

DUO-THERM®
by Dometic

RECORD THIS INFORMATION FOR FUTURE REFERENCE
BEFORE INSTALLING THE UNIT:

Model Number _____
Serial Number _____
Date Purchased _____
Place of Purchase _____

Royale **Penguin®**

**ROOF MOUNT AIR CONDITIONER
WITH REMOTE ELECTRONIC THERMOSTAT
MODELS 610115.411 & 610115.311**



PATENT NO. 4641502

Pre-Wired for Optional Heat Package

USA
SERVICE OFFICE
The Dometic Corp.
509 So. Poplar St.
LaGrange, IN 46761

CANADA
Dometic Dist.
866 Langs Dr.
Cambridge, Ontario
CANADA N3H 2N7



UNDERWRITERS
LABORATORIES
INC. ®
LISTED



WARNING

This unit must be serviced by an authorized serviceman. Modification of the appliance can be extremely hazardous and could lead to serious injury or death.

AVIS

Cet appareil doit être réparé seulement par un réparateur autorisé. Modification de l'appareil pourrait être extrêmement dangereuse, et pourrait causer mal ou mort.

**INSTALLATION &
OPERATING INSTRUCTIONS**

MODEL

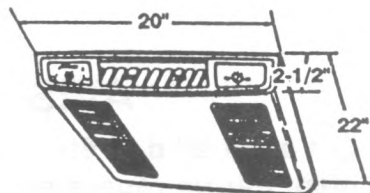
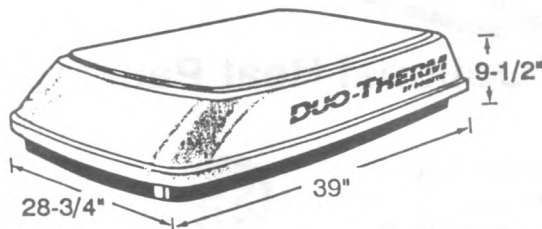
**610115.411
610115.311**

**IMPORTANT INSTRUCTIONS
MUST STAY WITH UNIT
OWNER - READ CAREFULLY**

1. GENERAL INFORMATION

SPECIFICATIONS

MODEL NO.	610115.411	610115.311
Nominal Capacity (BTU/HR)	13,500	13,500
Electrical Rating	115 VAC, 60 Hz., 1 ph.	
Compressor Rated Load Amps	11.5	12.4
Fan Motor Rated Load Amps	3.1	3.1
Compressor Locked Rotor Amps	50.0	60.0
Fan Motor Locked Rotor Amps	8.8	8.8
Heater Amps @ 120V AC	12.7	12.7
Power, Cooling (kw)	1.7	1.7
Power, Heating (kw)	1.6	1.6
Refrigerant (R22) Oz.	17.0	15.5
Minimum Wire Size ***	12 AWG Copper Up to 24 ft.	
Circuit Protection	20 Amp Time Delay Fuse or HACR Circuit Breaker	
Installed Weight (Pounds)	114	108
Roof Thickness (Min./Max.) *	1" to 6"	1" to 6"
Minimum Generator	1 Unit	3.5 KW
Size **	2 Units	5.0 KW



*** For lengths over 24' consult the National Electrical Code.

** The Dometic Corporation gives general guidelines for generator requirements. These guidelines come from experience people have had in actual applications. When sizing the generator, the total power usage must be considered. Also keep in mind generators lose power at high altitudes and from lack of maintenance.

* For roofs 4-1/4" to 6" thick an optional duct (Part No. 318556) and bolt kit (Part No. 318557) are required.

This air conditioner is prewired for an Optional Electric Heater.

2. PRECAUTIONS

WARNING

IMPROPER INSTALLATION MAY DAMAGE EQUIPMENT, COULD ENDANGER LIFE, CAUSE SERIOUS INJURY AND/OR PROPERTY DAMAGE.

- Read installation and operating instructions carefully before starting your air conditioner installation.
- The Dometic Corporation will not be liable for any damages or injury incurred due to failure in following these instructions.
- Installation must comply with the National Electrical Code and any State or Local codes or regulations.
- DO NOT** add any devices or accessories to this air conditioner except those specifically authorized by The Dometic Corporation.
- This equipment must be serviced by qualified personnel and some states require these people to be licensed.

3. CHOOSING PROPER LOCATION FOR THE AIR CONDITIONER

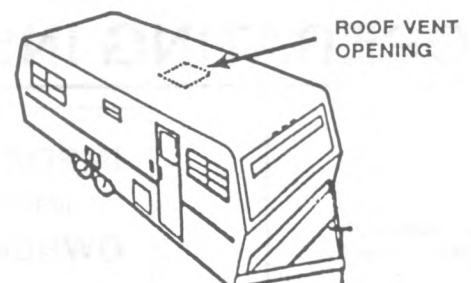
This air conditioner is specifically designed for installation on the roof of a recreational vehicle (RV). When determining your cooling requirements, the following should be considered:

- Size of RV
- Window area (increases heat gain)
- Amount of insulation in walls and roof of RV.
- Geographical location where RV will be used
- Personal comfort level required.

From this information the size of air conditioner(s) and the number of air conditioners needed can be determined.

A. Normal Location

The air conditioner is designed to fit over an existing roof vent opening. When the vent is removed, it normally creates a 14" X 14" opening.

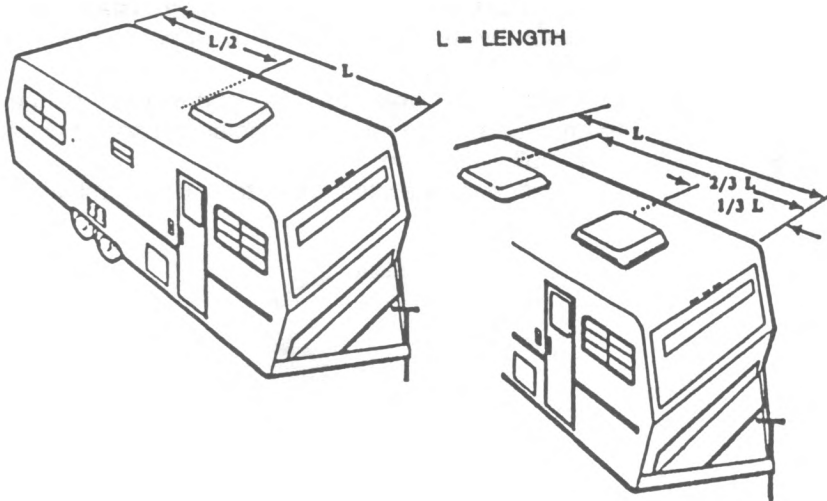


B. Other Locations

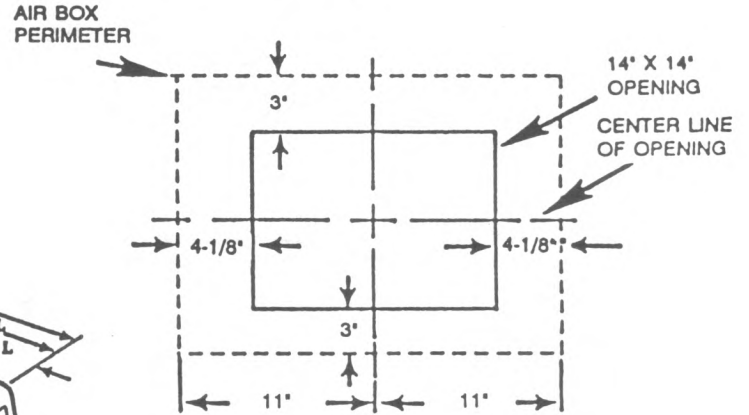
When no roof vent is available or another location is desired, the following is recommended:

For one unit installation: The air conditioner should be mounted slightly forward of center (front to back) and centered from side to side.

For two unit installations: Install one Air Conditioner 1/3 and one Air Conditioner 2/3's from front of RV and centered from side to side.



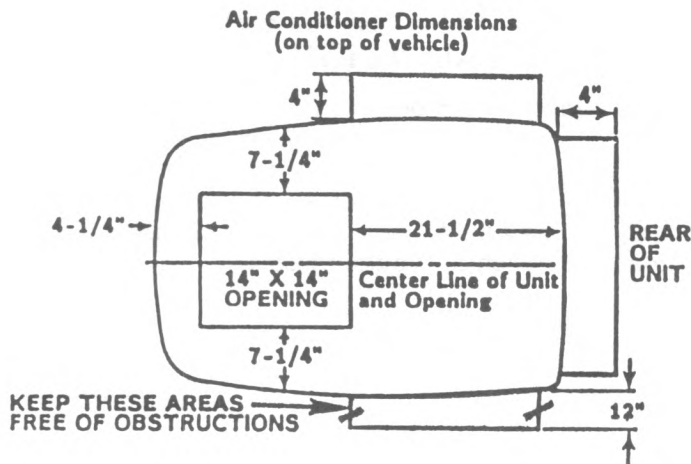
- The roof must be designed to support 140 lbs. when the RV is in motion. Normally 220 lb. static load design will meet this requirement.
- Check inside the RV for air box obstructions (i.e. door openings, room dividers, curtains, ceiling fixtures, etc.)



It is preferred that the air conditioner be installed in a relatively **flat and level** roof section measured with the RV parked on a level surface. NOTE: A 8° slant to either side, or front to back, is acceptable.

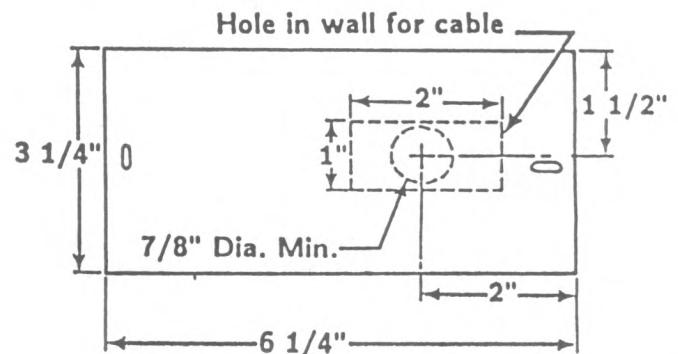
C. After location has been selected:

- Check for obstructions in the area where air conditioner will be installed.



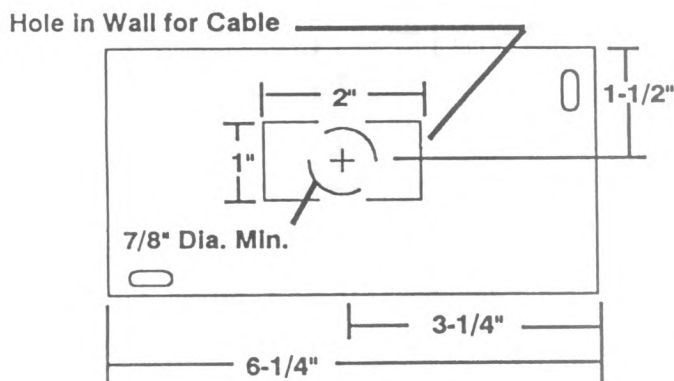
4. THERMOSTAT LOCATION

- The thermostat should be located on an inside wall approximately 4-1/2 feet (54") above the floor.
- Check the location for heat source other than room air. (Example: cook stove, direct sunlight, microwave oven, or lights.)
- A hole at least 7/8" diameter will be needed to route the cable through the wall.
SUGGESTION: An opening 2" wide by 1" high will make cable connection easier.
- The hole should be located 2" from the right edge of the thermostat and 1-1/2" from the top. The thermostat base is 6-1/4" long by 3-1/4" high.



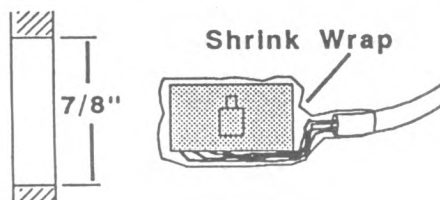
5A. CABLE INSTALLATION (OEM)

- A. The thermostat should be located on an inside wall approximately 4-1/2 feet (54") above the floor.
- B. Check the location for heat source other than room air. (Example: cook stove, direct sunlight, microwave oven, or lights.)
- C. A hole at least 7/8" diameter will be needed to route the cable through the wall.
SUGGESTION: An opening 2" wide by 1" high will make cable connection easier.
- D. The hole should be located 3-1/4" from the right edge of the thermostat and 1-1/2" from the top. The thermostat base is 6-1/4" long by 3-1/4" high.



The cable must be routed from the thermostat to the roof opening.

- E. Choose the shortest, most direct route.
- F. Three standard cable lengths are available:
 - 1. 15 feet - Part No. 3101632.010
 - 2. 25 feet - Part No. 3101632.028
 - 3. 30 feet - Part No. 3101632.036
- G. The air conditioning end of the cable is covered with a heat shrink tubing. This allows cable routing through a 7/8" diameter hole without damage to the plug. **NOTE:** The tubing must be carefully removed before connection to the air conditioner.



- H. Consider where screws, nails or staples might contact the cable.
- I. Leave 3" of cable extending through the wall for connection to the thermostat.
- J. Enough cable must extend into the 14" x 14" opening to allow connection to the ribbon cable from the upper unit.

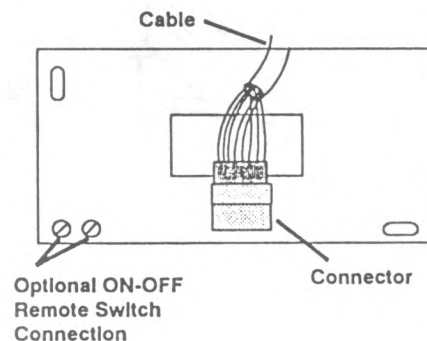
5B. CABLE INSTALLATION (AFTERMARKET)

The same steps must be taken as for OEM installation but routing through the ceiling and walls may not be practical. There are metal or plastic raceways available at most electrical distributors. This will allow routing along the interior surface of your ceiling and wall to the thermostat.

6. THERMOSTAT INSTALLATION

Now that the cable is run, install the thermostat.

- A. Remove the thermostat cover by gripping top and bottom, then pull.
- B. Connect the cable to the connector on the thermostat back. The plug is polarized and latches when fully engaged.
- C. Connect remote switch wires to screw terminals if applicable.



- D. Push the wire back into hole and fill excess with insulating material. **(NOTE:** Make sure mounting screw will not hit cable).
- E. Mount base to wall with two screws provided, being careful not to damage touch pad.
- F. Check alignment and tighten screws.
- G. Replace cover.

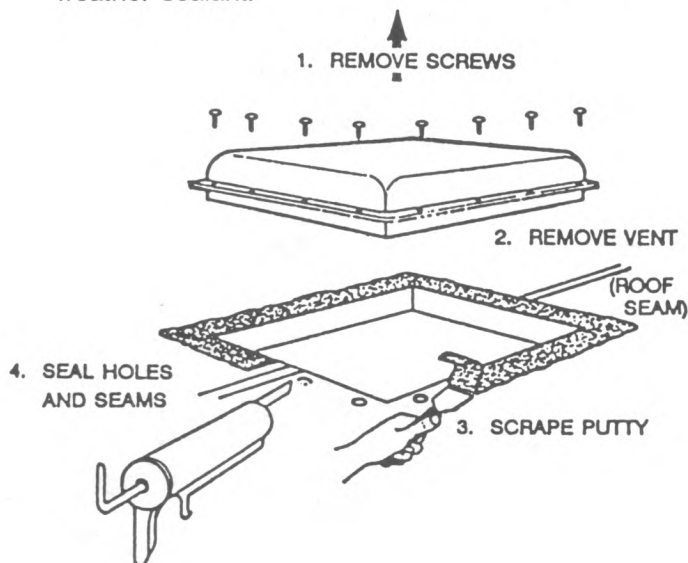
7. REMOTE SWITCH INSTALLATION (Optional)

The thermostat has provision for connection of a remote ON/OFF switch. The user-specified switch may be installed anywhere up to 40 feet from the thermostat. Two conductor thermostat wires (minimum 28 AWG) can be used for this connection and must be routed from the switch to the thermostat.

8. ROOF PREPARATION

A. ROOF VENT REMOVAL (AFTERMARKET)

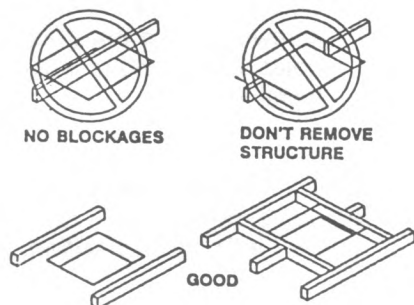
1. Unscrew and remove the roof vent.
2. Remove all caulking compound around opening.
3. Seal all screw holes and seams where the roof gasket is located. Use a good grade of all weather sealant.



B. NEW OPENING

(Installation Other Than Vent Opening)

1. A 14" X 14" opening must be cut through the roof and ceiling of the RV. It is recommended this opening be located between roof reinforcing members.



WARNING

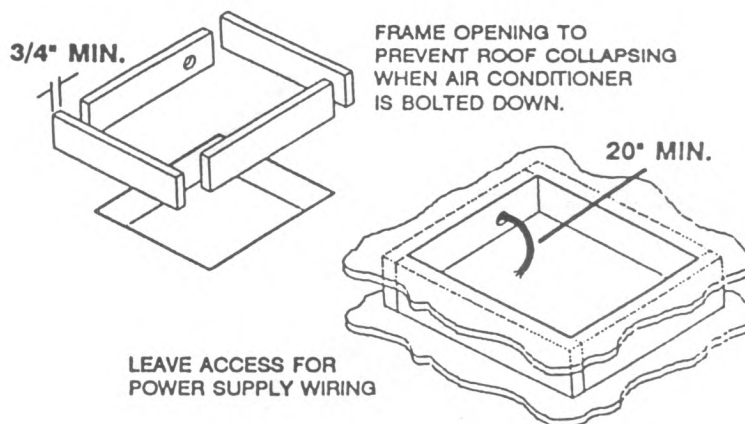
Disconnect all power supplies and the positive (+) terminal from the supply battery. Failure to follow this instruction may create a shock hazard.

2. Mark a 14" X 14" square on the roof and carefully cut the opening.
3. Using the roof opening as a guide, cut the matching hole in the ceiling.

CAUTION: There may be electrical wiring between the roof and ceiling.

C. OPENING PREPARATION

1. If the opening exceeds 14-1/2" X 14-1/2", it will be necessary to install spacers.
2. If the opening is less than 14" X 14", it must be enlarged.
3. Route a copper 12 AWG with ground supply line from the fuse box or circuit breaker to the roof opening.
 - a. The power supply must be on a separate 20 amp Time Delay Fuse or HACR Circuit Breaker.
 - b. Wiring must comply with all National, State and Local wiring codes.
 - c. Make sure at least 20" of wire extend into the roof opening. This insures easy air conditioner attachment.
 - d. If vent fan was removed, the existing wire may be used provided it is of proper size and correctly fused.
4. The roof opening must be framed to provide adequate support and prevent air from being drawn from the roof cavity. Lumber 3/4" thick or more and long enough to bridge the opening must be used. Remember to provide an entrance hole for the power supply wire.

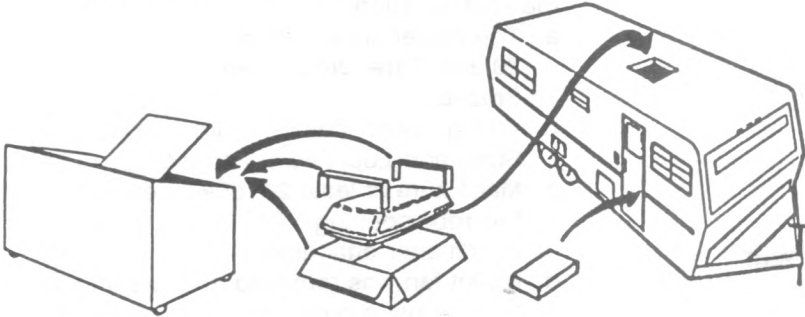


NOTE: NEVER create a LOW SPOT on the roof where water will collect. Water standing around the air conditioner may leak into the RV interior.

5. The 14" X 14" roof opening is part of the return air and must be finished in accordance with NFPA Standard 501C, Standard for recreational vehicles, Section 2-7.
6. Use a steel sleeve and a grommet (or equivalent methods) to protect the wire where it passes through the return air duct.

9. PLACING THE AIR CONDITIONER ON THE ROOF

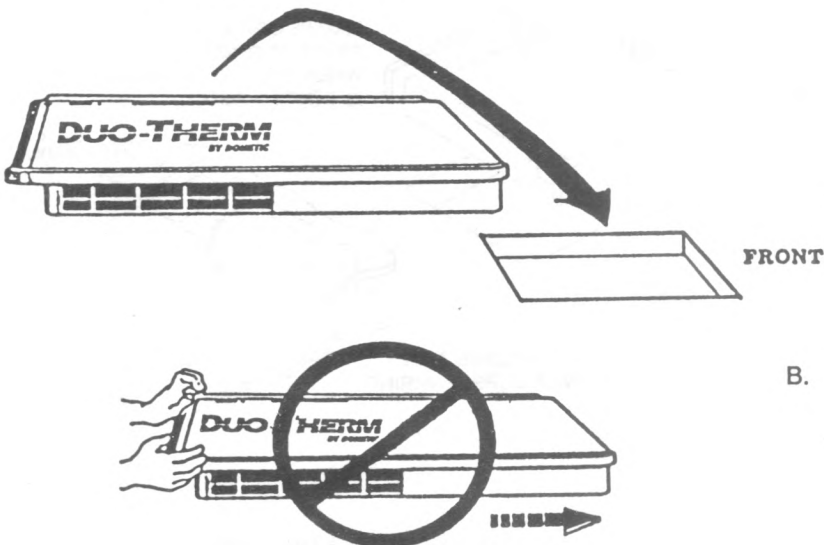
- A. Remove and discard the carton. The air box and mounting parts are in a separate box located in the carton. These parts will be used for the inside portion of the installation.



- B. Place the air conditioner on the roof.

CAUTION: Use care in lifting - this unit weighs approximately one hundred (110) pounds.

- C. Lift and place the unit over the prepared opening using the gasket as a guide. The blunt end goes toward the rear of the RV.



CAUTION: DO NOT slide the unit. This may damage the neoprene gasket attached to the bottom and create a leaky installation.

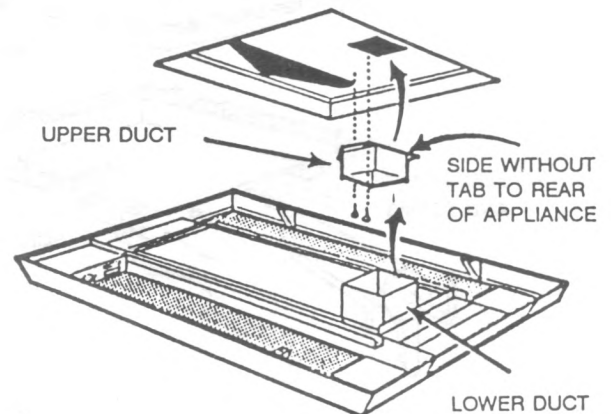
This completes the outside work. Minor adjustments can be done from the inside if required.

10. DISCHARGE DUCT AND CEILING TEMPLATE INSTALLATION

- A. Remove the air box and mounting hardware from their carton. The upper duct is shipped inside the lower duct which is part of the ceiling template. The mounting hardware is in a plastic bag.

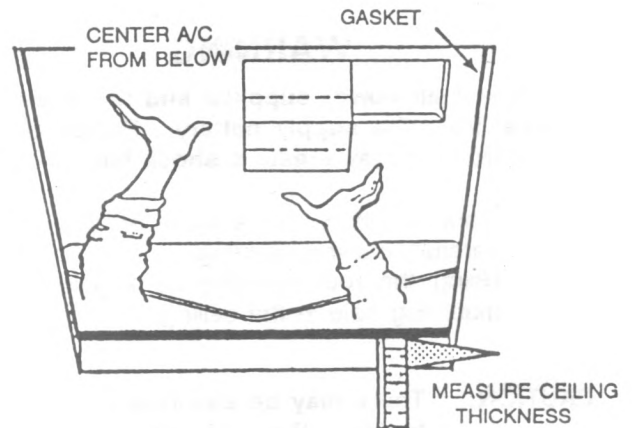
MOUNTING HARDWARE:

- 6 Sharp pointed sheet metal screws
- 3 1/4-20 X 6" Mounting Bolts
- 3 Wire nuts
- 1 Junction box cover
- 1 Blunt point sheet metal screw

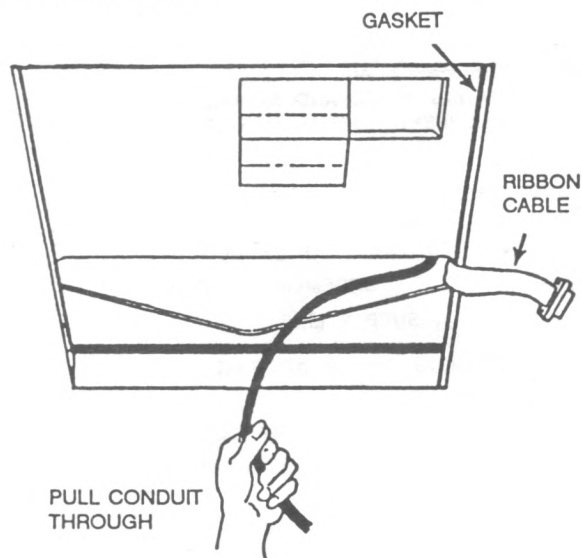


1. Remove the upper duct from the ceiling template and locate it over the blower discharge. **NOTE:** The edge without the flange installs toward the rear of the RV.
2. Use two of the sharp pointed sheet metal screws to hold the duct to the base pan. The holes are prepunched in the pan for ease of location.

- B. Check gasket alignment over roof opening and adjust if necessary. Unit may be moved from below by lifting and sliding.



- C. Reach up into the return air opening and pull the conduit power cable and flat ribbon cable down for later connection.



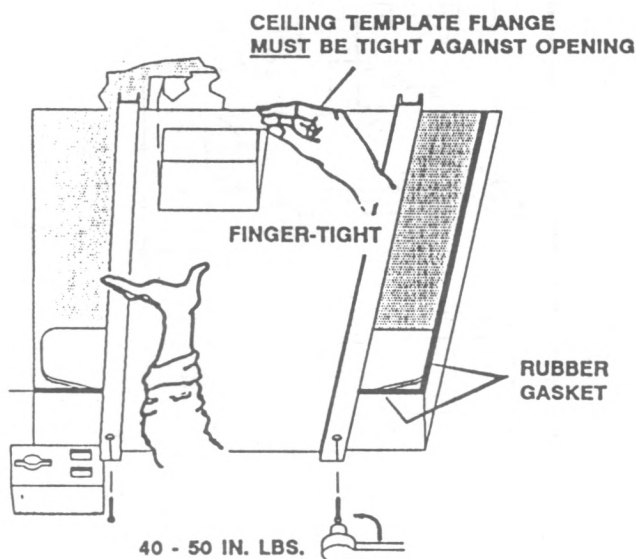
- D. Measure the ceiling thickness:

1. If the distance is 1" to 2", remove the perforated tabs from both upper and lower ducts.
2. If the distance is 2" to 3" remove the perforated tabs from the bottom duct only.
3. If the distance is 3" to 4-1/4" install the ducts as received.
4. If the distance is 4-1/4" to 6" (maximum thickness), optional duct and bolt kits are available:

Duct (Part No. 318556)

Bolts (Part No. 318557)

- E. Take the ceiling template and slide the lower duct over the upper duct.



- F. Hold the ceiling template with one hand and with the other install the three 1/4" x 6" mounting bolts through the template and into the base pan.

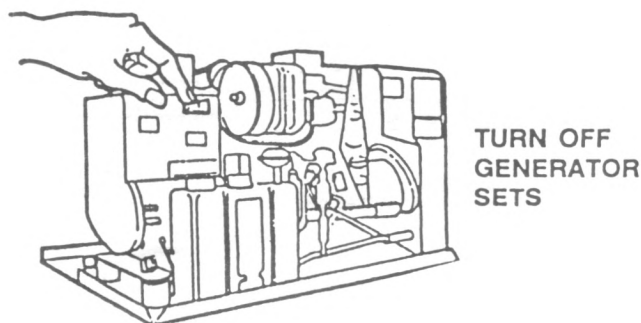
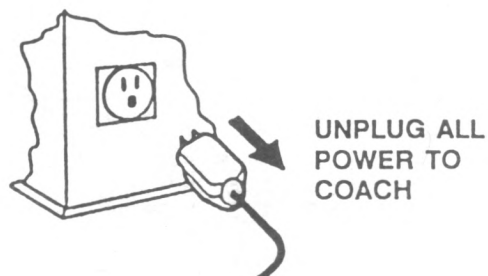
1. Finger-tighten the (3) bolts and check alignment. There should be an equal opening on each side and the rear flange must be tight against the roof opening.
2. Evenly tighten the bolts to a torque of 40 to 50 inch pounds. This will compress the roof gasket to approximately 1/2".

CAUTION: If bolts are left loose there may not be an adequate roof seal. If bolts are over-tightened damage may occur to the air conditioner base or ceiling template.

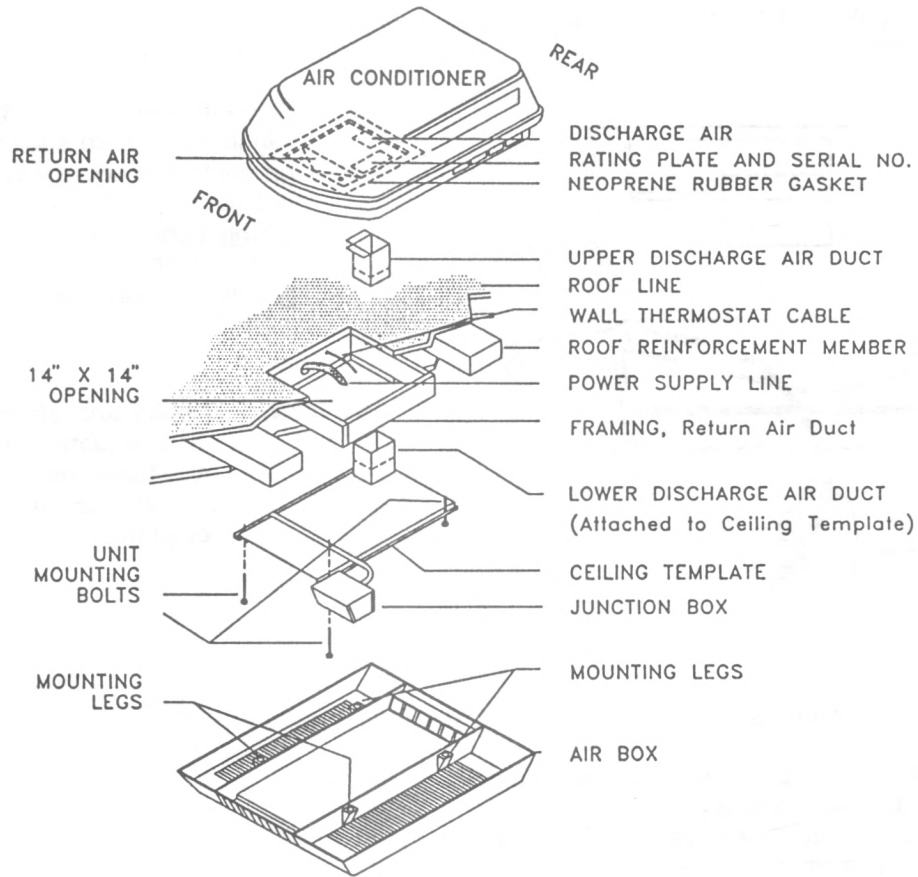
11. CONNECTION OF POWER SUPPLY

WARNING

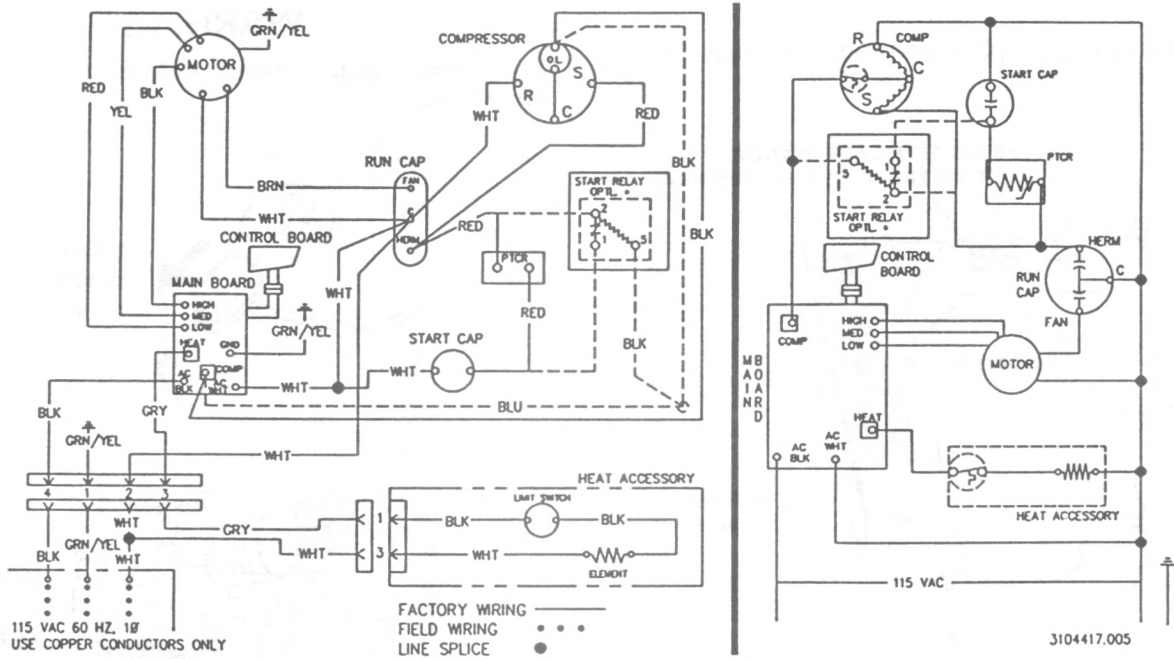
Disconnect ALL power before wire leads are connected.

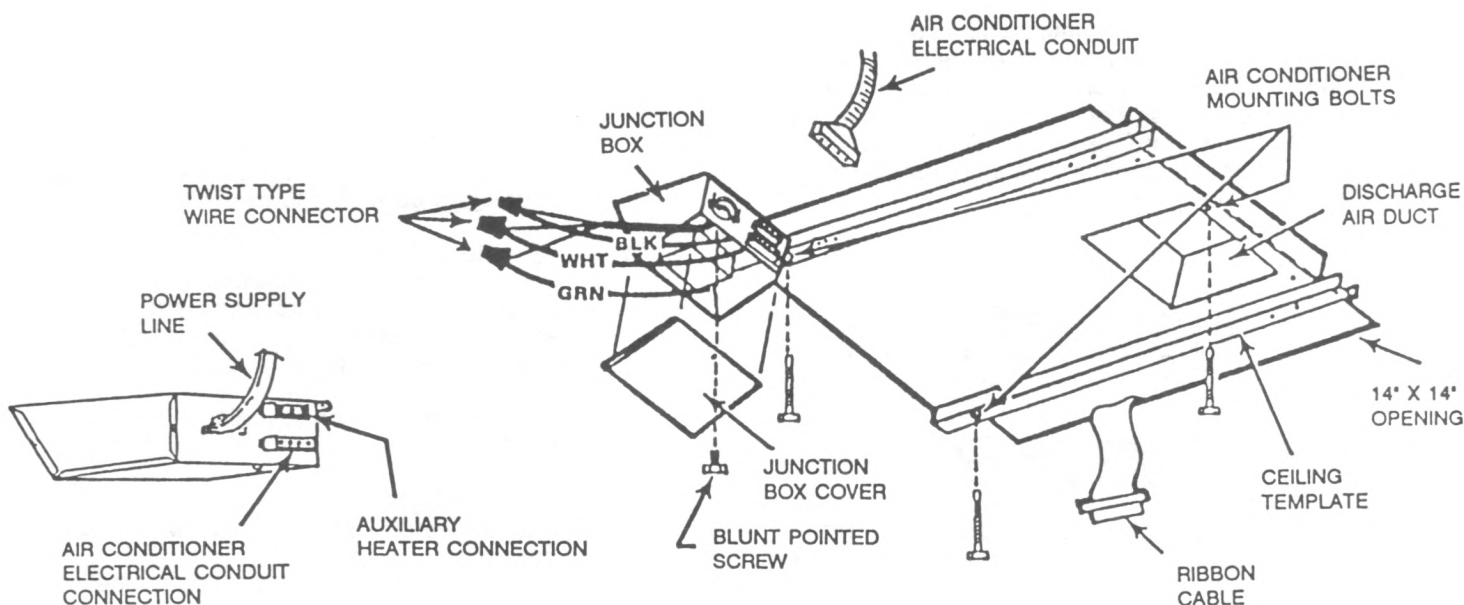


ASSEMBLY DRAWING



WIRING DIAGRAM



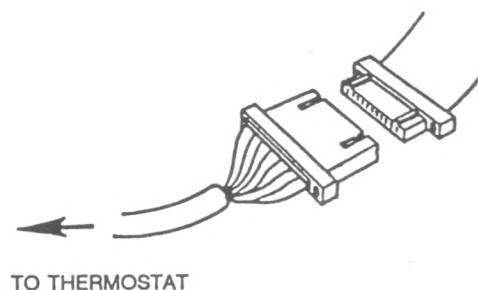


- A. Route supply line into junction box on ceiling template.
- B. Connect white to white; black to black; and green to green or bare copper wire using appropriate sized twist connectors.
- C. Tape the connectors to the wire with electrician's tape.
- D. Push the wires into the box and tighten the strain relief.
- E. Install the cover (part of the mounting hardware) with the one blunt point screw provided.

NOTE: If optional heater is part of this installation, now is the time to install it. Installation instructions are provided with the heater kit.

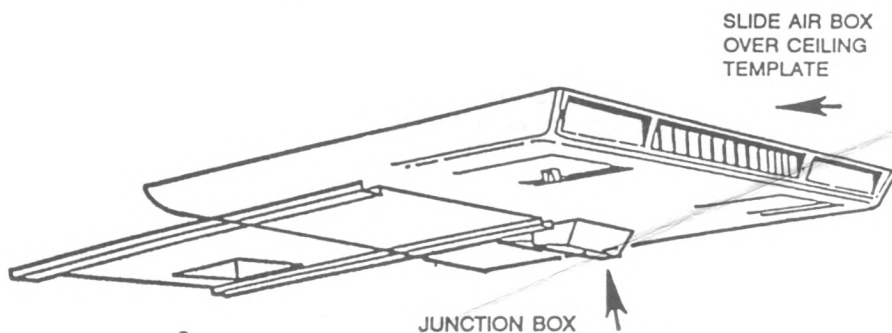
- F. Plug the electrical conduit from the upper unit into the mating junction box connector. (NOTE: Conduit has a 1.5" minimum bending radius.)

- G. Connect the ribbon cable from the unit to the thermostat cable. The connectors are polarized and will easily snap together. **DO NOT FORCE.**

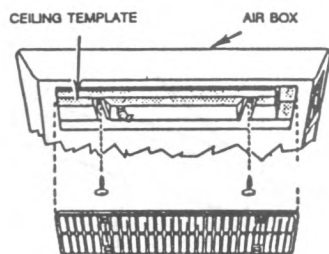


12. AIR BOX INSTALLATION

- A. Remove the two filter-grilles from the air box.
- B. Slide the air box over the ceiling template with the touch pad control on the same end as the junction box.

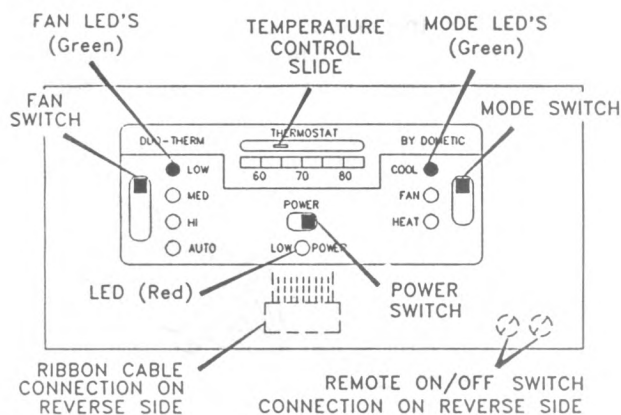


- C. Install the four (4) sharp pointed screws through the air box legs and into the prepunched ceiling template. **NOTE:** There are four optional mounting holes on the outer edge of the return air opening for which no screws are provided. These are only required where an uneven ceiling does not allow proper fitting of the air box.



- D. Install the filter-grilles by pushing them into place.
E. Turn on power to the air conditioner for operational check. Please read the following Operating Instructions before proceeding.

13. OPERATING INSTRUCTIONS



A. CONTROL DESCRIPTION:

1. Power Switch:

- Located lower center of control.
- Turns air conditioner ON to set condition of FAN and MODE switch.
- Turns air conditioner OFF.
- Green LED lights next to FAN and MODE switch light up to indicate power ON.
- No LED lights on when control is OFF.

2. Mode Switch:

- Three position switch located on right side of control.
- Used to select COOLING, FAN or HEAT mode of air conditioner operation.
- Mode selected is indicated by green LED light when control is turned on.

3. Fan Switch:

- Four position switch located on left side of control.
- Used to select HIGH, MEDIUM, LOW or AUTOMATIC FAN operation.
- Fan speed selected is indicated green LED light when control is turned on.

4. Temperature Slide:

- Located top center of control.
- Movable arm on control selects temperature at which the refrigerant compressor or electric heater (if so equipped) is turned ON and OFF.
- User sets to position to maintain temperature level desired.

5. Low Power Light:

- Red indicator light located lower center of control.
- When on, it indicates AC voltage is below 97 volts AC.
- Unit continues to operate (see Special Control Features E.4)

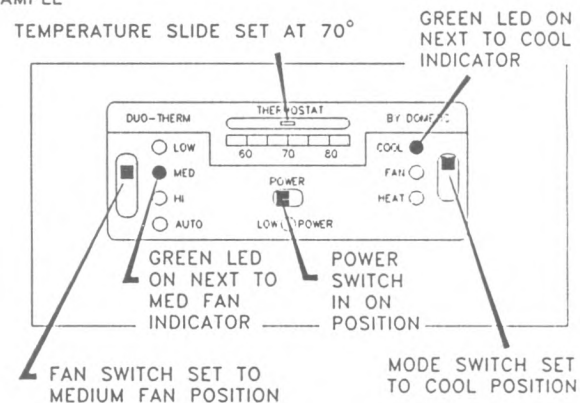
6. Remote Power Switch Connection:

- Two screw terminals located on back side of control.
- Used to connect a remote ON/OFF switch.
- Remote ON/OFF switch, if used, operates same as power switch. (See Special Control Features E.5)

B. COOLING MODE OPERATION

- Turn POWER switch (or REMOTE switch if used) to ON position.
- Place mode switch COOL position.
- Set temperature slide switch to your desired temperature level.
- Select your desired fan speed. **NOTE:** See Special Features Section E.1 for AUTO Fan Operation.
- The fan starts immediately and after a delay of approximately two minutes, the compressor will start.
- The fan and compressor will now cycle OFF per the set point. The fan will restart immediately and the compressor will restart in approximately two minutes when thermostat senses need for cooling.

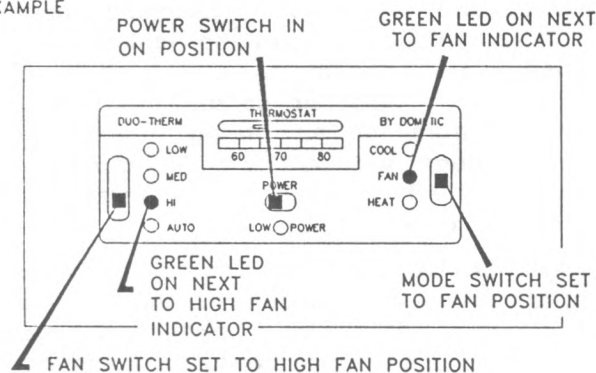
EXAMPLE



C. FAN MODE OPERATION

1. Turn POWER switch (or REMOTE switch if used) to ON position.
2. Place MODE switch in FAN position.
3. Select the desired fan speed: HI-MED-LOW-AUTO. NOTE: In AUTO position the fan operates only at low speed in FAN mode of operation.

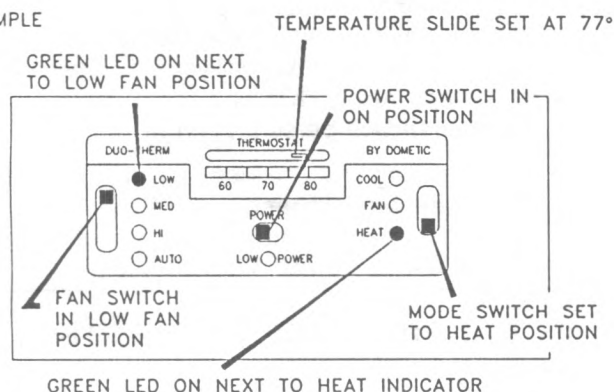
EXAMPLE



D. HEAT MODE OPERATION (If So Equipped)

1. Turn POWER switch (or REMOTE switch if used) to ON position.
2. Place mode switch in HEAT position.
3. Set temperature slide switch to your desired temperature level.
4. Select your desired fan speed (HI-MED-LOW-AUTO) NOTE: In AUTO position the fan operates only at low speed in HEAT mode of operation.
5. The fan runs continuously with the electric heater cycling ON/OFF per the set point to maintain an even comfort range.

EXAMPLE

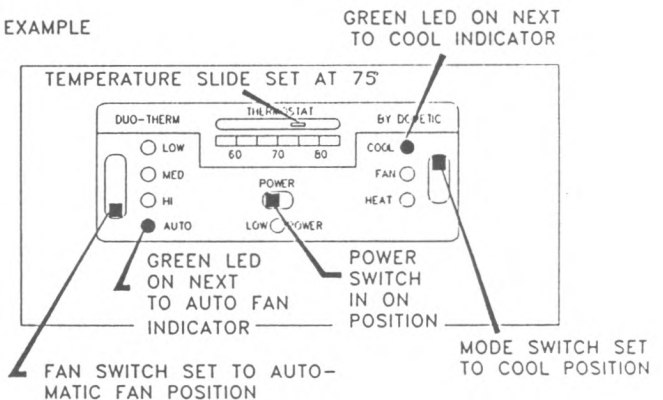


E. SPECIAL CONTROL FEATURES:

1. Auto Fan: When selected, FAN switch will:
 - a. Automatically select the fan speed depending on the difference between set temperature and room temperature.

- b. Temperature difference of:
 - 8° or more - Fan operates on HIGH
 - 4° to 8° - Fan operates on MEDIUM
 - 4° or below - Fan operates on LOW

EXAMPLE



2. Refrigerant Compressor Time Delay:

The compressor will always have a delay in starting of approximately two minutes any time it is required to begin the cooling cycle.

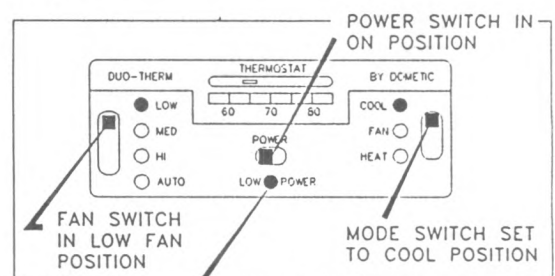
3. Power Interruption:

In the event power to the air conditioner is interrupted for any reason, the system will restart in the condition previously set by user.

4. Low Power Indicator:

The red light will come on any time AC voltage drops below 97 volts AC for more than ten seconds. The light will remain on until the voltage is above 103 volts AC. The air conditioner will continue to run when red light is on as long as sufficient power is available to compressor to keep it running. NOTE: If red light is on, investigate the cause of the low voltage condition and correct to insure efficient operation of the air conditioner.

EXAMPLE



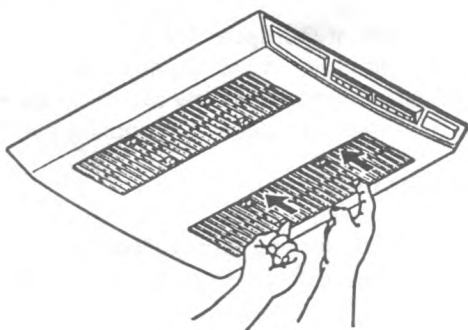
RED LED LIGHT ON INDICATING VOLTAGE HAS DROPPED BELOW 97 VAC FOR MORE THAN 10 SECONDS

5. Remote ON/OFF Switch:

This switch is user supplied and may be installed up to 40 feet from the control. Two screw terminals are located on the back of the control for this connection. The remote switch acts in conjunction with the power switch and when installed acts like a three-way switch in your house.

14. MAINTENANCE

AIR FILTERS: Periodically remove the filter/grille assemblies located in the air box and clean. Remove the assemblies by placing fingers on the long portion of latches and with an over-and-downward pressure, unlatch the catches. After assemblies are removed, wash the filter/grille assemblies with soap and warm water. Let assemblies dry and then reinstall.



NOTE: Never run the air conditioner without return air filters in place. This may plug the unit evaporator coil with dirt and may substantially affect the performance of the unit.

FROST FORMATION on Cooling Coil: Under certain conditions, frost may form on the evaporator coil. If this should occur, inspect the filter and clean if dirty. Make sure air louvers are not obstructed. Air conditioners have a greater tendency to frost when the outside temperature is relatively low. This may be prevented by adjusting the thermostat slide to a warmer setting. Should frost continue, operate on LOW, MED or HIGH FAN setting until the cooling coil is free of frost.

The ability of the air conditioner to maintain the desired inside temperature depends not only on the heat gain of the vehicle but also some preventative measures taken by the occupants. During extreme outdoor temperatures, the heat gain of the vehicle may be reduced by:

- Parking the vehicle in a shaded area;
- Using window shades (blinds and/or curtains);
- Keeping windows and door shut;
- Avoiding the use of heat producing appliances.

Starting the air conditioner early in the morning and giving the system a "head start" on the expected high outdoor ambient will greatly improve its ability to maintain the desired indoor temperature.

CAUTION

The manufacturer of this air conditioner will not be responsible for damage caused by condensed moisture on ceilings or other surfaces. Air contains moisture and this moisture tends to condense on cold surfaces. When air enters the vehicle, condensed moisture may appear on air registers, ceilings, windows, etc. The air conditioner removes this moisture from the air during normal operation. Keeping doors and windows closed when this air conditioner is in operation will minimize condensed moisture on cold surfaces.

For a more permanent solution to a high heat gain, accessories like A&E outdoor patio and window awnings will reduce the heat gain by removing the direct exposure to the sun, and add a nice area to enjoy company during the cool of the evening.

15. SERVICE - Unit Does Not Operate

If your unit fails to operate or operates improperly, check the following before calling your service center:

- A. If RV is connected to motor generator, check to be sure motor generator is running and producing power.
- B. If RV is connected to power supply by a land line, check to be sure line is sized properly to run air conditioner load and it is plugged into power supply.
- C. Check your fuse or circuit breaker to see if it is open.
- D. In the air conditioner air box, check to be sure the air conditioner conduit is plugged into the junction box and ribbon cable is connected.
- E. After the above checks, call your local service center for further help. This unit must be serviced by qualified service personnel only.

When calling for service always give the air conditioner Model Number and Serial Number. This information can be found on the unit rating plate located on the air conditioner base pan.

DID YOU PURCHASE AN ELECTRIC HEAT STRIP

... for your new air conditioner? It's simple to add because your unit is completely pre-wired. You won't regret adding it to remove the chill from the air on those cool morning and evening hours during the camping season. Contact your Dealer to order our 5600 BTU Heat Strip (Part # 3101121).