



INSTALLATION INSTRUCTIONS

FOR

6797-933* HEAT PUMP

6799-933* COOL ONLY

FLUSH MOUNT CEILING PLENUM

TABLE OF CONTENTS

Warnings	2
Package Contents	2
General Information	3
Ceiling Plenum Installation Requirement	3
Supply Ducting And Registers	4
Routing Thermostat Wiring	6
Routing 115 VAC Wiring	6
Preparation And Positioning The Roof Top Unit	7
Ceiling Plenum Preparation And Mounting	7
Installing The Control Box	9
Wiring Diagram	11

WARNINGS

IMPORTANT NOTICE

These instructions are for the use of qualified individuals specially trained and experienced in installation of this type equipment and related system components.

Installation and service personnel are required by some states to be licensed. PERSONS NOT QUALIFIED SHALL NOT SERVICE THIS EQUIPMENT.

WARNING

Improper installation may damage equipment, can create a hazard and will void the warranty.

The use of components not tested in combination with these units will void the warranty, may make the equipment in violation of state codes, may create a hazard and may ruin the equipment.

WARNING - SHOCK HAZARD

To prevent the possibility of severe personal injury or equipment damage due to electrical shock, always be sure the electrical power to the appliance is disconnected.

CAREFULLY FOLLOW ALL INSTRUCTIONS AND WARNINGS IN THIS BOOKLET TO AVOID DAMAGE TO THE EQUIPMENT, PERSONAL INJURY OR FIRE.

NOTE

The words “Shall” or “Must” indicate a requirement which is essential to satisfactory and safe product performance.

The words “Should” or “May” indicate a recommendation which is not essential and not required, but which may be useful or helpful.

PACKAGE CONTENTS

- 1) Ceiling Plenum
- 1) Intermediate Length Adjustable Divider
- 1) Extended Length Adjustable Divider
- 1) Adjustable Divider Insulation
- 1) Return Air Grille
- 1) Wirebox Assembly

- 1) Return Air Filter
- 1) Small Parts Package Consisting Of:
 - 4) Flat Washer
 - 4) Mounting Bolt
 - 2) Divider Screw
 - 1) Wirebox Strain Relief
 - 1) Freeze Sensor Thermister
 - 2) Wing Nut
 - 1) Warning Card
 - 3) Wire Nut
- 1) Basepan Foam Pad

GENERAL INFORMATION

The flush mount ceiling plenum is designed for application in systems that utilize field fabricated (OEM supplied) air ducting. The ducting must be routed through the ceiling cavity (between the interior ceiling and roof). Ducting specifications are given in the section labeled "Supply Ducting and Registers".

This system utilizes a single, non-ducted centrally located return air opening. The return air opening is contained within the ceiling plenum. The ceiling plenum must be located directly below the roof opening used for mounting the roof top unit.

All manual controls have been removed from the ceiling plenum. They have been replaced with control relays. The relays are mounted in the electrical box of the ceiling plenum. The relays contain 12 VDC coils (which are energized by a wall mounted thermostat), with contacts that control the 115 VAC used to power the roof top unit.

NOTE

To protect the wall mount thermostat from overcurrent damage, a 2 amp fuse is provided on the thermostat. It is recommended that a fuse be provided at the power supply to protect the thermostat wires up to the thermostat.

All air conditioning functions are controlled by the low voltage wall mounted thermostat. The thermostat controls a 12 VDC electrical circuit which is used to energize the relays

in the ceiling plenum. The thermostat that RV Products provides for the system is a combination (Heat/Cool) thermostat. This thermostat is capable of operating up to 4 roof top air conditioners and furnaces with a 12 VDC control circuit not exceeding one (1) amp.

All air conditioning equipment is subject to freeze-up when evaporator air flow is sufficiently reduced. Ducting of any length creates potential for reduced evaporator air flow and system freeze-up. To protect both the installer and RV Products from conditions that promote reduced air flow and system freeze-up, RV Products has equipped the ceiling plenum compressor control circuit with a low temperature sensor. The low temperature probe monitors the temperature of the air conditioner evaporator coil. When the temperature of the evaporator coil drops below 28 degrees F, the switch will open, stopping compressor operation. Compressor operation will resume once the evaporator warms to 55 degrees F.

IMPORTANT

The low temperature sensor is wired to the ceiling plenum electrical circuit. The probe must be inserted into the evaporator coil of the roof top unit by the installer.

The 6797-933* ceiling assembly mates with any 6797 series heat pump to provide cooling and heat pump operation.

The 6799-933* ceiling assembly mates with any 6799 series air conditioner to provide cool only operation.

CEILING PLENUM INSTALLATION REQUIREMENT

1. The ceiling plenum must be installed under the roof opening.

The ceiling plenum bolts to the bottom of the roof top unit. Compression of the framed ceiling cavity between the roof top unit and the ceiling plenum holds both components in place.

DIVIDER	RANGE
INTERMEDIATE LENGTH	2.25" to 3.25"
EXTENDED LENGTH	4.0" to 5.0"

2. Ceiling cavity depth (the measurement from the ceiling to the roof).

3. The 115 VAC service for the roof top unit must be routed into the ceiling plenum. To prevent wire pinching and to promote ease of installation, allowances must be made for routing the 115 VAC supply wiring into the front of the roof opening.
4. Thermostat wiring must be run from the wall thermostat mounting location to the ceiling plenum low voltage wiring leads. To prevent wire pinching and to promote ease of installation, allowances must be made for routing the low voltage wiring into the front of the opening.
5. The ceiling plenum has a 9 pin socket extending from the front of the electrical box. This mates with the roof top unit 115 volt electrical conduit. When making this connection, verify that the plugs are properly aligned and have snapped together securely.

6. A low voltage terminal strip on the front of the box connects to the thermostat wires. The wires can connect by 1/4" quick connects. RV Products recommends using insulated quick connects. See chart below for wire colors and designations.
7. Provided with the ceiling plenum are two divider plates which are used to separate the return air from the supply air. Select the appropriate plate for the roof thickness in use and discard the unused divider.

IMPORTANT

Upon installation, the divider must be raised to and sealed with both the bottom of the roof unit and the sides of the roof opening. RV Products provides foam seals for this purpose. Divider plates provided represent most common existing range of roof thickness in the industry. The extended length divider may be trimmed to accommodate roof thicknesses between 3.25" and 4.0".

Plenum Terminal Designation	Thermostat Wire Connection	Function Of Low Voltage Terminal Extending From Ceiling Plenum
R+ Room (2 terminals) F (2 terminals) Gen B- Sig	Red Any White Any Blue Purple	Provides +12 VDC to upper unit control box The remote room temperature sensor attaches here* Freeze sensor attaches here Allows system to connect to an auto generator start system Provides -12 VDC to upper unit control box Communication line between upper unit control box and thermostat
* Zone 1 has option of using thermostat as room sensor		

SUPPLY DUCTING AND REGISTERS

A. Ducting

NOTE

1. The field fabricated supply ducting must attach to both sides of the ceiling plenum. A minimum of two ducts are required, with one duct attached to each side of the plenum.

See Figures 1 and 2 for both an overhead view of the system with ducts and a ceiling plenum/ceiling cavity installation.

2. Each duct must have a minimum height of 1 1/2", maximum height cannot exceed 4 inches. Total free area inside each duct must be no less than 10 square inches.

To decrease restriction and increase air flow, the ducting should make as few bends and turns as possible. When corners or turns are required, we recommend that you radius the corners to keep air flow at a maximum.

Ten (10) square inches of free area per duct is the minimum requirement. Larger ducting will improve air flow and system performance.

3. Where ducting secures to the ceiling plenum, maximum width is 8 inches.
4. All field fabricated air supply ducting must be insulated and must have a vapor barrier.

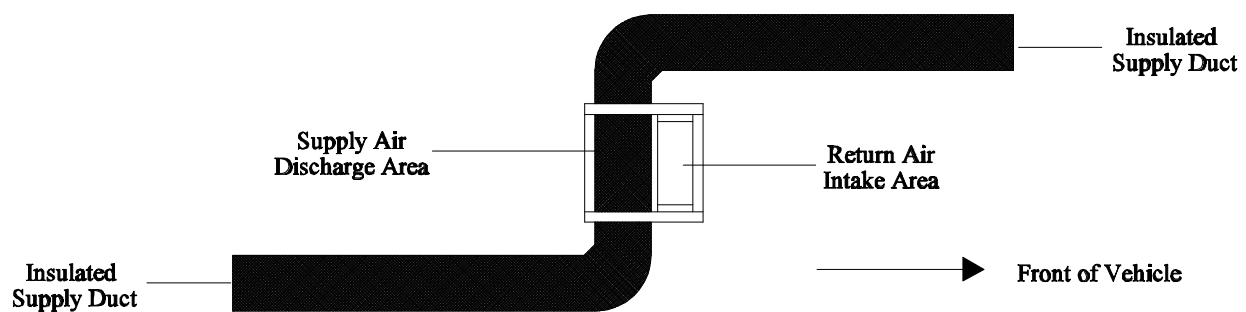


FIGURE 1

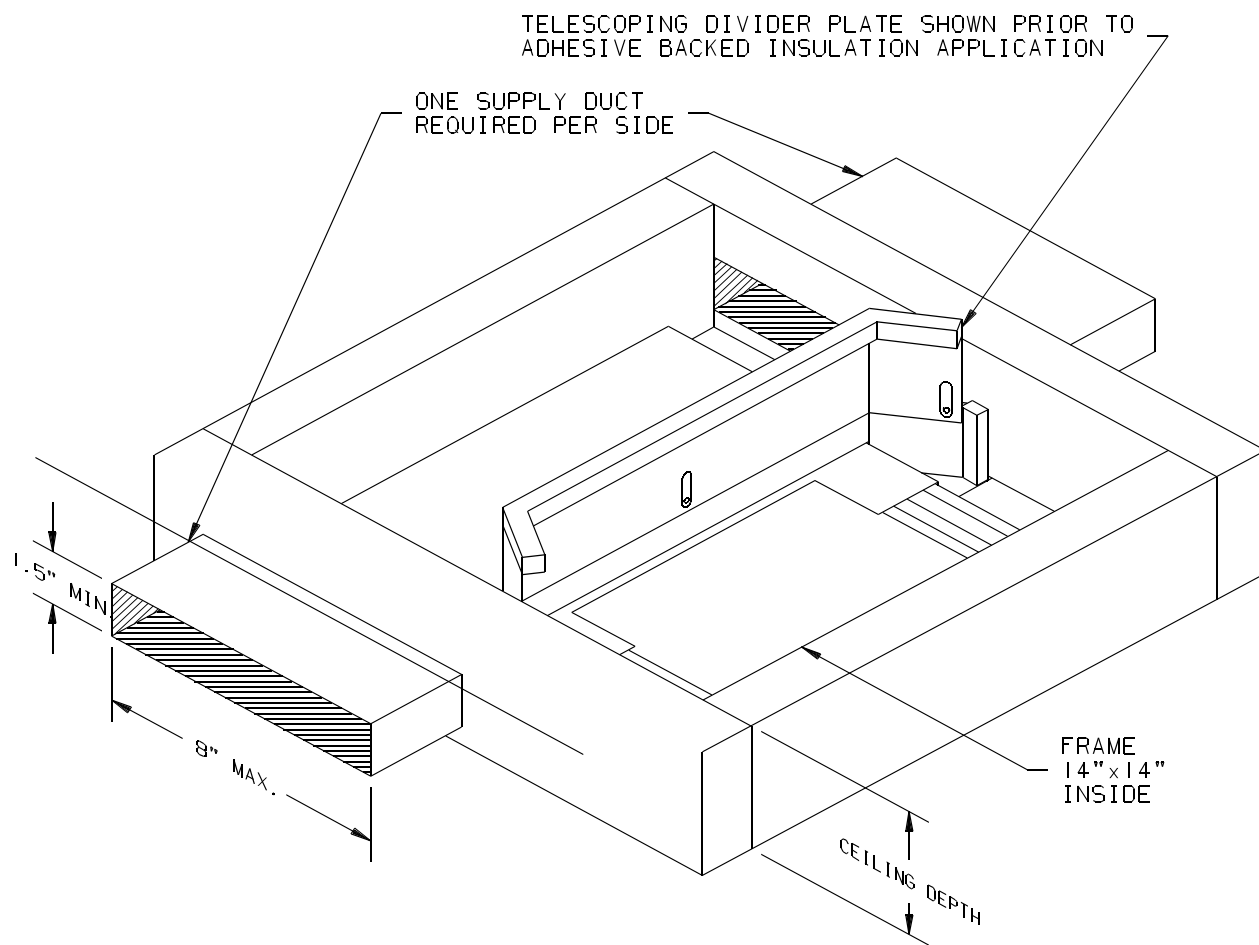


FIGURE 2

IMPORTANT

Insulating reduces cooling loss and helps prevent water staining of the vehicle ceiling due to moisture condensation.

B. Registers

Supply registers should have a minimum discharge area of 48 square inches per system, or 24 square inches per duct.

Figure 3 shows how to determine the discharge area for a given register, and how to determine the number of registers required.

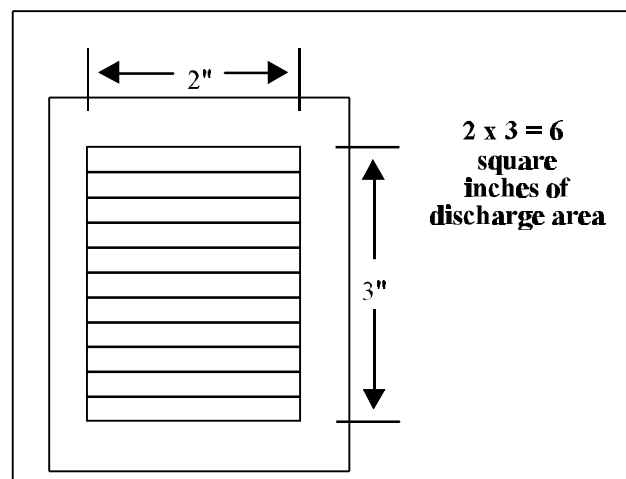


FIGURE 3

The register in Figure 3 provides 6 square inches of discharge area. Each duct would require four registers of this size to satisfy the 24" requirement.

ROUTING THERMOSTAT WIRING

1. Following the instructions packed with the thermostat, determine a location for thermostat mounting.
2. Following RV Products low voltage wiring specifications and all local and national electrical codes:
 - A. Route the thermostat control wiring from the thermostat mounting location into the front of the ceiling plenum opening.

These wires are as follows:
 - (1) Red wire for +12 VDC circuit (R+)
 - (1) Blue wire for -12 VDC circuit (B-)
 - (1) Purple wire for communication signal (Sig)
 - (1) Any color for auto generator start (optional) (Gen)
 - (1) Any color for room temperature sensor (zone 1 optional, required for other zones)
 - (1) For each heating appliance (Up to 4)
 - B. See Figure 9 for wiring requirements for multiple zones.
3. RV Products low voltage wiring specifications:
 - A. Low voltage wiring should be no smaller than 18 gauge.
 - B. Low voltage wiring must be routed into the front side of the ceiling plenum opening.
 - C. Low voltage wiring should not be routed with high voltage wiring.
 - D. If low voltage and high voltage wires must cross, they should do so at right angles from one another.

ROUTING 115 VAC WIRING

Following RV Products high voltage wiring specifications and all local and national electrical codes, route the roof unit 115 VAC supply wiring from its power source and into the front of the roof opening. To allow attachment to ceiling plenum high voltage connections, extend approximately 12" of the wiring into the opening.

High Voltage Wiring Specifications

1. U.L. listing requires the conductors to be copper with a minimum size of #12 AWG.
2. To prevent voltage drops greater than 10% during starting loads, adhere to the following guideline:

For lengths greater than 50', use #10 AWG.

Circuit Protection - Refer to upper unit nameplate.

PREPARATION AND POSITIONING OF THE ROOF TOP UNIT

1. Consult roof top unit installation instructions for mounting requirements of the roof unit.
2. Prepare the roof unit for installation with the ceiling plenum.
3. Install foam basepan pad at this time. See Figure 5. Pad is provided with adhesive on one side with release paper. Trim off any excess length on ends.

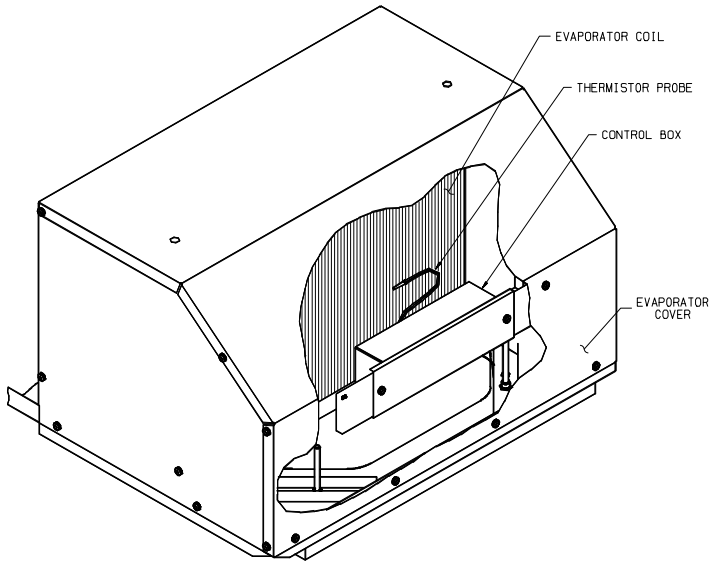


FIGURE 4

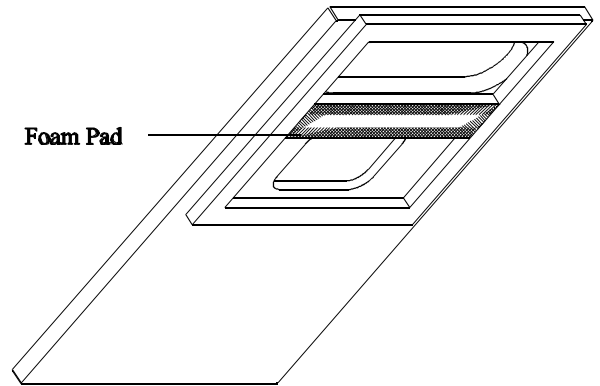


FIGURE 5

CEILING PLENUM PREPARATION AND MOUNTING

A. Preparation

1. Locate foam topped, three-sided, telescoping divider plate, reference Figure 6. Insert telescoping divider plate between the back of the ceiling plenum electrical box and the vertical insulated divider directly behind it. Attach the telescoping divider plate with 2 sheet metal screws provided in the parts package. Leave the screws slightly loose for adjustment purposes.
2. A low voltage terminal strip on the front of the box connects to the thermostat wires.

B. Mounting

1. After having prepared the roof top unit, place it over the roof opening.

2. Position ceiling plenum into the ceiling opening. For proper orientation of the ceiling plenum, reference Figure 7.

NOTE

When inserting the plenum into the roof opening, be careful not to pull the foam insulation away from the sides of the ceiling plenum. The insulation is required to create a positive air seal within the ceiling cavity.

3. Using the four bolts and washers provided, secure the ceiling plenum to the roof top unit. The four mounting bolts are to be assembled up through the bottom of the ceiling plenum and into the bottom of the roof top unit.

NOTE

Mounting bolts should be tightened evenly. A rotating tightening procedure (similar to car tire rim mounting) is essential for proper gasket compression. The bolt tightening procedure is complete when the gasket under the roof top unit has been evenly compressed 1/4".

4. Secure ceiling plenum to ceiling with screws.
5. Locate the roof unit conduit assembly. Route the conduit through the return opening.

Raise the divider until it seals against the bottom of the roof top unit. Secure the telescoping divider in its new position by tightening the two screws.

6. Measure how far the divider plate extends above the ceiling plenum electrical box. Using this measurement, trim the adhesive backed foam insulation pad (provided with this package) to this measurement. Peel off the adhesive backing and apply the insulation pad to the raised divider plate. The insulation pad is longer than the roof opening (See Figure 2).

NOTE

Be sure to create a positive air seal both top to bottom and side to side within the roof opening.

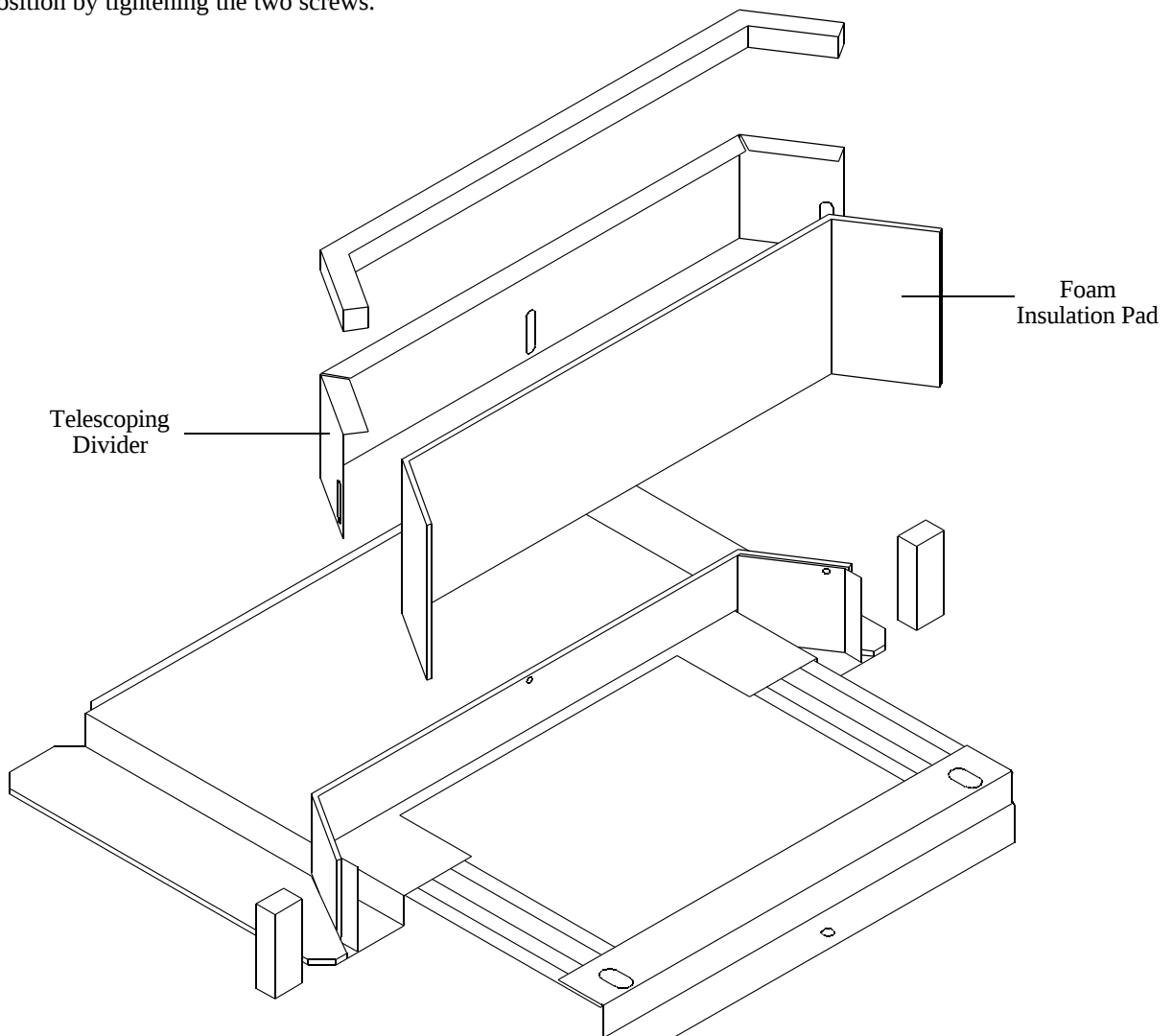


FIGURE 6

INSTALLING THE CONTROL BOX

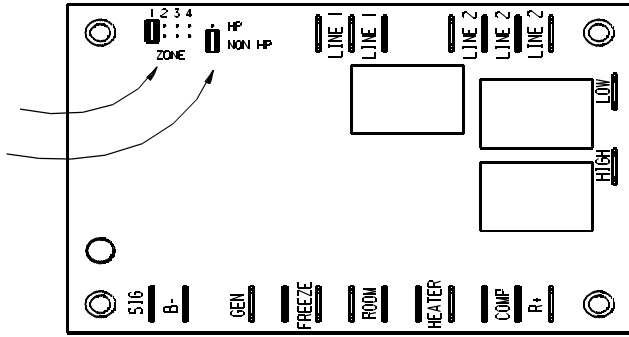


FIGURE 7

WARNING - SHOCK HAZARD

To prevent the possibility of severe personal injury or equipment damage due to electrical shock, always be sure the electrical power is disconnected or off before beginning installation.

1. Remove the control box assembly's cover which is held by two sheet metal screws.
2. Set the "zone" jumper to the proper zone position for the particular position the air conditioner or heat pump will be in the coach (Refer to Figure 7 - Zone 1 is shown). Zones should be numbered from the front to the back of the coach with Zone 1 in front.
3. Set the "HP"/"NON HP" jumper to "HP" if the unit is a heat pump or to "NON HP" if the unit is not a heat pump (Refer to Figure 7 - Non HP is shown).
4. Feed the field lead wires and ground through the strain relief found with the control box then through the 7/8" hole in the side of the box.
5. Wire nut the black 12-gauge field power conductor to the stripped black 12-gauge wire in the control box.
6. Wire nut the white 12-gauge field power conductor to the stripped white 12-gauge wire in the control box.
7. Wire nut the ground field power conductor to the stripped green ground wire in the control box.
8. Insure that no bare wires can come into contact with live electrical parts and that wires cannot be pinched between the control box sides and lid. Insert the

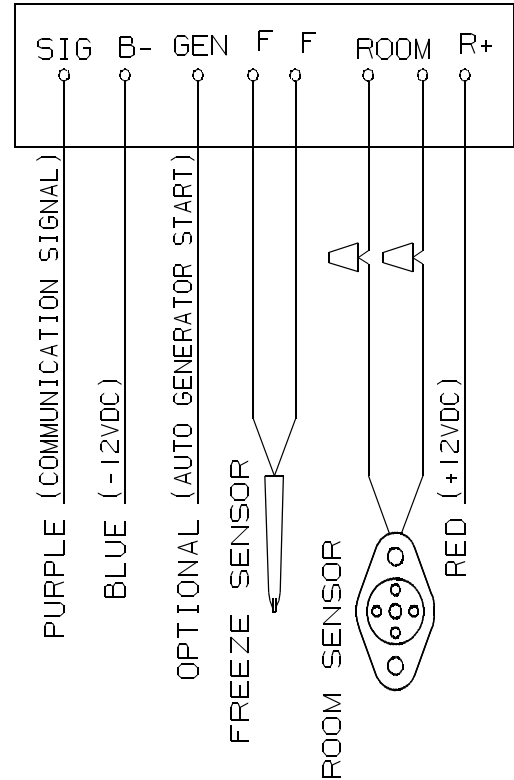


FIGURE 8

strain relief into the control box entry hole to secure the field wiring. Reinstall the control box lid.

9. Two (2) machine screws will be found on the upper units. The control box will be mounted by positioning the control box over the screws and using the supplied wing nuts to fasten the control box to the upper unit enclosure (Refer to Figure 4).
10. Attach the thermostat wires to the control box per Figure 8.
11. Insert the evaporator freeze sensor between the evaporator fins near the bottom center of the evaporator and between the bottom two tubes (See Figure 4). Insert straight in until contacting the staggered tube directly in back of the insertion point. When contact has been made, elevate the exposed end of the sensor approximately 45 degrees, then continue insertion at a 45 degree angle until the sensor is completely embedded into the evaporator.
12. Gently fold all wiring into the electrical box while verifying that it is not either pinched or cut.

Zone 2 is wired in by jumpering SIG, B- and R+ on Zone 1 box to Zone 2 box. Zone 3 is wired in by jumpering from SIG, B- and R+ on Zone 2 box to Zone 3 box. Zone 4 is wired in by jumpering from SIG, B- and R+ on Zone 3 box to Zone 4 box (See Figure 9).

Complying with the warnings listed below, connect the 115 VAC supply wiring to its power source. Be sure all power remains off until beginning checkout procedure.

DANGER

WHEN USING NON-METALLIC SHEATH SUPPLY CABLES (ROMEX, ETC.), STRIP SHEATH BACK TO EXPOSE 4-6 INCHES OF THE SUPPLY LEADS. STRIP THE INDIVIDUAL WIRE LEAD ENDS FOR WIRE CONNECTION (ABOUT 3/4" BARE WIRE). REMOVE NYLON STRAIN RELIEF FROM ELECTRICAL BOX. INSERT THE SUPPLY WIRES INTO THE STRAIN RELIEF. WIRE SHEATH MUST PROTRUDE PAST STRAIN RELIEF. MAKE SURE SHEATH CABLE IS CENTERED IN STRAIN RELIEF BEFORE SNAPPING IT BACK INTO BOX.

IF OTHER THAN NON-METALLIC CABLES ARE USED FOR SUPPLY CONDUCTORS, APPROPRIATE STRAIN RELIEF CONNECTORS OR CLAMPS SHOULD BE USED.

IN NO CASE SHOULD CLAMPING OR PINCHING ACTION BE APPLIED TO THE INDIVIDUAL SUPPLY LEADS (NEUTRAL AND "HOT" WIRES).

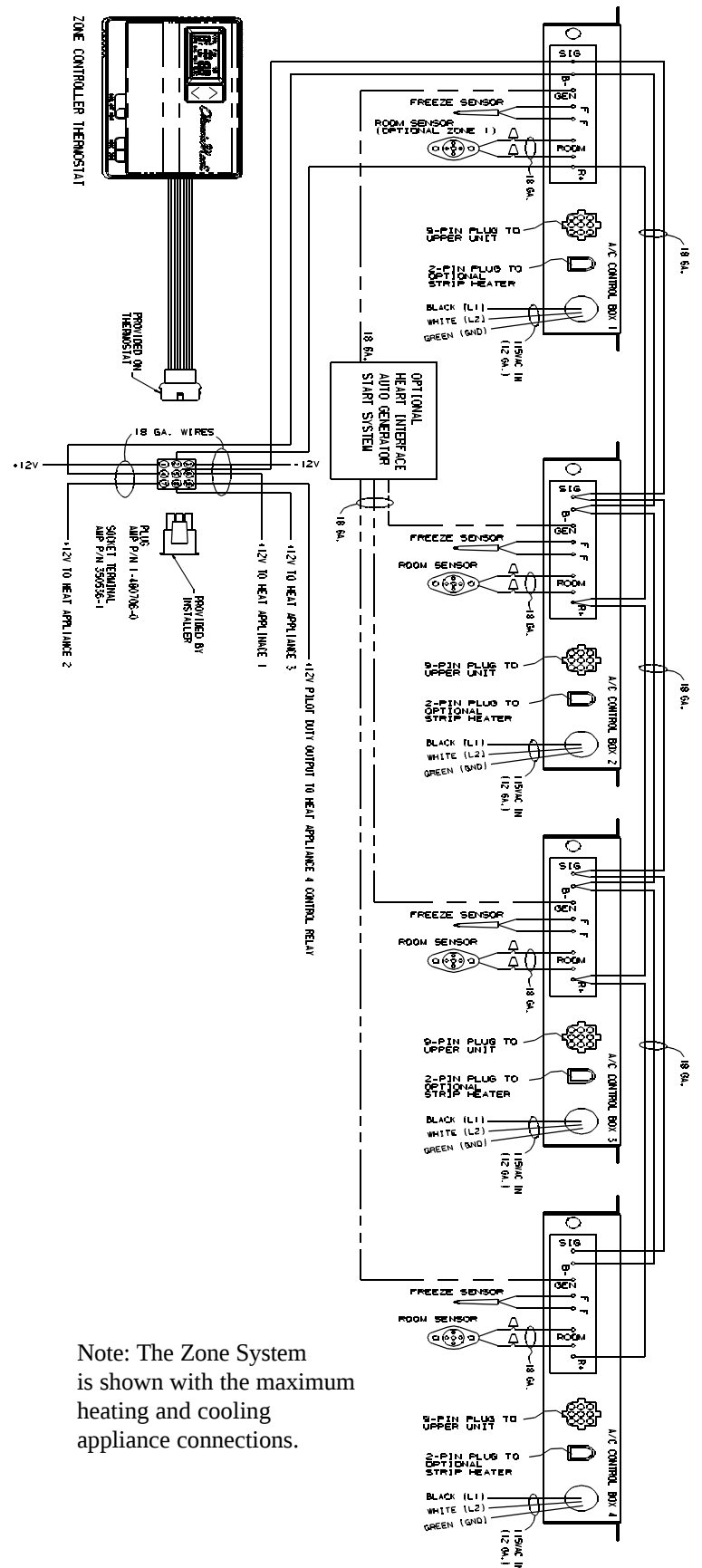


FIGURE 9



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