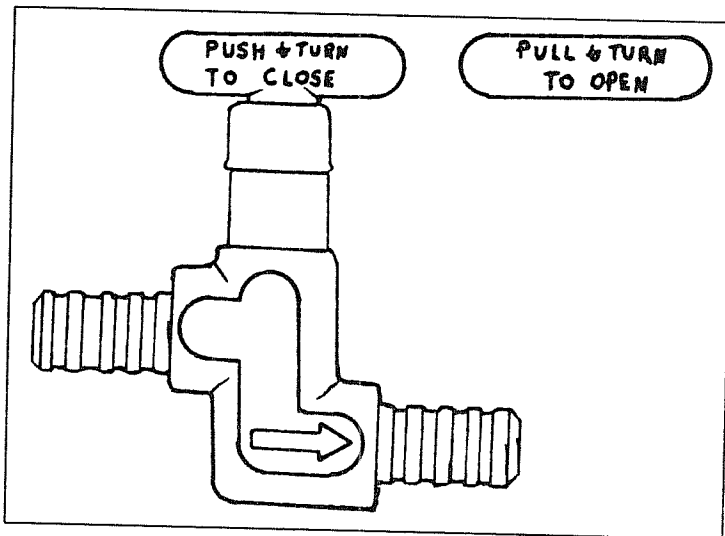
- C. Mop out any remaining water in the Ice Maker mold.
 - D. Leave door propped open two inches so that humidity will not build up inside the cabinet and corrode the microswitches.
12. Remove any items (food, cosmetics, etc.) from the interior that might be damaged by freezing, or might damage the motorhome if containers break.

For additional winterizing protection add non-toxic antifreeze (approved for drinking water systems) to your water lines using the following procedure:

1. Reconnect all lines except the hose to the pump inlet port. Close all drain valves (See Step 3).
3. Turn bypass valve to bypass position. Access to the bypass valve in the 36 foot model is in the bottom of the wardrobe just forward of the bathroom. The 32 foot basement model access is through the bottom access panel below the wardrobe sliding doors.
3. Attach a length of hose to the pump inlet port. This piece of hose should be long enough for the free end to be inserted into and reach the bottom of the antifreeze container.
4. Dilute the antifreeze solution in accordance with the manufacturer's instructions.
5. Open all water faucets.
6. Insert hose length into the antifreeze container, turn the pump switch on, and run the water pump until the antifreeze solution fills all water lines and the water heater. Flush toilet. Work shower hand spray while holding down in tub.
7. Shut off the pump and close all faucets.
8. Disconnect the hose length from pump inlet fitting and reconnect water system inlet line.

DRAIN VALVES

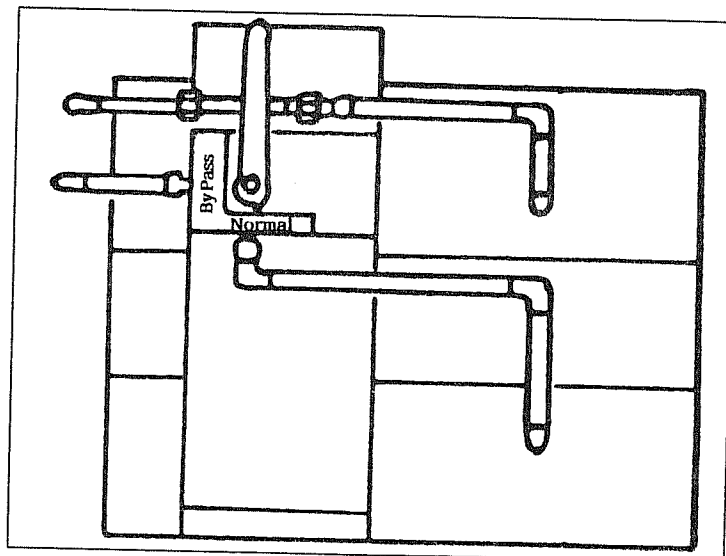
Directly below is an illustration of a line drain valve used by Airstream. They are made out of an gray nylon material. The diagram at the bottom is the back of a water heater showing the bypass valve in the normal flow position.



The valves are opened by pulling up on the handles while turning them counterclockwise. About five complete turns will open them completely.

To close, push down and turn clockwise about five complete turns.

Note: These valves do not have stops. You can just keep turning them.



DRAIN AND WASTE SYSTEM

The drain and waste system of your motorhome includes waste holding tanks made from molded plastic. The MAIN HOLDING TANK enables you to use the toilet for several days away from disposal facilities. The waste water from the sink, shower, and bath and lavatory drain into the AUXILIARY HOLDING TANK. Each tank has its own dump valve; however, both tanks drain through a common outlet. Therefore, you need to make only one connection when hooking up in a trailer park with sewer facilities.

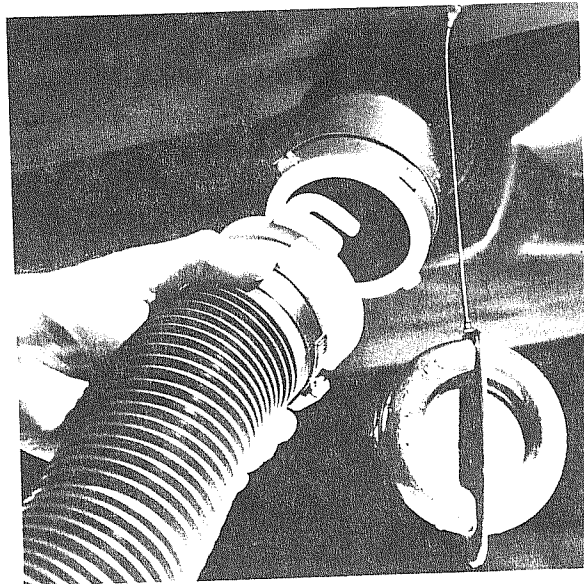
Monitor Panel

Check your monitor panel frequently. When the MAIN HOLDING TANK is completely full, sewage cannot be emptied from the toilet bowl. If the AUXILIARY HOLDING TANK is overfilled, drain water will "backup" into the tub and cause an unpleasant cleaning job. Never drain the tanks at any place other than an approved dumping station.

To empty both tanks attach the sewer hose by pressing the bayonet fitting onto the outlet adapter and rotate clockwise until it feels solid and secure. Attach the outlet end of the hose to the sewage outlet, making sure that the hose is placed so that it will drain completely. The dump valves are located on the lower rear roadside corner of the motorhome. 32 foot basement models have the outlet behind the utility compartment door and the hose is routed out the bottom. 36 foot models have the outlet extended just below the body as shown in the illustration. Pull the dump valve handle out as far as it will go and wait until the tank is drained. If the auxiliary tank is drained after the waste tank, the soapy water will help keep the sewer hose and outlet clean.

The main holding tank must be flushed out until all paper and waste material is removed. Close the dump valve and refill the tank with 5 to 10 gallons of clean water and repeat until clean.

Sewage Outlet



When Parked and Connected to Sewer Outlet

When you are in a park and connected to a sewer outlet keep the main holding tank dump valve closed, and empty the tank every few days or whenever it becomes almost full. ONLY BY SENDING A LARGE VOLUME OF LIQUID THROUGH THE MAIN HOLDING TANK AT A TIME WILL TOILET PAPER AND OTHER SOLIDS COMPLETELY WASH AWAY.

This practice will avoid the accumulation of solids in the main holding tank which could lead to an unpleasant cleaning job. Should solids accumulate, close the dump valve, fill the tank about half full with water, then drive the motorhome for a few miles. The turbulence and surging of the water will usually dissolve the solids into suspension so the tank can be drained. Keep the auxiliary tank valve open when connected to a sewer outlet.

Draining the tanks as described will protect them from freezing during storage. When traveling in sub-freezing temperatures use a winterizing solution designed for RV use. Follow the directions on the container.

CAUTION: Never put wet strength paper towels or tissues in your holding tank since they won't dissolve and can "catch" in the mechanism of the dump valve. Colored toilet tissue is slower to dissolve than white. Most RV accessory stores offer tissue designed for RVs that will completely dissolve.

Drain Systems Cleaning

There are many deodorizers on the market in tablet, liquid and powder form. These not only combat odor, but stimulate the bacteria that works to dissolve the solids in your tank. Picking a deodorizer with lubricating qualities will ease slide valve operation.

The only cleaning agents that can be used without causing harm to the system are household ammonia and trisodium phosphate in small quantities. Do not use any product that contains any portion of petroleum distillates. This attacks the rubber seals of your toilet and dump valve. Also, do not use any dish detergent or abrasive cleaners. All products should be marked approved for ABS drainage system.

When winterizing drains use only recreational vehicle plumbing type antifreeze. These are sold through your dealer.

ELECTRICAL SYSTEM

12 VOLT SYSTEM

BATTERIES

Your Airstream Land Yacht motorhome is equipped with three batteries; an engine battery and two coach batteries.

Engine Battery

The engine battery is used for starting the engine and operating the headlights, taillights, running lights, instrument panel lighting, automotive air conditioning and other accessories. The engine battery is charged by the alternator while driving.

Coach Batteries

The coach batteries, located in the stepwell, are used for interior lighting, exhaust fans, generator, water pump, central control panel, entertainment center, optional 12 volt convenience outlets and the refrigerator when it is switched to 12 volt power. These batteries are charged by the engine's alternator when driving, or by the converter when plugged into 120 volt city power. They are also charged by the generator, when it is running, through the 120 volt city power system.

An inverter is available as an option, and is used to convert the 12 volt power to 120 volts. This allows most small appliances to be operated for a short time until the generator is started or the motorhome is plugged into city power.

Battery Isolator

A battery isolator, located in the engine service compartment, electronically isolates your coach batteries from the engine battery, allowing you to operate your interior accessories without draining the starting battery. The engine alternator properly charges each battery as you drive.

Auxiliary Start Switch

The auxiliary start switch is mounted in the bottom edge of the dash just left of the steering column. This is a double throw switch. If your engine battery is dead, pushing the switch to the left will operate a solenoid, allowing your engine battery to pick up power from the coach batteries. If the coach batteries are low and you need to start your generator, pushing the switch to the right closes the solenoid so the generator will start off the engine battery.

Note: Right and left operation may be reversed in some instances.

Interior Lights

Many interior lights have been included in your motorhome to give you almost infinite variable light intensity.

There are two main clusters of light switches. Just inside the main door on the galley end panel are switches for the **step, patio light** and **forward ceiling lights**. The forward ceiling lights must have their switches on before the remote switch on the galley end panel will control them.

The second cluster of switches is in the bathroom. They control the **bath lights, ceiling vent, water heater** and **water pump**.

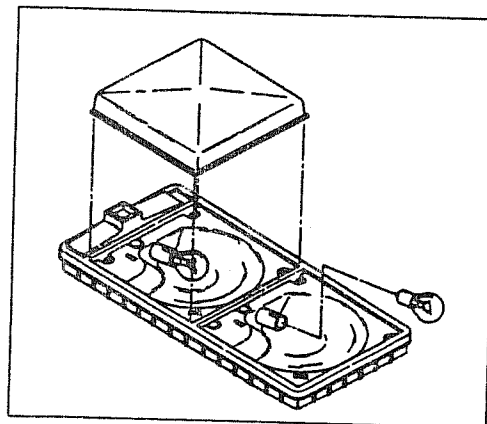
The **ceiling fan switch** will raise and lower the vent cover and turn the fan on or off. The **water pump switch** operates in conjunction with the pump switch on the monitor panel. The pump can be turned on or off at either location.

The **water heater switch** supplies power to the ignitor and gas valve. When turned on it will flash red until flame is sensed, then the red light will be extinguished.

The **bulbs** in the interior lights are all easily replaced if they burn out. Round, exposed bulbs, such as those around the bathroom mirror and reading lights, are replaced by depressing them into their base, then turning to the left about 1/4 turn. This will allow them to "pop" out part way so they can be removed.

WARNING: If they are difficult to turn, use a folded rag to protect your hand when grasping the bulb in case it should unexpectedly shatter.

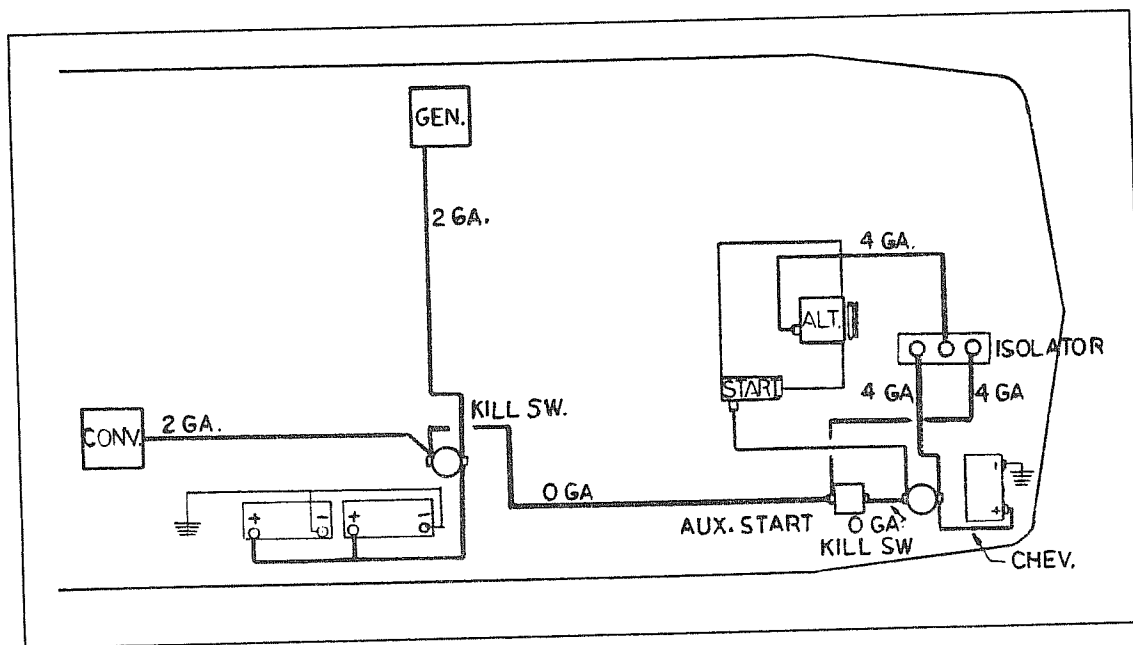
The ceiling and wardrobe **light lens** are removed by squeezing the sides of the lens in until they clear the frame. In cold weather it is helpful to leave the light on for a while to soften the plastic and avoid cracking. Incandescent bulbs are removed by depressing and turning to the left about 1/4 turn. Fluorescent bulbs are removed by turning either direction.



Basic 12 Volt Operation

Just inside the main door are two battery disconnect switches commonly called "kill" switches. Turning these switches off disconnects all loads from the batteries to prevent premature battery discharge. The exception is the memory circuit of the radio. Its draw is in the milliamp range, so it has been wired around the disconnect switches so you won't have to continually reset your favorite radio stations.

In normal daily use just leave the switches in the ON position. Whenever the motorhome will be stored for more than a few days turning the switch off will assure the batteries being in the best possible charged state when you return.



Coach 12 Volt Distribution

The 12 volt coach wiring has been broken into two distribution systems. The heavy duty distribution point is a series of circuit breakers located on the back of the coach battery box. Access is from underneath. In this location you will find the coach battery disconnect relay, a large 120 amp/12 volt circuit breaker and a series of four smaller circuit breakers.

Note: There are two ATC type fuses on the disconnect relay.

Power from the 120 amp breaker is distributed on to the smaller breakers that feed power to the suspension air compressor, step plus refrigerator, and leveling jacks/trunk door locks if applicable.

The second distribution point is at the Energenius converter that is discussed on the following pages.

Interior Distribution - 12 Volt

The 12 volt distribution panel is located in the bottom of the kitchen cabinet. This is also the location of the 110 volt breakers....and also the location of the optional inverter.

It is difficult to discuss one voltage level at a time since the 110 volt and 12 volt systems interact automatically with each other. It is called an energy management system, and is marketed under the trade name Energenius. You will find a separate manual for this piece of equipment in your packet.

The Energenius performs two basic functions. When the motorhome is plugged into city power, or the generator is running, it acts as a converter. The converter takes the 110 volt and reduces it to 12 volt DC. The 12 volt supplies power to most lights, appliances and fans, plus a charging current to the coach batteries.

The big plus to the Energenius is its added optional feature to perform inverter functions. When you are not plugged into city power, and the generator is not running, the Energenius will take 12 volt DC current from the batteries and supply 110 volt AC to your receptacles. About 600 watts of power is available. It won't run your air conditioner, but it is nice to be able to percolate that early morning pot of coffee without disturbing the quiet serenity of the wilderness by starting your generator.

Operation is simple. Just press the on/off switch on the upper right hand corner of the unit until the Energenius logo glows. From this point on it takes care of everything automatically.

When operating the inverter portion you must be aware of the tremendous loads put on your batteries. This is probably best shown by a little ninth grade science. If you have a percolator that uses 500 watts, here is what the figures look like:

120 Volt (Plugged In)	12 Volt (Battery Power)
$\frac{500 \text{ Watts}}{120 \text{ Volt}} = 4.1 \text{ AMP}$	$\frac{500 \text{ Watts}}{12 \text{ Volt}} = 41 \text{ AMP}$

Your two coach batteries are rated around a total of 210 amp hours. As you can see from the formula above, after about three hours there is not going to be a lot of battery power left.

A little common sense will make the system useful. But, if you try to over do it you will soon have dead batteries.

ENERGENIUS SYSTEM

Manufacturer: Eneractive Group, Inc.
25416 C.R. 6, Suite 313
Elkhart, Indiana 46514
Phone: 219-264-1393

Trouble Shooting Guide

The Energenius system products are designed using the highest quality of parts and components available. With the extensive engineering and high quality going into these products, you should enjoy many years of trouble free operation and enjoyment from your Energenius product. If the Energenius product doesn't appear to be working properly, chances are that the problem is small and can be corrected by using this trouble shooting guide.

SYMPTOM: No AC Power at the AC Outlets

SOLUTION:

1. Check that either the Shoreline, Generator, or charged batteries are available to the Energenius.
2. Check that all AC circuit breakers are in the "ON" position.
3. If using batteries as your source, check that the silver Energenius logo is lit. It is located beside the on/off switch.

SYMPTOM: No 12 volt charger/converter (Charge indicator not lit)

SOLUTION:

1. Make sure the shoreline or generator is providing adequate power.
2. Check that 30 amp AC breaker (Green) is in the ON position.
3. Check batteries for charge condition. Batteries may be fully charged and the Energenius' large charger/converter may have automatically shut off. If so, the Energenius is simply maintaining the battery's charge with a small trickle charger.

SYMPTOM: No 12 volt charger/converter (Charge indicator lit)

SOLUTION:

1. Check the square circuit breaker located at the lower right side on the front panel of the Energenius. If a white marker is exposed, the breaker must be reset.

SYMPTOM: 12 Volt lights and loads flicker approximately every 10 minutes.

SOLUTION: 1. This indicates that there are NO batteries connected to the output of the Energenius. This could be from your remote battery disconnect, or the battery cable(s) are disconnected at the batteries. This Flicker will NOT harm your lights or 12 volt appliances.

SYMPTOM: Energenius won't change over to the Generator after it is started.

SOLUTION: 1. There is an approximate 30 second delay after starting the Generator before the Energenius will switch over to the Generator.
2. Check that the circuit breakers on the generator are in the ON position and haven't been "tripped".

SYMPTOM: Only some of the 12 volt lights and appliances are working.

SOLUTION: 1 Check that all of the 12 volt fuses behind the front access door are good and that none of them are "blown".

SERVICE CENTER INFORMATION

WARNING: Service should only be performed by qualified service technicians. There are no serviceable parts inside of the unit.

The Energenius is easy to service if the need should ever arise. The electronics of the Energenius system is located on one printed circuit board and is connected using common connectors. To service follow the following simple instructions.

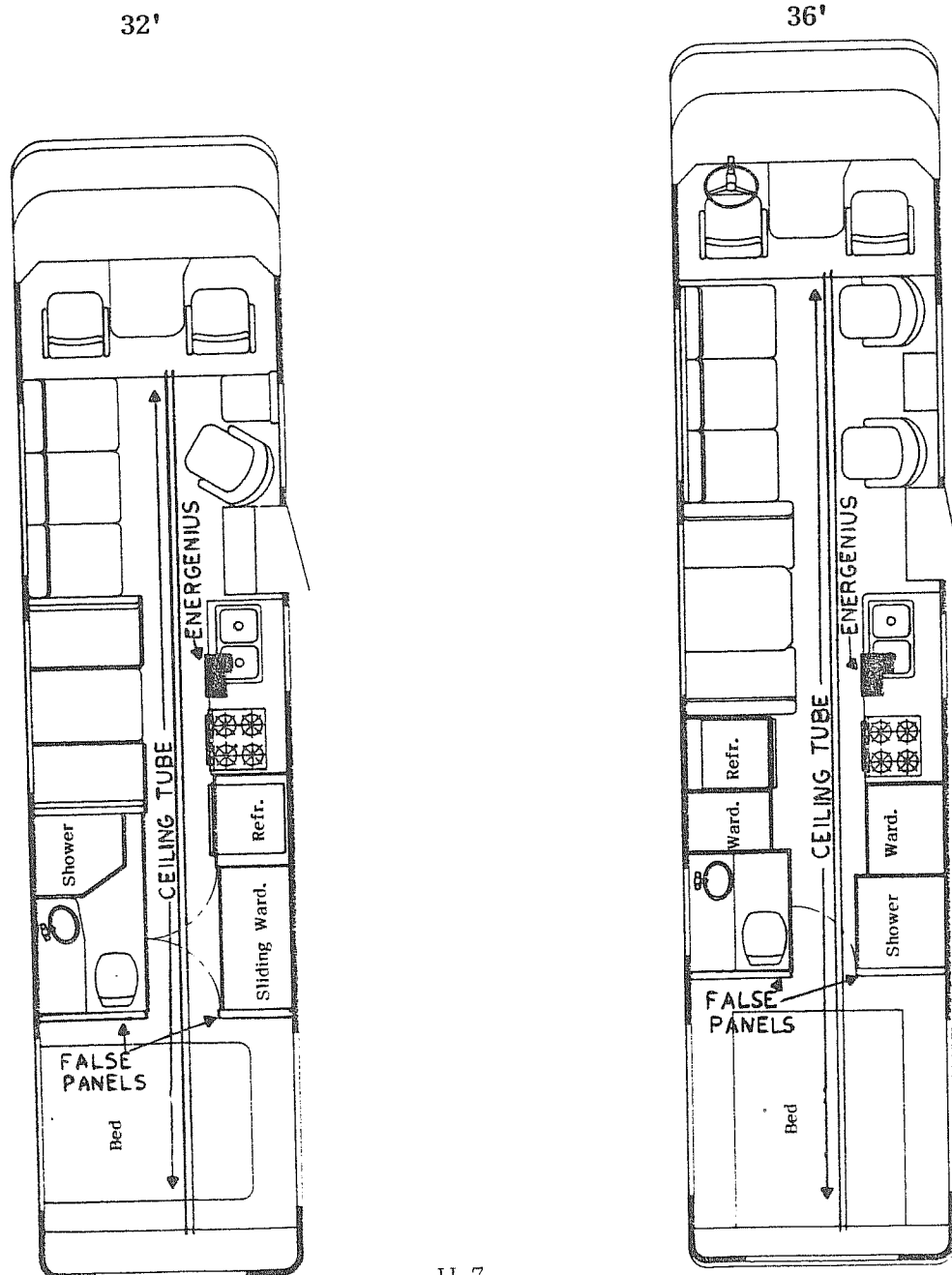
1. Determine by following the Trouble Shooting Guide that there is in fact a failure.
2. Order from the Eneractive Group, Inc. Parts Department a new Main Board Assembly (Part Number A10036). These boards are "pooled" so the cost will be low. There will also be a deposit required for the assurance of the old board being returned.
3. Remove the top/side cover of the Energenius unit. Remove the main board (large printed circuit board) noting the position of the wires and their connection points.
4. Install new circuit board and connect all wires as before. Loosely mount top/side cover and test unit for proper operation. If operating correctly, tighten all screws on top/side cover and install unit back into proper position.
5. If you experience difficulty during the above procedures, please contact Eneractive Group Customer Service Department.

Interior 12 Volt Wire Locations

In lieu of 12 volt wiring diagrams you will find the path of each interior circuit described in the text below. We find this makes it easier to actually locate the wires than a diagram would.

To accommodate the wiring there are false panels on the back of the bathroom or rear wardrobe on each side, and the bottom of the forward roof lockers. This blank space is ideal for running the wires. A second feature is a plastic tube run full length of the ceiling 8" off center toward the curbside. Wires running lengthwise of the motorhome are located in this tube. Access can be gained at each ceiling light.

The following are floor plans showing the 36' and 32' motorhomes. For your reference the position of the Energenius, false panels and ceiling tubes are shown.



To follow the directions face the Energenius located under the kitchen cabinet.
This should make the front to your left.

WIRE COLOR	POWERS	PATH
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Purple	Curbside Wardrobe Lights Rear Bedroom Lights Rear Bedroom 12 V Recp.	From the Energenius the wire goes to the curbside wall, then runs back to the false panel. Within this space a splice is made to run forward into the wardrobe lights and rearward to the 12 volt receptacle. After the splice the wire goes into the ceiling tube (access at rear ceiling light) then into the rear of the coach to power all five bedroom lights.
Yellow	Bathroom Switches Optional Attic Fan	From the Energenius the wire goes to the curbside wall back to the false panel. From this space across through ceiling tube (access at rear ceiling light) to false panel at rear of bathroom where it feeds all the switches. If unit has an optional attic fan a splice at the rear ceiling light runs yellow wire forward to fan.
Green	Monitor Panel Galley Light	From the Energenius the wire goes to the curbside wall then back to the first wardrobe. In the wardrobe the wire runs up the forward wall into the false bottom of the galley roof locker where it feeds the monitor panel and galley light.

Blue	<p>Center Vent Forward Reading Lights Visor Light Dinette Light Roadside Wardrobe</p> <p>*Note: See Yellow circuit if unit has optional attic fan</p>	<p>From the Energenius the wire goes to the curbside wall then runs back to curbside false panel. From this area it goes into the ceiling tube and runs clear to the front of the roof. A splice is made at center *ceiling vent. At the front of the roof the wire runs both to the curbside and roadside until it reaches the false bottom of the roof lockers on each side. Within the bottoms of the lockers the wires run back each side to feed the lights mounted in the bottom of the locker. On the roadside it continues on back from the dinette light and feeds the wardrobe light.</p>
Brown	<p>Center Ceiling Lights Patio Lights</p>	<p>From the Energenius the wire goes to the curbside wall and splits to the front and rear. Going forward it runs to the switches on the end of the galley for the patio light and the forward ceiling light switch. The brown wire going toward the rear goes to the false panel then up into the ceiling tube to feed the two rear ceiling lights.</p>
Red	<p>Furnace(s)</p>	<p>From the Energenius the wire goes to the curbside wall, then forward and down through the floor to feed the front furnace, then back up through the floor and back along the wall to the rear furnace.</p>

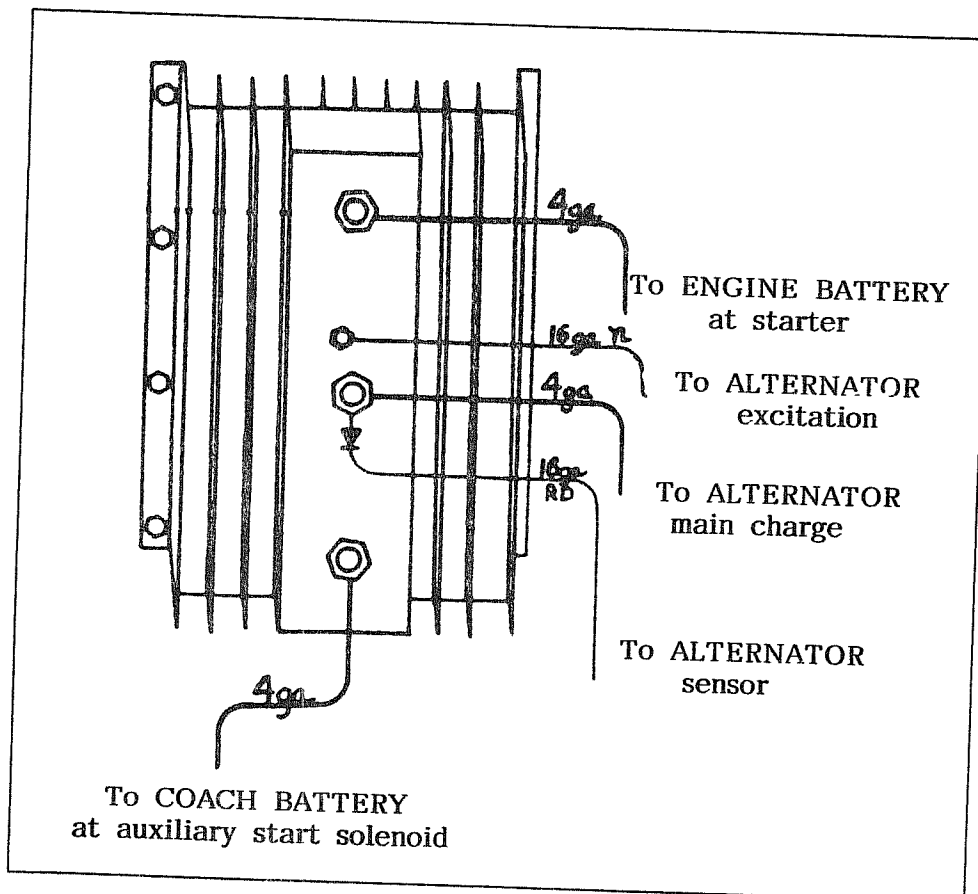
Automotive 12 Volt System

The Airstream automotive 12 volt system of your motorhome powers the Airstream accessories normally associated with driving, such as: power seats, electric mirrors, back-up monitor, automatic step, etc.

As an owner/operator your job to make the automotive system function is easy. Simply turn the ignition key on and start the engine. Everything happens automatically.

The main component of the Airstream automotive system is the isolator shown in the diagram. If you open the front access door of the motorhome, the isolator is the blue, finned component in the upper center.

The function of the isolator is to distribute charging current from the alternator to the engine and coach batteries when you are driving, yet sever the connection when the key is "off". This prevents the engine battery from becoming discharged by use of the interior 12 volt lights and appliances even if you are not plugged into 110 volt city power.



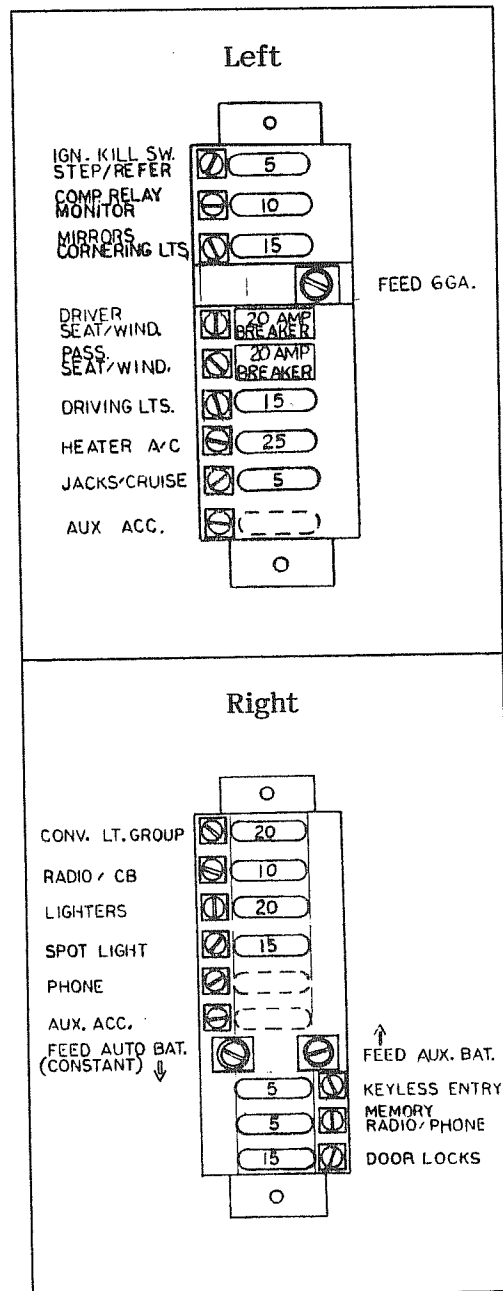
Automotive 12 Volt System

The Chevrolet fuse block is located under the dash to the left of the steering column. The fuses are marked for taillights, wipers, etc. as you would commonly see in any passenger car.

Directly below the Chevrolet fuse block is a double strip of fuses that are used to supply power to Airstream automotive accessories.

The Airstream automotive fuses are illustrated below. The fuses in the left side are only "hot" when the ignition switch is on. The upper fuses on the right are "hot" at all times except when the disconnect switch by the main door is turned off. The lower fuses on the right side feed memory circuits and will always have power unless the automotive battery cables are disconnected.

Power for the fuse strips is picked up from the isolator via a 50 amp circuit breaker and a solenoid. If the solenoid ever needs replaced be sure the replacement is rated for continuous duty. Some starter solenoids will appear identical, but may not even last a week in continuous use environment.



Battery Disconnect Switch

Just inside the main door of the motorhome is a pair of switches marked BATTERY DISCONNECT. A separate switch is used for the coach battery system and the chassis battery system.

Although they are easy to operate there is no reason to shut the switches off each time you leave the coach. The intent is to use them when the coach will not be used for a week or more. Another application is an easy way to remove power from the system when working on 12 volt wiring.

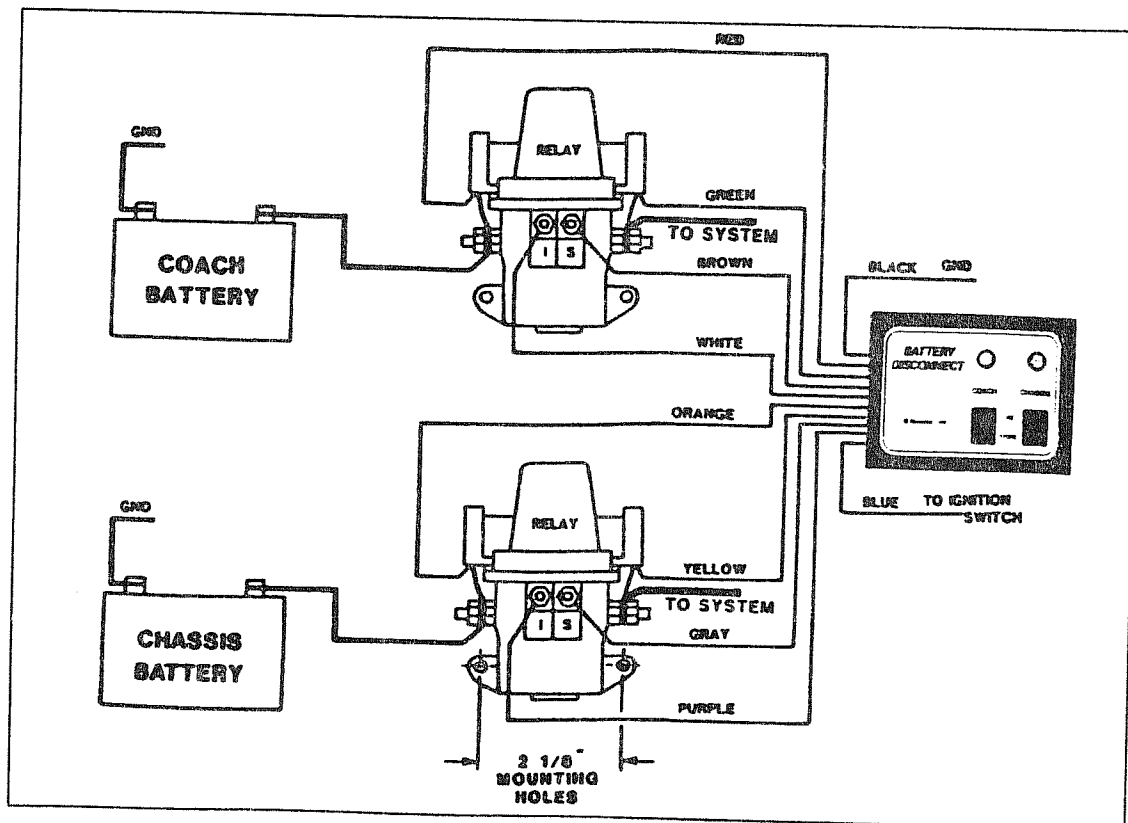
When the switches are in the STORE position heavy duty relays disconnect the batteries from the electrical wiring. The exceptions are the memory circuit of the radio and telephone, plus the keyless entry system. These will still have power.

When the switches are in the USE position the indicator lights will glow red. When stored the light will be extinguished. It is not abnormal for the lights to take a few seconds to go out as capacitors discharge.

The relays will not work if the batteries become completely discharged. The system will have to be jumped or the batteries removed and charged.

The relays are fused with two ATC 5 amp fuses on each relay. If the fuses are blown the switches and/or the indicator lights may not function properly.

The relay for the coach batteries are mounted to the back of the battery storage box in the step well. The chassis relay is left of the radiator just below the water recovery bottle.



MONITOR PANEL

Operating Instructions

SYSTEM SELECT:

1. Set switch to either Tanks or Batt. (Battery).
2. For battery level, now push the TEST switch.

TANK SELECT:

3. With SYSTEM SELECT switch set at TANKS position, select either FRESH (drinking water), GREY (Shower and dish waste water) or BLACK (Septic waste water) and then push the TEST switch.
4. Water pump on/off switch is provided also. When pump is on, indicator light will come on.

AUTO FILL (Optional)

When hooked to a city water source you may fill your fresh water tank by turning on this switch. An electrical valve opens and allows water to flow into the tank. The water tank lights will remain illuminated until the switch is turned off. The valve remains open until the 3/4 level is reached, then shuts off automatically.

Calibration

To calibrate your monitoring panel simply fill all of your tanks with tap water. Set the selector switch to the tank to be calibrated. Press the test switch and, using a small flat bladed screwdriver, rotate the adjustment located behind the small hole on the face of the panel and identified by the small black letter above (F fresh, G grey, B black). As the adjustment is turned, the lights will turn on and off in sequence. When the last light (marked F) is fully lit, the tank is properly calibrated.

Principles of Operation

Two aluminum foil pads are glued to each tank. A small high frequency alternating voltage is passed to one of the pads. A radio signal is capacitively coupled to the other pad. The radio signal is passed back up to the panel where it is electronically converted to a direct voltage which drives the LED readout.

That is the mechanism by which water level is sensed through the walls of the tank. The radio signal (and the readout) is proportional to the area of the aluminum foil pads covered by water (on the other side of the tank wall). Therefore, if the pads are installed correctly the read out is proportional to the water level in the tank.

Trouble Shooting Considerations

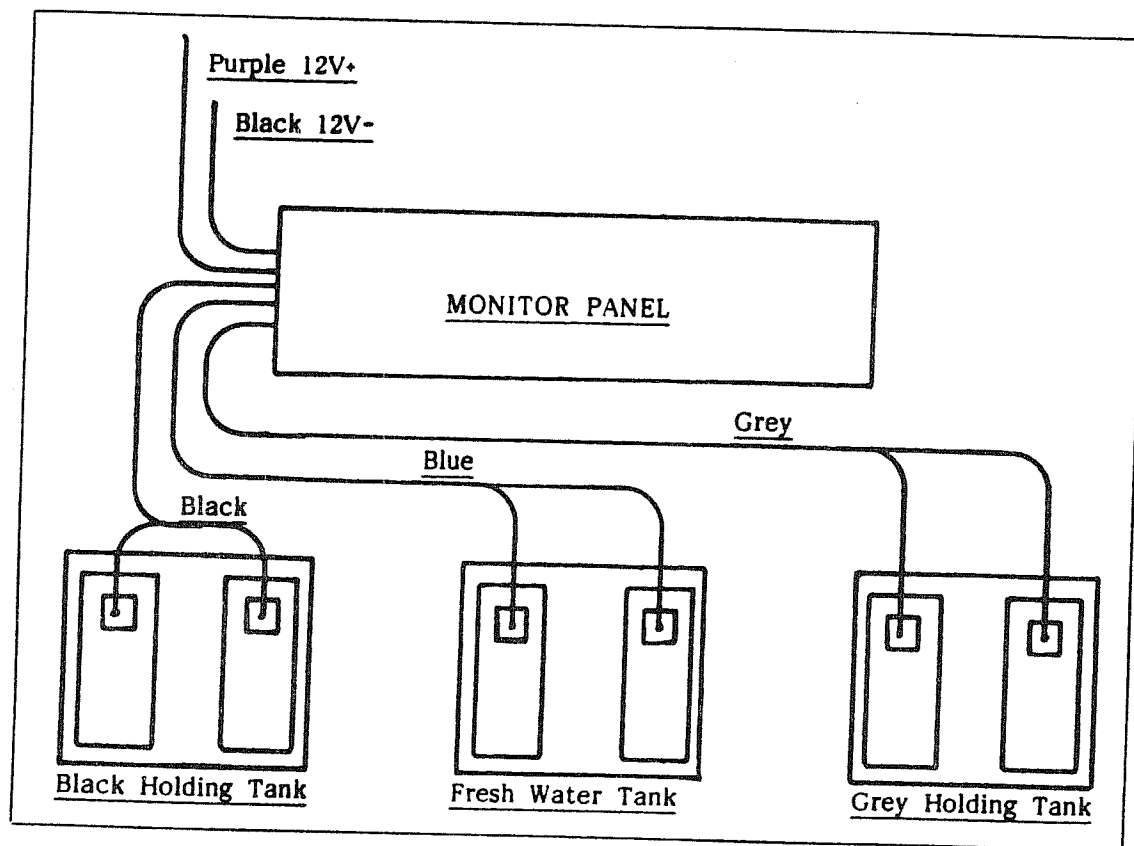
For the purpose of trouble shooting we usually divide the system into three components:

1. The panel.
2. The cable harness (and panel connection).
3. The tanks (and foil tank connections).

Generally the first step is to see if the problem is caused by improper adjustment. If not, check to see if the panel is defective. If it is not, check either the tanks or the cable harness (or both) in whichever order is most convenient.

System Configuration

The cable harness is connected to the tanks and the panel (and the power) as shown below:

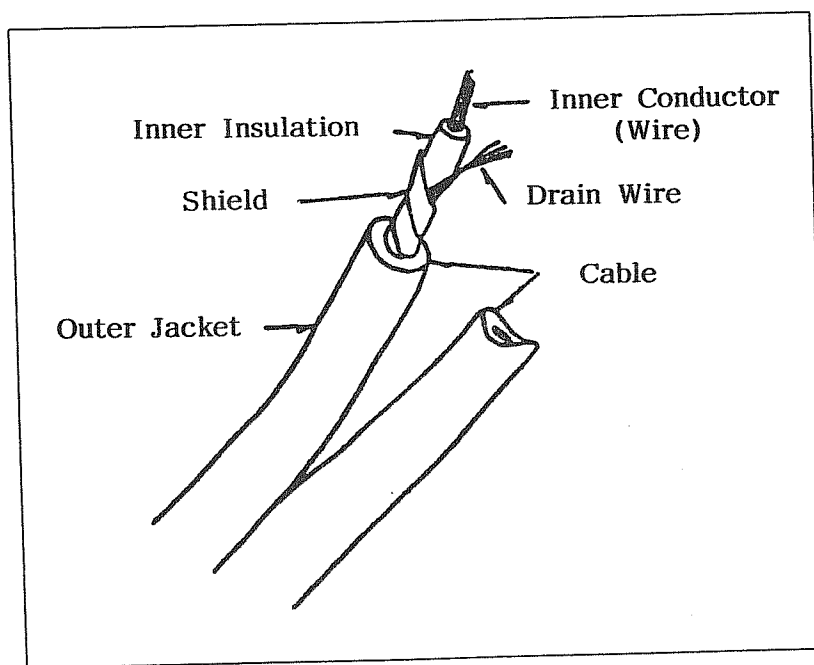


The alternating voltage is passed down to one of the aluminum foil pads on the fresh water tank by the blue cable, red inner insulation side. (See Cable Construction for details and terminology.) The alternating voltage is passed from that connection to one of the pads on each of the holding tanks by two jumper wires.

The radio signal is passed from the other pad on the fresh water tank to the panel by the blue cable, clear inner insulation side. The radio signal is passed from the holding tanks to the panel by the two sides of the grey cable.

Cable Construction

Each cable consists of two sides bonded together in a zip-cord. Each side has a copper stranded center conductor covered by an insulating layer (inner insulation is red on one side and clear on the other side). A non-insulated copper stranded wire runs alongside (called the "drain wire") and an aluminized mylar foil (called the "shield") is spiral wrapped around the center conductor and the drain wire both. A PVC jacket which is either blue or grey covers the whole cable. See below:



The center conductors conduct the alternating voltages and radio signal. The center conductors are connected to a wire soldered to a copper foil pad which is glued to the aluminum foil pad. This method is used because of the difficulty of soldering copper to aluminum. The drain wires and the shields (since they touch the drain wires) are grounded to the frame through the panel.

The aluminum pads are glued to the tanks with a rubber based glue. This is because polyethylene (the tank material) expands more than the aluminum pads when heated. Using the glue allows the pads and tank to expand at their differing rates without breaking the glue joint.

Problem Solving

PROBLEM: No LEDS go on when the test switch is pressed.

CAUSES: A. Panel is getting no power.

B. Defective panel.

- REMEDY:**
1. Test panel on module tester or replace panel to see if the same problem occurs.
 2. Check to see if the connector is on properly. Connector pins must contact the foil etch fingers on the board (if edge connector is used).
 3. Using a volt meter, check to see if the power wires at the connector have about +12 volts across them (purple is positive, black is negative).
 4. Make sure power wires are not reversed.

PROBLEM: Panel reads only empty on one or more tanks.

CAUSES: A. Broken connections to tanks.

B. Aluminum foil pads loose.

C. Not enough aluminum foil pad area.

D. Grounded center conductor of cable or pad on tank.

E. Defective panel.

- REMEDY:**
1. Fill tanks and adjust pots completely clockwise. If you do not want to fill the tanks you can simulate a full tank by pressing a hand on both aluminum foil pads on the tank.

2. Test Panel on module tester or replace panel to see if the same problem occurs.
3. Visually check pads on tanks: They should be firmly stuck to the tank. They should have an area of at least 50 square inches each, and there should be no metal (other than copper foil pads) touching them (thereby grounding them).
4. Check the connections of the cables (and jumper wires) to the tank. The drain wires and shield should not be connected or touching anything. (Ideally the drain wires and shield should be trimmed back all the way to the outer jacket and a piece of electrician's tape wrapped around there).
5. If the problem still exists, disconnect all of the tank connections from the tanks, but keep the blue cable, red side and the two jumper wires connected together. Apply the "finger test" to each set of cable pairs (or cable-jumper wire pairs on the holding tanks).

FINGER TEST: Lick your thumb and fore-finger of one hand. Lay the bare ends of the cable pair (or the cable-jumper wire pair) which were connected to a tank on your fore-finger, close to each other but not touching. Squeeze the two ends between your thumb and finger. This simulates a full tank, so the panel should read full on whichever tank the cable pair (or the cable-jumper wire pair) was connected to. You should be able to vary the reading by squeezing harder or softer.

If you cannot get a good finger test on all three tanks, or the fresh tank only, the blue cable is damaged and must be replaced. If you cannot get a good finger test on the grey and/or the sewer tank, the grey cable has been damaged and must be replaced.

If you have an Acu-Gauge cable tester, using it will shorten the trouble-shooting process. The cable tester detects shorts (to frame ground) in the cables. Use as directed in the cable tester instructions supplied with the tester. PLEASE NOTE: If a short is indicated by the tester the short could be in the indicated cable or anything connected to that cable. For example, if the blue cable-red side is indicated, that cable could be shorted, or the pad connected to that cable (on the fresh water tank) could be shorted to the frame, or the jumper wires (which are connected to the blue cable, red side) could be shorted, or the foil pads connected to the jumper wires could be shorted to the frame. The short could also be in the connection of the cable, jumper wires and foil pad.

If the grey cable (either side) is indicated, the short is either in the grey cable, the pads connected to the grey cable, or in the connections between the grey cable and its pads.

PROBLEM: Cannot get a full reading on one or more tank tests.

CAUSES: A-E Same causes as in the previous section.

F. Metal hanger strap between the two aluminum foil pads.

G. Needs slightly more foil because tank walls are thicker than usual.

H. Swelling tank loosens connection between foil strips making up pads.

REMEDY:

1. Do procedures 1 through 4 from the previous section.
2. Check to see if there is a metal hanger strap passing between the pads. (The strap does not have to touch the pads to cause a problem.) If there is, remove one of the pads and relocate it so that both of the pads are on the same side of the hanger strap.
3. If the aluminum foil pads are made of vertical strips of aluminum foil tape, run a few strips of foil tape horizontally across the vertical strips (cross-hatching). If the pads are made of horizontal strips, cross-hatch vertically.
4. If the reading is almost full (one light down from full) try adding a little more pad area. One or two more strips on each pad should do it (assuming there were 50 square inches on each to begin with). Do not overdo this. If two more strips of aluminum foil tape per pad does not solve the problem move on to the next procedure.
5. Do procedure 5 from previous section.

PROBLEM: Tank tests read only full or read only where they were adjusted regardless of water level.

CAUSES:

- A. Power wires connected to the converter rather than the battery.
- B. Disconnected or cut drain wires at connector.
- C. Unshielded wire spliced into cable.
- D. Short between center of conductors of cable, or between aluminum foil pads on tank.

E. Pads too close together.

F. Pads much too large.

G. Defective panel.

- REMEDY:
1. Test panel on module tester or replace panel to see if the same problem occurs.
 2. Empty the tanks. Unplug the coach from shore power (thereby turning off the converter). If that removes the problem disconnect the power wires and reconnect them directly to the battery.
 3. Visually inspect the connector to the panel. There should be 4 bare drain wires in the connector. Drain wires should not be cut.
 4. Using an ohmmeter check for continuity between the drain wires and the frame (ground). Panel should be connected but do not push the test button. If there is no continuity and the panel is okay the connector is bad and the pin connectons in the connector should be redone.
 5. Visually inspect the tanks. The aluminum foil pads should not touch each other and should be at least 2 inches apart. The aluminum foil pads should be no larger than 100 square inches (sometimes you need more than the recommended amount, 50 square inches, because the tanks are built thicker etc., but over 100 square inches is too much).
 6. Visually check to see if the proper colors of cable are connected to the tanks (blue to fresh water, grey and a jumper to each of the holding tanks). If not it is likely that some unshielded cable has been spliced on and the cable must be replaced.
 7. Expose the drain wires near the tanks by stripping back the outer jacket. Using an ohmmeter check the continuity between the drain wire and the frame (ground). Panel should be connected, but do not push the test switch. If there is no continuity the cable is damaged and must be replaced. After completing this test trim the drain wire and shield back to the outer jacket and wrap a piece of electrician's tape around there.
 8. Trace the cables to see if there are any splices. If so replace the cable.

PROBLEM: Cannot get an empty reading on tanks or LEDS flicker or some stay on.

- CAUSES:
- A. Power wires connected to converter rather than battery.
 - B. Too much pad area.
 - C. Jumper wires too long.
 - D. Aluminum foil pads pass under the tank.
 - E. Defective panel.

- REMEDY:
- 1. Empty the tanks.
 - 2. Test panel on module tester or replace panel to see if the same problem occurs.
 - 3. Unplug the coach from shore power. If this removes the problem disconnect both power wires and connect them as near to the battery as possible.
 - 4. Check the aluminum foil pads on the tanks. They should have an area of less than 100 square inches each. They should not touch. They should be at least 2 inches apart. They should be on the vertical faces of the tank and should not slip under the tank. Also, if the tank has a curved bottom edge the lower edge of the foil pads should be cut off just above the curved bottom edge.
 - 5. Make sure that the jumper wires are not stretched across the pads. If the jumpers are longer than 10 foot and the problem still occurs, use shielded cable for the jumper wire and connect the drain wires to the blue cable, red side drain wires (see cable construction).
 - 6. If the problem still occurs make sure the cables and jumper wires are not run alongside a wire coming from the converter.
 - 7. If the problem still occurs, do procedures 3, 4, 6, 7, and 8 from previous section.

PROBLEM: Erratic Readings: They suddenly jump two or more LEDS as you fill or empty tanks, or move when no water is being added or taken. Or, certain LEDS do not go on or go on in wrong order.

- CAUSES:
- A. Loose intermittent connections.
 - B. Foil pad on non-vertical face of tank.
 - C. Swelling tank loosens connection between foil strips making up pad.

D. Power wire connected to converter.

E. Defective panel.

REMEDY: 1. Test panel with module tester or replace panel to see if the same problem occurs.

2. Check all connections for looseness, etc.

3. Pads should be only on vertical faces and both pads should run from near the top edge of the tank to near the bottom edge of the tank. If the tank is stepped, put the pads only on the vertical faces of the tank. Connect the vertical pads across step with a thin (1/4") strip of foil.

4. If the pads are made of vertically run strips of aluminum foil tape, run a few strips of foil tape horizontally across the vertical strips (cross-hatching). If the strips making up the pads are horizontally run, cross-hatch vertically.

5. Make sure the pads are stuck firmly to the tanks.

6. Connect the power wires as close to the battery as possible.

PROBLEM: LPG not working (if panel is equipped with one).

CAUSES: A. LPG not connected properly.

B. Sending unit bad.

C. LPG float bad.

D. Defective panel.

REMEDY: 1. Test panel on module tester or replace panel to see if problem still occurs.

2. Ground red wire from connector. LPG should read empty. Disconnect red wire. LPG should read full.

3. Check to see that the red LPG wire in the connector to the panel is in the proper slot in the connector. On the 106 horizontal models, the proper slot is in the 7th from the top. On the 106 vertical models, the proper slot is in the 7th from the left. On the 105 models, the proper slot is in the 11th from the left. On the HRC models the proper hole is the middle vertical row, second horizontal row from the top. (The top of the connector has 2 notches in it.)

4. Connect the red wire to the 90 ohm sending unit on the LPG tank.
5. Check to see that the sending unit and LPG tank float magnets are aligned.
6. Replace sending unit.
7. Replace tank float system.

PROBLEM: Aluminum foil pads come unstuck.

CAUSES: 3M 4693 Glue was not used to stick the pads on.

TV ANTENNA

Manufacturer:

Winegard Company
3000 Kirkwood Street
Burlington, Iowa 52601
Phone: 800-843-4741

Raising Antenna to Operating Position

Turn elevating crank in "UP" direction until some resistance to turning is noted. Antenna is now in operating position. Check to make sure switch on front TV jack is on.

Rotating Antenna

Make sure antenna is in "UP" position. Pull down on directional handle with both hands until it disengages ceiling plate and rotate for best picture and sound on television set.

Lowering Antenna to Travel Position

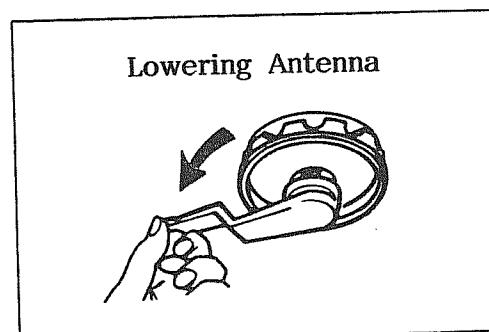
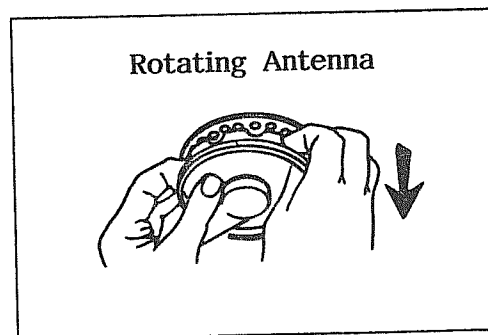
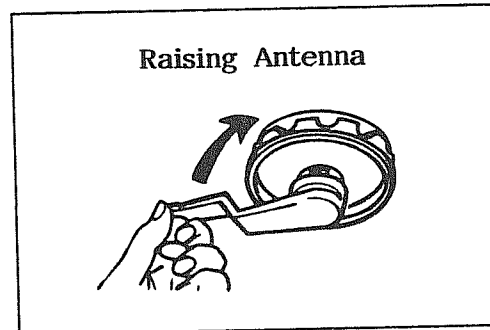
Rotate antenna until pointer on directional handle aligns with pointer on ceiling plate.

WARNING: Antenna must be in "down" position while traveling to prevent damage.

Turn elevating crank in the "Down" direction until resistance is noted. Antenna is now locked in travel position.

Checking Operation

1. Tune TV receiver to nearest station and rotate antenna for best picture and sound.
2. Turn off switch on power supply. Picture on TV receiver should be considerably degraded with power off.



DO'S

1. Do check parking location for obstructions before raising antenna.
2. Do carefully raise, lower and rotate - if difficult, check for cause.
3. Do rotate slowly when selecting station and check fine tuning on TV set to make sure it is properly adjusted.
4. Do lower antenna before moving vehicle.

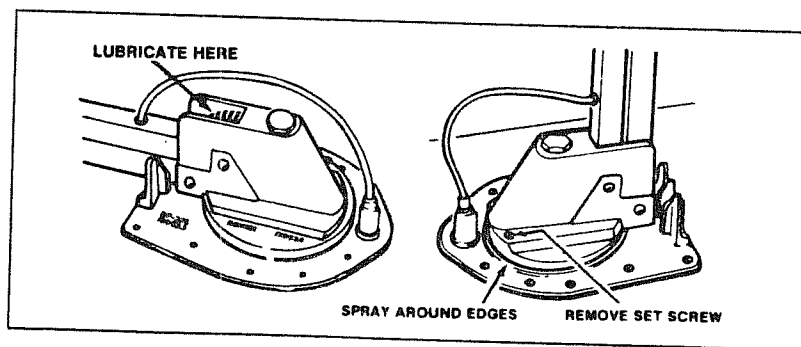
DON'TS

1. Don't force elevating crank up or down. Check for cause of trouble.
2. Don't rotate directional handle hard against stops.
3. Don't travel with lift in up position.
4. Don't leave lift part way up or down.
5. Don't apply sealing compound or paint over top of base plate or anywhere on lift.

Maintenance

Lubrication

To lubricate the elevating gear apply a liberal amount of silicone spray lubricant to the elevating gear with the lift in the down position, then run the lift up and down a few times to distribute lubricant over gears.



Lubricating Rotating Gear Housing

In the event that rotating the antenna becomes difficult, normal operation can be restored by lubricating the bearing surface between the rotating gear housing and the base plate. Any spray type silicone lubricant may be used.

Elevate antenna and remove set screw from rotating gear housing as shown. Spray lubricant into hole and around edges of gear housing. Rotate gear housing until lubricant coats bearing surfaces and antenna rotates freely.

Elevating Shaft Worm Gear Assembly

Replacement Procedure

STEP 1: Lower antenna to travel position and refer to drawing to identify parts indicated in steps below.

STEP 2: Loosen set screw on elevating crank (#1) and remove crank (#1), spring (#2), directional handle (#3).

STEP 3: Go to roof of vehicle and remove retaining ring from pin (#5) holding top elevator tube in rotating gear housing and remove pin.

STEP 4: Remove bearing plug (#4) from top of rotating gear housing. Disengage elevating gear (#6) and remove elevating shaft assembly (#7).

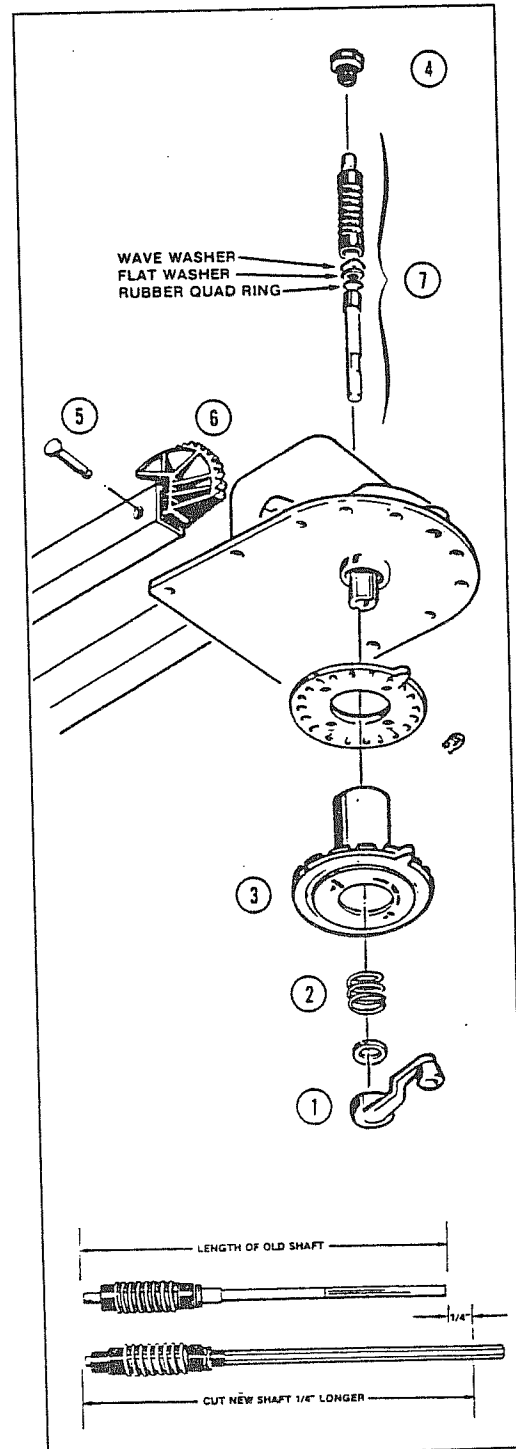
Note: Make sure all parts below worm gear are removed from rotating gear housing. These include bearing, quad ring and one or two washers.

STEP 5: Cut new shaft 1/4" longer than old shaft. See Illus: Discard old bearing plug item (#4).

STEP 6: Lubricate worm gear on new elevating shaft assembly with spray silicone lubricant, make sure quad ring, washer and wave washer are on lower bearing and insert assembly in housing.

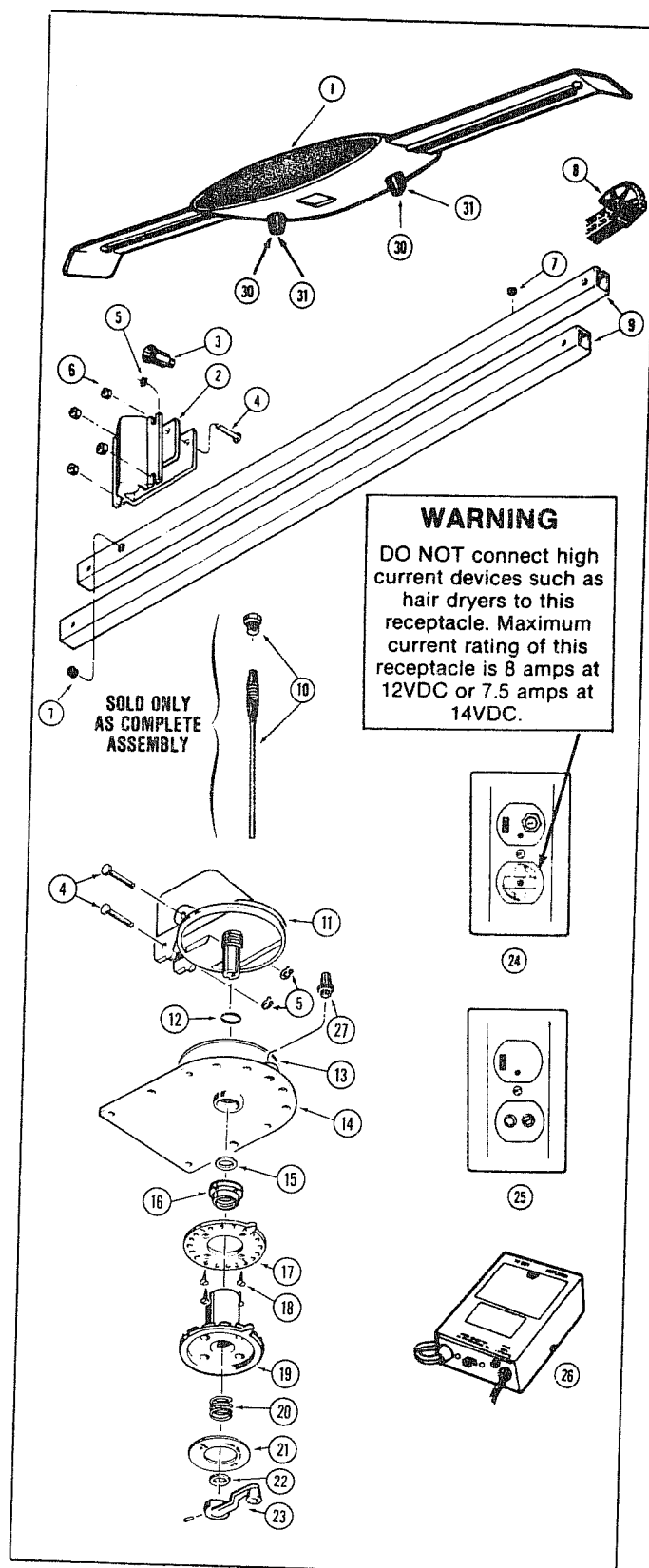
STEP 7; Install new plastic bearing plug in top of housing. Re-engage elevating gear in worm gear. Replace pin and retaining ring.

STEP 8: Replace directional handle, spring and elevating crank. Make sure set screw contacts flat on shaft before tightening.



PARTS DESCRIPTION

1. Antenna Head
2. LM-300 Leveling Mount
3. Boot, Coax Cable
4. Pin, Headed/Grooved
5. Ring, Retaining Snap
6. Spacer, Plastic
7. Grommet, Plastic
8. EG-87 Elevating Gear
9. Tube, Square Elevator
10. Elevating Shaft Assy
11. Housing, Rotating Gear
12. Ring, Quad Seal
13. Bearing, Nylon
14. Housing, Base Plate
15. Bearing, Nylon
16. GHN-1 Gear Housing Nut
17. Plate, Ceiling
18. Screw
19. Handle, Directional
20. Spring, Handle
21. Decal, Crank Cover
22. Bearing, Nylon
23. Elevating Crank/Set Screw
27. Boot, Gear Housing
30. Bumper, Rubber
31. Screw



KEYLESS ENTRY SYSTEM

The keyless entry feature is one of the convenience features that quickly spoil you. Before getting overly confident hide a copy of the dead bolt key in a place accessible from the exterior of the vehicle. Someday you may be very happy you did.

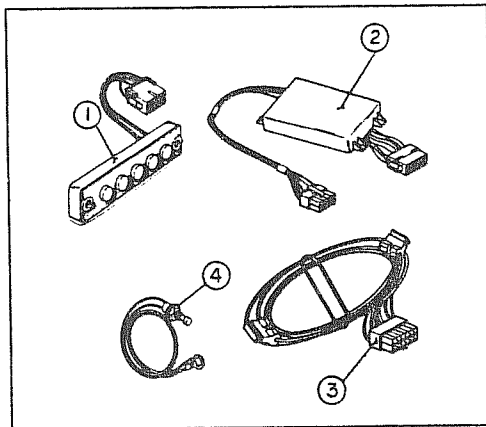
The system is powered from the engine battery. When the proper code is entered on the key pad current is supplied to the drive motor which pushes the striker out, locking the door. The unlock code reverses the polarity to the motor, it turns in the opposite direction, and the striker is retracted.

The hidden program button described in the code system is located in the kitchen cabinet next to the door.

The locking code is 5-5-5.

PROGRAMMING INSTRUCTIONS ARE FOUND IN THE "EXTERIOR" SECTION OF THIS MANUAL.

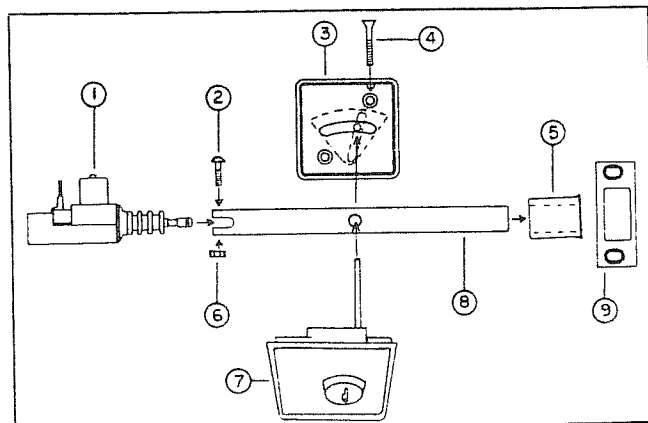
Electrical Components-Keyless Entry System



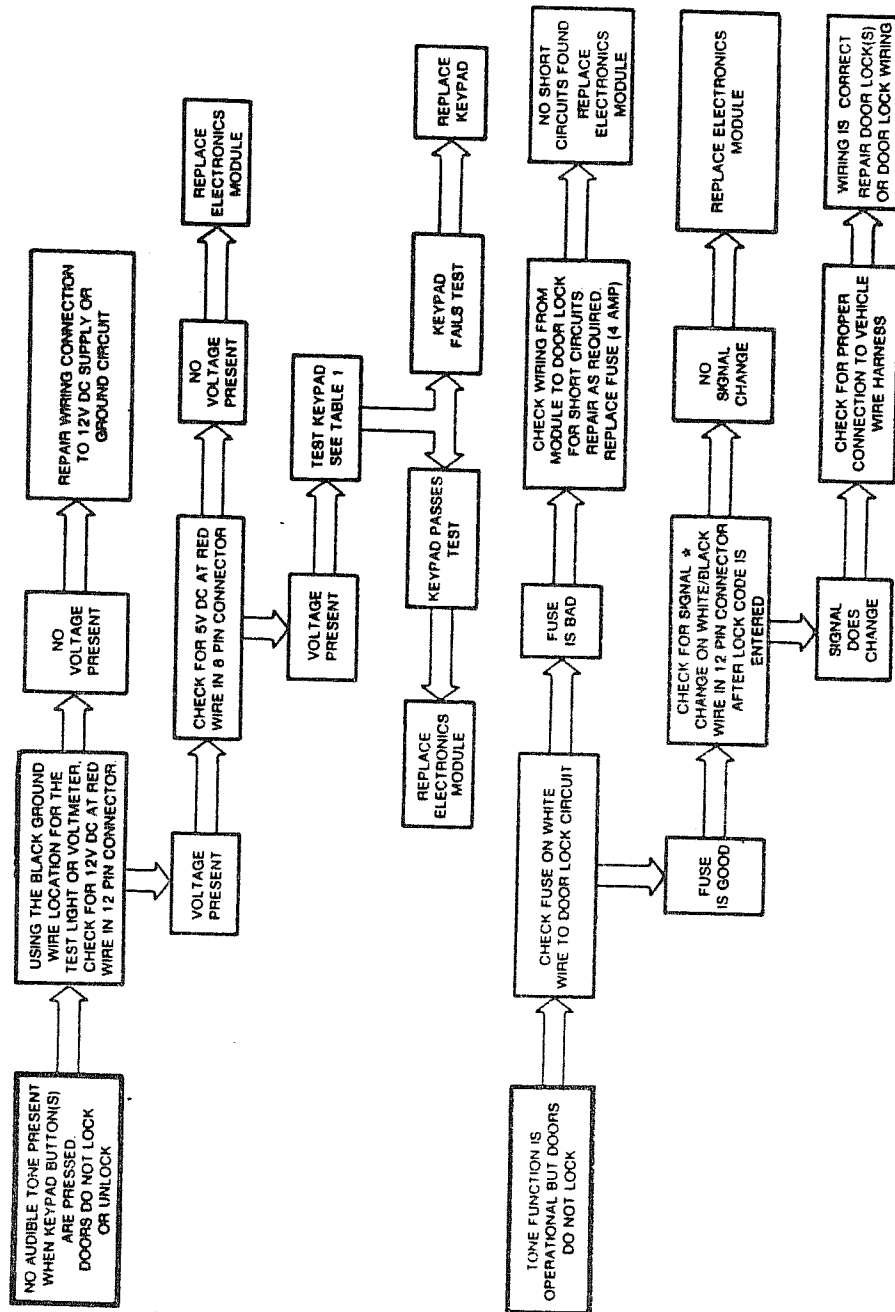
1. Keypad
2. Electronics Module
3. Wire Harness
4. Programming Button

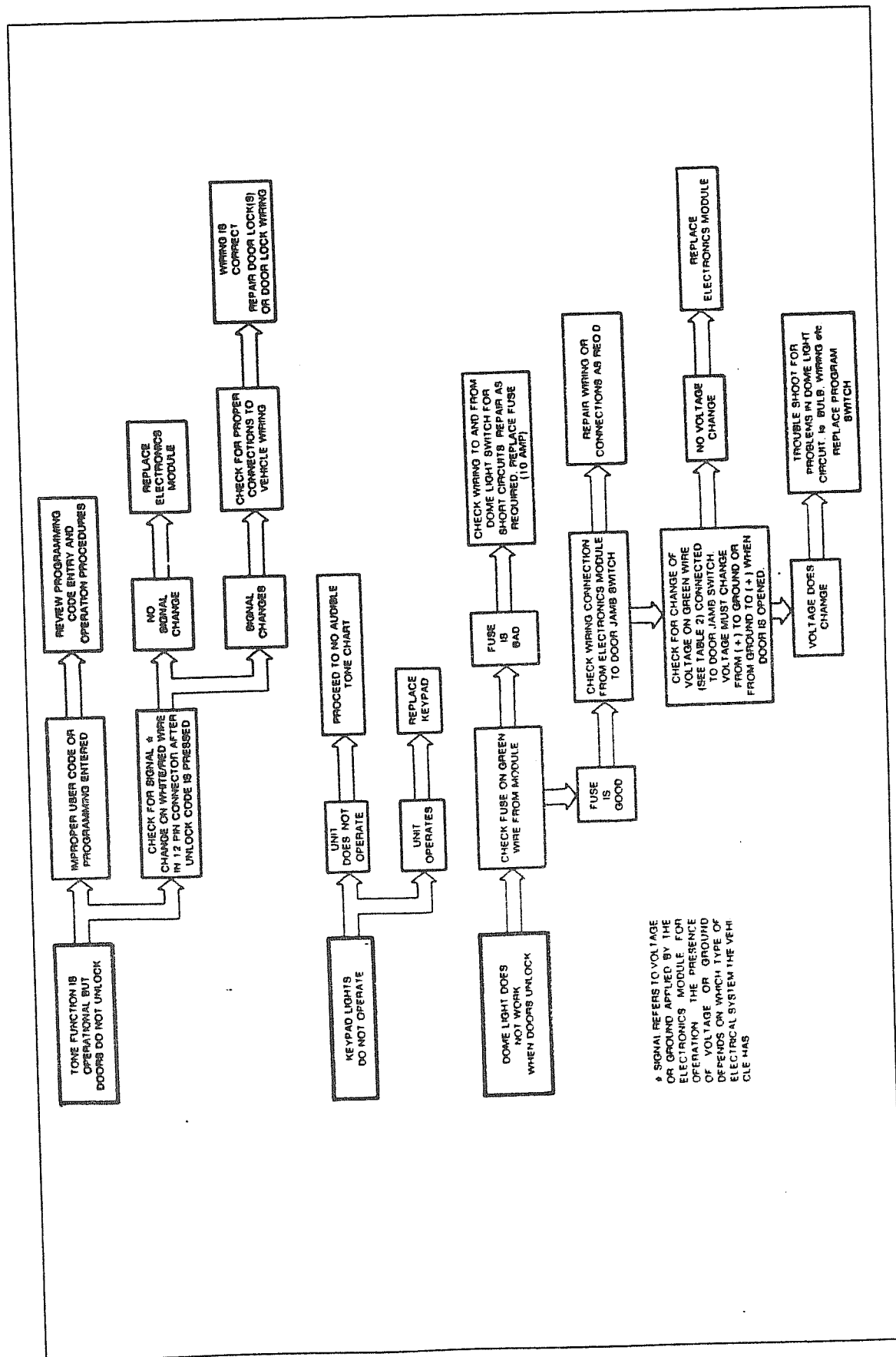
Dead Bolt Assembly (Used with Keyless Entry System)

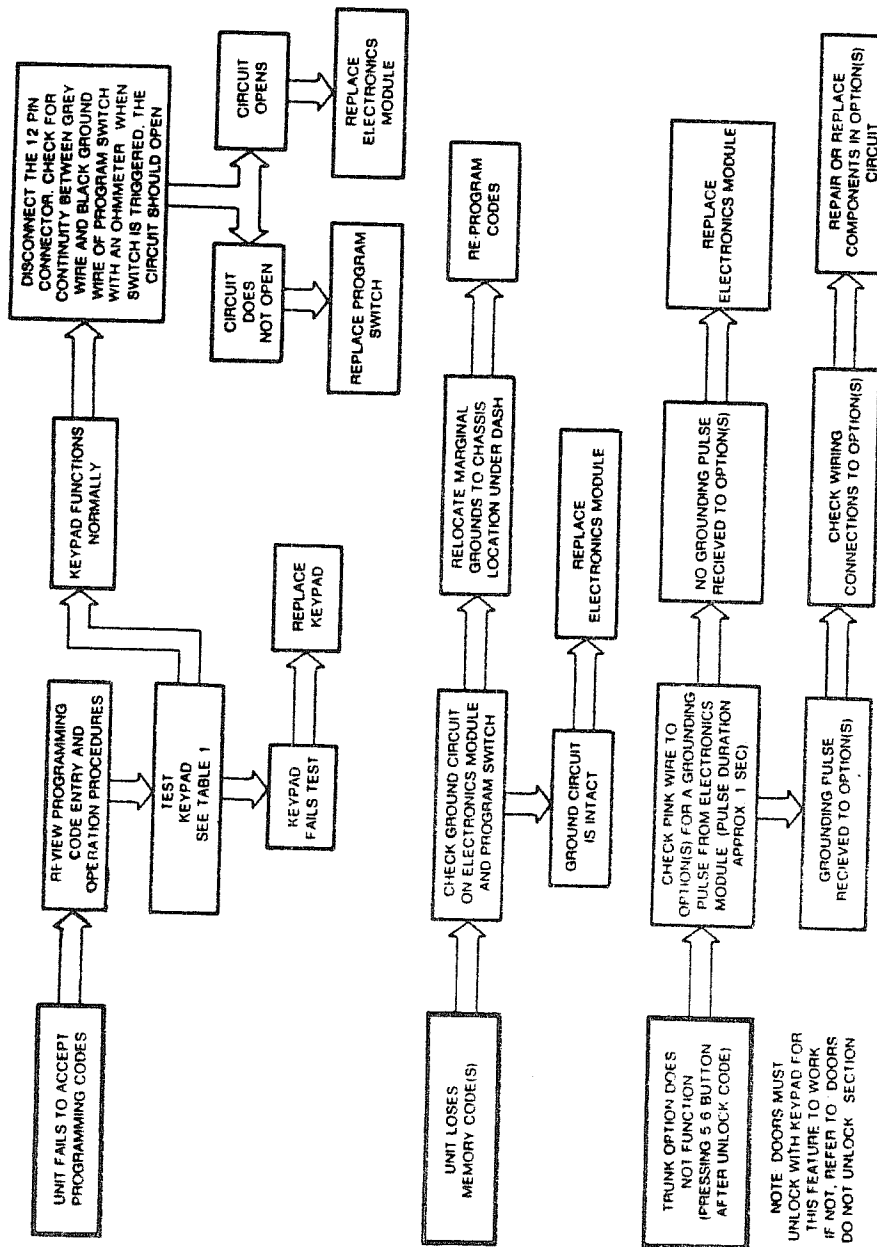
1. Motor and Plunger
2. Bolt, 8-32 X 1"
3. Lock Plate, Interior
4. Bolt, 8-32 x 1 5/8"
5. Lock Bolt Guide
6. Nut, 8-32
7. Lock Plate, Exterior
8. Lock Slide Bolt
9. Striker Plate



KEYLESS ENTRY TROUBLESHOOTING GUIDE







Keypad Test

Procedure

1. Connect the (-) lead of an analog voltmeter to the black wire in the 8 pin connector (Pin No. 8).
2. Set the voltmeter range to a setting greater than 6V DC.
3. Connect the other lead (+) of the voltmeter to the corresponding wire shown in Table 1.
4. With the corresponding wire button activated the meter should show a momentary voltage pulse. If no pulse is evident the Keypad is defective and should be replaced.**

Note: The keypad and system has to be checked while all connections to the vehicle are in place. Failure to do so can result in erroneous readings.

Note: Actuation of the Keypad should operate the tone function with minimal effort applied to the button face. Replace keypad if excessive force is required.

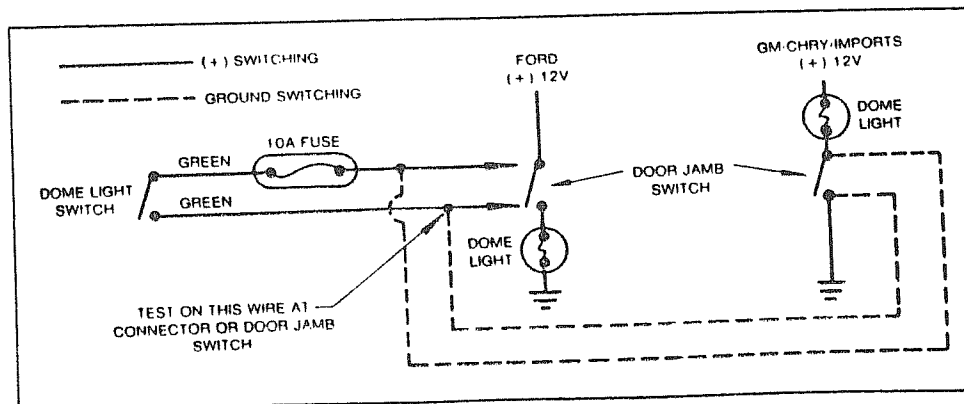
* Refer to the back side of 8 pin connector.

** Providing the keypad is supplied with power (5V DC) on the red wire (Pin 1) and ground on the black wire (Pin 8)

TABLE 1

Function	Wire Color	* Pin Location	Operation	
			Actuated	Not Actuated
1 2	White	3	Min 4V DC	OV DC
3 4	Blue	4	Min 4V DC	OV DC
5 6	Orange	5	Min 4V DC	OV DC
7 8	Brown	6	Min 4V DC	OV DC
9 10	Yellow	7	Min 4V DC	OV DC

TABLE 2



WIRING SCHEMATIC

INSIDE THE 'KEYLESS ENTRY' SYSTEM
(TYPICAL HOOK-UPS)

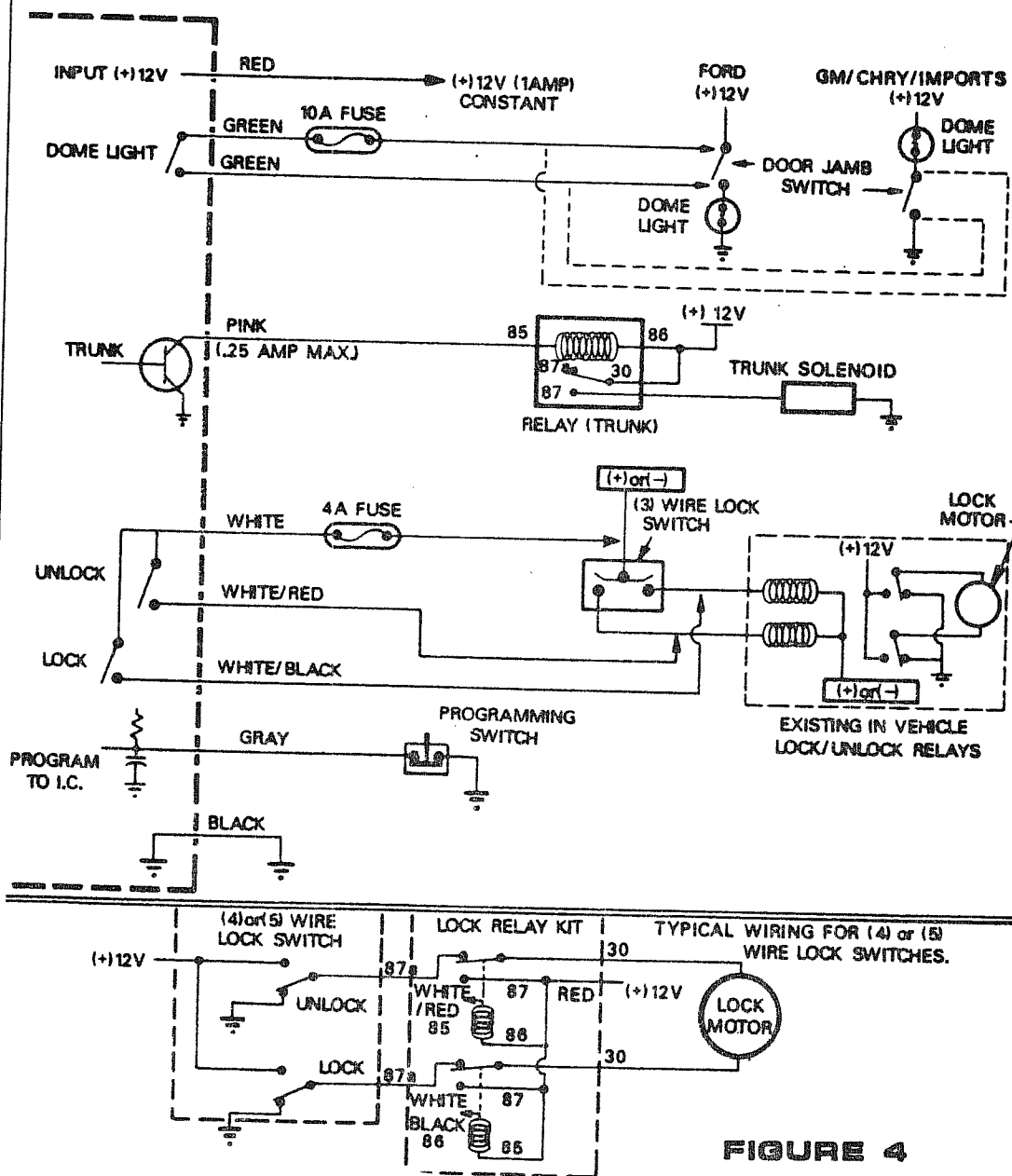
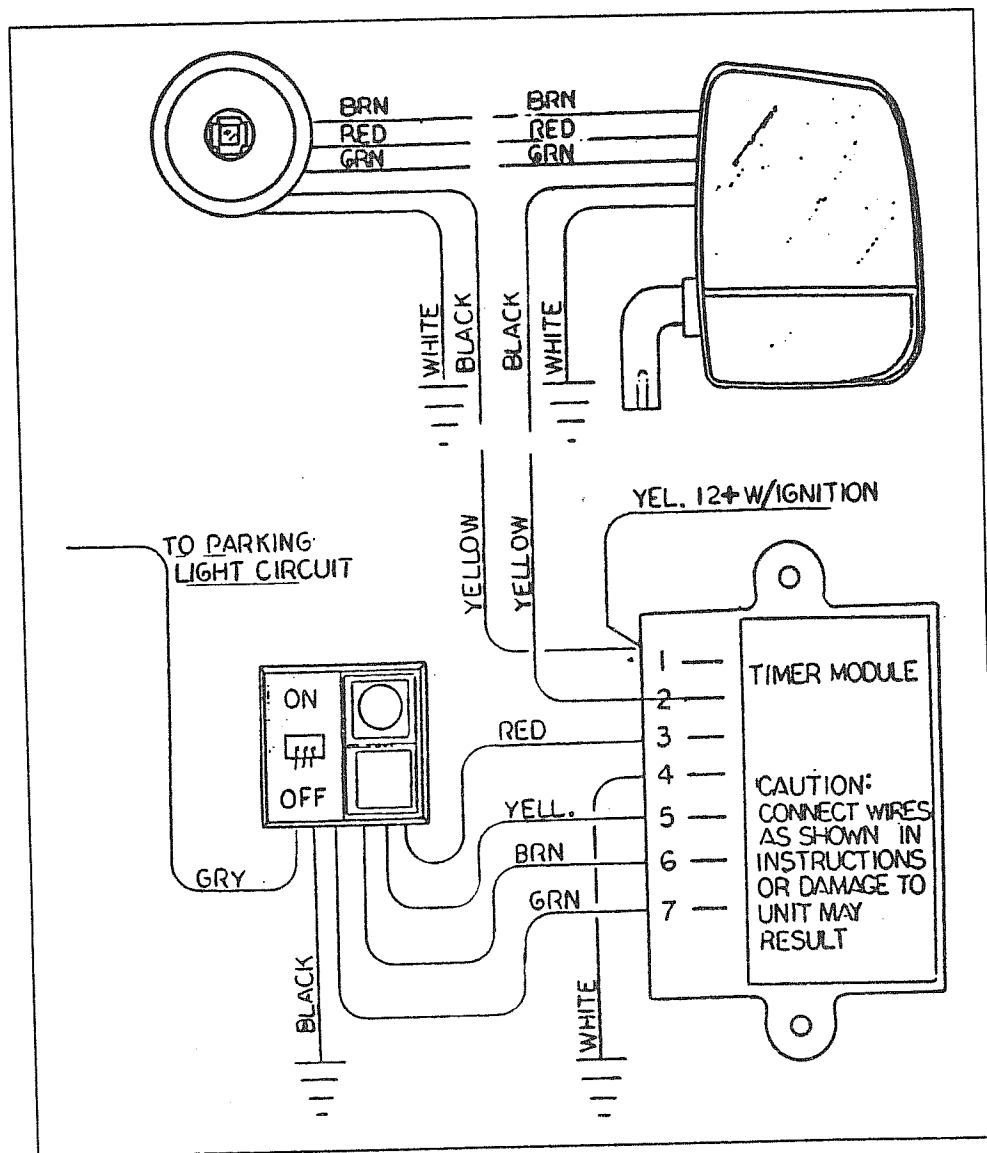


FIGURE 4

REMOTE CONTROL MIRRORS



The remote control mirrors are easy to operate. Just move the joy stick in the direction you need to tilt the mirror. The timer module, that is mounted on the back of the dash, automatically shuts off the mirror heater after a nine minute interval.

Power to the module is supplied from Airstream's automotive circuit breakers.

NOTES

110 VOLT POWER

The Airstream motorhome can use two different sources of 110 volt power. One is obtained by plugging the power cord into a receptacle at the campsite. The other is by starting the generator. Plugging into an outside source is preferable. The generator is normally for use when other sources aren't available.

The power cord supplied with your motorhome is rated at 30 amps and should be used whenever possible. Store the cord in whichever compartment is most convenient for you.

The power cord receptacle is located on the roadside rear corner of your motorhome. As you compare the cord plug to the receptacle you will see there is only one possible way for it to mate. Once mated you are prepared to plug into city power.

Three Pronged Plug

When the three pronged plug can be used there will be no problem with proper polarity or grounding. In some older parks and other locations where three pronged outlets are not available, certain precautions to insure proper grounding and polarity must be taken.

1. Attach the three pronged plug to a two prong adapter. The third conductor line of this adapter has a short wire lead which must be grounded.
2. For proper grounding connect the ground lead to a grounded outlet box or to a cold water pipe. When no water pipe is available, drive a metal rod two feet into the ground and attach the ground lug to it, thus providing the unit with proper grounding.

When your motorhome is hooked up to 100 volt city power, or the generator is running, the converter system charges the coach battery. The speed and degree of charge depends on how much power is used for lights and appliances, as only the surplus goes to charging the batteries. If you are making an extended stay you should (if it is available) keep your motorhome hooked up to 110 volt city power.

Generator Operation

To operate the generator simply start the generator at the control panel or dash switch. After the generator has run a couple of minutes an automatic relay will close and current from the generator will be supplied to the 120 volt circuit breakers. This is indicated by the AC power light on the control panel starting to glow. Operating the generator for about one hour each day will normally keep the battery charged.

A separate operating manual has been provided that covers the generator operation in more detail.

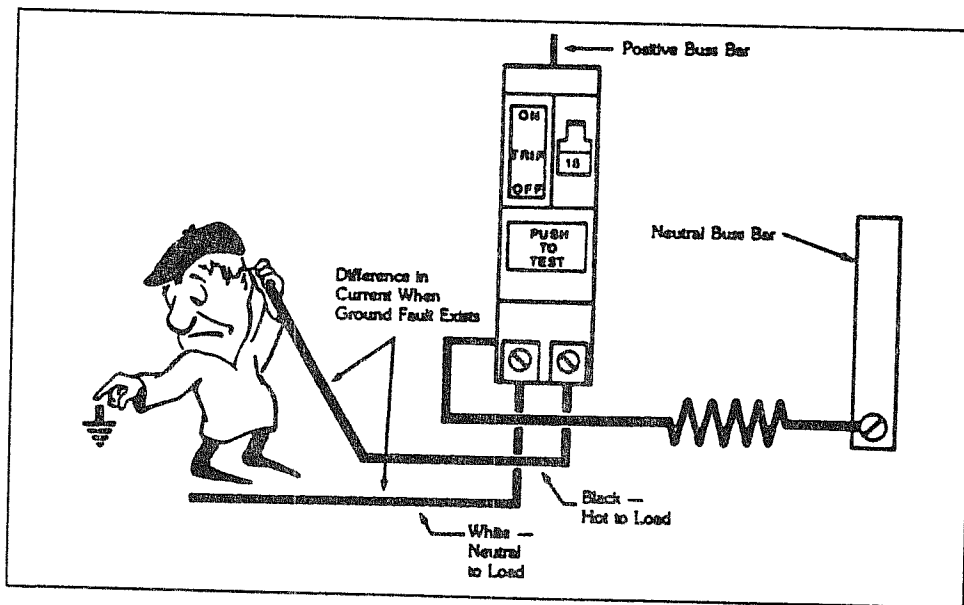
Priority Switch

Because of the high amperage loads involved, both air conditioners cannot be operated at the same time on city power. However, a double throw switch above the galley allows you to choose between front and rear air conditioners. You may operate both air conditioners by running the generator and flipping the priority switch to the front air conditioner. To obtain the fastest cooling from the air conditioners you must run the generator and set the selector switch on "front air". Once the motorhome has cooled, operating one air conditioner will hold the temperature unless the temperatures are extreme.

110 Volt Circuit Breakers

In the event of a failure of a 120 volt circuit, check your circuit breaker first. While you are connected to the 120V receptacle or 120V generator the wiring is protected by circuit breakers in the breaker panel. If a breaker continues to trip after you have reset it several times, your circuit may be overloaded with appliances, or there may be a short in the circuit. If lessening the load does not solve the problem consult an Airstream Service Center or the factory.

Ground Fault Circuit Interrupter (GFCI)



Many states require RV's which are sold in their state, and which have exterior 120 volt receptacles, to have a ground fault circuit interrupter. Units manufactured for sale in these states have type THQL 15 amp GFCI breakers installed on the general circuit, since the exterior breaker is on this circuit. This breaker replaced the standard TQL-15 amp breaker. When properly installed the GFCI circuit breaker provides reliable overload and short circuit protection, plus protection from Ground Faults that might result from contact with a "hot" load wire and ground.

Note: The GFCI circuit breaker will not reduce shock hazard if contact is made between a "hot" load wire and a neutral wire, or two "hot" load wires.

Each GFCI circuit breaker is calibrated to trip with a ground current of 5 milliamperes or more. Since most persons can feel as little as 2 milliamperes, a distinct shock may be felt if the need for protection exists. However, the shock should be of such short duration that the effects will be reduced to less than the normally dangerous level. However, persons with acute heart problems or other conditions that can make a person particularly susceptible to electric shock, may still be seriously injured.

While the GFCI circuit breaker affords a high degree of protection, there is no substitute for the knowledge that electricity can be dangerous when carelessly handled or used without reasonable caution.

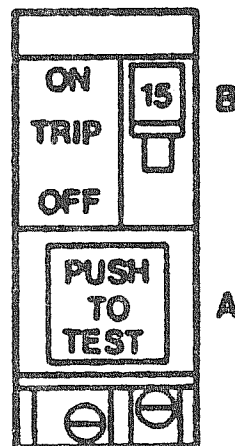
WARNING:

The GFCI circuit breaker provides protection only to the circuit to which it is connected. It does NOT provide protection to any other circuit.

OCCUPANT: MAKE THIS TEST EACH MONTH AND RECORD THE DATE ON THE CHART

1. With handle B in "ON" position, press PUSH TO TEST button A.
2. Handle B should move to TRIP position, indicating that GFCI Breaker has opened the circuit.
3. To restore power, move handle B to "OFF" and then to "ON".

Important — If handle B does not move to TRIP position when test button is pressed, the GFCI Breaker Protection is not complete. If this happens, replace GFCI Breaker.



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1988												
1989												
1990												

Locating Shorts and Opens

The key in locating shorts and opens is isolation. The first step is to isolate the circuit with the short or open. The second step is to then isolate the section of the circuit with the fault. Once the section is identified, the specific problem can be located. The cause may be a loose or corroded connection, cut wire, worn insulation, defective component, etc. The following procedure is one method for isolating shorts and opens.

SHORTS

1. Isolate the circuit which has the short by noting which circuit breaker has tripped.
2. Disconnect the power inlet cord from the power source.
3. Using the 120V schematic as a reference, disconnect outlet boxes one at a time starting at the box furthest from the distribution panel. After disconnecting each box check for continuity between the black wire and ground or common (white) wire, on the distribution panel side of the circuit. When a continuity light or OHM meter indicates no continuity the short is either in the receptacle just removed or the section of Romex wire between this receptacle and the previous receptacle removed.
4. Examples of a short are: A) The black wire of the 120V system contacting the white wire, bare wire or grounded surface. B) An internal short in a 120V appliance.

Any damaged wire must be replaced. The National Electrical Code does not permit splicing 120V wiring outside an outlet box or junction box. Also, the wire must not be exposed to an area such as a sharp metal edge which may damage the wire.

OPENS

1. Check all receptacles and components for voltage on the circuit which has the open.
2. If all receptacles and components of the circuit are without power, begin to look for open in the distribution panel.
3. Inspect for loose or corroded connections and a faulty circuit breaker.
4. Check for power on both ends of circuit breaker. If there is no power on the inlet side of the circuit breaker, the open is between the power cord's male connector and the distribution panel.
5. The open can be isolated by noting the outlets which do not have power. Example: If the bath outlet in the rear bath model has power, and the converter has no power, the open is between the bath outlet and converter outlet.
6. Examples of an open are: A) Loose or corroded connections. B) A wire disconnected from a terminal. C) Contacts in the circuit breaker which do not make contact. D) A broken wire.

Switch-Over Relay - Air Conditioner

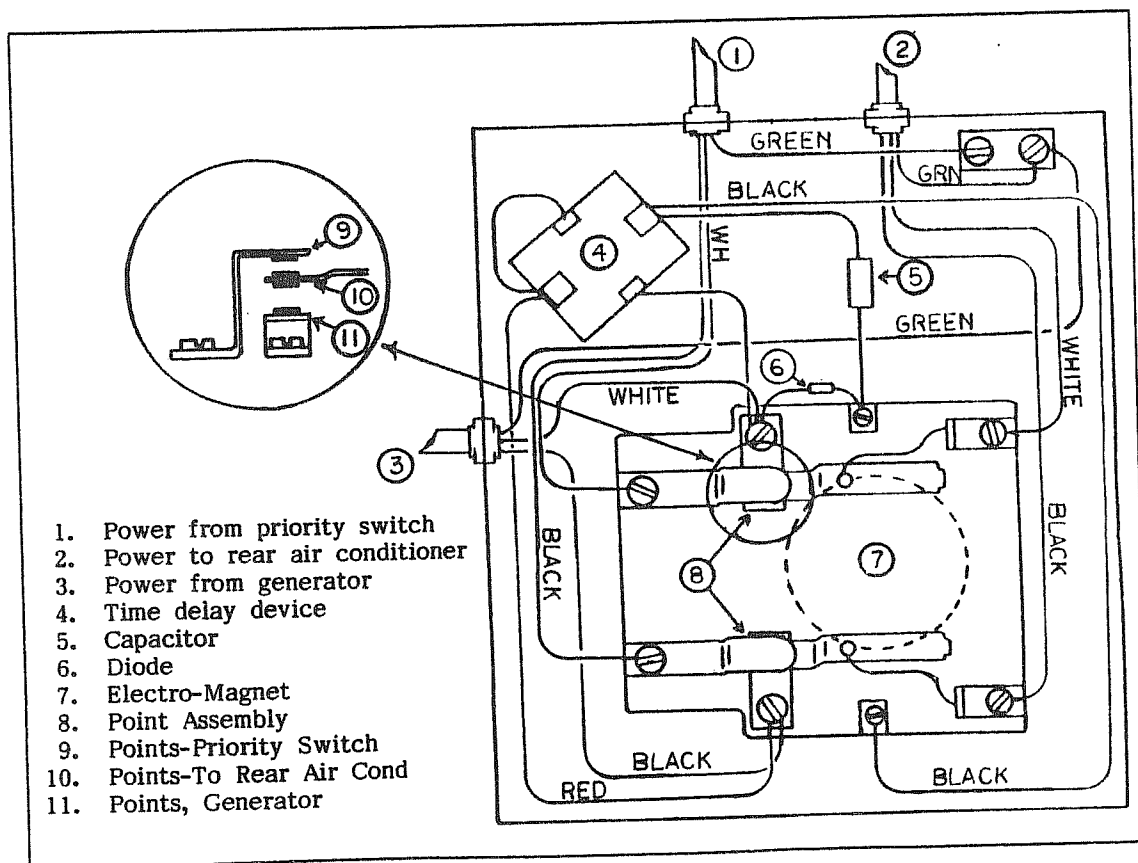
The rear air conditioner switch-over relay is designed to prevent 110 volt current produced by the generator from being fed back through the city power cord. There is a built in time delay to allow the generator to reach normal operating speed before the relay switches close and throw a load on the generator.

The switch over relay is located under the galley cabinet. It will increase the life of the relay if you will turn off the air conditioner prior to shutting down the generator.

Operation

In its normal state the points #9 and #10 are closed. In this position power will come in from the priority switch (wire #1), go through the points #9 to points #10 and out wire #2 to the rear air conditioner.

When the generator is started power is supplied to the time delay relay #4 and points #11. When the delay is satisfied current is conducted onto the electro-magnet #7. The magnet draws points #10 down into contact with points #11. This allows the generator to provide power to the rear air conditioner while breaking the connection to the priority switch. At the same time the main circuit of the generator has gone through a similar device built into the Energenius converter. This circuit feeds the main breakers so you can set the priority switch to front air.



NOTES

APPLIANCES

AIR CONDITIONER

Manufacturer: The Coleman Company
Heating and Air Conditioning Group
3050 N. St. Francis
Wichita, Kansas 67219
Phone: 316-832-6450

Note: Review the air conditioning literature supplied in your Owner's Packet before proceeding.

The roof air conditioner used on Airstream motorhomes is one of the most popular on the market today. In your Owner's Packet is a set of literature covering all operating and maintenance instructions. If the literature is misplaced please contact the air conditioner manufacturer or your Airstream dealer for replacement. A detailed service guide may be ordered from the manufacturer.

Because of the amount of power drawn by the air conditioners it is only possible to operate one at a time when plugged into city power. A wall switch, located above the kitchen counter, allows you to operate either the front or rear air conditioner, but not both at the same time.

Another appliance drawing a lot of current is the microwave. Operating the microwave and an air conditioner at the same time will put your electrical system at the edge of maximum draw. If the air conditioner goes into a "start up" cycle the additional current will probably cause your main circuit breaker to kick out. If this situation occurs it is best to leave the air conditioner off for the few minutes the microwave is normally operated.

Both air conditioners may be operated when the generator is running. Set the priority switch to the front air conditioner and it is powered through the normal circuit. The generator powers the rear air conditioner through a separate circuit.

The voltage to the air conditioner is critical. We commonly refer to 110 or 120 volts, but a check with a volt meter may find voltage much lower. Your air conditioner will probably not function if the current drops below 105 volts. Low voltage is usually associated with older or poorly maintained trailer parks, but many people have found their homes, built only twenty or thirty years ago, may not be capable of operating the air conditioner on some receptacles. Parking your motorhome so the power cord can be plugged into a receptacle close to the fuse or circuit breaker box can alleviate the problem. Avoid extension cords and adapters whenever possible. If an extension cord must be used it should be as short and heavy as possible to provide the most current to the air conditioner.

If high temperatures are expected you should make an effort to park in a shaded area. Starting the air conditioner early in the morning also helps. It is much easier to hold a comfortable temperature than it is to lower the temperature after the interior of the motorhome is already hot.

If you feel the air conditioner is not operating properly there is a very simple test. Two small inexpensive thermometers are all that is needed. With the air conditioner in the HIGH-COOL mode place one thermometer next to the air intake and the other thermometer in the flow of cool air being expelled. After about 5 minutes check the thermometers. A normally operating air conditioner will have at least a 15 degree difference in temperature.

The first place to check if your air conditioner has lost efficiency is the intake filters. When used consistently they should be cleaned every two weeks.

CAUTION:

You may repeat the above-mentioned test using two thermometers with the filters removed to isolate the problem. But, NEVER operate the air conditioner over a long period without filters, or expensive repairs will be required.

If warranty repairs are required use only one of the air conditioner manufacturer's service centers or an authorized Airstream dealer.

The roof of your Airstream will easily support a mechanic if a little common sense is used to keep his weight spread out. If the mechanic weighs 250 lbs., is carrying 50 lbs. of equipment, and jumps up and down on one foot, he can damage the roof. And, he can pay for the repair too!

Service Problems

The following list of service problems covers only some of the more common problems which may occur and lists only the more probable causes.

In many instances it will be necessary to use the wiring diagram to check out the electrical circuits step by step starting at the power service.

PROBLEM: Nothing runs on either Hi or Low Cool.

CAUSE: 1. Power supply dead. Open circuit breaker or fuse.
2. Faulty selector switch.

PROBLEM: Inadequate cooling but compressor and fan run.

CAUSE: 1. Selector switch set at Low Cool.
2. Low evaporator air flow (frost may form on accumulator).
Check for a) dirty filter: b) air damper set on low: c) squirrel cage loose on motor shaft: d) fan motor not up to speed due to tight bearings, faulty fan capacitor: e) dirt and lint on evaporator coil.
3. Moisture in system. Frost periodically forms and melts on accumulator.
4. Heat gain of RV exceeds cooling capacity of air conditioner.
5. Low charge. Leak in system.

PROBLEM: Fan runs on Low or High Cool, but compressor neither runs nor hums.

CAUSE: 1. Selector switch open to compressor.
2. Thermostat open.
3. Compressor overload switch open.
4. Compressor winding open.

PROBLEM: No cooling. Compressor runs but won't pump.

CAUSE: Compressor vane stuck (compressor must be replaced).

PROBLEM: Fan runs on Low or High Cool but compressor periodically hums for 15 to 30 seconds.

- CAUSE:
1. Low voltage. Voltage must be 115V plus or minus 10% (Minimum of 103.5V).
 2. Faulty capacitor.
 3. Start relay contacts open.
 4. Compressor start winding open or grounded.
 5. Compressor mechanically stuck.

PROBLEM: Compressor trips breaker or thermal current overload immediately - no hum.

- CAUSE:
1. Compressor winding shorted or grounded.
 2. Circuit breaker or thermal current overload faulty.

PROBLEM: Compressor cycles on and off, resulting in inadequate cooling.

- CAUSE:
1. Thermostat bulb touching metal.
 2. Thermostat out of calibration.
 3. Collar connecting blower outlet to ceiling assembly missing or too short.
 4. Compressor cutting out on overload due to: a) dirty condensor coil: b) Low or High voltage: c) overcharge or non condensables in the system: d) Low charge: e) plugged up cap tube.

PROBLEM: Fan won't run regardless of selector switch setting, but compressor runs on High and Low Cool.

- CAUSE:
1. Faulty selector switch.
 2. Fan motor windings open, shorted or grounded.
 3. Fan capacitor shorted, weak or open.
 4. Fan bearings dry.

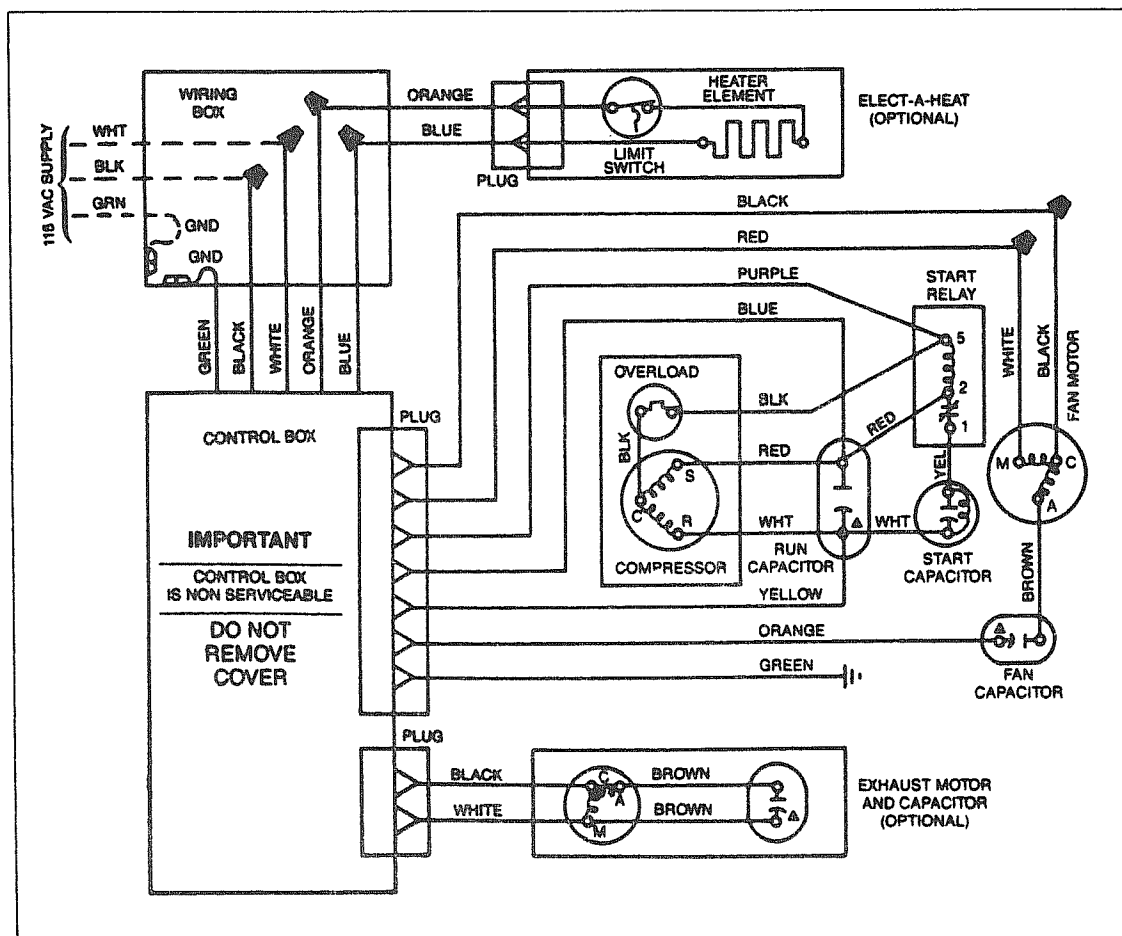
PROBLEM: Air conditioner vibrating.

- CAUSE:
1. Fan blade or blower wheel out of balance.
 2. Motor shaft bent.

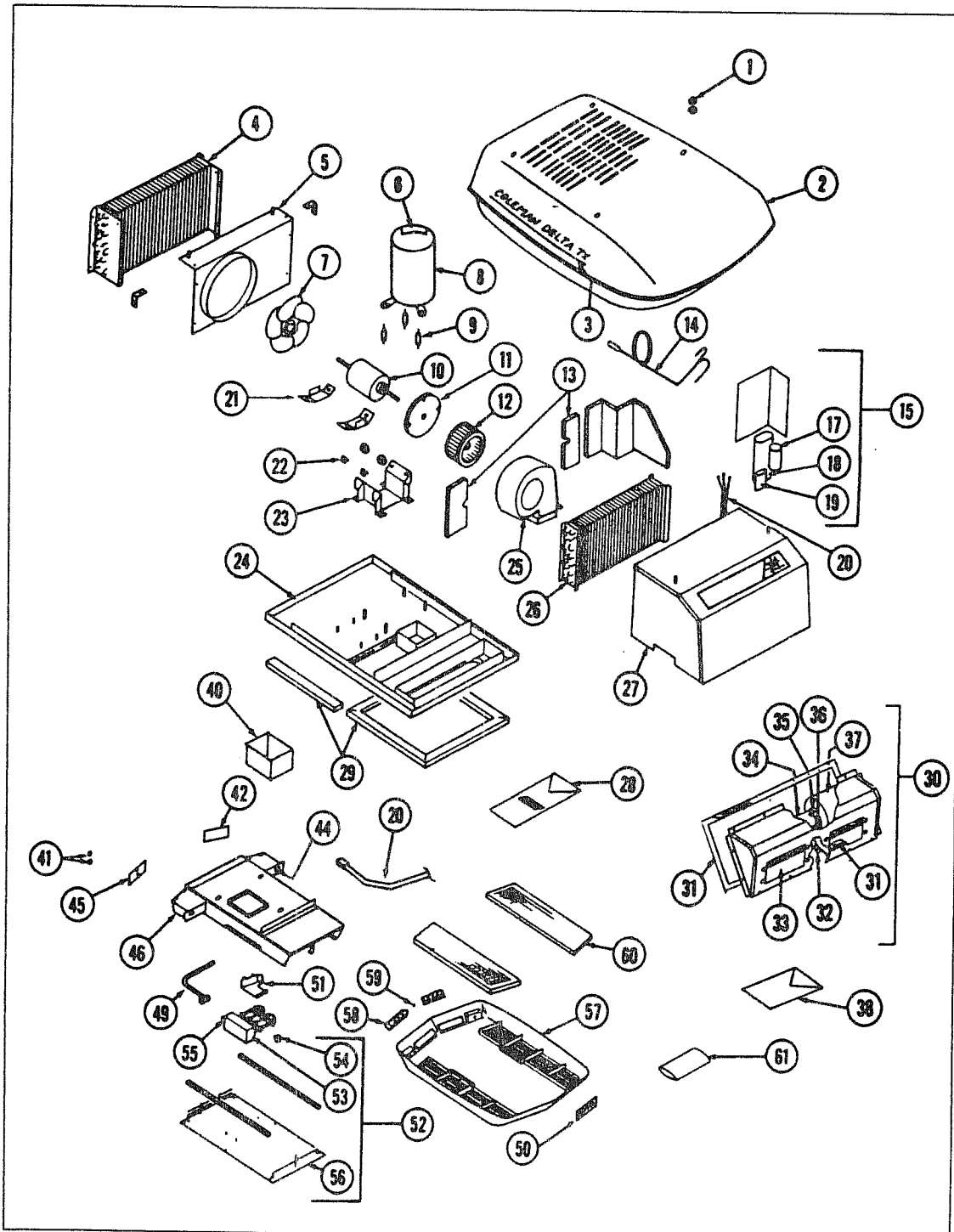
PROBLEM: No heat (models equipped with heating elements.)

- CAUSE:
1. Limit switch open.
 2. Selector switch open.
 3. Thermostat open.

Electrical Wiring Diagram



AIR CONDITIONER PARTS DIAGRAM



Parts Description Preceding Page

- | | |
|------------------------------|------------------------|
| 1. Acorn nut & washer | 54. Limit Switch |
| 2. Shroud | 55. Wire Bundle |
| 3. Delta TX Decal Pkg | 56. Heat Strip, bottom |
| 4. Condenser Coil | 57. Ceiling Shroud |
| 5. Fan Shroud | 58. Louver |
| 7. Fan (4 blade) | 59. Washer |
| 8. Compressor | 60. Filter |
| 9. Compressor Mount | |
| 10. Motor | |
| 11. Cover (Scroll) | |
| 12. Impellor | |
| 13. Blower Cover | |
| 14. Liquid Line | |
| 15. Junction Box Assy, Comp. | |
| 17. Start Capacitor | |
| 18. Run Capacitor | |
| 19. Run Capacitor | |
| 20. Conduit & Wiring Assy | |
| 21. Motor Bracket | |
| 22. Motor Mount (Rubber) | |
| 23. Motor Mount (Steel) | |
| 24. Base Pan Assy | |
| 25. Scroll Assy | |
| 26. Evaporator Coil | |
| 27. Evaporator Cover Assy. | |
| 28. Customer Envelope | |
| 29. Gasket Pkg. | |
| 30. Exhaust Assy Complete | |
| 31. Gasket Pkg | |
| 32. Run Capacitor | |
| 33. Door w/hinge | |
| 34. Motor | |
| 35. Motor Mount | |
| 36. Blower Wheel | |
| 37. Scroll Assy, Right/left | |
| 38. Small Parts Pkg | |
| 40. Duct Collar | |
| 41. Knob | |
| 42. Decal | |
| 44. Wire Connector | |
| 45. Decal | |
| 46. Control Ass | |
| 49. Wire Bundle | |
| 50. Logo | |
| 51. Cover, Control Box left | |
| 52. Heat Strip Assembly | |
| 53. Heat Element | |

SPECIFICATIONS/DIMENSIONS

		6779 Delta TX Series
BTU Capacity (nominal)	Cooling	13,500
Electrical Rating		115 V/60 Hz./1 Phase
Compressor Locked Rotor AMPs		63.5
System Full Load AMPs At ARI Standard Condition	Cooling	14.1
RUNNING WATTS: (cooling) A.R.I. Standard Condition (80°F. DB/ 67°F. WB Indoor, 95°F. DB Outdoor at 115 VAC)		1600
RUNNING WATTS: (cooling) A.R.I. Maximum Condition (95°F. DB/ 71°F. WB Indoor, 115°F. DB Outdoor at 103.5 VAC)		1930
Evaporator Air Delivery (CFM)		Infinite Selection Between 210 to 310 CFM
Compressor Start Delay		4 Second Maximum
Low Voltage Shutdown Point		86 VAC \pm 6 VAC
Low Voltage Shutdown Time		40 Seconds Minimum 70 Seconds Maximum
Start Winding Cut Out Voltage		150 VAC Minimum 200 VAC Maximum
Compressor Start Limit 1st Try		.9 Seconds Minimum 1.9 Seconds Maximum
Compressor Start Limit 2nd Try		.6 Seconds Minimum 1.6 Seconds Maximum
Thermostat Cycling Temperature		61° \pm 5° @ Full Counterclockwise 85° \pm 5° @ Full Clockwise
Compressor Motor Resistance Both Windings R to S Run Winding R to C Start Winding C to S		Approximately: 7.0 Ohms @ Rx1 .5 Ohms @ Rx1 6.5 Ohms @ Rx1

EXTERIOR SHROUD	HEIGHT	12 $\frac{3}{4}$ "
	WIDTH	29"
	LENGTH	48"
CEILING PLATE	DEPTH	3"

FURNACE

Manufacturer: Hydro Flame Corporation
1874 South Pioneer Road
Salt Lake City, UT 84104
Phone: 801-972-4621

The manufacturer of the furnace in your motorhome has been well known in the RV industry for many years. The furnace burns LP gas, and is powered by 12 volt current from the battery or power converter when plugged into city power. Operating instructions are located in your Owners Packet. If they should become misplaced new literature can be ordered direct from the manufacturer or your Airstream dealer. The manufacturer also offers a detailed service guide for your furnace.

WARNING: Carefully read all the manufacturer's instructions prior to operating. NEVER store flammable material next to the furnace.

If warranty service is required use only a service location recommended by the furnace manufacturer or your Airstream dealer.

Lighting Directions

WARNING: This furnace is sealed and cannot be lit with a match. Failure to follow the instructions exactly may result in an explosion and possible damage to the furnace and injury to the operator.

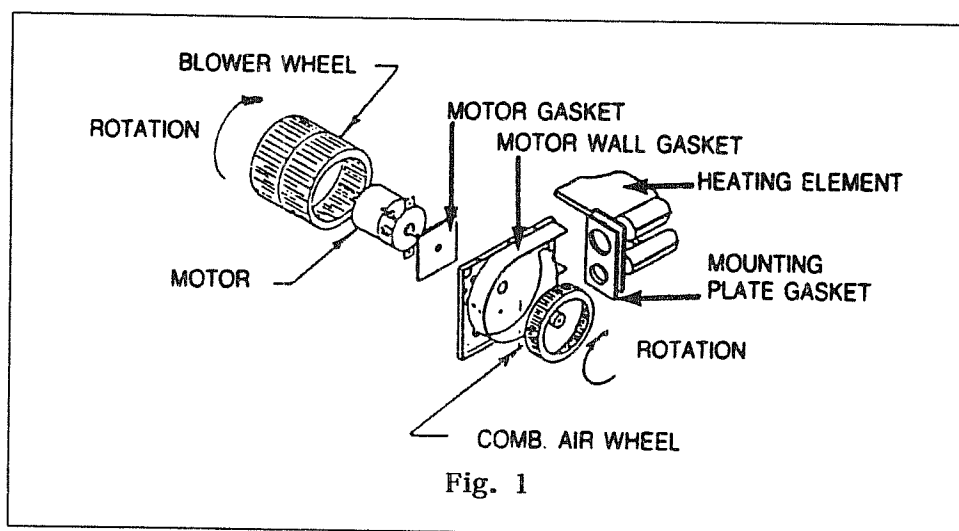
1. Set thermostat to "OFF".
2. Turn gas off at outside LP tank and wait 5 minutes.
3. Turn gas valve to "ON".
4. Turn thermostat up until blower comes on.
5. Allow 20 seconds or more for furnace to light due to a pre-purge cycle designed into the ignition system. On initial start up in cold weather it may take up to two (2) minutes for the furnace to light.
6. If burner does not light, set thermostat to "OFF", wait 60 seconds and try again for ignition.
7. If after three tries and no ignition, go to shutdown and determine the cause. Be sure to have gas to the furnace (no air in the gas line).
8. If furnace lights, set thermostat to desired temperature setting.

Furnace Components

WARNING: Service and repair procedures in the following text is intended for Qualified Service Personnel use only.

Blower Assembly

The blower assembly is powered by a 12 volt DC motor. Two wheels are used. One for circulating warm air and the other for providing combustion air. See Fig. 1. The blower motor is permanently lubricated and no oiling is required. However, the blower assembly, including blower wheels, should be cleaned every season to remove accumulations of dirt and lint.



Direct Spark Ignition Circuit Board

The circuit board is located on the back of the electrical panel just behind the front door. As shown in Fig. 2 it operates in conjunction with the igniter assembly (located at the right side of the control box on the burner box assembly). To provide safe reliable ignition without the use of a standing pilot as described in the "Sequence of Operation" section, the circuit board provides an initial purge cycle of about 20 seconds. During this time only the blower runs so that any unburned gases are purged out of the heat exchanger, prior to ignition.

This purge cycle time is unique to the circuit board used by Hydro Flame and is not the same as most other circuit boards used by other manufacturers. Therefore, it is essential to use only the Hydro Flame Circuit Board if a replacement is required. Hydro Flame circuit board has a protective cover added to the assembly to give added protection from handling and moisture. See Fig. 2.

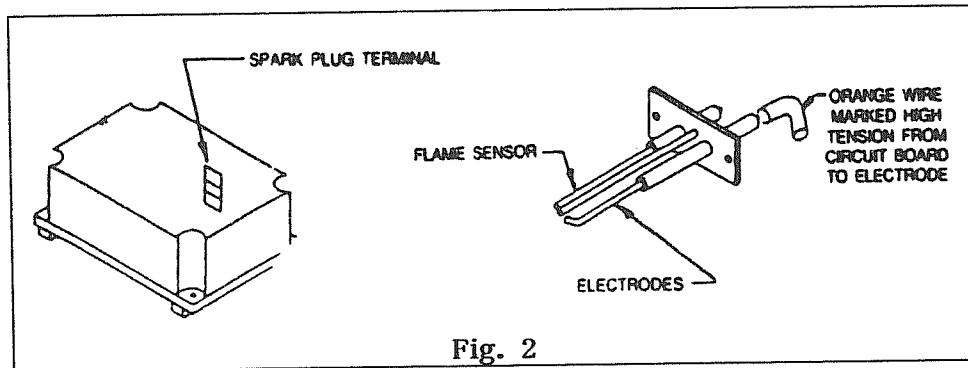


Fig. 2

The electrode assembly consists of two electrodes and one flame sensor probe. The spark produced by the circuit board to the electrodes ignites the burner after the purge cycle is completed. The flame sensor probe senses the heat from the burner and signals the circuit board to keep the gas valve open. If ignition does not occur so that the flame sensor does not sense heat, the circuit board will shut the gas valve off within 6 to 9 seconds.

Burner Assembly

To remove the burner assembly from the control box, first remove the draft shield assembly by opening the front door catches and unscrewing the wing nut located on the side of the combustion air housing cover and front screw. See Fig. 3. Next unscrew the manifold from the blower wall and remove the three (3) screws on the burner box.

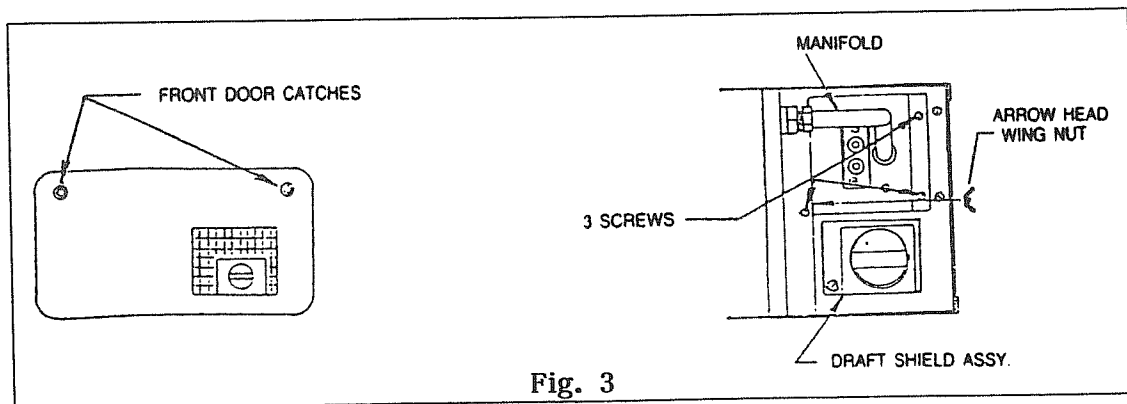


Fig. 3

Pull manifold to the right until manifold clears the brass fitting. Now remove burner assembly by pulling the manifold toward you and disconnecting the electrode wires.

CAUTION: When re-installing the burner assembly make sure the two screws on the burner box flange are secure and not stripped.

Air Seal Gaskets

In order to prevent leakage of combustion air from the sealed system, there are gaskets in the following places. These gaskets must be in place and undamaged. See Fig. 4 for gasket locations.

1. Heat exchanger gasket.
2. Motor wall gasket.
3. Motor gasket.

Heat Element Assembly

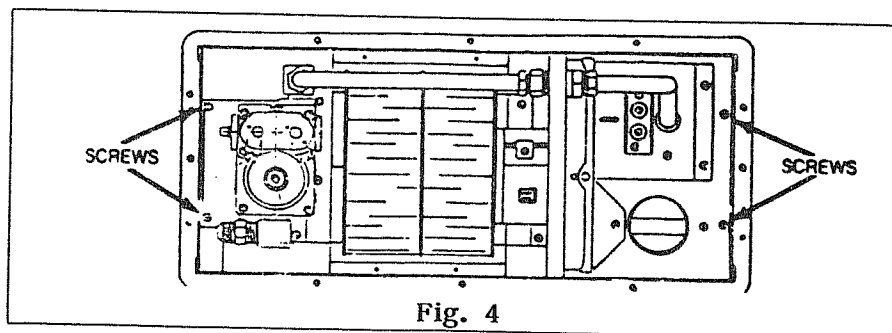
The heat element assembly can be removed in order to service the exchanger or the heat element gasket. Follow the steps listed:

1. Turn off gas at LP tanks.
2. Disconnect gas line from left side of furnace.

WARNING: Fire or explosion may result when gas line is disconnected at the furnace and the gas bleeds out. Check all appliances which have a pilot still burning and extinguish them or any other flame source in the vicinity.

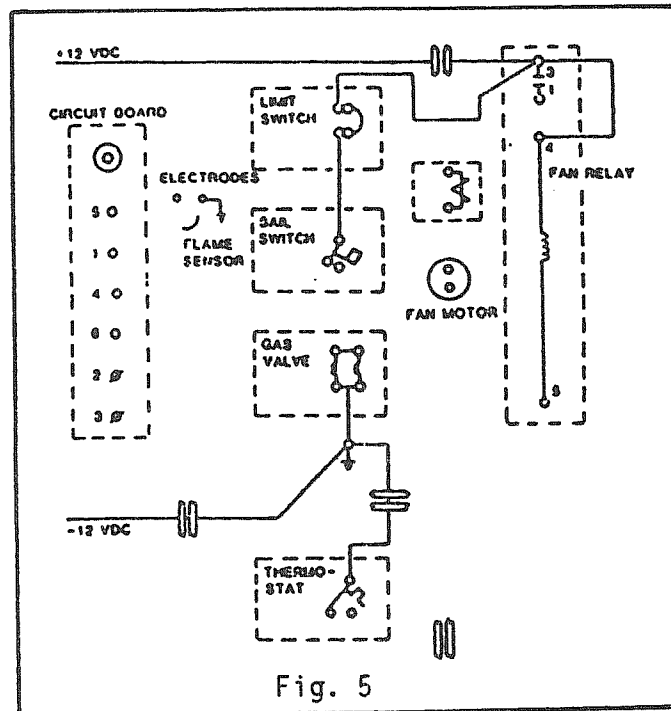
3. Unplug the electrical plastic disconnect plug from the left side of the furnace.
4. Remove six screws on the left inside of the control box and the two screws on the right inside of the control box. See Fig. 4.
5. Remove the twelve screws holding the front door on.
6. Pull the entire control box assembly forward where it can now be serviced and bench tested.
7. Remove burner assembly as described earlier and remove three remaining screws holding element assembly to control box.

CAUTION: When re-installing heat element assembly and control box assembly, be sure all screws are firmly in place.

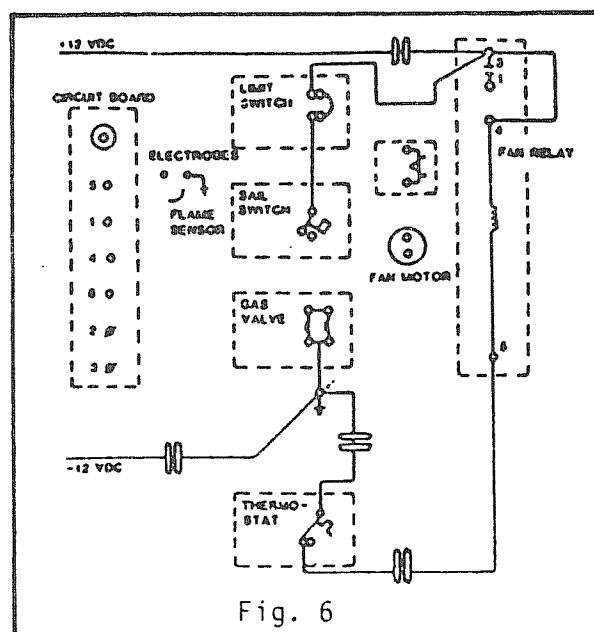


SEQUENCE OF OPERATION

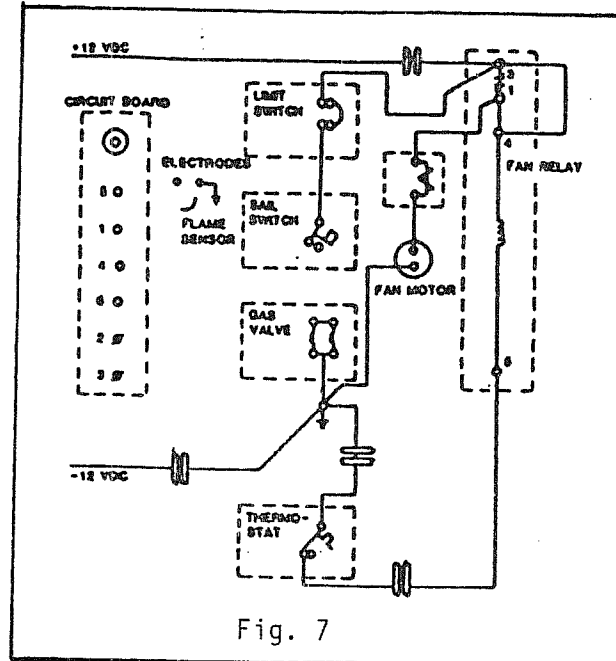
- A. On stand by the +12 VDC is connected to terminal #3 of the fan relay which is closed. The voltage will extend (1) through the red wire to terminal #1 of the open fan relay, (2) through another red wire to the limit switch, (3) through the limit, (4) through the red wire to the sail switch. See Fig. 5.



- B. When the temperature inside the RV drops to the set temperature of the thermostat, the thermostat contacts close to (1) switch 12 VDC to terminal #5 of the fan relay terminal, (2) through the yellow wire to -12 VDC ground, thus the fan relay coil is energized. See Fig. 6

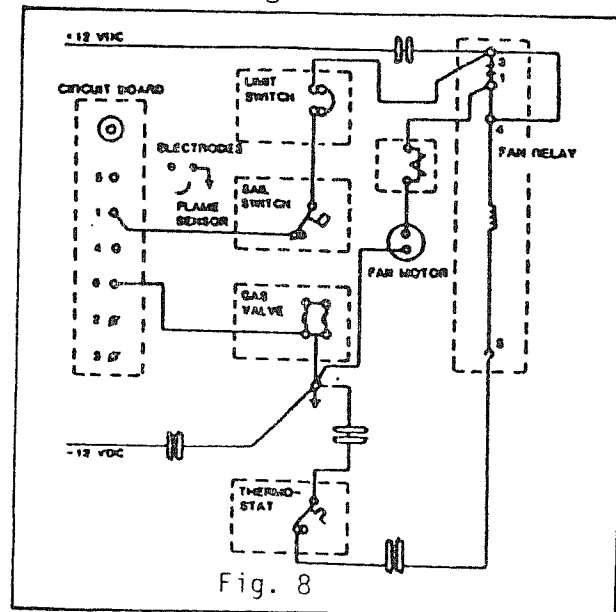


- C. With the fan relay coil energized, the contacts of the fan relay will close and the +12 VDC will pass (1) through the contacts from #3 to #1, (2) through the red wire to the circuit breaker, (3) through the circuit breaker, (4) through the red wire to the motor, (5) through the motor, (6) through the black wire to the ground system. Thus, the fan motor runs. See Fig. 7



- D. As the fan comes up to speed the air current will close the sail switch and the +12 VDC will pass (1) through the sail switch, (2) through the wire to the #1 terminal of the circuit board.

Note: The ground side of the circuit board is established from terminal 6 through the red wire to the grounded side of the fan relay. When the circuit board is energized it will start the 20 second count down of purge time. See Fig. 8.



- E. When the 20 second purge time is complete, the circuit board will switch +12 VDC to the ungrounded terminal of the gas valve and the gas valve will open. The circuit board will simultaneously initiate the igniter spark through the large orange wire to the igniter electrode, then ignition will occur. See Fig. 9.

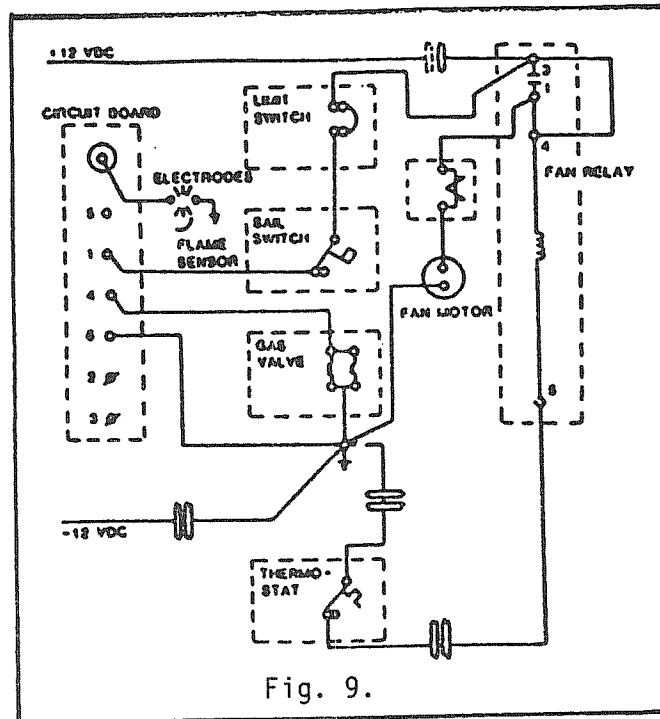


Fig. 9.

- F. When the gas valve is energized and the ignition spark occurs, (Paragraph E) the circuit board will start the 6 to 9 seconds waiting time to prove the presence of a flame. When the flame is established above the burner in less than 6 to 9 seconds, the flame sensor will detect the flame and signal (through the black wire to terminal #5) circuit board to continue the heating cycle.

Note: If the flame sensor does not detect a flame, the flame sensor will signal the circuit board to lock-out the gas valve.

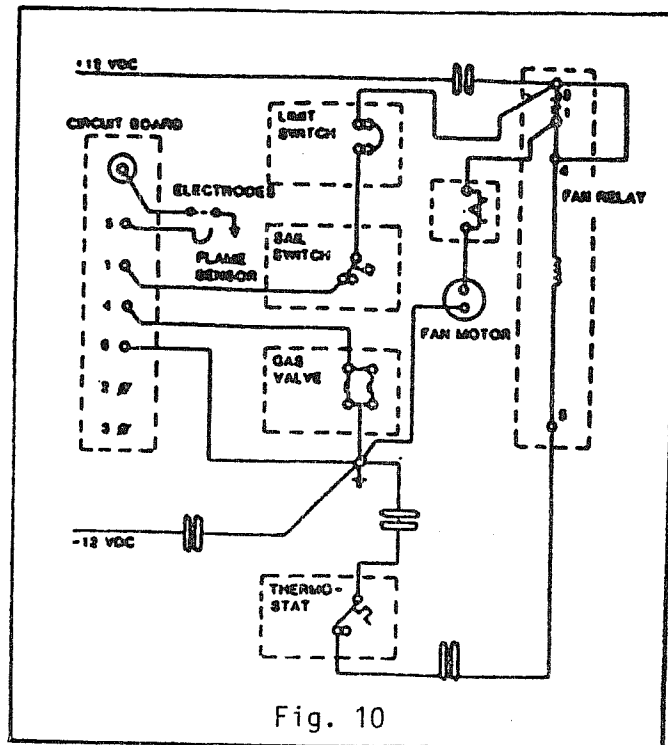


Fig. 10

- G. When the temperature of the RV rises above the thermostat set temperature, the thermostat will open and disconnect the -12 VDC to terminal #5 of the fan relay. Then the gas valve will close and the fan relay contacts will open, after a cool down period of 1 to 2 minutes for the heat in the fan relay coil to be extracted. See Fig. 11.

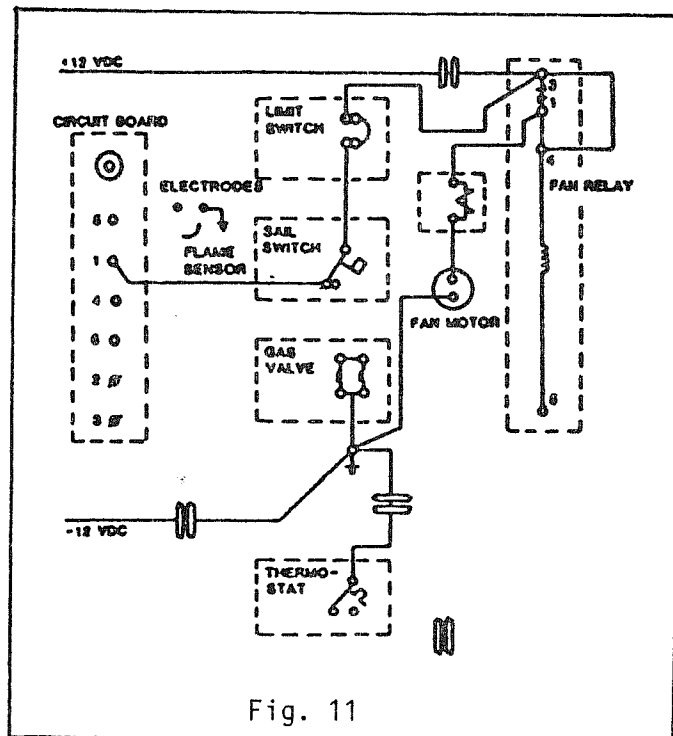
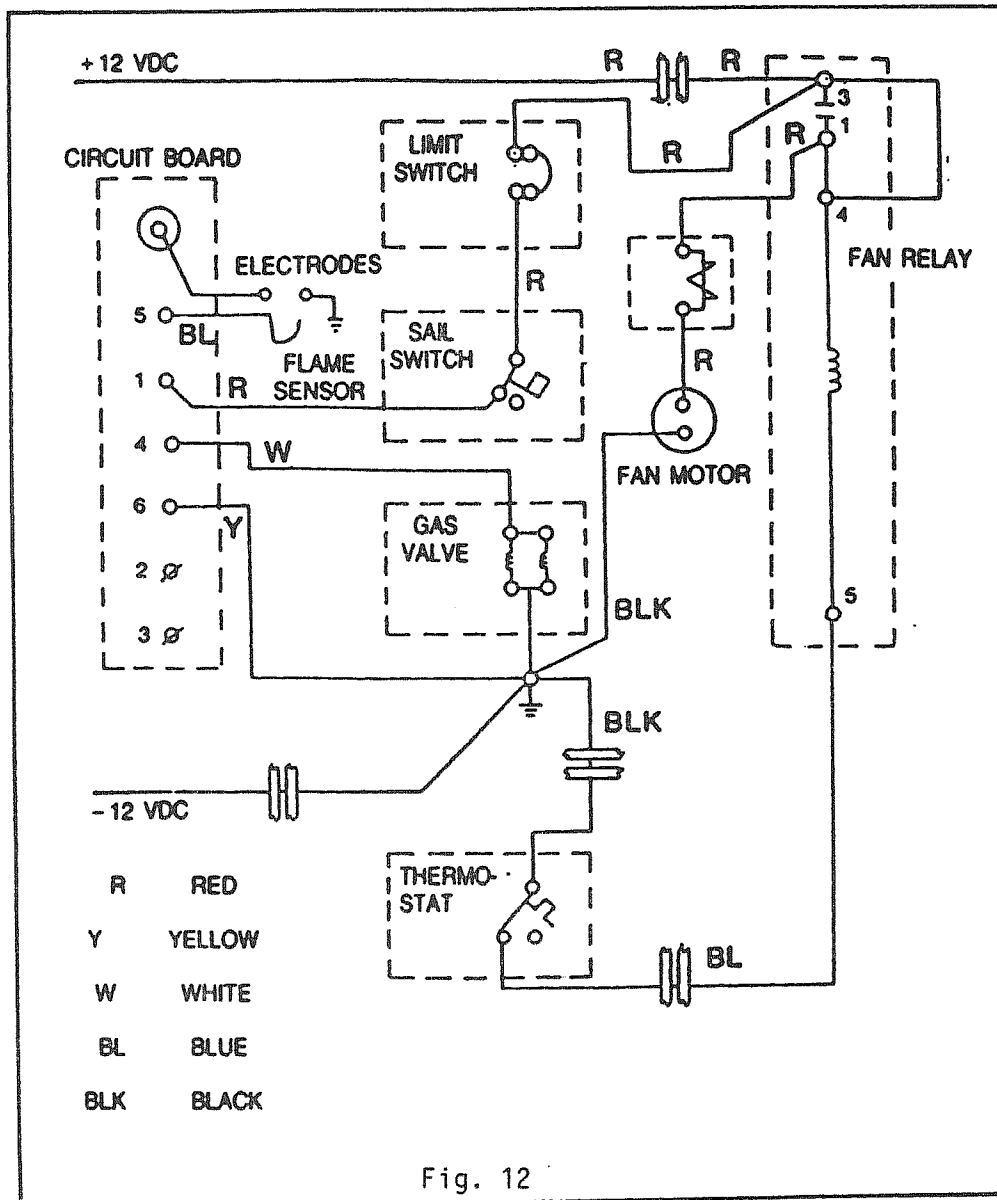


Fig. 11

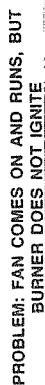
The complete wiring diagram, with all switches in their normal positions, is shown in Fig. 12.



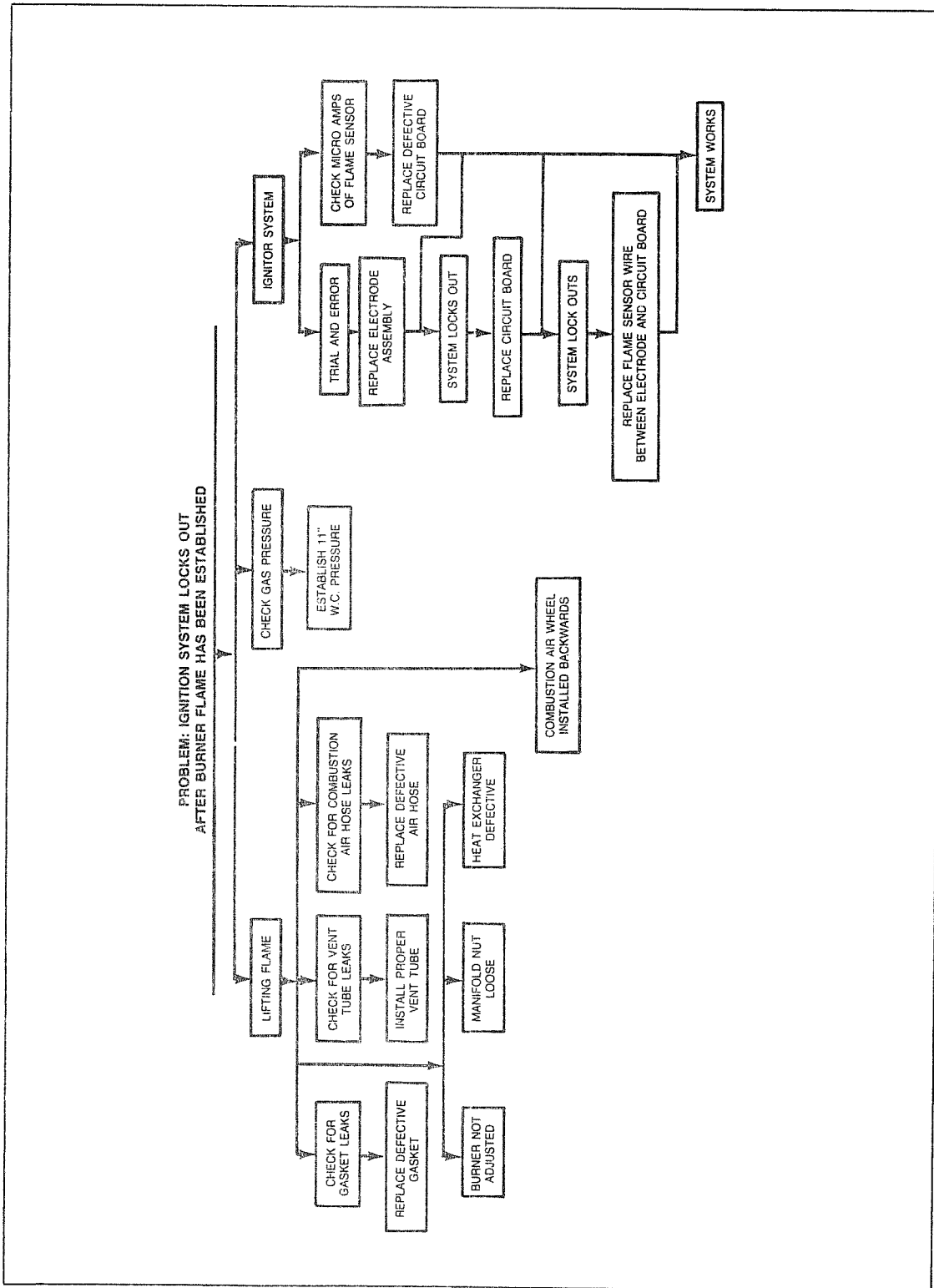
```

graph TD
    Start([PROBLEM: FAN DOES NOT RUN,  
AND THERMOSTAT "ON"]) --> Step1[CHECK VOLTAGE AT FIELD LEAD]
    Step1 --> Step2{0 VDC}
    Step1 --> Step3{12 VDC}
    
    Step2 --> Step4[115 VOLT SYSTEM]
    Step2 --> Step5[12 VOLT MODELS]
    Step5 --> Step6[RESTORE BATTERY POWER  
TO FURNACE]
    Step6 --> Step7{FAN MOTOR  
DONESNT RUN}
    Step7 --> Step8[CHECK FURNACE WIRING]
    Step8 --> Step9{FAN MOTOR  
DONESNT RUN}
    Step9 --> Step10[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step10 --> Step11{0 VOLTS}
    Step10 --> Step12{115 VOLTS}
    Step11 --> Step13[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step13 --> Step14{0 VOLTS}
    Step14 --> Step15[REPLACE DEFECTIVE  
CONVERTOR]
    Step12 --> Step16[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step16 --> Step17{0 VOLTS}
    Step17 --> Step18[REPLACE DEFECTIVE  
CONVERTOR]
    Step16 --> Step19{12 VDC}
    Step19 --> Step20[REPLACE DEFECTIVE  
MOTOR]
    Step19 --> Step21[CHECK CIRCUIT BREAKER]
    Step21 --> Step22{0 VOLTS}
    Step22 --> Step23[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step3 --> Step24[CHECK THERMOSTAT CIRCUIT]
    Step24 --> Step25{THERMOSTAT CIRCUIT CLOSED}
    Step25 --> Step26{JUMP RELAY}
    Step26 --> Step27{FAN MOTOR RUNS}
    Step27 --> Step28[CHECK RELAY]
    Step28 --> Step29[REPLACE DEFECTIVE  
RELAY]
    Step26 --> Step30{FAN MOTOR DOESNT RUN}
    Step30 --> Step31[CHECK CIRCUIT BREAKER]
    Step31 --> Step32{12 VDC}
    Step32 --> Step33[REPLACE DEFECTIVE  
MOTOR]
    Step31 --> Step34{0 VOLTS}
    Step34 --> Step35[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step25 --> Step36[CHECK WIRING  
TO THERMOSTAT  
FOR OPEN CIRCUIT]
    Step36 --> Step37[REPLACE DEFECTIVE  
THERMOSTAT]
    Step37 --> Step38{THERMOSTAT LOCATED  
IN HIGH HEAT AREA}
    Step38 --> Step39[THERMOSTAT CIRCUIT OPEN]
    Step39 --> Step40[CHECK WIRING AT CONVERTOR]
    Step40 --> Step41[REPLACE CONVERTOR]
    Step41 --> Step42{FAN MOTOR  
DONESNT RUN}
    Step42 --> Step43[CHECK FURNACE WIRING]
    Step43 --> Step44{FAN MOTOR  
DONESNT RUN}
    Step44 --> Step45[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step45 --> Step46{0 VOLTS}
    Step46 --> Step47[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step47 --> Step48{0 VOLTS}
    Step48 --> Step49[REPLACE DEFECTIVE  
CONVERTOR]
    Step47 --> Step50{115 VOLTS}
    Step50 --> Step51[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step51 --> Step52{0 VOLTS}
    Step52 --> Step53[REPLACE DEFECTIVE  
CONVERTOR]
    Step51 --> Step54{12 VDC}
    Step54 --> Step55[REPLACE DEFECTIVE  
MOTOR]
    Step54 --> Step56[CHECK CIRCUIT BREAKER]
    Step56 --> Step57{0 VOLTS}
    Step57 --> Step58[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step59[CHECK FURNACE WIRING]
    Step59 --> Step60{FAN MOTOR  
DONESNT RUN}
    Step60 --> Step61[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step61 --> Step62{0 VOLTS}
    Step62 --> Step63[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step63 --> Step64{0 VOLTS}
    Step64 --> Step65[REPLACE DEFECTIVE  
CONVERTOR]
    Step62 --> Step66{115 VOLTS}
    Step66 --> Step67[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step67 --> Step68{0 VOLTS}
    Step68 --> Step69[REPLACE DEFECTIVE  
CONVERTOR]
    Step67 --> Step70{12 VDC}
    Step70 --> Step71[REPLACE DEFECTIVE  
MOTOR]
    Step70 --> Step72[CHECK CIRCUIT BREAKER]
    Step72 --> Step73{0 VOLTS}
    Step73 --> Step74[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step75[CHECK FURNACE WIRING]
    Step75 --> Step76{FAN MOTOR  
DONESNT RUN}
    Step76 --> Step77[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step77 --> Step78{0 VOLTS}
    Step78 --> Step79[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step79 --> Step80{0 VOLTS}
    Step80 --> Step81[REPLACE DEFECTIVE  
CONVERTOR]
    Step78 --> Step82{115 VOLTS}
    Step82 --> Step83[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step83 --> Step84{0 VOLTS}
    Step84 --> Step85[REPLACE DEFECTIVE  
CONVERTOR]
    Step83 --> Step86{12 VDC}
    Step86 --> Step87[REPLACE DEFECTIVE  
MOTOR]
    Step86 --> Step88[CHECK CIRCUIT BREAKER]
    Step88 --> Step89{0 VOLTS}
    Step89 --> Step90[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step91[CHECK FURNACE WIRING]
    Step91 --> Step92{FAN MOTOR  
DONESNT RUN}
    Step92 --> Step93[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step93 --> Step94{0 VOLTS}
    Step94 --> Step95[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step95 --> Step96{0 VOLTS}
    Step96 --> Step97[REPLACE DEFECTIVE  
CONVERTOR]
    Step94 --> Step98{115 VOLTS}
    Step98 --> Step99[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step99 --> Step100{0 VOLTS}
    Step100 --> Step101[REPLACE DEFECTIVE  
CONVERTOR]
    Step99 --> Step102{12 VDC}
    Step102 --> Step103[REPLACE DEFECTIVE  
MOTOR]
    Step102 --> Step104[CHECK CIRCUIT BREAKER]
    Step104 --> Step105{0 VOLTS}
    Step105 --> Step106[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step107[CHECK FURNACE WIRING]
    Step107 --> Step108{FAN MOTOR  
DONESNT RUN}
    Step108 --> Step109[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step109 --> Step110{0 VOLTS}
    Step110 --> Step111[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step111 --> Step112{0 VOLTS}
    Step112 --> Step113[REPLACE DEFECTIVE  
CONVERTOR]
    Step110 --> Step114{115 VOLTS}
    Step114 --> Step115[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step115 --> Step116{0 VOLTS}
    Step116 --> Step117[REPLACE DEFECTIVE  
CONVERTOR]
    Step115 --> Step118{12 VDC}
    Step118 --> Step119[REPLACE DEFECTIVE  
MOTOR]
    Step118 --> Step120[CHECK CIRCUIT BREAKER]
    Step120 --> Step121{0 VOLTS}
    Step121 --> Step122[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step123[CHECK FURNACE WIRING]
    Step123 --> Step124{FAN MOTOR  
DONESNT RUN}
    Step124 --> Step125[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step125 --> Step126{0 VOLTS}
    Step126 --> Step127[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step127 --> Step128{0 VOLTS}
    Step128 --> Step129[REPLACE DEFECTIVE  
CONVERTOR]
    Step126 --> Step130{115 VOLTS}
    Step130 --> Step131[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step131 --> Step132{0 VOLTS}
    Step132 --> Step133[REPLACE DEFECTIVE  
CONVERTOR]
    Step131 --> Step134{12 VDC}
    Step134 --> Step135[REPLACE DEFECTIVE  
MOTOR]
    Step134 --> Step136[CHECK CIRCUIT BREAKER]
    Step136 --> Step137{0 VOLTS}
    Step137 --> Step138[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step139[CHECK FURNACE WIRING]
    Step139 --> Step140{FAN MOTOR  
DONESNT RUN}
    Step140 --> Step141[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step141 --> Step142{0 VOLTS}
    Step142 --> Step143[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step143 --> Step144{0 VOLTS}
    Step144 --> Step145[REPLACE DEFECTIVE  
CONVERTOR]
    Step142 --> Step146{115 VOLTS}
    Step146 --> Step147[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step147 --> Step148{0 VOLTS}
    Step148 --> Step149[REPLACE DEFECTIVE  
CONVERTOR]
    Step147 --> Step150{12 VDC}
    Step150 --> Step151[REPLACE DEFECTIVE  
MOTOR]
    Step150 --> Step152[CHECK CIRCUIT BREAKER]
    Step152 --> Step153{0 VOLTS}
    Step153 --> Step154[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step155[CHECK FURNACE WIRING]
    Step155 --> Step156{FAN MOTOR  
DONESNT RUN}
    Step156 --> Step157[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step157 --> Step158{0 VOLTS}
    Step158 --> Step159[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step159 --> Step160{0 VOLTS}
    Step160 --> Step161[REPLACE DEFECTIVE  
CONVERTOR]
    Step158 --> Step162{115 VOLTS}
    Step162 --> Step163[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step163 --> Step164{0 VOLTS}
    Step164 --> Step165[REPLACE DEFECTIVE  
CONVERTOR]
    Step163 --> Step166{12 VDC}
    Step166 --> Step167[REPLACE DEFECTIVE  
MOTOR]
    Step166 --> Step168[CHECK CIRCUIT BREAKER]
    Step168 --> Step169{0 VOLTS}
    Step169 --> Step170[REPLACE DEFECTIVE  
CIRCUIT BREAKER]
    
    Step42 --> Step171[CHECK FURNACE WIRING]
    Step171 --> Step172{FAN MOTOR  
DONESNT RUN}
    Step172 --> Step173[CHECK FOR 115 VOLTS TO CONVERTOR]
    Step173 --> Step174{0 VOLTS}
    Step174 --> Step175[CHECK 115 VOLTS  
FROM CONVERTOR]
    Step175 --> Step176{0 VOLTS}
    Step176 --> Step177[REPLACE DEFECTIVE  
CONVERTOR]
    Step174 --> Step178{115 VOLTS}
    Step178 --> Step179[CHECK FOR 12 VOLTS  
FROM CONVERTOR]
    Step179 --> Step180{0 VOLTS}
    Step180 --> Step181[REPLACE DEFECTIVE  
CONVERTOR]
    Step179 --> Step182{12 VDC}
    Step182 --> Step
```

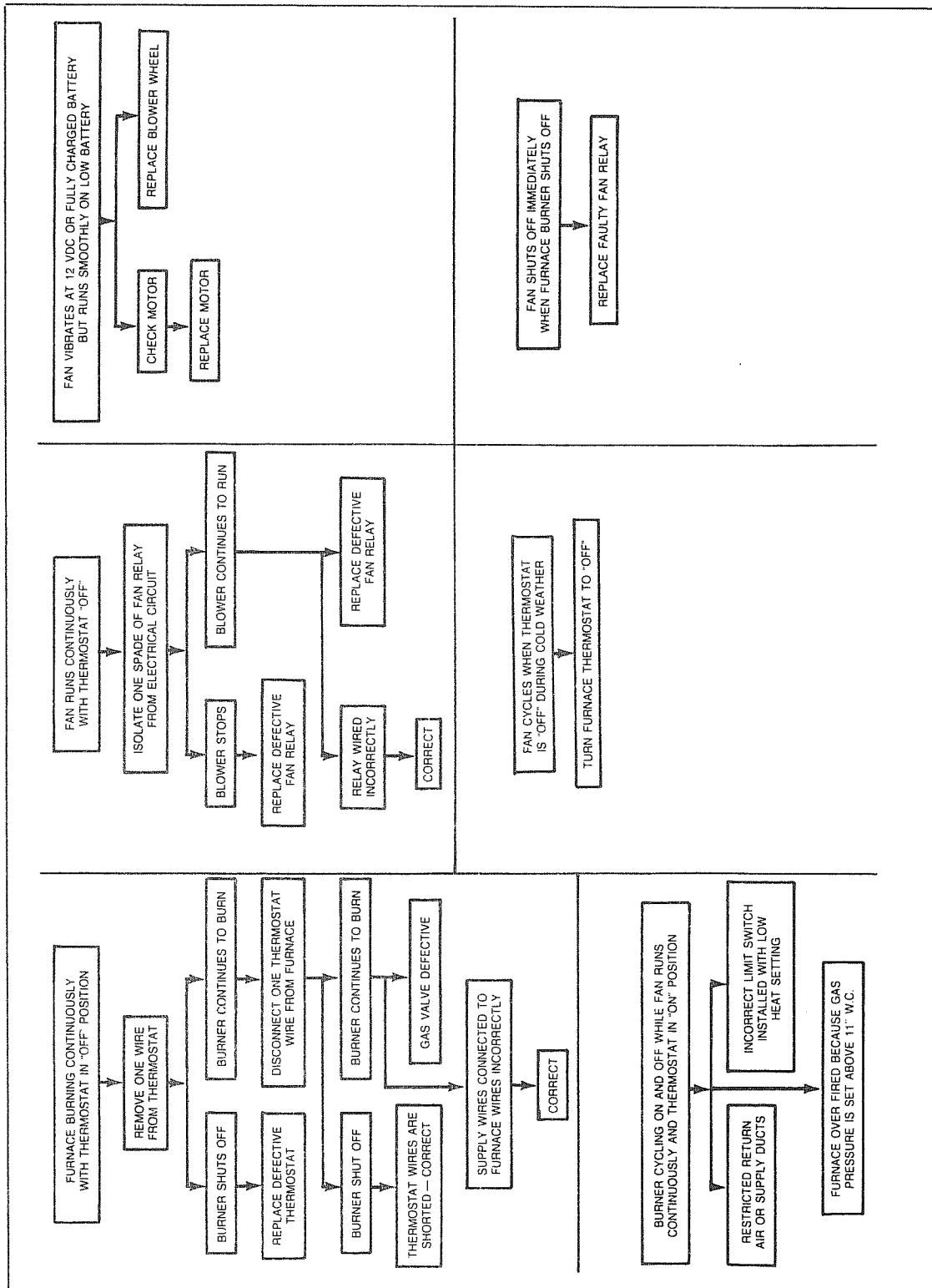
SERVICE CHART #2



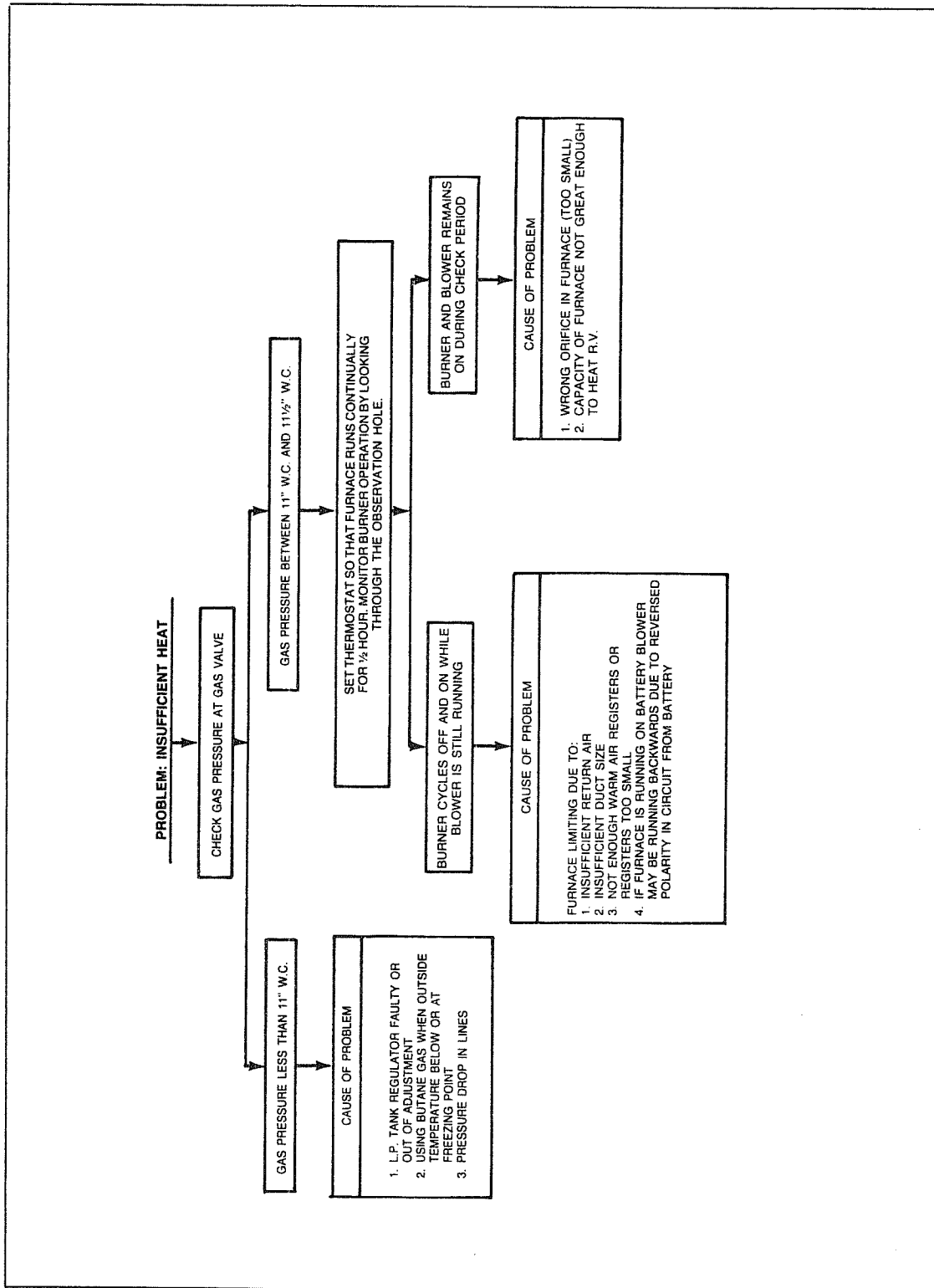
SERVICE CHART #3



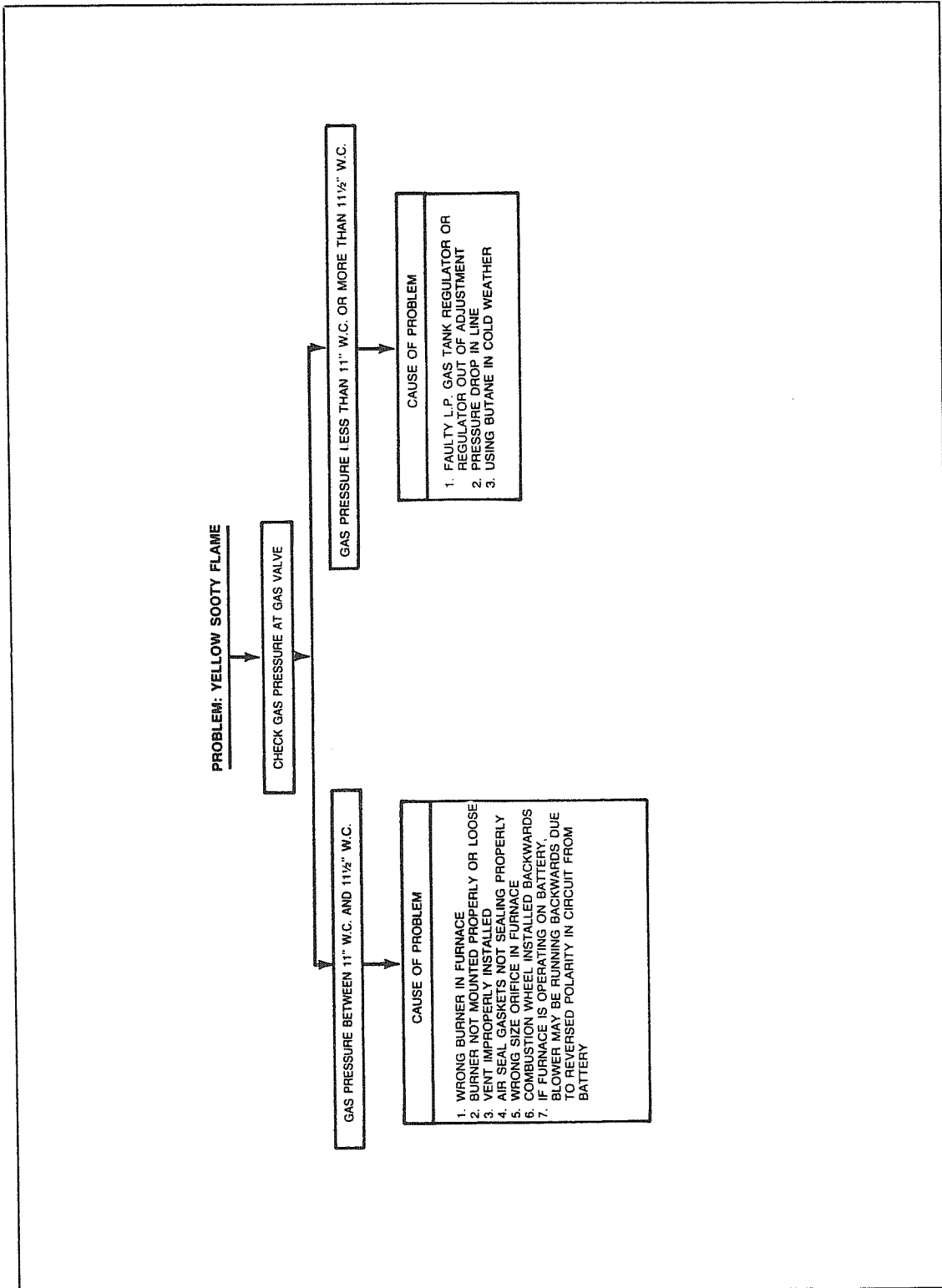
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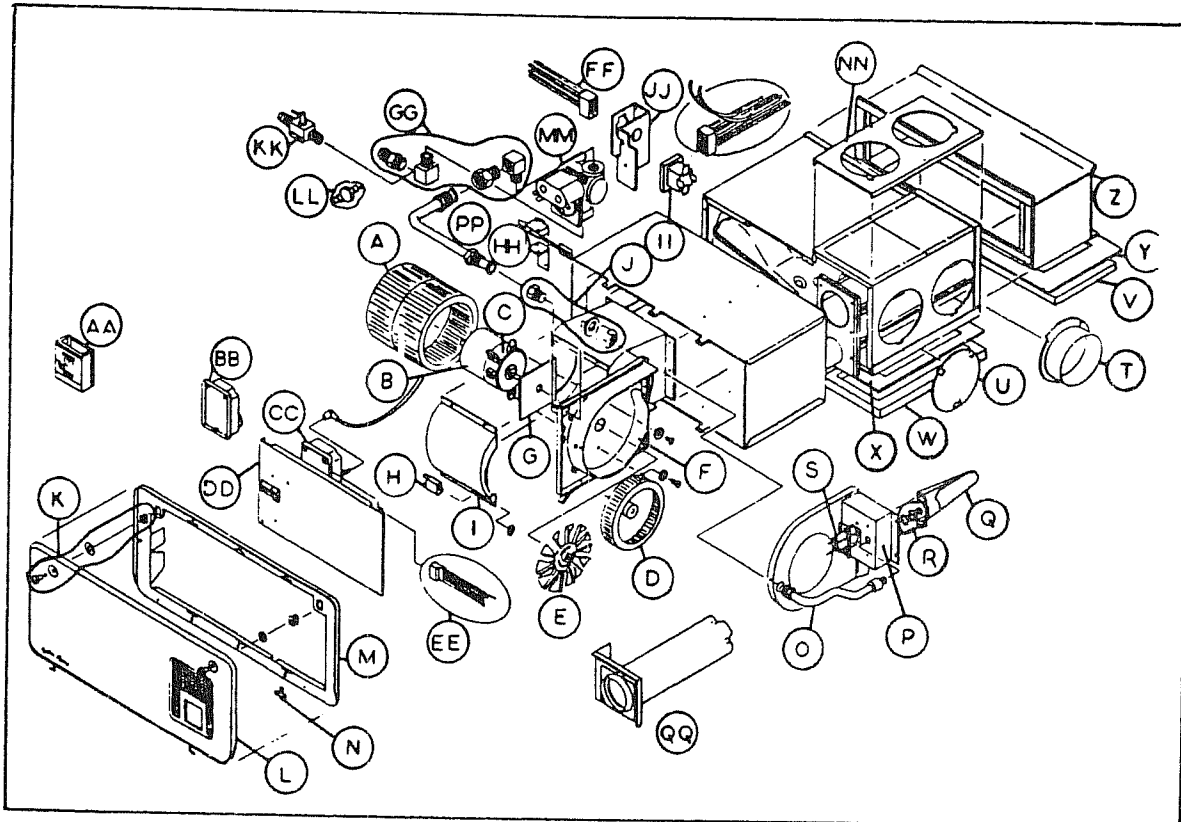
SERVICE CHART #5



SERVICE CHART #6



FURNACE PARTS LIST



- | | |
|----------------------------------|----------------------------------|
| A. Blower Wheel | V. Large Bottom Gasket |
| B. Motor | W. Small Bottom Gasket |
| C. Motor Bracket Assembly | X. Top Bottom Plenum Plate |
| D. Combustion Wheel | Y. Bottom Plenum Plate |
| F. Motor Mounting Wall Assy | Z. Bottom Extension Adapter |
| G. Motor Gasket | AA. Thermostat |
| H. Circuit Breaker | BB. ITT DSI Board |
| I. Blower Housing Back Cover | DD. Electrical Panle Assy |
| J. Motor Wall Brass Fitting | EE. Electrical Panel Wiring Assy |
| K. Door Catch and Latch Assy (2) | FF. Electrical Field Hookup |
| L. Front Door Panel Assy | GG. Valve Brass Fittings |
| M. Outer Bezel Assy | HH. Sail Switch Assy |
| N. Door Hinge Clip (20 | II. Relay |
| O. Manifold Right Side | JJ. White/Roger Valve Bracket |
| P. Burner box Assy | KK. Brass Shut off 3/8 x 3/8 |
| Q. Burner Assy | LL. Limit Switch |
| R. Orifice and Manifold nut | MM. White/Roger Valve |
| S. Electrodes | NN. Bottom Discharge Cover |
| T. Duct Adapter | PP. Manifold Left Side |
| U. Duct Cover Plate | QQ. Draft Cap Assy |

REFRIGERATOR

Manufacturer: Dometic Sales Corporation
2320 Industrial Parkway
P.O. Box 490
Elkhart, Indiana 46515
Phone: 219-295-5228

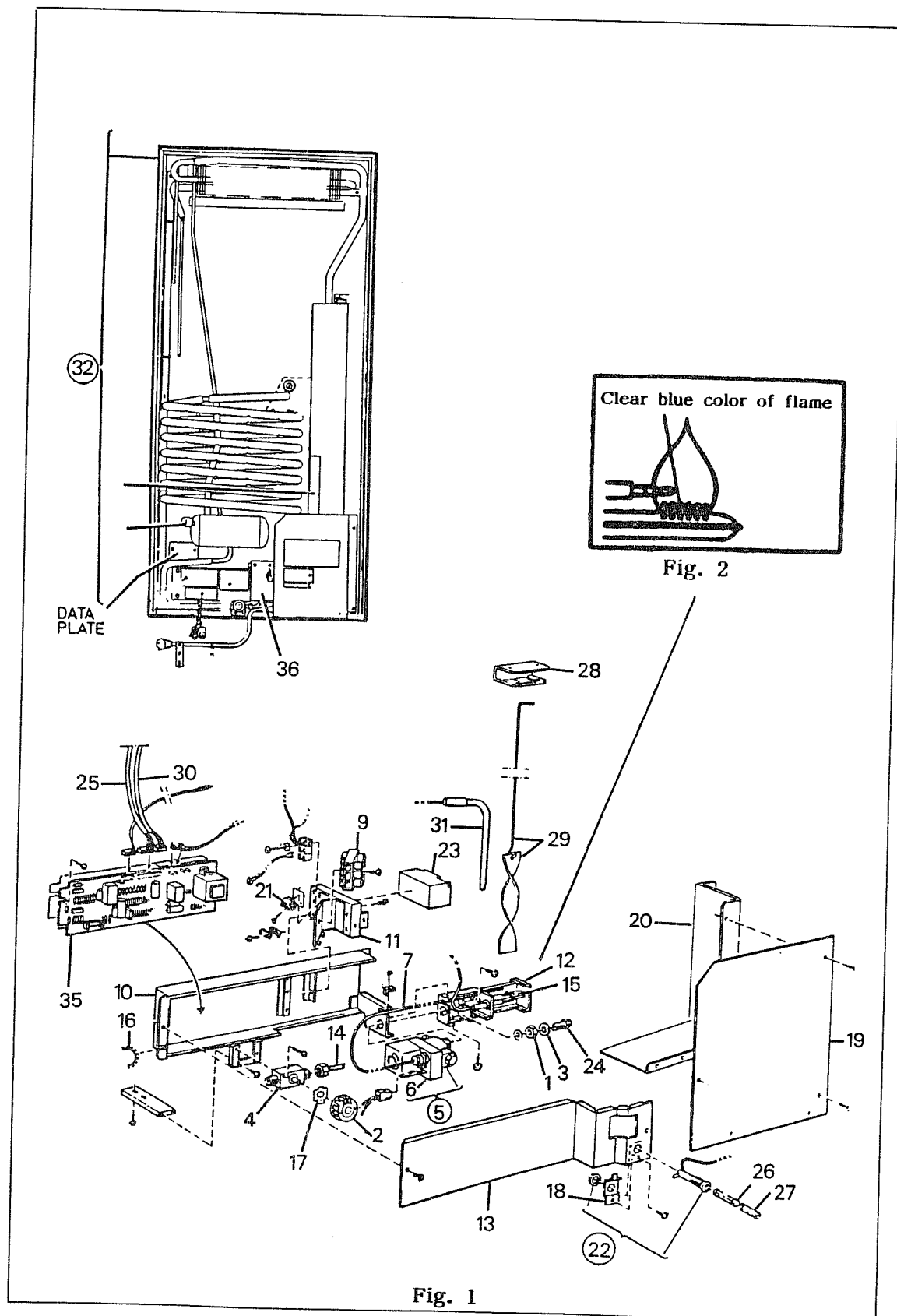
The refrigerator in your motorhome is an absorption type that works on either 110 volt city power or LP gas. For proper operation the refrigerator must be level in order for the refrigerant to circulate properly. In each refrigerator a round level has been provided. When parking the motorhome set the level in the freezer box (it may be left in the freezer without being damaged) and adjust the motorhome until the bubble stays within the circle. The level is set so it duplicates the refrigerator level. Refrigerators will sometimes operate if they are not level, but at the same time they are being damaged in such a way it may be necessary to replace a costly cooling unit prematurely.

Operating instructions are in your Owner's Packet and by the refrigerator controls. The manufacturer can provide a detailed parts list along with a diagnostic guide.

When loading your refrigerator always allow some space between articles so the cold air can circulate properly. Before traveling make sure all lids are securely on containers.

Make absolutely sure the refrigerator door is latched. It's no fun to clean up a mixture of eggs, jelly and leftover baked beans.

When storing the motorhome, and the refrigerator is turned off, it is a good idea to leave the door partially open so air can circulate.



PARTS DESCRIPTION - PRECEDING PAGE

- 1 Nut
- 2 Knob
- 3 Washer
- 4 Gas valve
- 5 Thermo-electric solenoid valve cpl.
- 6 Solenoid valve
- 7 Thermocouple element
- 8 Insulation plate
- 9 Terminal
- 10 Component box
- 11 Retainer
- 12 Burner housing
- 13 Cover
- 14 Gas pipe
- 15 Burner
- 16 Strip
- 17 Knob protecton
- 18 Retainer
- 19 Protection plate
- 20 Protection plate
- 21 Terminal
- 22 Fuse holder
- 23 Igniter
- 24 Burner jet
- 25 Lead
- 26 Fuse link, 3A
- 27 Insert
- 28 Flue cap
- 29 Flue baffle cpl.
- 30 Lead for light
- 31 Heater, 120V, 295W
- 32 Cooling unit
- 33 Filling cap
- 34 Lid
- 35 Circuit board
- 36 Splash protection

REFRIGERATOR CABINET RM2603/2803

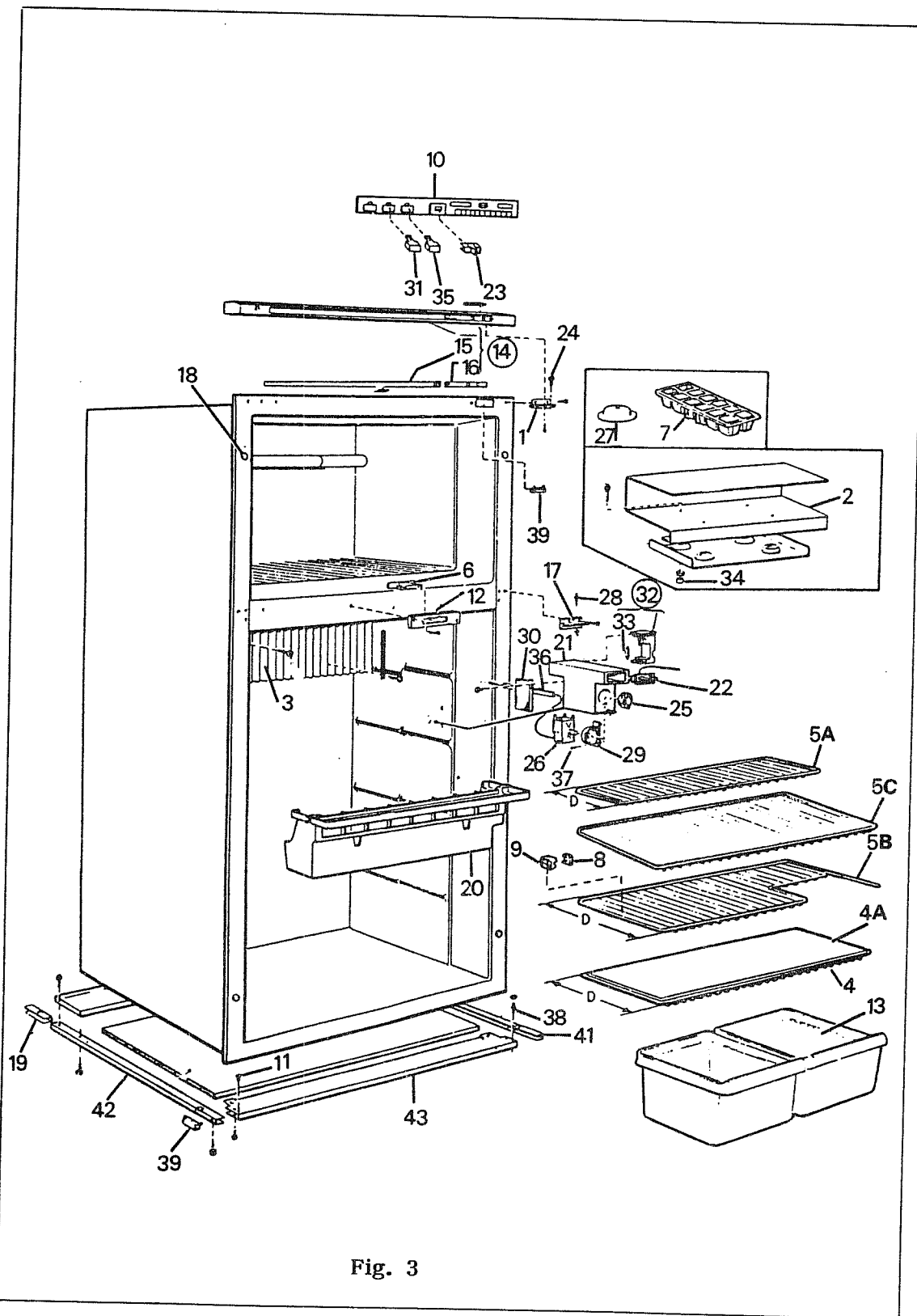
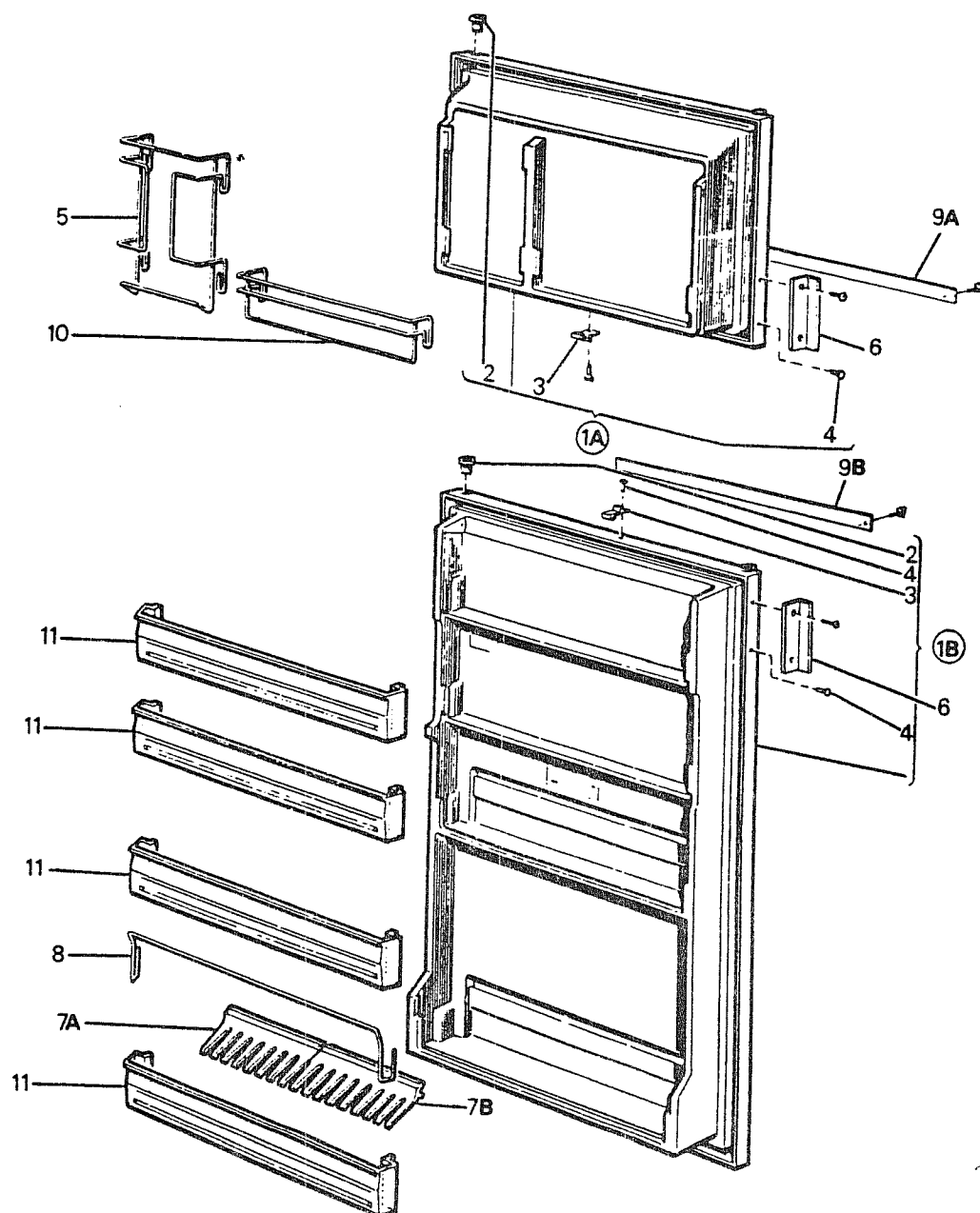


Fig. 3

PARTS DESCRIPTION - PRECEDING PAGE

- 1 Hinge, upper
- 2 Shelf
- 3 Cooling flange
- 4 Shelf, D
- 4A Shelf, plastic
- 5A Shelf, compl
- 5B Shelf, D approx 12"
- 5C Shelf, 12"
- 6 Latch, gray brown
- 7 Ice tray
- 8 Shelf lock, outer
- 9 Shelf lock, inner
- 10 Circuit board
- 11 Plug, gray brown
- 12 Latch housing, gray brown
- 13 Crisper, brown
- 14 Front decoration, cpl. gray brown
- 15 Decoration strip
- 16 Decoration strip
- 17 Hinge
- 18 Plug, gray brown
- 19 Support
- 20 Drip tray
- 21 Cover
- 22 Switch
- 23 Key
- 24 Hinge pin, upper
- 25 Knob, thermostat, light brown
- 26 Thermostat
- 27 Spirit level
- 28 Hinge pin
- 29 Thermostat retainer
- 30 Lamp shade
- 31 Push button
- 32 Light 12V cpl.
- 33 Lamp 12V
- 34 Cover
- 35 Push button
- 36 Cover
- 37 Pin
- 38 Hinge pin
- 39 Ferrule
- 40 Gable, RH gray brown
- 41 Gable, LH gray brown
- 41 Base side, RH
- 42 Base side, LH
- 43 Base front, gray brown

DOOR CABINET RM2603/2803



- | | | | |
|----|---------------------------|----|--------------------------|
| 1A | Door, Upper w/o Shelves | 7B | Bottle holder, 8" approx |
| 1B | Door, Lower w/o Shelves | 8 | Rack |
| 2 | Bushing | 9A | Decoration Strip |
| 3 | Catch Retainer | 9B | Decoration Strip |
| 4 | Plug, Grey | 10 | Wire Shelf |
| 5 | Basket | 11 | Door Shelf |
| 6 | Handle | | |
| 7A | Bottle holder, 7" approx. | | |

Fig. 4

WIRING DIAGRAM RM2603/2803

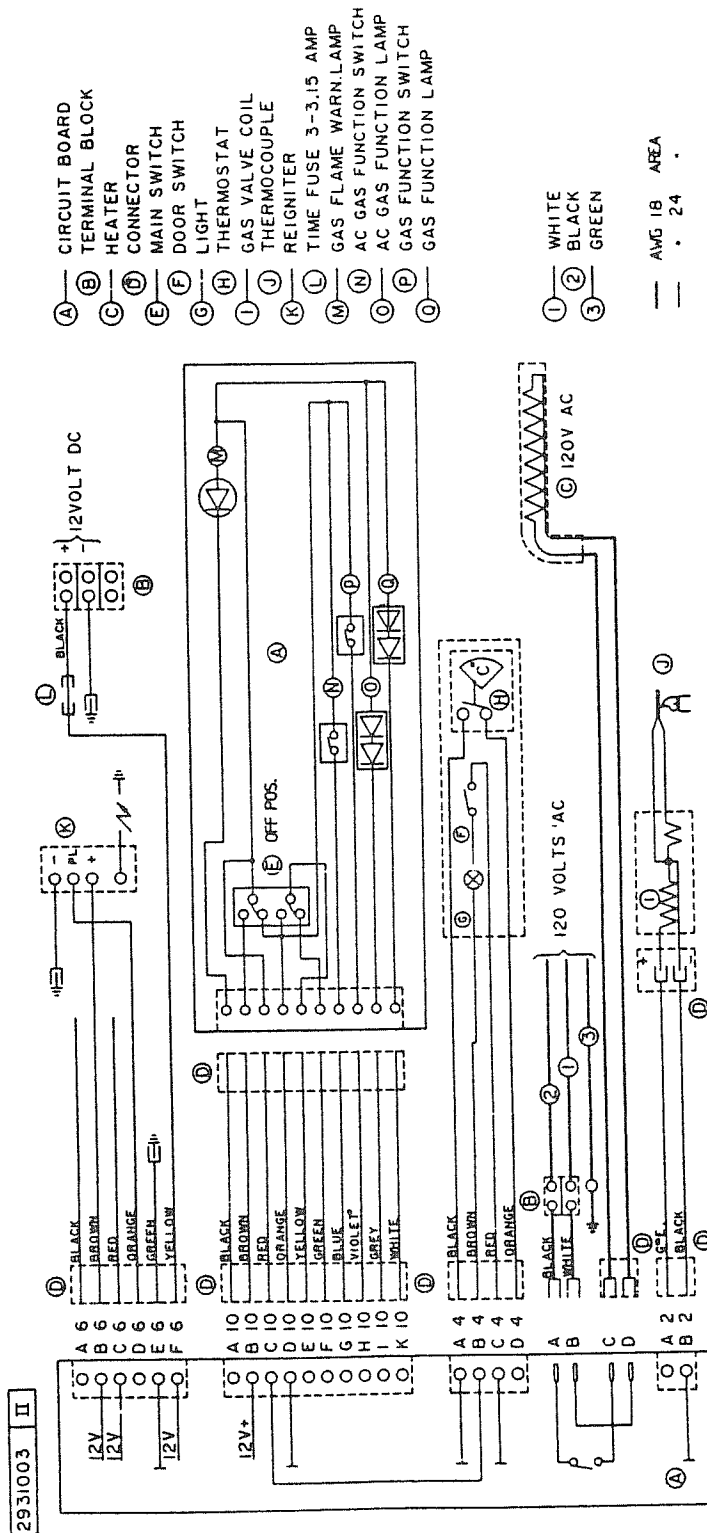


Fig. 5

To Remove and Replace the Refrigerator

Before working on the refrigerator make sure that 120V AC and 12V DC leads are disconnected. Shut the gas valve. Unscrew the hexagon nut and gas shut off valve. Let the gas valve remain on the gas supply line.

Loosen the screws fixing the refrigerator to the enclosure and remove the refrigerator. See Fig. 6

When replacing the refrigerator make sure that the sealing strips are properly positioned. After reassembly the gas connection should be checked for leaks.

Laying a sheet of thin hard material, such as masonite, in front of the refrigerator will make it easier to slide out. This will also help protect the carpet or flooring.

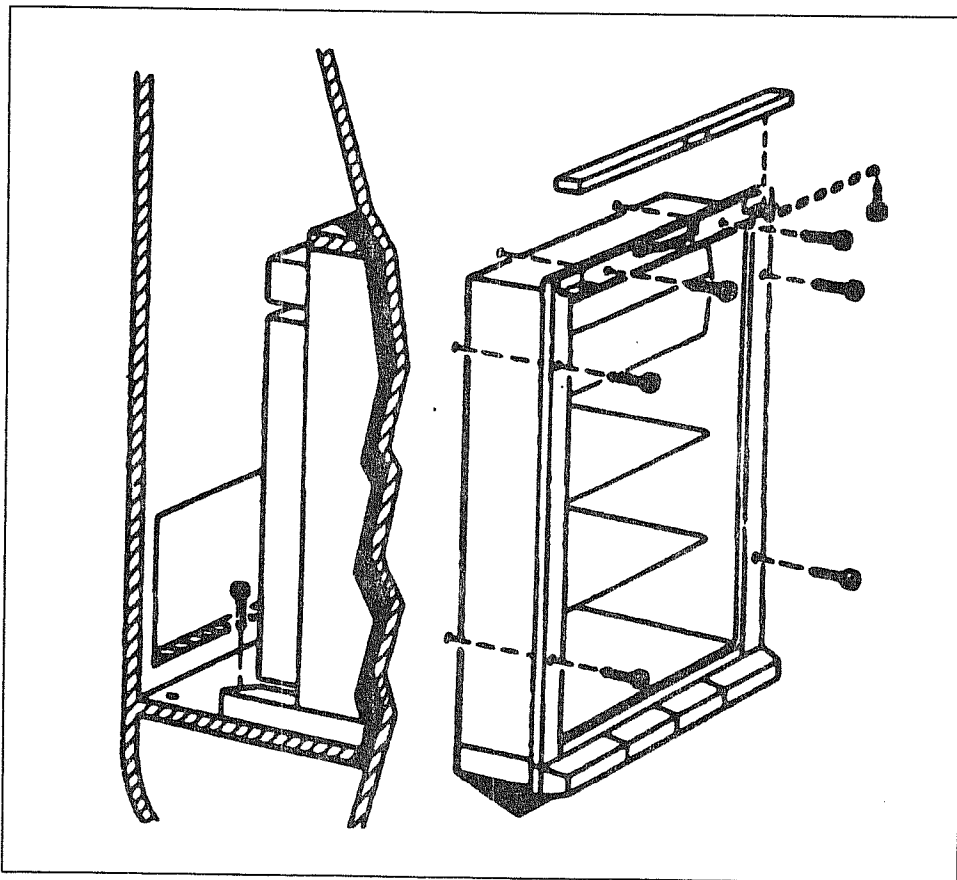


Fig. 6

Instructions for Use

How to Start the Refrigerator

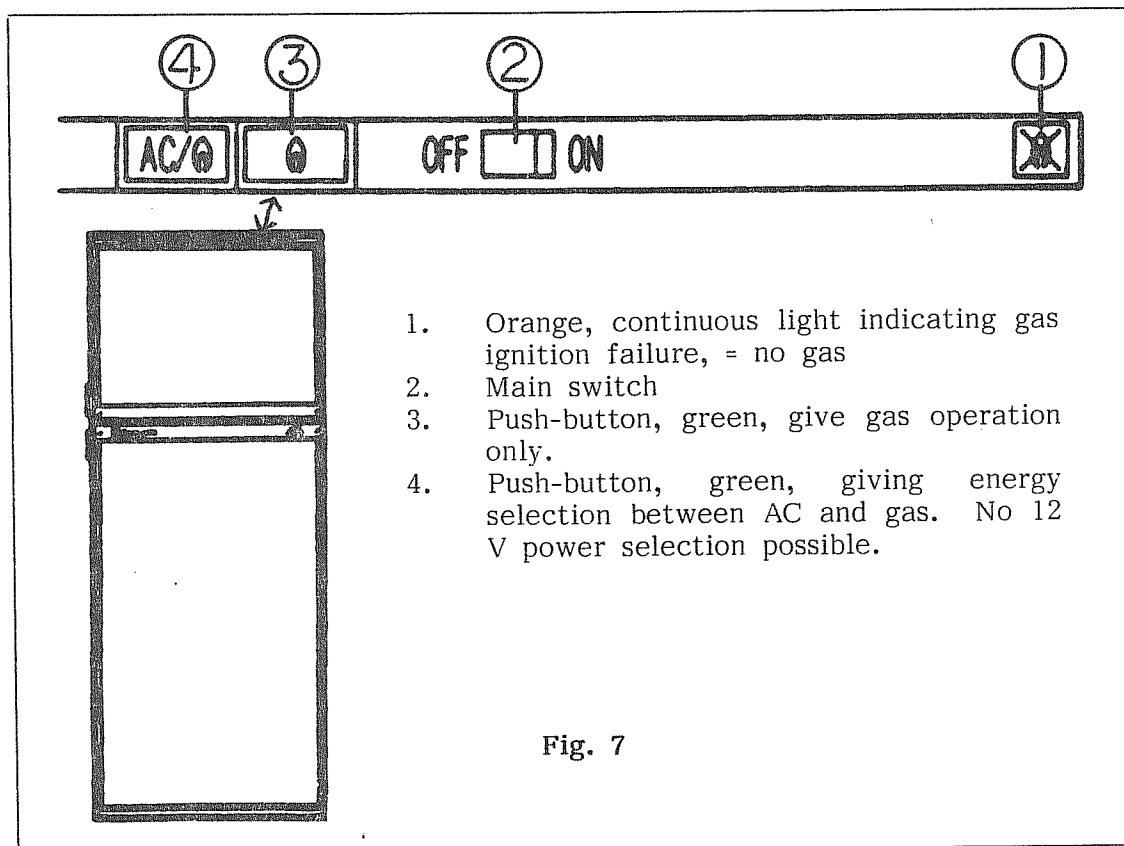
Leveling:

In the boiler, ammonia vapor is distilled from an ammonia-water mixture and carried to the finned condenser, where it liquifies. The liquid flows to the evaporator, where it creates cold by evaporating into a circulating flow of hydrogen gas. If the evaporator or coil is not level the liquid readily accumulates, forming pockets which can impair the gas circulation or even block it, in which case, of course, the cooling will stop. When the recreational vehicle is moving, the continuous rolling and pitching movement will not affect the refrigerator as long as the movement passes either side of level, but when the RV is temporarily parked this sensitivity of the refrigerator should be remembered. So, once more, before you start the refrigerator make sure it is level.

Operation (Fig 7)

Before starting the refrigerator check the gas valve in the piping. Do not forget the valve on the rear of the refrigerator, Fig. 1.

1. To start the refrigerator set the switch 2 to position ON. Lamp AC/() shall now be green.
2. Turn the thermostat knob inside the cabinet to suitable setting, e.g start with normal position.
3. To shut off the refrigerator set the switch 2 to position OFF.



Information on the Operation of the Refrigerator

General

This refrigerator is equipped with an Energy Selector system. The control system selects the most suitable available energy source. The selection will be made with highest priority to 120 V. Lowest priority has gas operation. No manual operation is necessary for change of energy source unless desired. The automatic energy control will, when turned on, start up in AC/⏏ mode.

Mode Indication and gas start up failure.

However, the new selection system also provides the possibility to be operated in reduced freedom of choice. At AC/⏏ the control system will select between 120 volt and gas with 120 volt as first priority.

Gas mode only can be selected by pressing the gas push button ⏏. The selection system will then operate on gas regardless if 120 V power is present. If the refrigerator does not succeed in lighting the gas (regardless which mode is selected) the lamp ✕ will be lit. If gas is the only available energy and ignition fails, indicating the LPG bottles are empty, the ✕ will be lit and the green mode selector button will be shut off. Further information is given below under the heading "Orange Light".

Low Voltage on 12 V DC Control System

The control system always requires 12V DC to be able to operate on any energy mode. If, however, the voltage drops below 9.5 volts, the control system will operate as follows: Regardless if the refrigerator is operating on 120V AC or gas, the control system will select gas, and continue operation independent of the thermostat. During the low voltage (9.5V DC) condition the thermostat is not connected to the system.

To indicate that the control system is in a low DC condition the selected mode indicator will be turned off. As soon as the 12V DC system is recharged, the control system will go back to normal operation. The interior light is unaffected during the whole procedure.

There is no by-pass flame on these refrigerators. The control system shuts off the gas when the refrigerator has correct temperatures. The gas flame will be lit by the control system when the temperature increases above the pre-set one.

✕ Orange Light

If the lamp ✕ begins to light the refrigerator control system has tried to light the gas flame but it did not succeed in doing so. We recommend the following operations:

1. Set switch 2 to position OFF and back ON again. The AC/⏏ lamp shall now be green and the control system does a new start attempt. If the refrigerator has not been in operation for while, or you have just refilled gas, this operation may have to be repeated several times. Each start attempt will last for up to three minutes. If the starting is not successful the lamp will turn on again.

2. If Operation 1 is not successful check your gas supply.
3. If you have gas make sure that all valves in the gas pipe are opened.
4. If none of these operations are successful contact a service center.

Note: The first start is always a problem. To empty the gas pipe from the gas vessel up to the refrigerator may take several minutes (ie: 3 to 4 operations as to point 1 above). Electric operation is not blocked during ~~M~~ light. Gas operation can only start after an OFF-ON operation.

The orange ~~M~~ light indicates faulty gas operation. To shut down the orange light turn the switch to off and back to on again.

How to use the Refrigerator

Food Storage Compartment

The food storage compartment is completely closed and unventilated, which is necessary to maintain the required low temperature for food storage. Consequently foods having a strong odor, or which are apt to absorb odors, should be covered. Vegetables, salads etc. should be covered to retain their crispness. The coldest positions in the refrigerator are underneath the cooling evaporator and at the bottom of the refrigerator, and the least cold positions are on the upper door shelves. This should be considered when different types of food are placed in the refrigerator. The bottle retainer in the lowest door compartment is divided in two removable parts.

CAUTION: Do not store explosive substances in the refrigerator such as cigarette lighter gas, petrol, ether or the like.

Defrosting

Shut off the refrigerator. Empty the refrigerator leaving the drip tray under the finned evaporator and the cabinet and freezer doors open. If desired, defrosting may be speeded up by filling the ice tray with hot water and placing it in the freezer. It might be necessary to empty the drip tray one or two times during the defrosting period. When all frost is melted empty the drip tray and dry the interior of the refrigerator with a clean cloth. Replace the drip tray and ice tray. Replace all food stuffs and set the thermostat to MAX for a few hours. Then reset the thermostat knob to its normal position.

Note: ON RM2803 the drip tray is placed on the rear side of the refrigerator.

Frozen Food Storage Compartment

The ice trays should be placed in direct contact with the freezer shelf for fastest ice making. Quick frozen soft fruits and ice cream should be placed in the coldest part of the compartment which is at the bottom of the aluminum liner, or in models with a shelf, on this or just below it. Frozen vegetables on the other hand may be stored in any part of the compartment. The compartment is not designed for the deep or quick freezing of food stuffs. Meat or fish foods, whether raw or prepared, and provided they are precooled in the refrigerator can, however, also be stored in the frozen food storage compartment. They can then be stored about three times as long as in the fresh food storage compartment. To prevent drying out keep food in covered dishes, in plastic bags or wrapped in aluminum foil.

Periodic Maintenance

Note: Before working on the refrigerator make sure that 120 V AC and 12V DC leads are disconnected. Shut off gas valve.

The Burner and Burner Jet (Fig. 1)

The color of the flame shall be clear blue over the slots of the burner (Fig. 2).

Once or twice a year, depending on use, it is necessary to clean and adjust the burner assembly. Proceed as follows:

1. Loosen screw and remove cover plate for burner housing.
2. Disconnect lighter cable from the electrode.
3. Loosen burner fixing screw and withdraw burner.
4. Clean burner tube with a brush. Blow with compressed air.
5. Screw off jet and clean with alcohol. Blow with compressed air. Never use a needle or similar instrument.
6. Reassemble.
7. Be careful that the end of the burner fits into the slot on the bracket.

The slots of the burner must be centrally located under the boiler tube.

The Electrode

For a proper ignition function it is necessary to keep the electrode insulation dry and free from dirt. The gap between burner tube and electrode shall be max. 3/16" (5mm) and min. 1/8" (3mm).

WARNING:

If the refrigerator is used intermittently it should be checked at least once a year.

It is important to keep the appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids. Check the venting system. The flow of combustion and ventilating air must not be obstructed.

Check the flue baffle that it is clean and reasonably free from soot. Heavy soot formation indicates improper functioning of the burner. Clean baffle and flue. Further, clean cooling unit and floor under refrigerator.

The entire gas installation should be checked for leaks at intervals. Test all pipe connections with soapy water, not with an open flame.

Check the energy selector system by connecting/disconnecting main voltage, start/stop the engine etc. too.

Compare and check that the system behaves as it is described above. If in doubt please contact a service center.

Note: Any service of the gas controls, with the exception of the above mentioned replacement, maintenance and cleaning operations must be performed by an authorized service center only.

Fault Tracing

The Refrigerator does not Freeze Satisfactorily:

Causes and Remedies

- A. Jet orifice clogged. Unscrew jet and blow clear or wash in alcohol. Do not use wire or pin to clean orifice.
- B. Check the leveling of the refrigerator.
- C. Air circulation around cooling unit is restricted. Be sure that refrigerator is properly ventilated.
- D. The evaporator is heavily coated with frost. Defrost.
- E. Flue baffle not inserted into the central tube of the cooling unit.
- F. The thermostat is incorrectly used. See paragraph on thermostat.
- G. Burner head clogged. Clean.

- H. Burner damaged. Replace. See Fig. 1
- I. Burner may be dislocated. Relocate.
- J. Wrong gas pressure at the burner. Have pressure checked at burner and at gas bottle. Pressure at burner must not fall below 11" W.C.

Odor From Fumes

Causes and Remedies

- A. The flame touches side of the boiler due to dislocation of the burner. Relocate. Burner dislocation may also cause smoke and discoloring of walls and ceiling.
- B. Burner damaged. Replace.
- C. The flue tube is dirty. Clean flue as follows: Cover burner and jet. Remove flue top and baffle. Clean flue with special flue brush. Clean baffle before putting back in place.

All the above instructions are to be followed closely. The refrigerator is quality guaranteed. However, we are not responsible for any failures caused by improper adjustments and unfavorable installation conditions.

CAUTION: Avoid water spraying through the refrigerator vents while washing your RV.

RANGE AND OVEN

Manufacturer: Magic Chef, Inc.
28812 Phillips Street
Elkhart, Indiana 46514
Phone: 219-264-9578

The range and oven in your Airstream works on LP gas. Electrical power used is by the 12 volt oven light in some models.

People using gas ranges in the home will find little difference in the operation of the range in the motorhome. Other customers, used to electric ranges, may be a little apprehensive at first; but, will quickly gain confidence. The basic operation of the gas ranges have been the same for many years; but, please be sure to read all the directions furnished by the manufacturer and located in the Owner's Packet. Excellent service and parts manuals are available from the manufacturer.

We find many experienced RVers do not use the pilot light for the top burners, preferring the flint type hand lighters instead. The main reason the pilots aren't used is due to the size of the motorhome and the climate in which most motorhomes are used. The pilots are very small, but of course, produce heat that may be noticeable in the motorhome. With limited counterspace it is normal to set articles on the closed top of the range. If the day is hot and the article is plastic it may become deformed from the low but constant heat of the pilot.

Operation Principle

Top Burners

The manifold along the front of the top burner section is continually pressurized as long as the LP tank valve is open. Upon opening any of the burner valves, this gas is injected through the burner orifice and into the venturi (mixing tube) where it mixes with primary combustion air and flows on to the burner. At this point the gas-air mixture is evenly discharged through the ports in the burner cap where ignition occurs (by use of a match or pilot light if applicable). The amount of primary air may be adjusted on earlier models to alter combustion characteristics.

Oven

(Main Burner)

The fuel supply for the oven burner is taken from the manifold in the top section of the range. The tube leading from the right hand side of the manifold extends down in the rear of the range and into the automatic oven safety valve. (On newer models this gas flow is taken at the thermostat mounted on the manifold. A tube leads from the thermostat to the oven safety valve.) When this valve opens, gas passes through it to the burner orifice. The orifice meters the gas flow into the burner venturi, where it mixes with primary combustion air and enters the burner casting. The oven pilot ignites this mixture resulting in flame evenly spread around the burner.

(Pilot burner)

The pilot burner is actually two pilots in one:

1. The STANDBY PILOT is that portion of the pilot light which burns constantly, providing that the LP tank and manifold valve (if applicable) are on. It ignites the gas-air mixture at the burner when the oven valve opens. It also provides the base for the heater pilot.
2. The HEATER PILOT is actually an extension of the standby pilot. It is on only when the oven thermostat "calls for heat". The purpose of the heater pilot is to open the oven safety valve thereby enabling gas to flow to the oven burner.

(Thermostat)

The thermostat is probably the most important component part in the functioning of the oven. It regulates the temperature of the oven keeping it at the desired cooking temperature. Thus, the thermostat is conducive to excellence in oven cooking. It is the thermostat (directly behind the oven control knob) that increases the "Standby Pilot" to the "Heater Pilot" flame.

The thermostat "senses" the oven temperature by means of a "thermal bulb" located in the top of the oven. This bulb is filled with gas and connected to a bellows in the thermostat by a capillary tube. When the oven is on: (1) the bulb heats up, (2) the gas expands, (3) causing the bellows in the thermostat to expand, (4) a mechanical linkage within the thermostat shuts off the higher flow of gas to the pilot burner and throttles the amount down considerably. The pilot flame ceases to burn at the heater position, but continues at standby.

As the temperature begins falling in the oven, the above described re-occurs, except now (1) the bulb cools, (2) the gas contracts, (3) the bellows in the thermostat contracts, (4) the mechanical linkage in the thermostat then causes an increasing amount of pilot gas to flow and the pilot goes to the heater flame position.

Note: On the newer model ranges the thermostat will have a "pilot off" or "pilots off" position on the thermostat knob. With the thermostat set at this position, all gas is shut off from the oven pilot "pilot off". When the thermostat is set on the "pilots off" position all gas to the top pilot and oven pilot is shut off.

(Oven Safety Valve)

This valve controls the gas flow to the main burner. The valve is operated by a thermal bulb in the heater pilot flame. This bulb is connected to a bellows in the valve by a capillary tube. When the bulb is heated it expands the mercury in it, expanding the bellows and opening the valve. The opposite occurs when the heater pilot flame subsides.

Sequence of Oven Operation

With the thermostat set at 350 degrees, for example, the following steps automatically occur:

- a. The thermostat "calls" for heat (see thermostat operation principle)
- b. The pilot flame increases to the heater position (see thermostat operation principle)
- c. The oven valve opens (see "Oven Safety Valve") and lets gas into main burner.
- d. Burner heats up oven and thermostat quits calling for heat
- e. Pilot heater flame subsides
- f. Oven safety valve closes
- g. Oven is ready for another cycle

Trouble Shooting

(Top Burners)

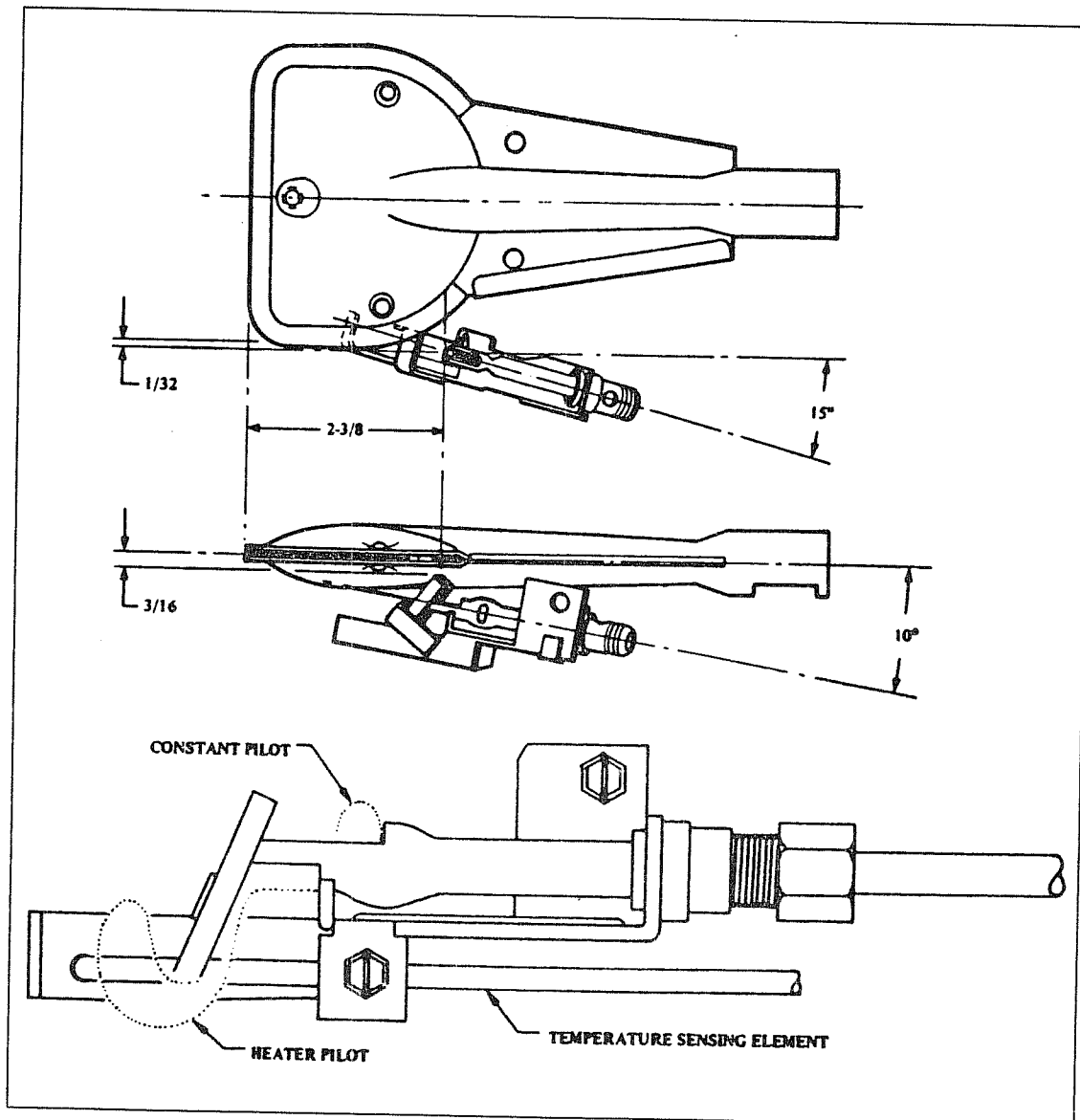
The possibility that a service call on the top burner portion of the range will require anything more than minor adjustments and/or cleaning is very remote.

Combustion problems may occasionally arise, but these can normally be attributed to an accumulation of dirt, grease, dust, or spider webs etc. in the venturi or the burner.

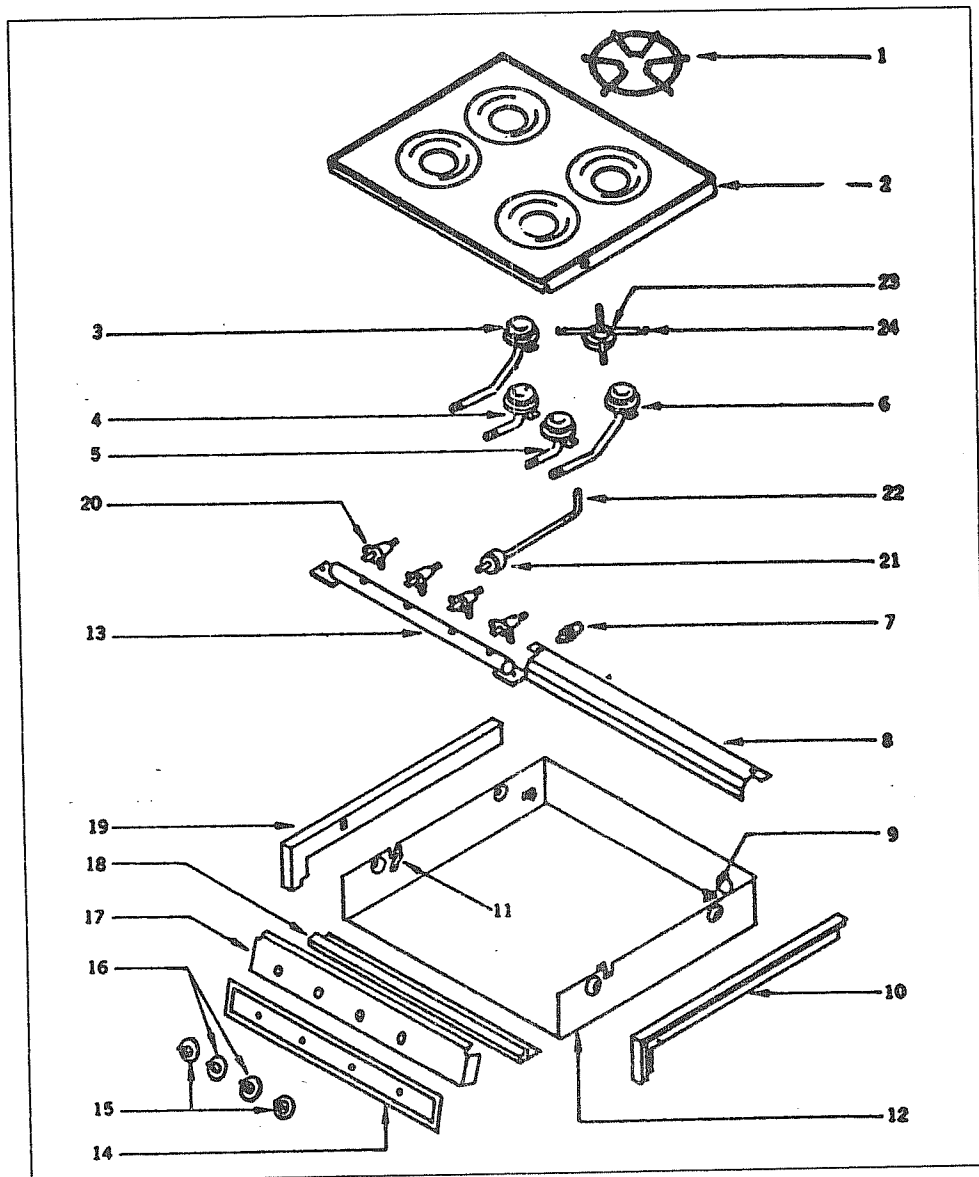
(Pilot Adjustment)

On models ordered from the factory with top burner pilots, these pilots may need to be checked in cases of (1) burners not lighting, or (2) soot accumulating within top burner section. The proper setting for this pilot is when the flame burns blue with a slight yellow tip. The tip of the flame should be about even with the top of the body of the lighter.

OVEN PILOT LOCATION

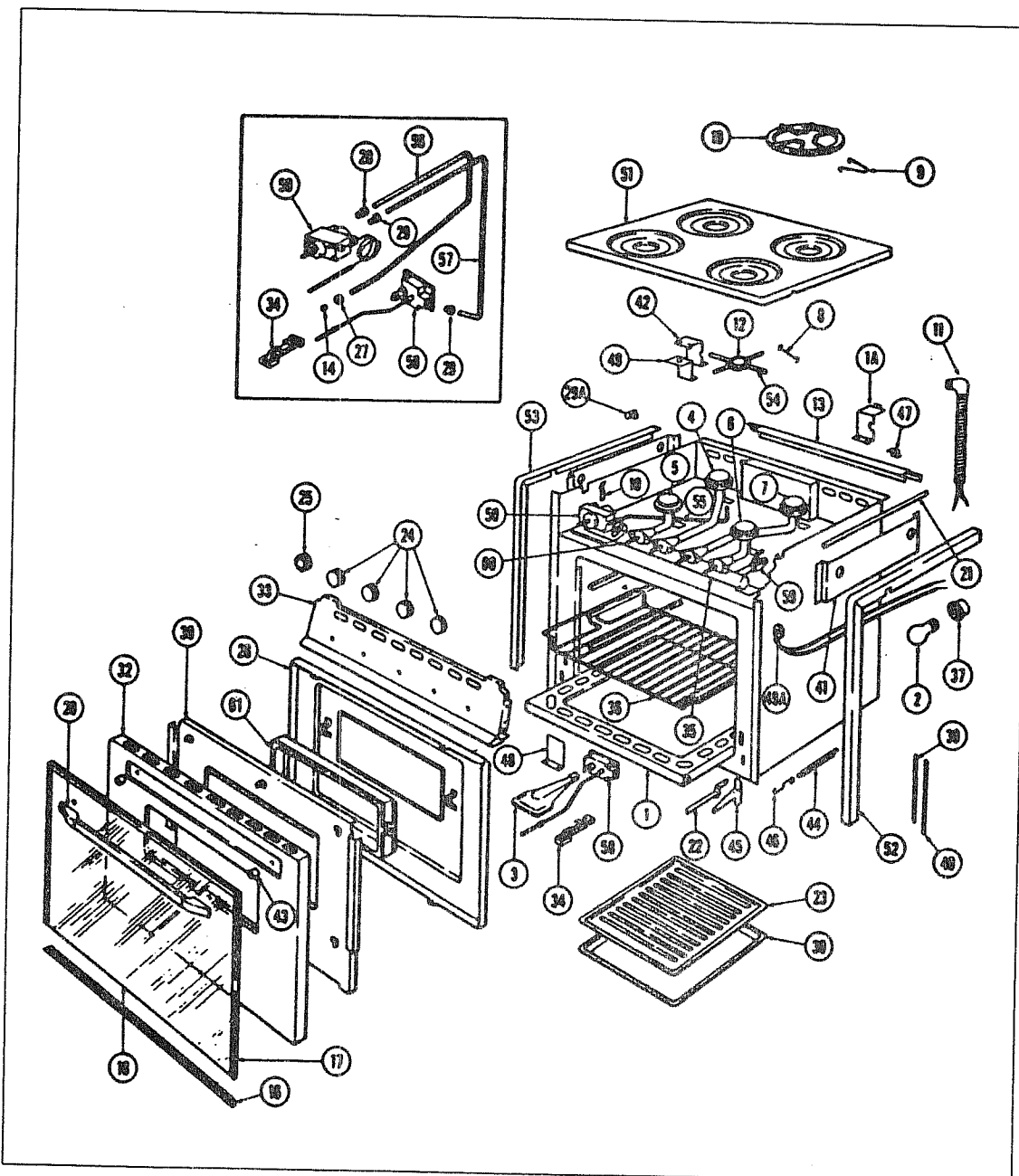


RANGE TOP



- | | |
|-----------------------------|-------------------------------|
| 1. Burner grate | 13. Mainfold Pipe |
| 2. Main top | 14. Mainfold Panel Trim |
| 3. Burner, Left Rear | 15. Burner Knob, Rear |
| 4. Rubner, Left Front | 16. Burner Knob, Front |
| 5. Burner, Right Front | 17. Mainfold Panel Back-up |
| 6. Burner, Right Rear | 18. Mainfold Panel Lower Trim |
| 7. Half Union | 19. Burner Box Trim, Left |
| 8. Top rear trim | 20. Burner Valve |
| 9. Tee Nut | 21. Top Pilot filler |
| 10. Burner Box Trim, Right | 22. Pilot Tube |
| 11. Main Top Hold Down Clip | 23. Lighter cup Assembly |
| 12. Burner Box | 24. Flashtube Extension |

RANGE AND OVEN ASSEMBLY



PARTS DESCRIPTION FOR PRECEDING PAGE

- | | |
|---------------------------------------|----------------------------------|
| 1. Bottom, oven | 26. Liner, oven door |
| 1A. Junction box | 27. Nut, compression 1/8" |
| 2. Bulb, oven light | Nut, compression 3/16" |
| 3. Burner, Oven | 28. Nut, loxit, 3/16" |
| 4. Burner Top, left rear | 29. Nut, loxit, 1/4" |
| 5. Burner Top, left front | 29A. Nut, Tee |
| 6. Burner Top, right front | 30. Pan, broiler |
| 7. Burner top, right rear | 32. Panel, oven door, black |
| Button, plug (not shown) | 33. Panel, manifold |
| 8. Clip, flashtube | 34. Pilot, oven |
| 9. Clip, grate | 35. Pipe, manifold |
| 10. Clip, main top | 36. Rack, oven |
| Clip, thermostat bulb (not shown) | 37. Receptacle, oven light |
| 11. Conduit assembly and service cord | 38. Retainer, insulation |
| 12. Cup, lighter assembly | 39. Retainer, Seal |
| 13. Deflector, flue | Screw, door frame (not shown) |
| 14. Ferrule - 1/8" fitting | Screw, main top clip (not shown) |
| Thermostat-inlet (not shown) | Screw, door handle (not shown) |
| 16. Frame, lower glass | Screw frame (not shown) |
| 17. Frame, upper glass | 40. Seal, door, top |
| 18. Glass, outside | Seal, door side |
| 19. Grates, top | |
| 20. Handle oven door | |
| 21. Harness, tube oven light | |
| 22. Hinge, oven door, RH | |
| Hinge, oven door, LH | |
| 23. Insert, broiler pan | |
| Insert, burner (not shown) | |
| 24. Knob, top burner | |
| 25. Knob, thermostat | |

MICROWAVE OVENS

Only technicians specifically trained and equipped for servicing microwave ovens should work on your unit.

The microwave information provided with your coach will provide you with a list of service facilities, or the manufacturer's phone number to obtain this information.

WATER HEATER

Manufacturer: Atwood Mobile Products
4750 Hiawatha Drive
P.O. Box 1205
Rockford, Illinois 61105
Phone: 815-877-7461

Note: Review the water heater literature supplied in your Owner's Packet before proceeding.

CAUTION: Hydrogen gas can be produced in a hot water system served by this heater that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable. To reduce the risk of injury under these conditions it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. There should be no smoking or open flame near the faucet at the time it is open.

Electronic Ignition

The switch used to light your electronic ignition water heater is located in the bathroom above the lavatory top. When the switch is turned on, the red light will come on indicating the "try" mode is in effect. Normally the burner will ignite in just a few seconds and the light will go out. If your LP system hasn't been used for some time the system may go into safety lock out (about 20 seconds) before the air is all expelled from the lines. Turning the switch off for 30 seconds then back on reinstates the "try" mode. (See **Note** below.)

Principle of Operation

When the switch is turned on, power is supplied to the thermostat (located inside the junction box at the back of the water heater). When the thermostat senses the water in the tank requires heat (below 120°F) its contacts close and completes the circuit to the circuit board. This will energize the coils in the dual solenoid gas valve allowing gas to flow out of the main burner orifice, mix with air at the ventura (air adjusting slots), then flow out the end of the main burner.

Simultaneously the coil on the circuit board provides a high voltage current to reach the spark probe at the main burner. This ignites the gas. When the flame is sensed by the probe, current is conducted to the relay and the valve remains energized. Sparking ceases when the electrode to ground current path is altered by the presence of flame. The water heating process beings. When the water in the tank drops below 120°F the process will automatically repeat itself.

Note: A complaint sometimes received at Airstream is the fact the water heater will not light for a while when the motorhome is first parked. The explanation is easy. The water is already hot! The motorhome water heater has a heat exchanger plumbed into the engine radiator system. As you are driving the water is being heated without you having to do a thing.

SAFETY

ECO Switch: The unit is equipped with an ECO (Energy Cut-Off) switch. This is located next to the thermostat and should the water exceed 190°F the contacts in the ECO switch will open and completely shut off the power to the unit.

It is unlikely, but should this occur it is necessary to move the rectangular cover from the back (inside) of the unit and manually depress the red button. The unit should then be checked before continuing use to determine why the water overheated. Refer to trouble shooting section.

Relief Valve: Each unit is equipped with a temperature pressure relief valve. Should the water in the tank exceed 201°F, or 125 PSI, the valve will open and allow cold water to enter and reduce the temperature of the water or release the pressure built up.

Circuit Board Lock-Out:

Should the spark not ignite the gas, a built in timing circuit in the circuit board will shut down and the red light next to the interior switch will come on. It is necessary to shut this switch "off", wait 30 seconds, then turn switch back on. If unit again fails to light, check trouble shooting section.

Storage and Winterization Procedure for Water Heaters

Normal storage and winterization procedures would be as follows:

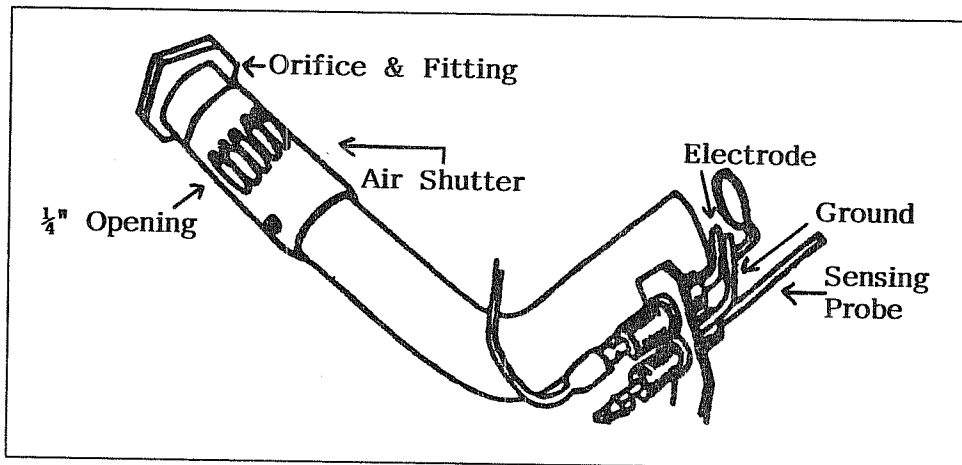
1. Thoroughly drain the inner tank. Simply open the petcock drain valve contained at the front base of the unit. To assist in draining, plus to eliminate the chance of developing an air lock, also open your relief valve.
2. Once the unit has been thoroughly drained, approximately two quarts of water will remain in the base of the tank due to the position of the petcock drain valve. Strictly for winterization precautions, these remaining two quarts of water will not harm the unit. As these two quarts of water freeze, it has ample room for expansion without causing freezing damage.

Adjustment for Direct Ignition Water Heater

The following are adjustments that can be made to all direct ignition water heaters. These adjustments will improve initial start up and recycling capabilities of the unit.

Air Shutter Positioning

The air shutter should be positioned in such a manner that will allow the main burner flame to be blue with a trace or flash of yellow appearing through the flame. Approximate positioning is 1/4 way open. **Note Illus.** The importance of this adjustment is to allow an adequate air/gas mix to be ignited by the electrode at the end of the burner tube. If the air shutter is not positioned properly this will minimize the unit's start up and recycling capabilities.



Main Burner Alignment

It is important that the air shutter is fitted over the orifice holder. It is also important that the orifice is centered in the main burner tube. This adjustment allows for the proper air/gas mix.

Electrode Positioning

The electrode and the ground probe should be positioned in the area between the end of the burner tube and the flame spreader. This adjustment allows for instantaneous start up and recycling. The flame sensing probe should not be grounded on the flame spreader or any other metal object in the combustion chamber. The sensing probe is the component part of the electrode that relays to the circuit board that a flame is present and everything is functioning properly. The flame sensing probe sends microamps to the circuit board. When the circuit board receives the proper amount of microamps it allows the gas valve to stay open and the main burner flame to stay on. The male connector on the back of the flame sensing probe should be clean and free of corrosion; also, the female connector on the white wire. If the water heater initially starts up, runs for one minute or less, the probe could be at fault. First clean it. If this does not correct the problem, replace the electrode assembly. It is important to note that the air adjustment shutter positioning plays an important part in the functioning of the flame sensing probe. When the main burner flame is blue and not roaring, the flame spreads correctly and the sensing probe is heated quicker.

TROUBLE SHOOTING

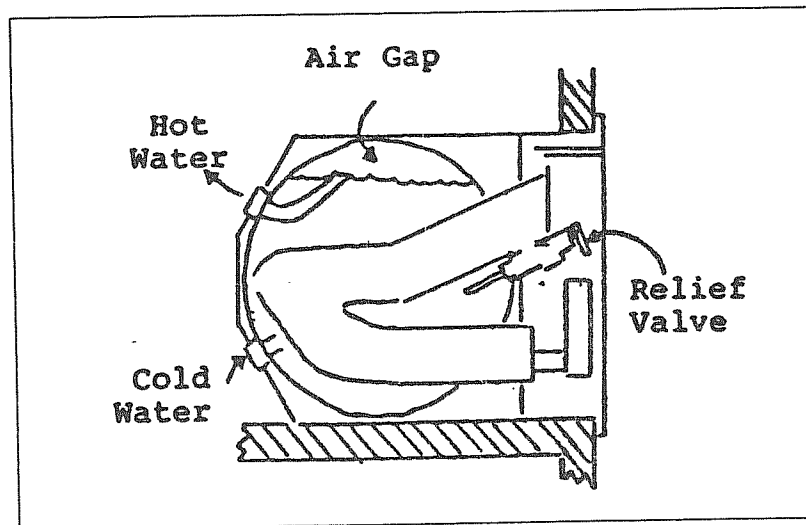
General Test

If you are not sure if the water heater is functioning properly there is a simple test you can perform. With the water heater off, run all the hot water out of the system by opening any of the faucets. Now light the water heater and time it until the burner shuts off. A good working heater will shut off within just a few minutes short of a half hour as timed from a completely cold start up.

Temperature/Pressure Relief Valve

Problem: Weeping or dripping of relief valve while water heater is running DOES NOT mean it is defective. This is caused by the normal expansion of water as it is heated in the closed water system of a recreational vehicle.

The Atwood water heater tank is designed internally with an air gap at the top of the tank to reduce the possibility of this occurring.



In time the expanding water will absorb this air. To replace the air:

- Remedy:**
1. Turn off water heater.
 2. Turn off incoming water supply.
 3. Open a faucet in the coach.
 4. Pull handle of P & T valve straight out and allow water to flow until it stops.
 5. Allow P & T valve to snap shut. Close faucet and turn on water supply.

Electronic Ignition System

Problem: Switch on red light does not flash.

- Remedy:**
- A. Water in tank at 160 degrees. Drain off water below 160 degrees then observe unit for start up.
 - B. Unit must be connected direct to battery. Battery must produce at least 10V DC. If lower, charge battery.
 - C. Remove cover from back of water heater and manually depress red reset button.
 - D. Check wiring of switch with diagram.
 - E. Defective interior switch. Replace.
 - F. Defective ECO switch. Check for closed contacts with continuity tester. Replace.
 - G. Defective thermostat. Contacts should be closed when thermostat is cooled. Replace.

Problem: Switch on red light remains on (not a flash).

- Remedy:**
- A. Inadequate voltage. Check battery.
 - B. Improper wiring. Check with diagram.
 - C. Circuit board ground wire or ground at back of unit broken or disconnected.
 - D. Flame sensing probe grounding to flame spreader or burner. Check by removing lead from probe. If unit goes through lock-out cycle, bend sensing probe away from flame spreader and replace lead.
 - E. Top of SCR contacting sheet metal casing with power off. Bend SCR top until contact with sheet metal is broken.

Problem: Switch on red light flashes then stays on.

- Remedy:**
- A. No gas supply. Check all valves to open. Unit must have minimum of 11" water column pressure.
 - B. Check connection to solenoid valve with volt meter. Should have 12V DC.
 - C. Defective solenoid valve. Test with good battery. One lead on case, one lead on white wire. An audible click should be heard.

- D. Water temperature may be 160 degrees, causing contacts to fluctuate.
- E. Defective circuit board. Replace.

Problem: Switch on red light flashes one time then goes out. Unit not lit.

- Remedy:**
- A. Spark probe grounded. Proper gap 1/8" from center wire, burner tube and/or flame spreader.
 - B. Broken or shorted spark probe lead wire (heavy insulated, light brown.)
 - C. Temperature of water at 160 degrees allowing thermostat contacts to fluctuate.
 - D. Possible defective circuit board. Replace.

Problem: Yellow main burner flame.

- Remedy:**
- A. Improper air adjustment.
 - B. Partially plugged main burner orifice. Remove and clean. DO NOT ENLARGE.
 - C. Obstruction in main burner tube. Spiders, rust etc. Remove and clean.
 - D. Bent or missing flame spreader. Straighten or replace.
 - E. Inadequate gas pressure into valve. Check with manometer 11" water column minimum.
 - F. Inadequate gas pressure at outlet side of valve. Remove pressure tap plug located at right front of solenoid valve. Insert 1/8" MPT pipe nipple. Hook up manometer. Turn on unit.
 - G. Grille in upper left hand side of grille obstructed. Filters, tape, etc. should not be used to block any portion of this grille.
 - E. Gas solenoid bracket bent. Orifice not pointed up center of main burner.

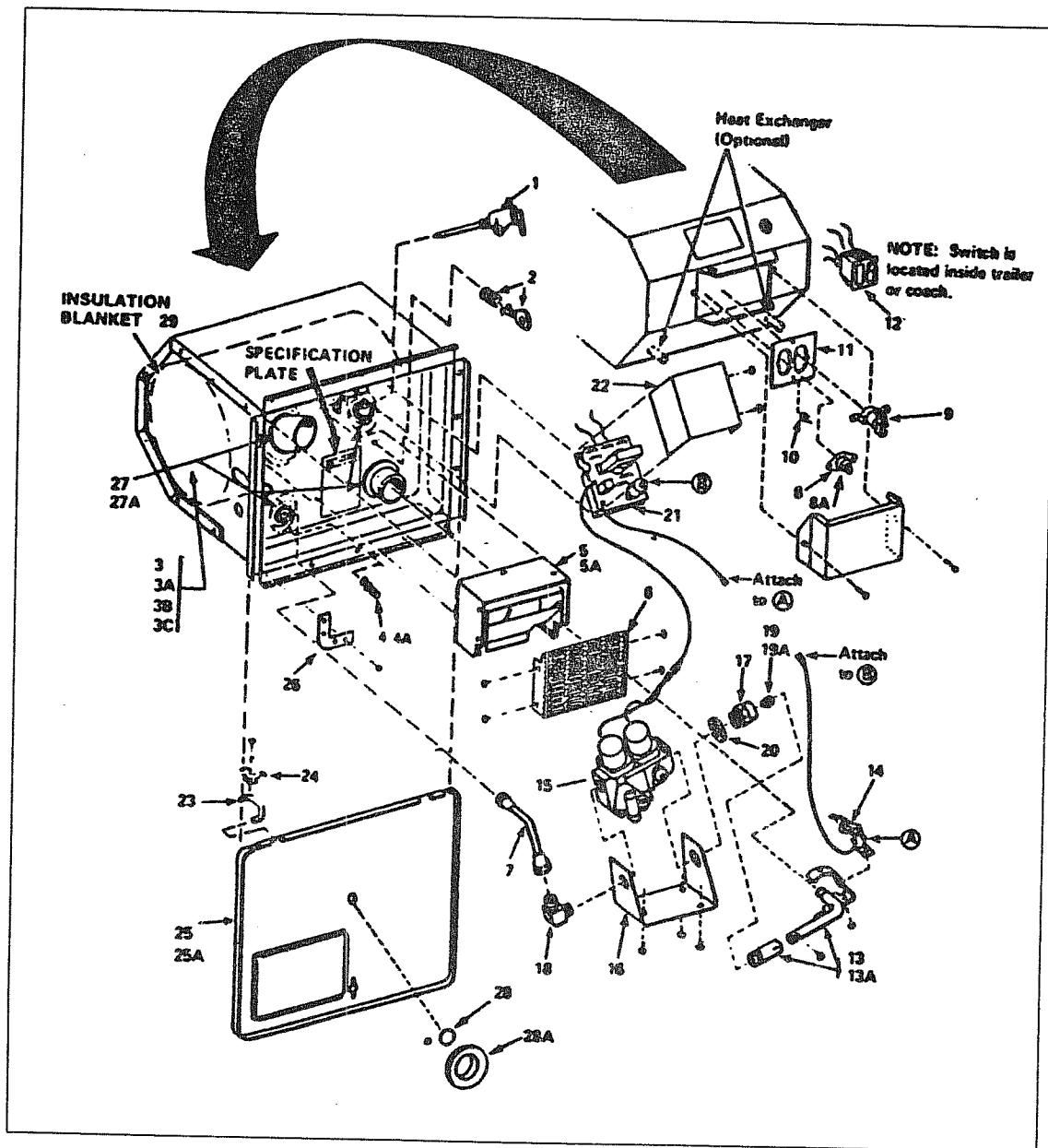
Problem: Tank leaks water.

- Remedy:**
- A. Check all plumbing fittings for leaks.
 - B. Tank Corrosion. Refer to warranty with unit.

Problem: Spark igniter continues to spark while burner is on.

- Remedy:**
- A. Flame sensor not correctly positioned in flame.

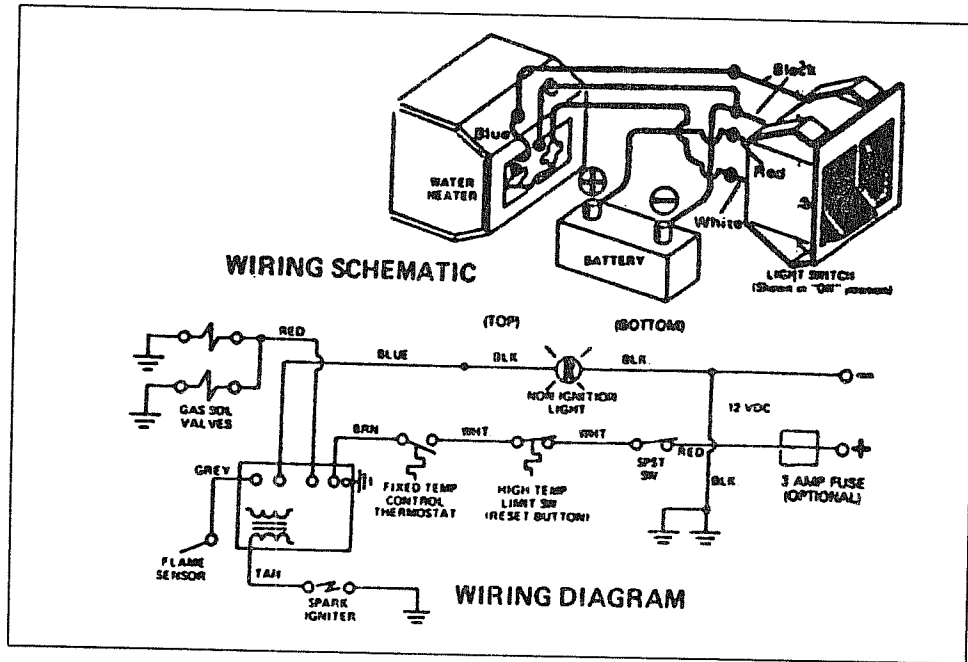
PARTS DESCRIPTION WATER HEATER MODEL G6A-4E



PARTS DESCRIPTION FOR PRECEDING PAGE

1. Relief valve 1/2" fitting
2. Cam-loc fastener
3. Inner tank
4. Drain plug
5. Flue box
6. Exhaust grille
7. Gas inlet tube
8. Thermostat 12V DC, 140° preset
9. ECO switch
10. Lock-nut
11. Control retainer plate
12. Switch package
13. Main burner
14. Spark probe assembly
15. Gas valve
16. Valve bracket
17. Orifice holder
18. Elbow fitting
19. Main burner orifice
20. Washer gasket
21. Circuit board
22. Circuit board cover
23. Hinge pin
24. Hinge clip
25. Access cover
26. Corner brackets (set of 4)
27. Gasket kit (standard or high performance)
28. Gasket for sight window
- 28A. Access cover, sight window
29. Insulation blanket

WIRING SCHEMATIC/DIAGRAM



Removal

In order to remove the water heater, access must be gained to the water lines on the back of the heater. The carpeted panel next to the panel is only held in with about three screws - two in the top and one in the bottom corner. They can be difficult to see buried in the nap of the carpet, but if you feel with your finger tips you won't have any problem finding them. Once you have access to the lines the removal is basic:

1. Turn off LP gas at the bottles.
2. Disconnect city water or turn off water pump.
3. Remove drain plug in the face of the heater and open a faucet so water will drain.
4. Mark and disconnect wires if it has electronic ignition.
5. Remove perimeter screws around the face of the heater.
6. Use a putty knife or similar tool to break the seal between the water heater and the side of the trailer. Be careful not to damage paint.
7. After heater has drained remove water lines next to toilet.
8. Remove gas line.
9. Work the heater side to side as you are pulling out.

WARNING: Be sure to check the gas line connection with soapy water when replacing.

HIGH VOLUME ROOF VENT (OPTIONAL)

Manufacturer: Kool-O-Matic
 1831 Terminal Road
 Niles, Michigan 49120
 Phone: 616-683-2600

The optional Kool-O-Matic vent system is designed to quickly exhaust stale, hot air and draw in fresh air. It is great to use when the outside temperature really doesn't call for air conditioning, but has built up in your motorhome.

There are three positions shown on the wall mounted control: OFF, ON and AUTO. Before turning on make sure the "winter" cover, held in place magnetically, has been removed from the vent louvers.

In the ON position the fan will run whenever current is available. The AUTO position makes use of the temperature control. In AUTO the fan will only come on when the temperature setting is reached. When the motorhome is cooled lower than the setting, the fan will shut off automatically until the temperature rises again. The AUTO setting is especially useful as a bedtime setting.

A control knob for adjusting the speed of the fan is located in the vent grille.

The only maintenance would be to occasionally wipe the vent grille off with any household type cleaner.

NOTES

SPECIFICATIONS

Note: The specifications provided were taken from prototype units. The actual figures may vary slightly.

	32 FT	36 FT
DIMENSIONS		
Exterior Height with Air Conditioner	130.4"	121.2"
Interior Head Room	77"	78"
Interior Width	94"	94"
Exterior Length	32' 9"	35' 11"
Exterior Storage Volume	134 Cu. Ft.	80 Cu. Ft.
CAPACITIES		
LPG Tank	100 lbs.	125 lbs.
Fresh Water Tank	60 Gal.	80 Gal.
Grey Water Holding Tank	35 Gal.	43 Gal.
Black Water Holding Tank	30 Gal.	45 Gal.
Fuel Tank	80 Gal.	80 Gal.
CHASSIS COMPONENTS		
Wheel Base	208"	208" w/tag
Rear End Ratio	4.63	4.63
Gross Vehicle Weight Rating (Maximum Carrying Capacity)	16,000 lbs.	18,000 lbs.
Front Air Bags, Chevrolet	55 psi	55 psi
Rear Air Bags, Airstream	Controlled by leveling valve	
Tire Pressure, Front	70 psi	70 psi
Tire Pressure, Rear	70 psi	60 psi
Tire Pressure, Tag		60 psi
Tire Size	8:00-19.5	8:00-19.5





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DIAGNOSIS (Continued)

PINPOINT TEST E
POWER LOCKS — Continued

TEST STEP	RESULT	ACTION TO TAKE
E6 LOCKS WORK INTERMITTANTLY. CHECK GROUND TO MODULE		
<ul style="list-style-type: none"> • Key Off. • Disconnect green connector. • Check continuity to Ground at pins 5 and 6 of the green connector. 	Continuity   No continuity  	CHECK and SERVICE loose connections. REPEAT Quick Test. SERVICE Circuit 57. REPEAT Quick Test.
E7 LOCKS DO NOT WORK IN FREEZING WEATHER		
<ul style="list-style-type: none"> • Bring vehicle into heated garage to thaw. • Lubricate locks as directed in Step E1. • GO to Quick Test to identify further problems. 		
E8 LOCKS ONLY WORK WITH ENGINE RUNNING		
Double check the following: <ul style="list-style-type: none"> • Battery fully charged. • Any latch or linkage binding (See Quick Test). • Loose or corroded connections to actuators, switches, keyless entry Module connectors. • GO to Quick Test to check for other problems. 		

REMOVAL AND INSTALLATION

Keypad Actuator Assembly
Mark VII, Thunderbird/Cougar

Removal

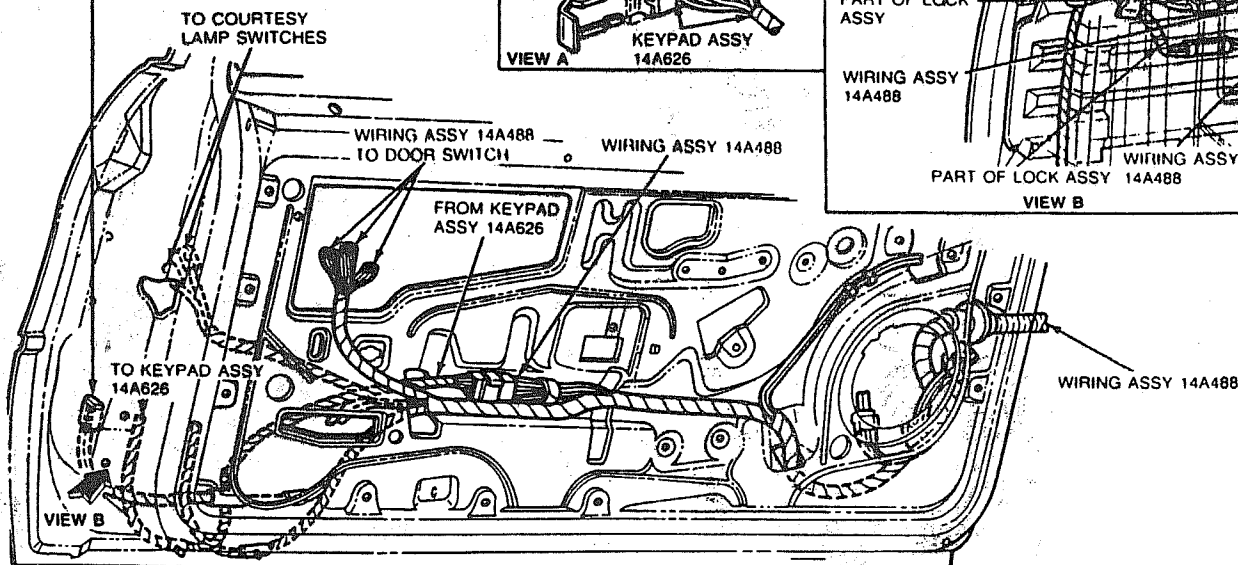
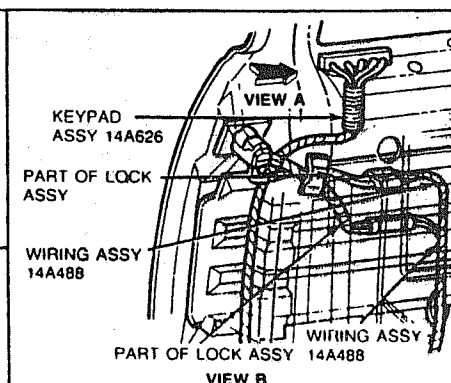
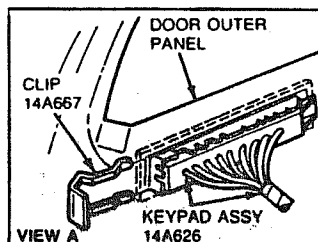
1. Remove interior door trim panel. Refer to Section 45-03.
2. Disconnect actuator wiring harness electrical connector.
3. Remove retaining clip.
4. Remove actuator and wiring harness assembly. Remove wiring harness locators from retaining holes.

Installation

1. Position wiring harness and actuator assembly in door.
2. Install clip retaining actuator to door and install locators in retaining holes.
3. Connect actuator wiring harness connector.
4. Install interior door trim panel. Refer to Section 45-03.

WIRING ASSY
14A488 TO DOOR
LOCK ACTUATORTO COURTESY
LAMP SWITCHESWIRING ASSY 14A488
TO DOOR SWITCH

WIRING ASSY 14A488

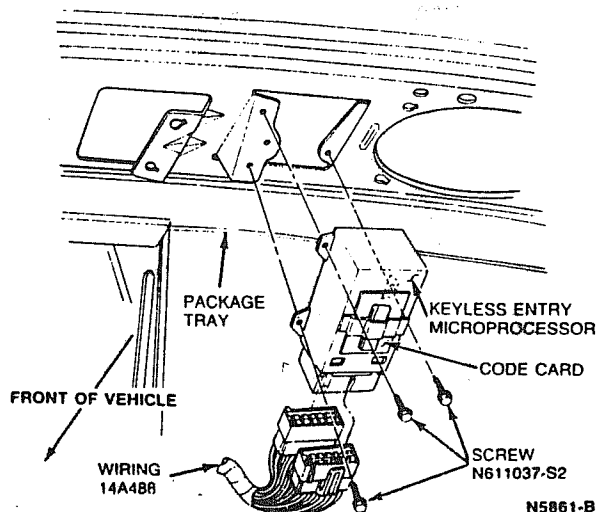
FROM KEYPAD
ASSY 14A626TO KEYPAD ASSY
14A626

N6619-A

Microprocessor/Relay Module

Removal and Installation

1. Remove three retaining screws and lower module.
2. Disconnect two connectors.
3. To install, reverse Steps 1 and 2.



N5861-B

