

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 & HEAT PUMP

USED WITH

PART NO. 3106476 or 3106575

AIR DISTRIBUTION BOX KIT

WITH THE DUO-THERM COMFORT CONTROL CENTER™
PRE-WIRED FOR OPTIONAL HEAT PACKAGE (A/C ONLY)

USA
SERVICE OFFICE
The Dometic Corp.
509 So. Poplar St.
LaGrange, IN 46761
(219) 463-4858

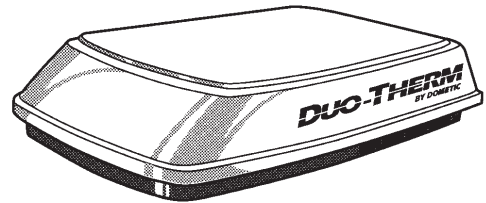
CANADA
Dometic Dist.
866 Langs Dr.
Cambridge, Ontario
CANADA N3H 2N7
(519) 653-4390



UNDERWRITERS
LABORATORIES
INC.[®]
LISTED
637G



CERTIFIED
LR 23565



! DANGER

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.

! DANGER

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 INSTRUCTIONS

IMPORTANT INSTRUCTIONS
MUST STAY WITH UNIT
OWNER — READ CAREFULLY

MODELS
600312.321
600312.421
600315.321
600315.421
630035.421

SPECIFICATIONS

MODEL NUMBER	600312.421	600312.321	600315.321	600315.421	630035.421
Nominal Capacity (BTU/HR) *	11,000	11,000	13,500	13,500	13,500
Electrical Rating	115 VAC, 60 Hz., 1 PH.				
Compressor Rated Load Amps	10.7	9.5	12.4	11.5	11.5
Fan Motor Rated Load Amps	3.1	3.1	3.1	3.1	3.1
Compressor Locked Rotor Amps	50.0	53.0	60.0	50.0	50.0
Fan Motor Locked Rotor Amps	8.8	8.8	8.8	8.8	8.8
Heater Amps/Watts @ 120V AC	12.7 / 1530				
Not Available					
Refrigerant (R22) oz.	16.0	16.5	15.5	17.0	19.5
Minimum Wire Size ** (AC ckt)	12 AWG Copper up to 24 ft.				
AC Circuit Protection	20 Amp Time Delay Fuse or				
DC Circuit Protection	20 HACR Circuit Breaker				
	Installation must comply with all National, State, Providence and/or Local Electrical Codes				
Installed Weight (Pounds)	101	95	96	102	102
Minimum Generator Size ***	1 UNIT	2.5 KW	2.5 KW	3.5 KW	3.5 KW
	2 UNITS	4.0 KW	4.0 KW	5.0 KW	5.0 KW

* Maximum unit performance achieved at full rated voltage.

** 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.

1. GENERAL INFORMATION

- A. This air conditioner is designed for:
- 1) Installation on a recreational vehicle during or after the time the vehicle is manufactured.
 - 2) Mounting on the roof of a recreational vehicle.
 - 3) Roof construction with rafters/joists on minimum of 16 inch centers.
 - 4) Minimum of 2.00 inches and maximum of 5.50 inches distance between roof to ceiling of recreational vehicle. Alternate installation methods will allow for roofs more than 5.50 inches thick.
- B. 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 extremely high outdoor temperatures, the heat gain of the vehicle may be reduced by:
- 1) Parking the RV in a shaded area
 - 2) Using window shades (blinds and/or curtains)
 - 3) Keeping windows and doors shut or minimizing usage
 - 4) Avoiding the use of heat producing appliances.

Starting the air conditioner 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.

C. Condensation

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 this air conditioner is in operation will minimize condensed moisture on cold surfaces.

2. PRECAUTIONS

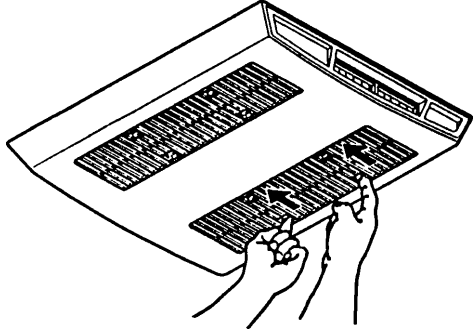
! DANGER

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

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

3. MAINTENANCE

- A. **AIR FILTERS:** Periodically remove and clean the filter/grille assemblies located in the air box. 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.

4. 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. 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:

- 1) 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.
- 2) 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.

INSTALLATION INSTRUCTIONS

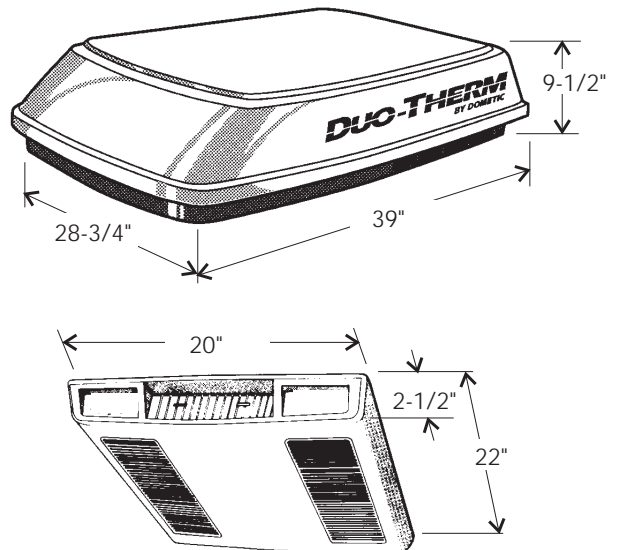
1. CHOOSING PROPER LOCATION FOR THE AIR CONDITIONER

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

- 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 14-1/4" X 14-1/4" 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.

FIG. 1



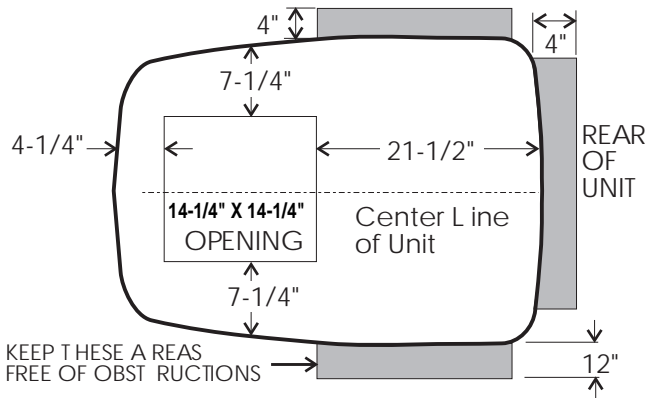
For two unit installations: Install one Air Conditioner 1/3 and one Air Conditioner 2/3's from front of RV and centered from side to side.

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.

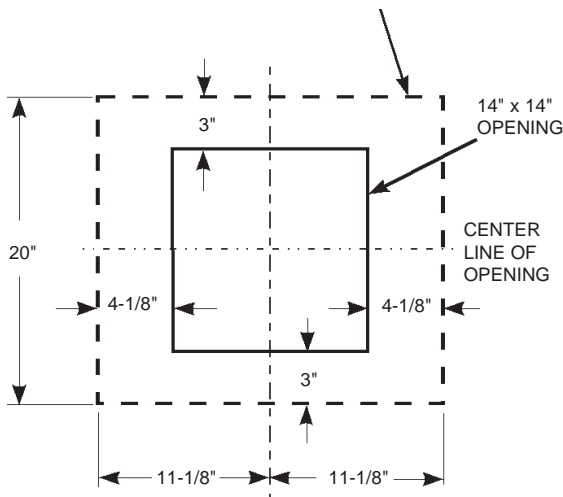
C. After location has been selected:

- 1) Check for obstructions in the area where air conditioner will be installed.
- 2) 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.
- 3) Check inside the RV for air box obstructions (i.e. door openings, room dividers, curtains, ceiling fixtures, etc.)

FIG. 2



AIR BOX PERIMETER



2. ROOF AND CEILING OPENING

A. ROOF PREPARATION

Before preparing the ceiling opening, the type of system options must be decided upon. If a remote sensor is to be used, provision must be made for it. If the load shed option is to be used, wires must be run from the load shed control to the Dometic A/C. If a furnace is to be connected, wires must be run from the furnace to the Dometic A/C. Read all of the following instructions before beginning the installation.

! DANGER

THERE MAY BE ELECTRICAL WIRING BETWEEN THE ROOF AND THE CEILING. DISCONNECT ALL POWER SUPPLIES AND THE POSITIVE (+) TERMINAL FROM THE SUPPLY BATTERY. FAILURE TO FOLLOW THIS INSTRUCTION MAY CREATE A SHOCK HAZARD.

B. ROOF VENT REMOVAL

- 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.

C. NEW OPENING

(Installation Other Than Vent Opening)

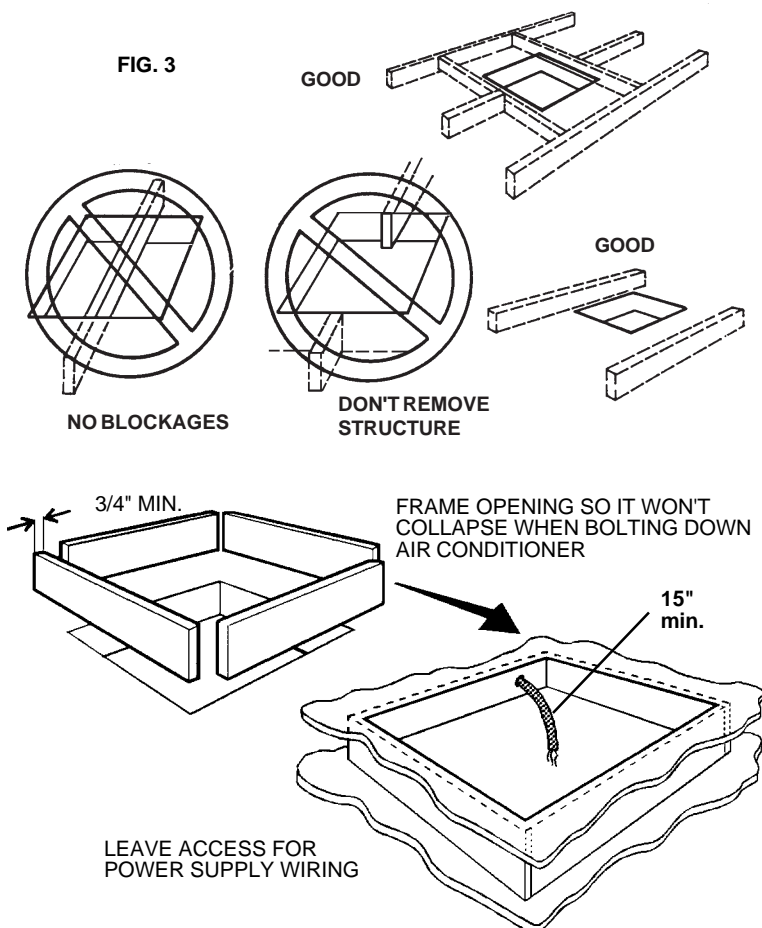
- 1) A 14-1/4" x 14-1/4" opening must be cut through the roof and ceiling of the RV. This opening must be located between the roof reinforcing members.
- 2) Mark a 14-1/4" x 14-1/4" square on the roof and carefully cut the opening.
- 3) Using the roof opening as a guide, cut the matching hole in the ceiling.

D. OPENING PREPARATION

- 1) The opening created must be framed to provide adequate support and prevent air from being drawn from the roof cavity. Lumber 3/4" or more in thickness must be used. Remember to provide an entrance hole for power supplies, furnace wiring, 4-conductor telephone cable, remote sensing and load shed (Energy Management System) options as desired.
- 2) The 14-1/4" x 14-1/4" opening is part of the return air system of the Air Conditioner and must be finished in accordance with NFPA Standard 501C Section 2.7.
- 3) Route a copper 12 AWG, with ground, 115 VAC supply line from the fuse or circuit breaker box to the roof opening.
 - a) This supply line must be located in the front portion of the 14-1/4" opening.
 - b) The power **MUST** be on a separate 20 amp time delay fuse or HACR circuit breaker.
 - c) Make sure that at least 15" of supply wire extends into the roof opening. This ensures easy connection at the junction box.

- d) Wiring must comply with all National, State and Local Wiring Codes.
- e) Use a steel sleeve and a grommet or equivalent methods to protect the wire where it passes into the opening.

FIG. 3



! CAUTION

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

- 4) Route a dedicated 12 VDC supply line (18-22 AWG) from the RV's converter or battery to the roof opening.
 - a) This supply line must be located in the front portion of the 14-1/4" opening.
 - b) Make sure that at least 15" of supply wire extends into the roof opening.
 - c) **In a multiple zone installation, this wiring is required in only one of the 14-1/4" openings.**
- 5) If a Remote Temperature Sensor is used, the connector end must be routed to the roof opening of the system which it will control. Make sure that at least 15" of the sensor cable extends into the roof opening. Refer to the Remote Sensor Instructions for details of the installation.

- 6) If a furnace is to be controlled by the system, the two furnace thermostat leads must be routed to the roof opening of the air conditioner that will control it. Make sure that at least 15" of the furnace thermostat wires extend into the roof opening.
- 7) If an Energy Management System (load shed feature) is to be used with the control, two wires must be routed to the roof opening of the zone to be managed. The signal required for this function is normally open relay contact. When the EMS calls for the compressor to shut off, the relay contacts should close. Make sure that at least 15" of the EMS wires extend into the roof opening.
- 8) Route a 4-conductor telephone cable from the **Comfort Control Center™** mounting position into the 14-1/4" roof opening. Make sure that at least 15" of the wire extends into the roof opening and 6" extend from the wall at the mounting position of the **Comfort Control Center™**
- 9) In the event that other Air Conditioners are installed (additional zones) an additional 4-conductor telephone cable must be routed to the other Air Conditioners. Make sure that at least 15" of the wire extends into the roof opening. (See Page 10, Fig. 18)

3. DOMETIC COMFORT CONTROL CENTER™ & CABLE INSTALLATION

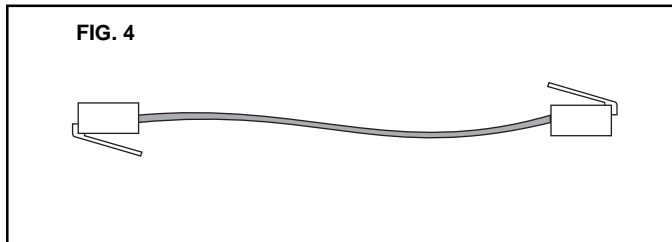
A. LOCATION

- 1) If the system is to be used **WITHOUT** a **Remote Temperature Sensor**, the proper location of the **Comfort Control Center™** is very important to ensure that it will provide a comfortable RV temperature. Observe the following rules when selecting a location:
 - a) Locate the **Comfort Control Center™** 54" above the floor.
 - b) Install the **Comfort Control Center™** 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.
- 2) If the system is to be used **WITH** a **Remote Temperature Sensor** in **ALL** zones, the comfort control Center may be mounted anywhere that is convenient in the coach. Try to avoid hard to reach and hard to see areas.
- 3) A 3/8" diameter hole will be needed to route the cable through the wall.

B. CONTROL CABLE INSTALLATION

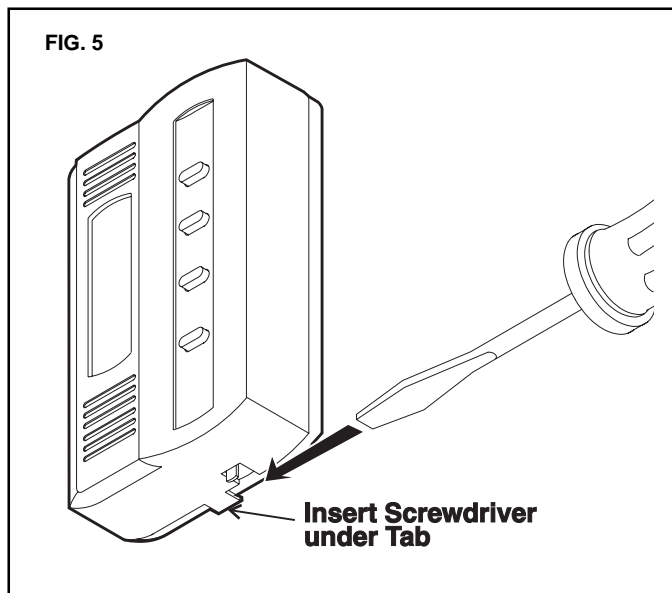
A 4-conductor telephone cable must be routed from the roof opening to the **Comfort Control Center™**

- 1) Choose the shortest, most direct route from the 14-1/4" opening to the **Comfort Control Center™** location selected. Leave 6" of cable extending through the wall.
- 2) The cable that should be used is a flat, 4-conductor telephone cable.
- 3) The cable must be terminated with a telephone RJ-11 connector. Refer to the crimp tool manufacturer for crimping instructions. Ensure that the cable is installed into the connector correctly before crimping. (See FIG. 4).



C. COMFORT CONTROL CENTER™ INSTALLATION

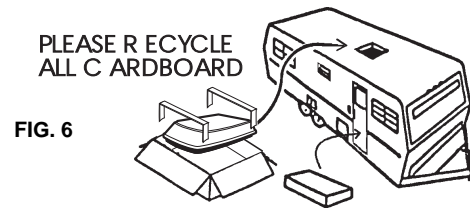
- 1) Carefully remove the base plate from the **Comfort Control Center™**. This may be accomplished by inserting a small screwdriver under the tab on the bottom edge of the front cover and gently prying. (See FIG. 5).



- 2) Insert the telephone cable through the hole in the base plate and mount the plate to the wall with the two screws provided. Check the alignment to ensure level installation.
- 3) Install the control cable RJ-11 connector into the back of the **Comfort Control Center™** and gently press onto the base plate.

4. PLACING THE AIR CONDITIONER ON THE ROOF

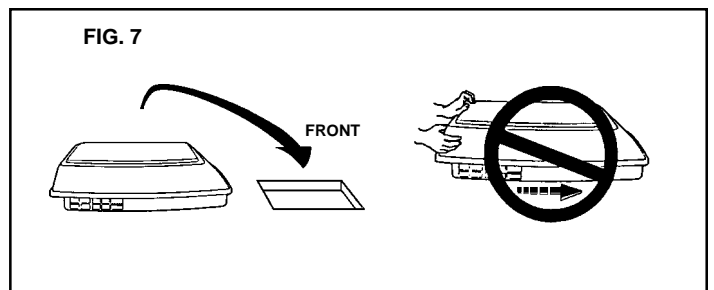
- A. Remove the Air Conditioner from the carton and discard.



- B. Place the Air Conditioner on the roof.

! CAUTION
USE CARE IN LIFTING. THIS UNIT WEIGHS APPROXIMATELY ONE HUNDRED (100) POUNDS.

- C. Lift and place the unit over the prepared opening using the gasket on unit as a guide. The **blunt end** goes toward the **rear** of the RV.
- D. Place the Air Box Kit inside the RV. This box contains mounting hardware for the air conditioner and will be used inside the RV.

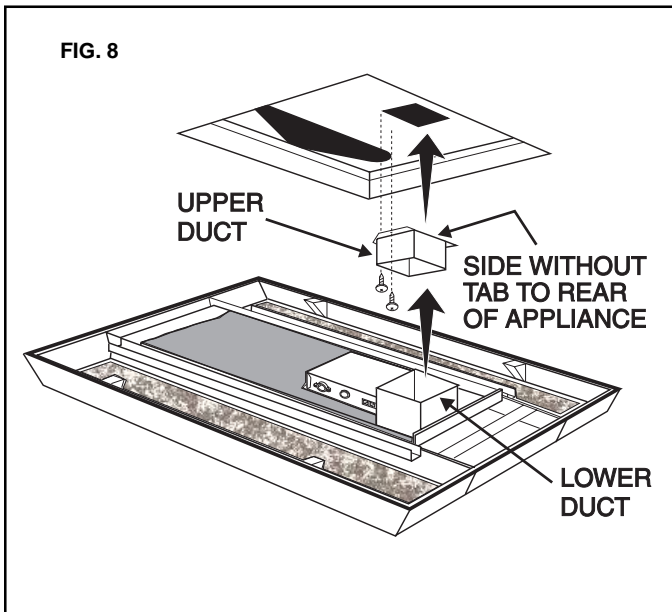


! CAUTION
DO NOT SLIDE THE UNIT. THIS MAY DAMAGE THE NEOPRENE GASKET ATTACHED TO THE BOTTOM AND CREATE A LEAKY INSTALLATION.

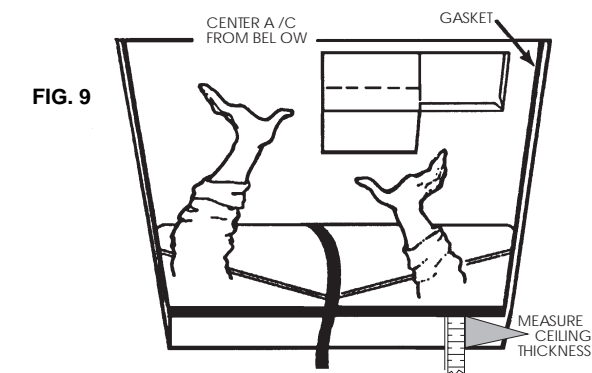
This completes the outside work. Minor adjustments can be done from the inside of the RV if required.

5. DISCHARGE DUCT & CEILING TEMPLATE INSTALLATION

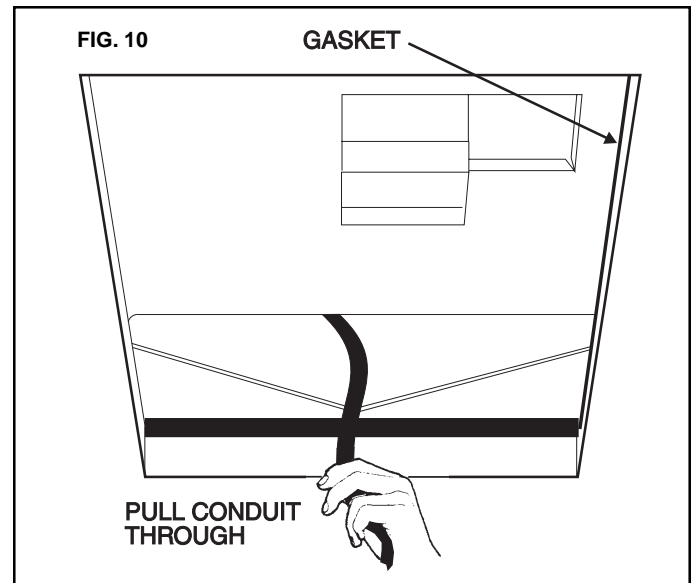
- A. Remove the air box and mounting hardware from their carton. The upper duct is shipped inside the lower duct which is part of the ceiling template.



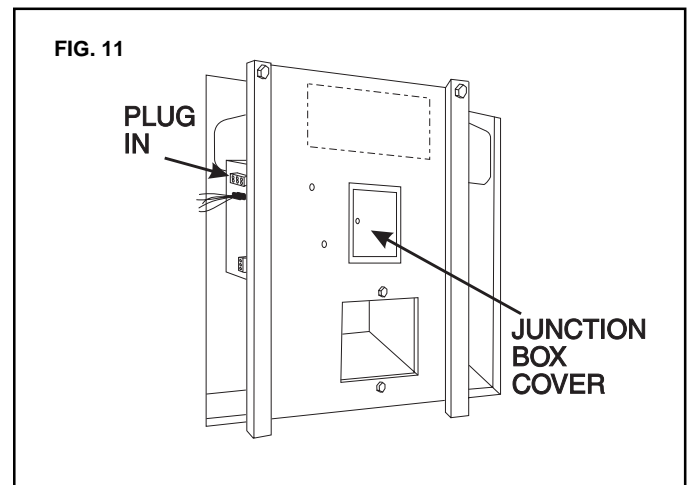
- B. Remove the upper duct from the ceiling template and locate it over the blower discharge. NOTE: The edge without the flange installs toward the **rear** of the RV.
- C. Use two of the sharp pointed sheet metal screws to hold the duct to the base pan. The holes are prepunched in the pan for each location.



- D. Check gasket alignment over roof opening and adjust if necessary. Unit may be moved from below by lifting and sliding.
- E. Reach up into the return air opening and pull the conduit power cable down for later connection. Pull the low voltage wire and telephone cable down for later connection.

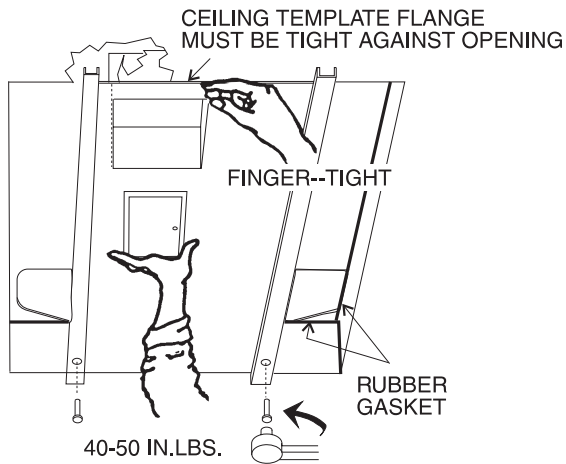


- F. Measure the ceiling thickness:
- 1) If the distance is 2" to 3" remove the perforated tabs from the bottom duct only.
 - 2) If the distance is 3" to 4-1/4" install ducts as received.
 - 3) If the distance is 4-1/4" to 6" (maximum thickness), optional duct and bolt kits are available:
 Duct (Part No. 318556)
 Bolts (Part No. 318557)
- G. Remove the junction box cover from the Electronic Control Kit.
- H. Plug the electrical conduit from the upper unit into the mating connector in Electronic Control Kit located on top of the ceiling template.



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

FIG. 12



- J. 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.
- 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.

6. WIRING OF SYSTEM

A. CONNECTION OF LOW VOLTAGE WIRES

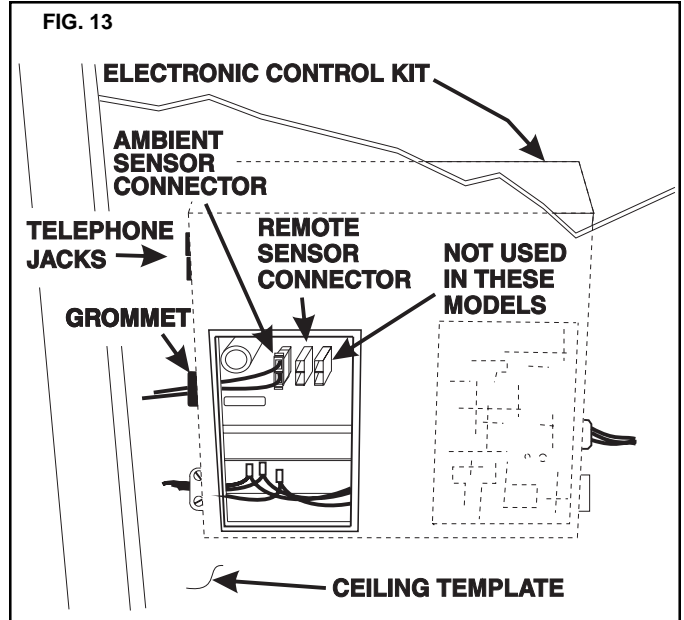
! CAUTION

Ensure that the 12VDC power is shut off. Damage to equipment could occur if the 12 volt power is NOT shut off.

- 1) Route **Remote Temperature Sensor** cable, if applicable, through the grommet in the **Electronic Control Kit** and attach it to the connector that matches its color.
- 2) Connect the previously run 12 VDC to the red and black wires protruding from the Electronic Control Kit. (In multiple zone installations, this needs to be done at only one zone.) Connect +12 VDC to the red wire; -12 VDC to the black wire.
- 3) Connect the previously run furnace thermostat wires (if applicable) to the blue wires protruding from the Electronic Control Kit. The polarity of these connections does not matter.
- 4) Connect the previously run Energy Management System wires (if applicable) to the yellow wires protruding from the Electronic Control Kit. The polarity of these connections does not matter.

- 5) If the A/C is a Heat Pump model (630035), route the Ambient Air Sensor Cable, already installed in the base model, through the grommet in the Electronic Control Kit and attach it to the connector that matches its color. (See FIG. 13).

FIG. 13



- 6) Terminate the 4-conductor telephone cable(s) protruding into the 14-1/4" roof opening. The cable(s) must be terminated with a telephone RJ-11 connector. Refer to the crimp tool manufacturer for crimping instructions. Ensure that the cable is installed into the connector correctly before crimping. (See FIG. 4)
- 7) Plug the telephone cable(s) into the telephone jack(s) visible on the side of the **Electronic Control Kit**. (It does not matter which one.)

B. CONNECTION OF 115 VOLT POWER SUPPLY

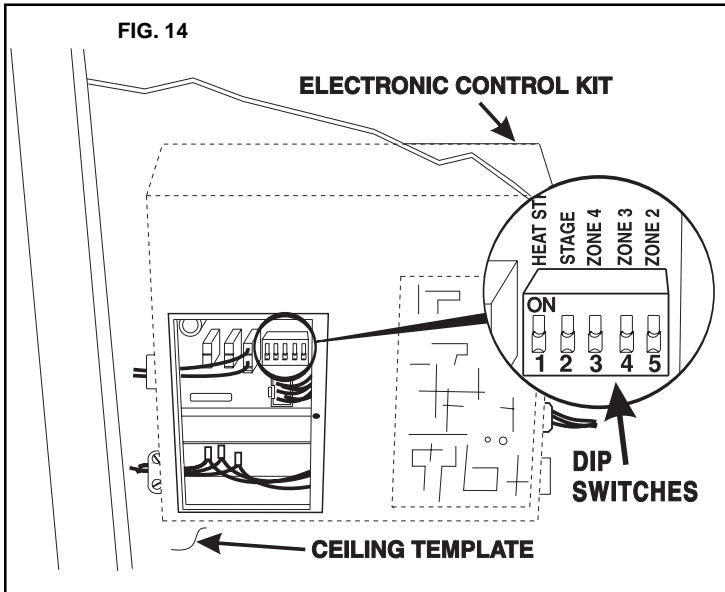
- 1) Route the previously run power supply line through the Romex Connector and into the Electronic Control Kit Junction Box.
- 2) Connect the white to white; black to black; and green to green or bare copper wire using appropriately sized twist wire connectors. **Tape** the twist wire connectors to the supply wiring to assure they do not vibrate off.
- 3) Tighten screws on strain relief connector being careful not to pinch and cut into the insulation on power supply leads.

7. SYSTEM CHECKOUT & CONFIGURATION

Now that the system is installed, it is necessary to check all operations and then configure the electronics.

E. ELECTRONIC CONTROL KIT CONFIGURATION

- 1) Adjust the dip switches visible in the **Electronic Control Kit** according to the options that are installed. (See FIG. 14). Placing the switch in the ON position selects that option.
NOTE: Dip switches are shipped from the factory in the "OFF" position.
- 2) Selection of ZONE 2 identifies this unit as Zone 2; likewise, Zone 3 and 4.
- 3) STAGE is not used on these units. Leave in the "OFF" position.
- 4) HEAT STRIP is placed to "ON" if an Electric Heat Strip is installed.
- 5) Replace the junction box cover on the **Electronic Control Kit**.



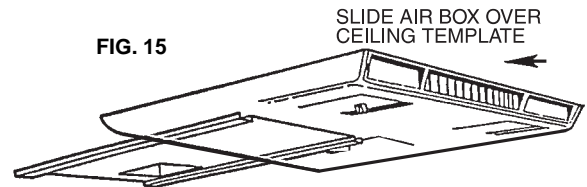
Refer to the Operating manual for a description of the air conditioner operation.

- 6) **SYSTEM CHECKOUT:** Verify that all features of the installed system work. Check fan speeds, cooling mode, heat pump mode, furnace (if connected) and heat strip. If the features do not work, check all wiring and confirm that the correct options have been selected on the Electronic Control Box. See **Comfort Control Center™** Operating Instructions.

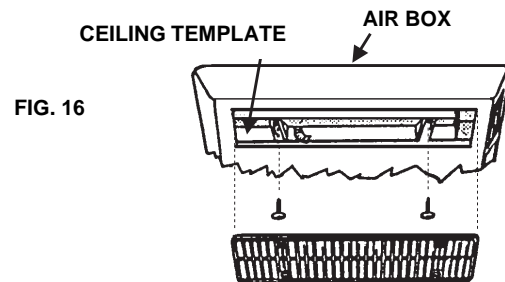
- 7) **SYSTEM CONFIGURATION:** If all features are functioning, perform the following configuration procedure:
 - a) Simultaneously depress **UP** and **DN** pushbuttons on the **Comfort Control Center™** for one second. This completes the system configuration.

8. AIR BOX INSTALLATION

- A. Remove the two filter-grilles from the air box.
- B. Slide the air box over the ceiling template.



- C. 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.



- D. Install the filter-grilles by pushing them into place.

FIG. 17

ROOF MOUNT ASSEMBLY

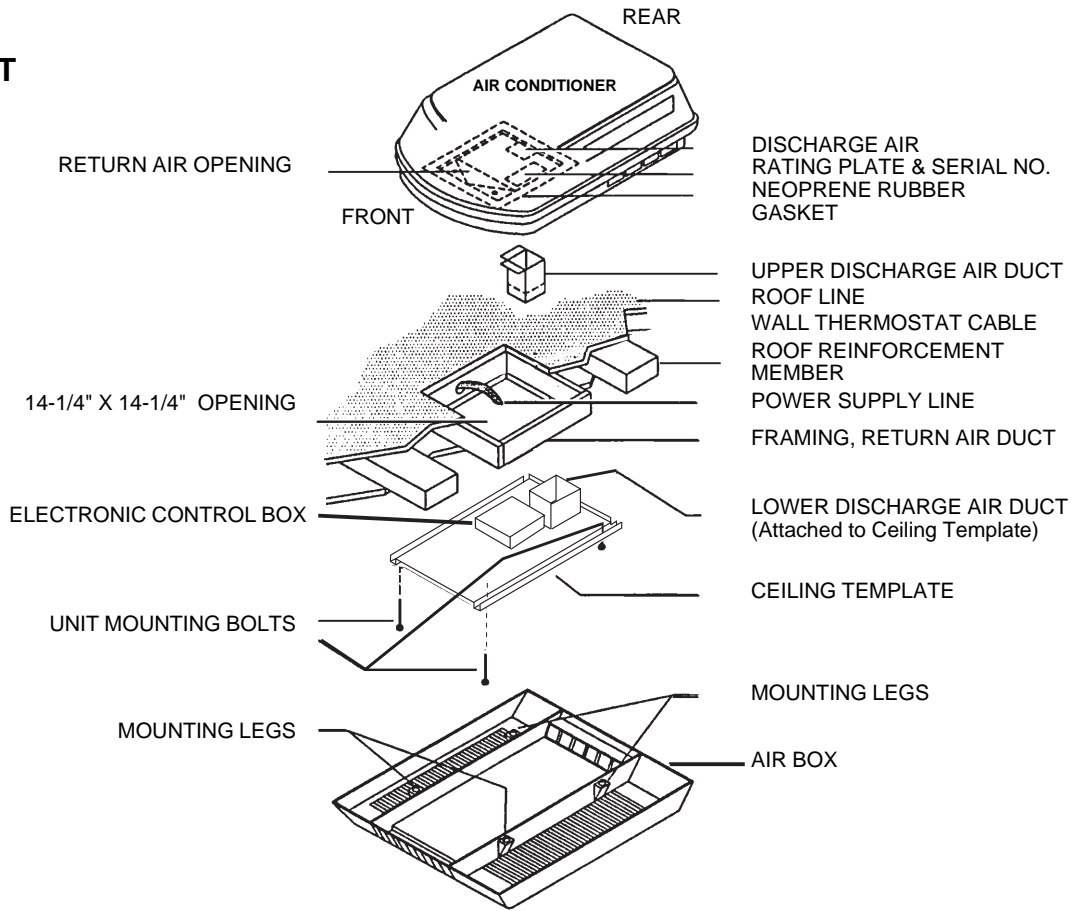
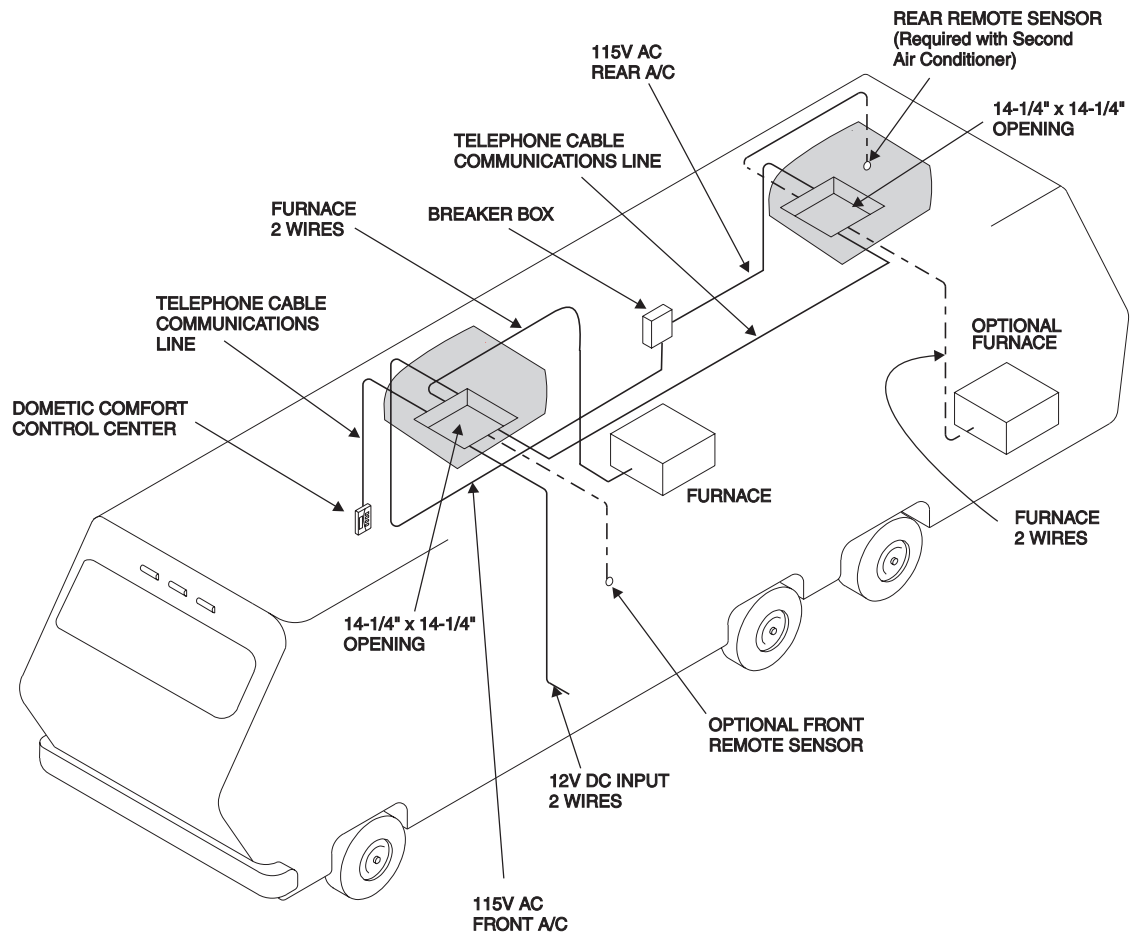
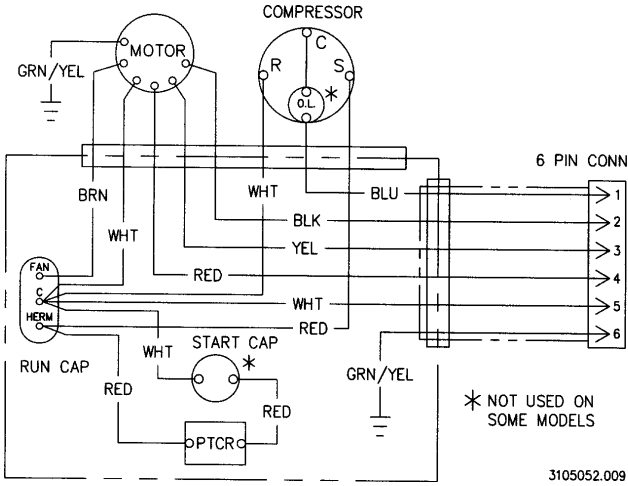


FIG. 18

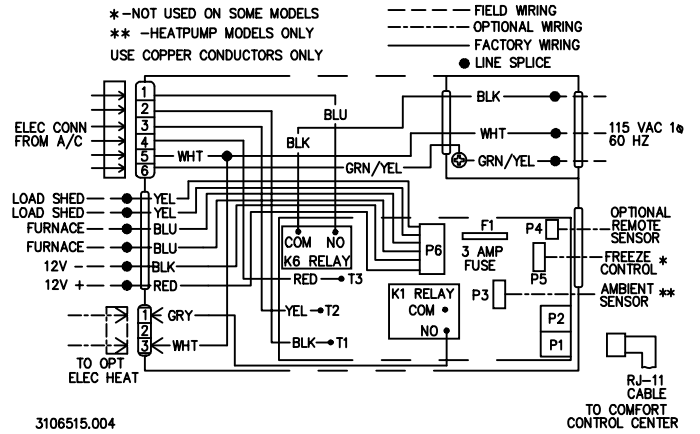


WIRING DIAGRAMS

AIR CONDITIONER



ELECTRONIC CONTROL KIT



HEAT PUMP

