

**DUO-THERM®**  
by Dometic

**RECORD THIS INFORMATION FOR FUTURE REFERENCE  
BEFORE INSTALLING THE UNIT:**

Model Number \_\_\_\_\_  
Serial Number \_\_\_\_\_  
Date Purchased \_\_\_\_\_  
Place of Purchase \_\_\_\_\_

## 600 SERIES

*Royale* **Penguin** 

**ROOF TOP AIR CONDITIONER**

**USED WITH**

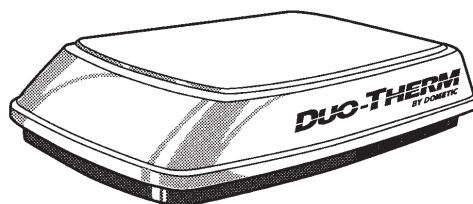
**PART NO. 3105459**

**AIR DISTRIBUTION BOX KIT**

**WITH REMOTE ELECTRONIC THERMOSTAT  
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



### 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

### MODELS

**600312.321**

**600312.421**

**600315.321**

**600315.421**

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

# 1. GENERAL INFORMATION

| MODEL NUMBER                 | 600312.421                                                                                     | 600312.321 | 600315.321 | 600315.421 |
|------------------------------|------------------------------------------------------------------------------------------------|------------|------------|------------|
| Nominal Capacity (BTU/HR)    | 11,000                                                                                         | 11,000     | 13,500     | 13,500     |
| Electrical Rating            | 115 VAC, 60 Hz., 1 PH.                                                                         |            |            |            |
| Compressor Rated Load Amps   | 10.7                                                                                           | 9.5        | 12.4       | 11.5       |
| Fan Motor Rated Load Amps    | 3.1                                                                                            | 3.1        | 3.1        | 3.1        |
| Compressor Locked Rotor Amps | 50.0                                                                                           | 53.0       | 60.0       | 50.0       |
| Fan Motor Locked Rotor Amps  | 8.8                                                                                            | 8.8        | 8.8        | 8.8        |
| Heater Amps/Watts @ 120V AC  | 12.7 / 1530                                                                                    |            |            |            |
| Refrigerant (R22) oz.        | 16.0                                                                                           | 16.5       | 15.5       | 17.0       |
| Minimum Wire Size * (AC)     | 12 AWG Copper up to 24 ft.                                                                     |            |            |            |
| AC Circuit Protection        | 20 Amp Time Delay Fuse or<br>20 HACR Circuit Breaker                                           |            |            |            |
| DC Circuit Protection        | Installation must comply with all National,<br>State, Providence and/or Local Electrical Codes |            |            |            |
| Installed Weight (Pounds)    | 101                                                                                            | 95         | 96         | 102        |
| Minimum Generator            | 1 UNIT                                                                                         | 2.5 KW     | 2.5 KW     | 3.5 KW     |
| Size **                      | 2 UNITS                                                                                        | 4.0 KW     | 4.0 KW     | 5.0 KW     |

\* For lengths over 24 ft., consult the National Electrical Code.

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

## 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. OPERATING INSTRUCTIONS

**NOTE:** Thermostat used with 3105459.014 Air Distribution Box Kit (ADB) does not have gas heat position.

### A. CONTROL DESCRIPTION:

#### 1. Power Switch:

- Located lower center of control.

- Turns air conditioner or gas furnace ON to set condition.
- Turns air conditioner or gas furnace OFF.
- Green LED lights next to MODE switch light up to indicate power ON.
- No LED lights on when control is OFF.

#### 2. Mode Switch

- Three position switch on thermostat used in 3105459.014 Air Distribution Box Kit (ADB). Four position switch on thermostat used 3105459.006 ADB Kit.
- Located on right side of control.
- Used to select mode of operation as follows:
  - COOLING
  - FAN
  - FAN OR OPTIONAL ELECTRIC HEAT ON 590 SERIES
  - GAS HEAT with the 3105459.000 Kit.

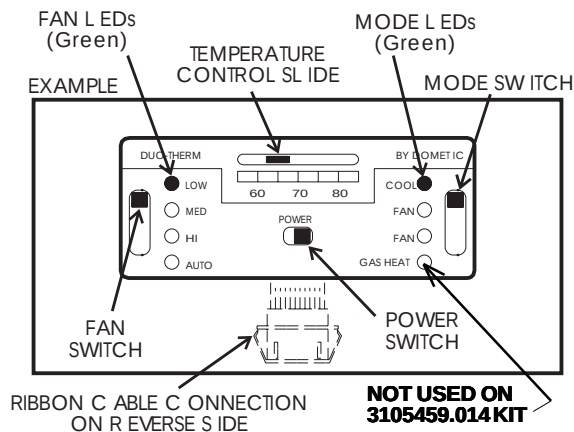
**NOTE:** No Gas Heat position on Thermostat used on 3105459.014 ADB Kit.

#### 3. Fan Switch:

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

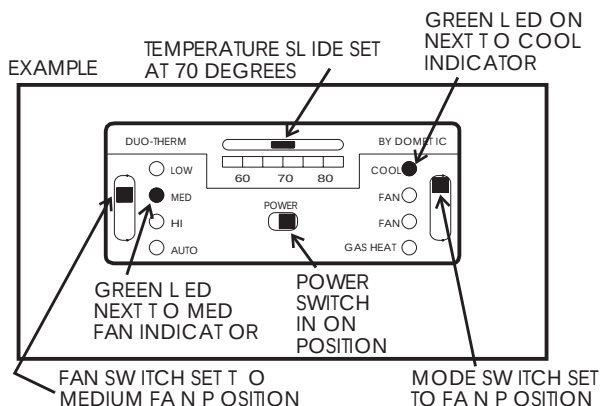
#### 4. Temperature Slide:

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



#### B. COOLING MODE OPERATION

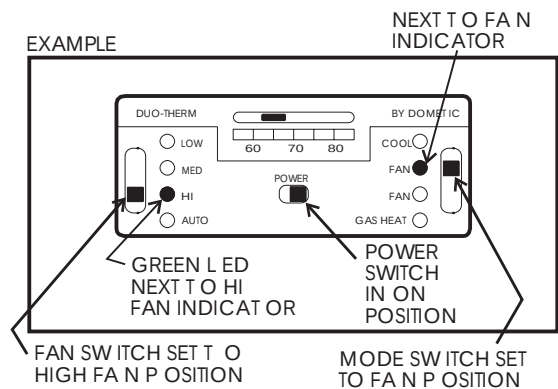
- Turn POWER switch to ON position.
- Place mode switch to COOL position.
- Set temperature slide switch to your desired temperature level.
- Select your desired fan speed. NOTE: See Special Features Section E. 1 for AUTO Fan Operation.
- The fan starts immediately and after a delay of approximately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



#### C. FAN MODE OPERATION

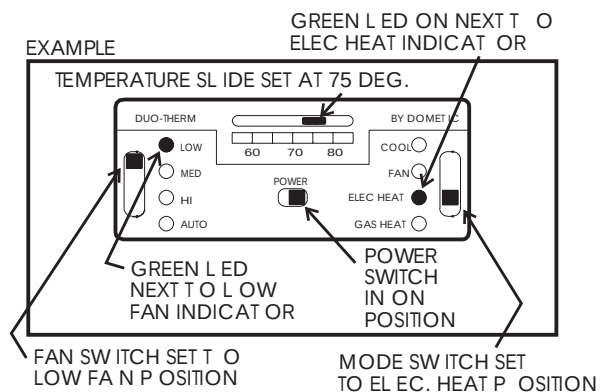
- Turn POWER switch to ON position.
- Place MODE switch in either FAN position.
- Select the desired fan speed: HI-MED-LOW-AUTO.

**NOTE:** In AUTO position the fan operates only at low speed in FAN mode of operation.



#### D. ELEC. HEAT MODE OPERATION (If So Equipped)

- Turn POWER switch to ON position.
- Place mode switch in ELEC. HEAT position.
- Set temperature slide switch to your desired temperature level.
- Select your desired fan speed (HI-MED-LOW-AUTO) NOTE: In AUTO position the fan operates only at low speed in ELEC. HEAT mode of operation.
- The fan will now:
  - Cycle ON and OFF with electric heater when fan switch is in AUTO position.
  - Run continuously when fan switch is in HI-MED-LOW position.

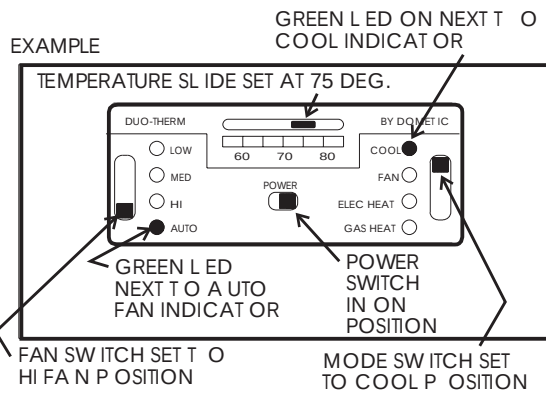


#### E. SPECIAL CONTROL FEATURES:

- Auto Fan Position:** (Cooling Mode Only)  
When air conditioner is in cooling mode of operation and this position is selected, the following will happen:
  - Fan speed is automatically selected depending on the difference between user set temperature and room temperature as follows:
 

|             |                          |
|-------------|--------------------------|
| 8° or more  | - Fan operates on HIGH   |
| 4° to 8°    | - Fan operates on MEDIUM |
| 4° or below | - Fan operates on LOW    |

- b. Fan will cycle ON and OFF with compressor. Any change of any switch on the thermostat will cause fan to come on.

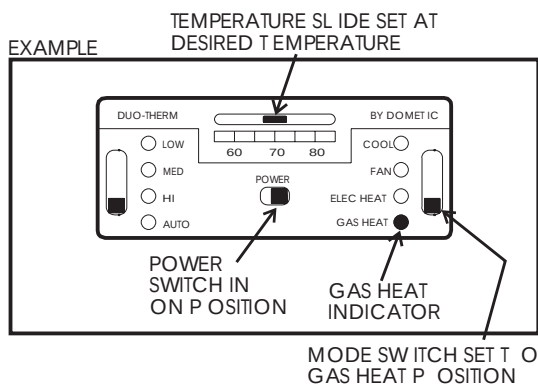


- Refrigerant Compressor Time Delay:** The compressor will always have a delay in starting of approximately two minutes any time it is required to begin the cooling cycle.
- Power Interruption:** In the event power to the air conditioner is interrupted for any reason, the system will restart in the condition previously set by user.

#### F. GAS HEAT MODE OPERATION (If Installed)

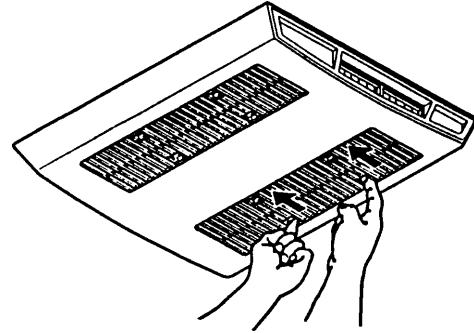
**NOTE:** No Gas Heat position on thermostat used on 3105459.014 ADB Kit.

- Turn POWER switch to ON position.
- Place mode switch to GAS HEAT position.
- Notice that the fan indicators extinguish and the GAS HEAT indicator illuminates. (The Dometic A/C fan will not operate in the GAS HEAT mode.)
- Set temperature slide switch to your desired temperature. The gas furnace will cycle ON and OFF to provide the selected temperature.



## 4. MAINTENANCE

**A. 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.

#### B. AIR BOX HOUSING:

Clean air box housing and control panel with a soft cloth dampened with a mild detergent. Never use furniture polish or abrasive cleaning materials.

#### C. FAN MOTOR:

Factory lubricated and requires no service under normal use.

**D. 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.

## 5. GENERAL INFORMATION

The ability of the air conditioner to maintain the desired inside temperature depends on the heat gain of the rv. Some preventative measures taken by the occupants of the RV can reduce the heat gain and improve the performance of the air conditioner. 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 condition early in the morning and giving it a "head start" on the expected high outdoor ambient will greatly improve its ability to maintain the desired indoor temperature.

#### NOTE

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 RV, condensed moisture may appear on the ceiling, windows, metal parts, etc. The air conditioner removes this moisture from the air during normal operation. Keeping doors and windows closed when the air conditioner is in operation will minimize condensed moisture on cold surfaces.

## 6. SERVICE - Unit Does Not Operate

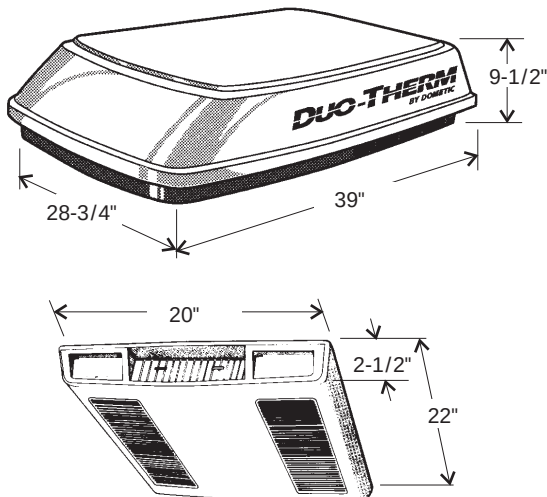
If your unit fails to operate or operates improperly, check the following before calling your service center:

- If RV is connected to motor generator, check to be sure motor generator is running and producing power.
- 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.
- Check your fuse or circuit breaker to see if it is open.
- 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 following:

- Air Conditioner Model and Serial Number found on Rating Plate located on base pan of air conditioner bottom. Remove return air grille to observe this rating plate.**
- Air Distribution Box Kit Part and Serial Number found on Rating Plate located on ceiling template. Observe this rating plate through the discharge louver of the air distribution box.**

## 7. INSTALLATION INSTRUCTIONS



## A. 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.

## B. CHOOSING PROPER LOCATION FOR THE AIR CONDITIONER

This air conditioner is specifically designed for installation on the roof of a recreational vehicle (RV).

### 1. 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.

### 2. Other Locations

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

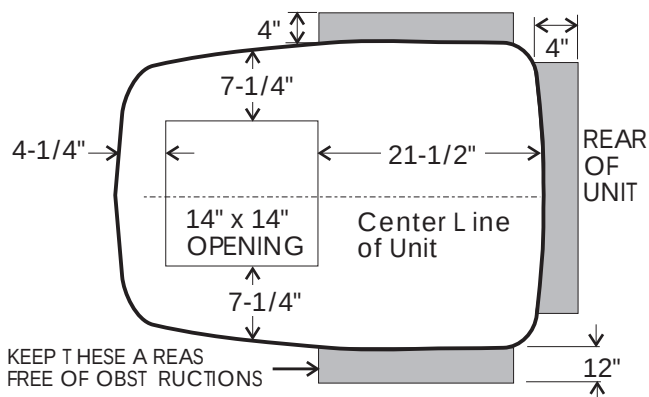
**For one unit installation:** The air conditioner should be mounted slightly forward of center (front to back) and centered from side to side.

**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.

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.

### 3. After location has been selected:

- Check for obstructions in the area where air conditioner will be installed.
- The roof must be designed to support 130 pounds when the RV is in motion. Normally a 200 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.)



## ! WARNING

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

- b. Mark a 14" X 14" square on the roof and carefully cut the opening.
- c. 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.**

### 3. OPENING PREPARATION

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

## C. ROOF PREPARATION

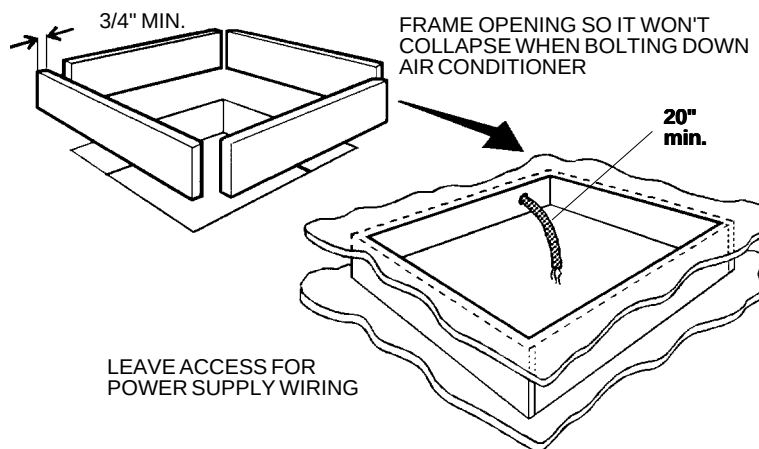
### 1. ROOF VENT REMOVAL:

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

### 2. NEW OPENING

#### (Installation Other Than Vent Opening)

- a. 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.



**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.**

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

## D. THERMOSTAT LOCATION & CABLE INSTALLATION (OEM)

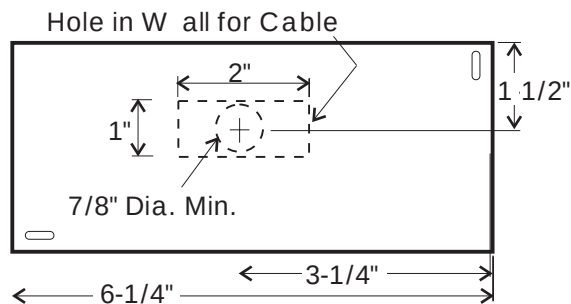
### 1. LOCATION

The proper location of the thermostat is very important to ensure that it will provide a comfortable RV temperature. Observe the following general rules when selecting a location.

- a. Locate the thermostat 54" above the floor.
- b. Install thermostat on a partition, not on an outside wall.
- c. NEVER expose it to direct heat from lamps, sun or other heat producing items.
- d. Avoid locations close to doors that lead outside, windows or adjoining outside walls.
- e. Avoid locations close to supply registers and the air from them.
- f. Never locate thermostat in a room that is warmer or cooler than the rest of the coach – such as the kitchen.
- g. The major living area is normally a good location.

### 2. WALL OPENING

- a. 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.**
- b. 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.

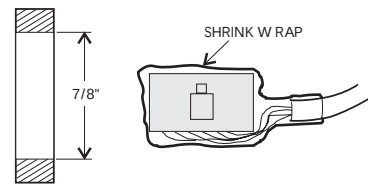


### 3. CABLE INSTALLATION

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

- a. Choose the shortest, most direct route.
- b. 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

- c. The thermostat 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.



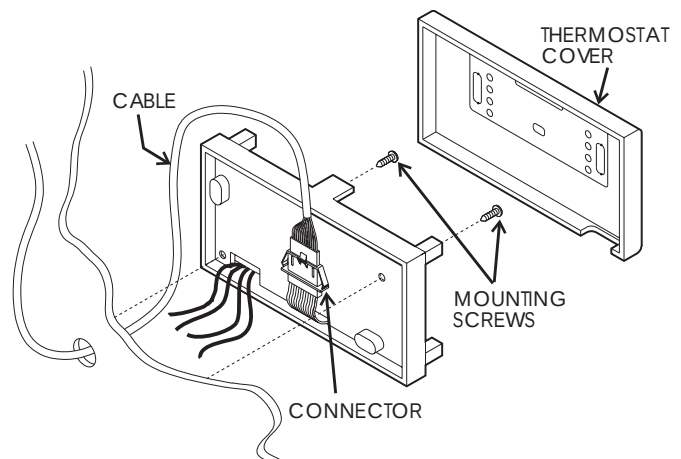
- d. Consider where screws, nails or staples might contact the cable.
- e. Leave 3" of cable extending through the wall for connection to the thermostat.
- f. Enough cable must extend into the 14" x 14" opening to allow connection to the ribbon cable from the upper unit.
- g. If the system is to control a gas furnace: Route 18 gauge thermostat wire from furnace to wall thermostat location at this time.

## D. 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.

## E. THERMOSTAT INSTALLATION

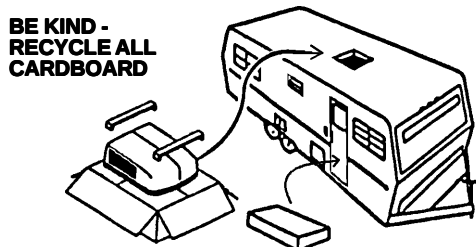
- 1. Remove the thermostat cover by gripping top and bottom, then pull.
- 2. Carefully cut the heat shrink cover from the thermostat cable end connector. Connect the cable to the connector on the thermostat back. The plug is polarized and latches when fully engaged.



3. Connect the red and black wires protruding from the back of the thermostat to the coach 12 volt DC system using 18 gauge wire (minimum). Connect the red wire to plus (+) and the black wire to minus (—).
4. If the system is to control a gas furnace, connect the blue wires protruding from the thermostat to the gas furnace in lieu of another thermostat. If a gas furnace is not to be connected, the blue wires need not be terminated. There is no active signal on these wires.
5. Push the excess wire back into hole and fill hole with insulating material. (**NOTE:** Make sure mounting screw will not hit cable).
6. Mount base to wall with two screws provided, being careful to not damage touch pad.
7. Check alignment and tighten screws.
8. Replace thermostat cover.
9. If the electric heat option is installed, remove decal from thermostat cover and replace with decal provided.

#### F. PLACING THE AIR CONDITIONER ON ROOF

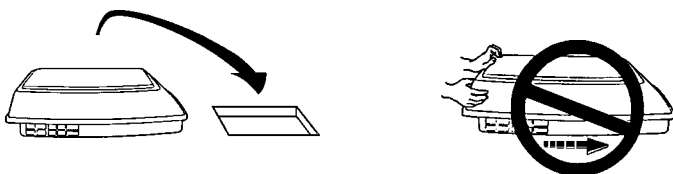
1. Remove the air conditioner from the carton and discard the carton.
2. Place air conditioner on the roof.



#### **! CAUTION**

Use care in lifting. This unit weighs approximately one hundred (100) pounds.

3. 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.
4. Place the 3105459 Air Box Kit inside the RV. This box contains mounting hardware for the air conditioner and will be used inside the RV.



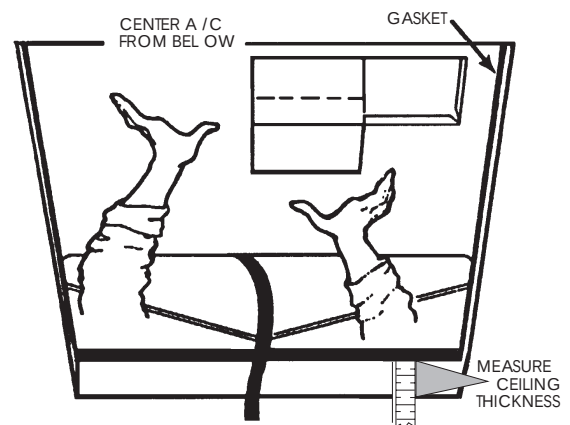
#### **! CAUTION**

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

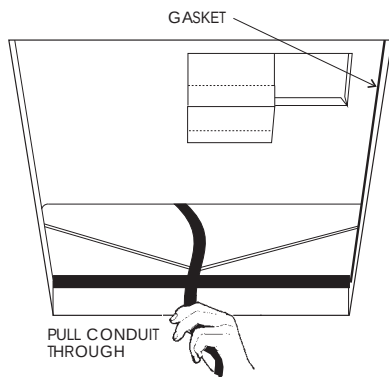
This completes the outside work. Minor adjustments can be done from the inside if required.

#### G. DISCHARGE DUCT AND CEILING TEMPLATE INSTALLATION

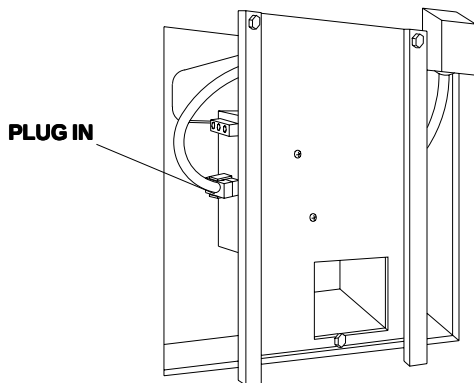
1. Remove the air box and mounting hardware from their carton. The upper duct is shipped inside the lower duct which is part of the ceiling template.
2. Remove the upper duct from the ceiling template and locate it over the blower discharge. **NOTE:** The edge without the flange installs toward the **rear** of the RV.
3. 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 each of location.



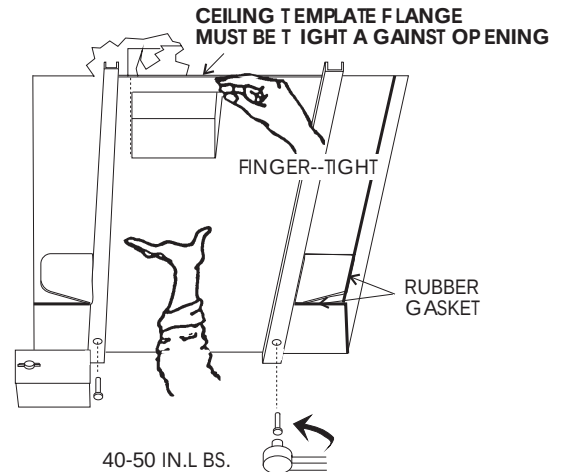
4. Check gasket alignment over roof opening and adjust if necessary. Unit may be moved from below by lifting and sliding.



5. Reach up into the return air opening and pull the conduit power cable down for later connection.
6. Measure the ceiling thickness:
  - a. If the distance is 2" to 3" remove the perforated tabs from the bottom duct only.
  - b. If the distance is 3" to 4-1/4" install the ducts as received.
  - c. 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)
7. Plug the electrical conduit from the upper unit into the mating connector in Electronic Control Module located on top of the ceiling template.



8. Take the ceiling template and slide the lower duct over the upper duct.



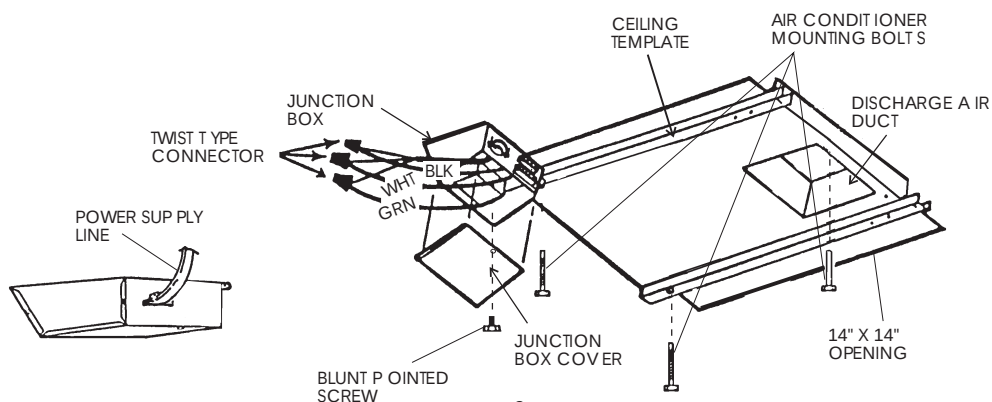
9. Hold the ceiling template with one hand and with the other, install the three 1/4" mounting bolts through the template and into the base pan.
  - a. Finger-tighten the (3) bolts and check alignment. There should be an equal opening on each side and the rear flange must be tight against the roof opening.
  - b. **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.

## G. CONNECTION OF POWER SUPPLY

8. Take the ceiling template and slide the lower duct over the upper duct.



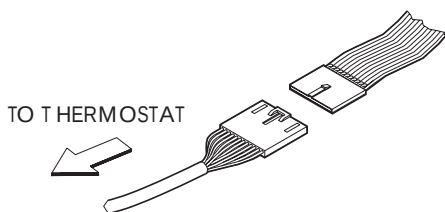
## ! WARNING

**Disconnect ALL power before wire leads are connected.**

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

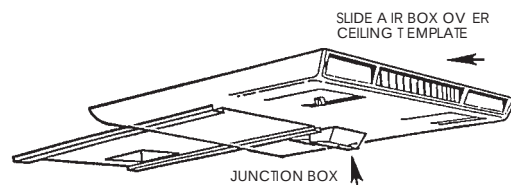
NOTE: If optional heater is part of this installation, now is the time to install it. Installation instructions are provided with the heater kit.

6. Connect the ribbon cable from the Electronic Control Module located on top of ceiling template to thermostat cable coming from wall thermostat. The connectors are polarized and will easily snap together. DO NOT FORCE.

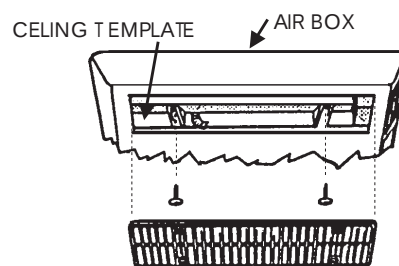


## H. AIR BOX INSTALLATION

1. Remove the two filter-grilles from the air box.
2. Slide the air box over the ceiling template.

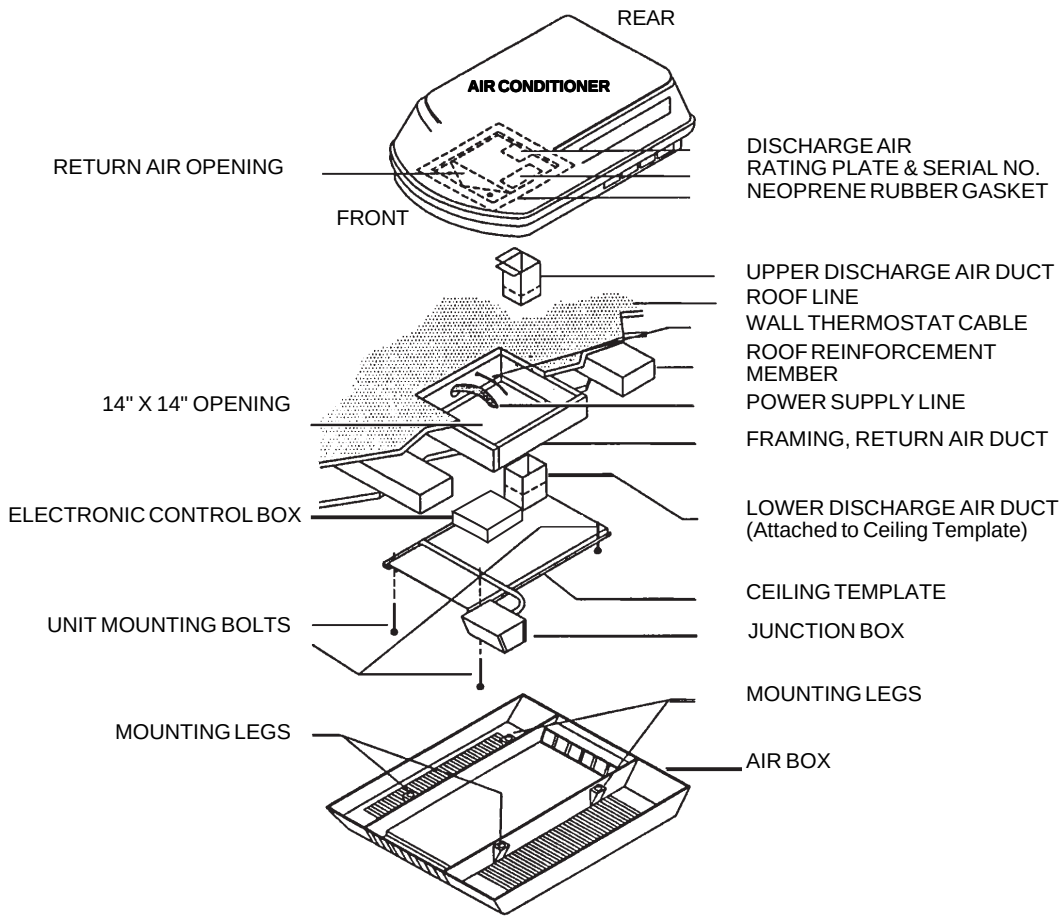


3. Install the four (4) sharp pointed screws through the air box legs and into the prepunched holes in ceiling template. NOTE: There are four optional mounting holes on the outer edge of the return air opening for which **no** screws are provided. These are only required where an uneven ceiling does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



4. Install the filter-grilles by pushing them into place.
5. Turn on power to the air conditioner for operation check.

## ROOF MOUNT ASSEMBLY



## WIRING DIAGRAM

