



# **INSTALLATION INSTRUCTIONS**

**FOR**

**7330C730**

**FLUSH MOUNT CEILING PLENUM**

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## 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) Small Parts Package                    |
| 1) Adjustable Divider            | 1) Basepan Foam Pad                       |
| 1) Adjustable Divider Insulation | 4) 1202B103 Flat Washers                  |
| 1) Return Air Grille             | 4) 6799-376 5/16" x 6 3/4" Mounting Bolts |
| 1) Return Air Filter             |   |

# GENERAL INFORMATION

The flush mount ceiling plenum is designed for application in systems that utilize field fabricated (OEM supplied) cold 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.

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 thermostats that RV Products provides for the system are combination (Heat/Cool) thermostats. These thermostats are capable of operating both the roof top air conditioner and any furnace with a 12 VDC control circuit.

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 probe. The low temperature probe monitors the temperature of the air conditioner evaporator coil. When the temperature of the evaporator coil drops below 31 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 part of the ceiling plenum electrical circuit. The switch must be inserted into the evaporator coil of the roof top unit by the installer when bolting the ceiling plenum to the roof top unit.**

This flush mount ceiling plenum will mount to and operate all current production roof top air conditioners. Regardless of which roof top unit is used, this system will operate with only two fan speeds; low and high. This system is not designed for and will not accept electric strip heating.

The ceiling plenum comes equipped with the following:

- 1) all hardware required for mounting and securing the roof top unit
- 2) a means of attaching the field fabricated ducting
- 3) the return air grille and filter

## CEILING PLENUM INSTALLATION REQUIREMENT

1. The ceiling plenum must be installed over 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.

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

DIVIDER	RANGE
7330-105 (Supplied)	3.25" to 4.25"
7330-103	2.0" to 2.75"
7330-108	5.0" to 6.0"

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 under screw heads or by 1/4" quick connects if provided.
7. Provided with the ceiling plenum is a divider plate which is used to separate the warm return air from the cold supply air.

**IMPORTANT**

**Upon installation, the divider must be raised to and sealed with both the bottom of the roof top unit and the sides of the roof opening. RV Products provides foam seals for this purpose.**

Ceiling Plenum Number	Plenum Wire Designation	Thermostat Wire Connection	Function Of Low Voltage Pigtail Extending From Ceiling Plenum
7330B751 (4 low voltage connection)	B Y GH GL	BLUE YELLOW GREEN GRAY	Completes -12 VDC circuit for all relays Energizes coil on Compressor Relay Energizes coil on High Fan Relay Energizes coil on Low Fan Relay

**SUPPLY DUCTING AND REGISTERS**

**A. Ducting**

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.

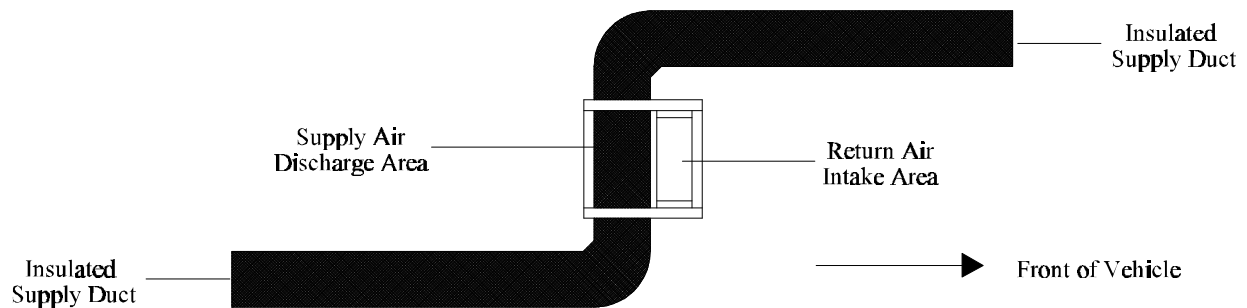
2. Each duct must have a minimum height of 1 1/2", maximum height cannot exceed 4 inches. Total free area inside each duct must be no less than 10 square inches.

**NOTE**

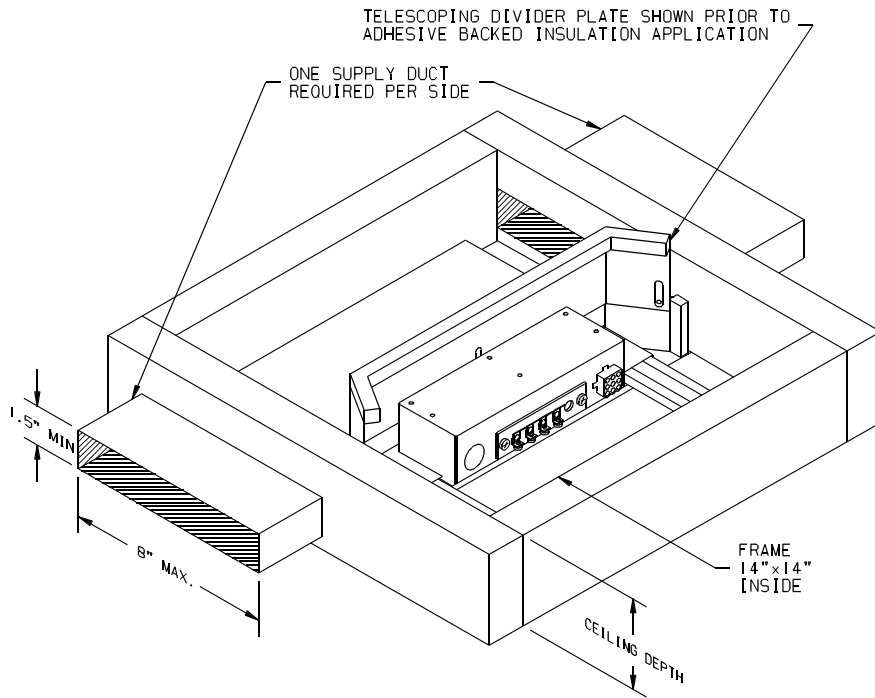
To decrease restriction and increase air flow, the ducting should make as few bends and turns as possible. When corners or turns are required, we recommend that you radius the corners to keep air flow at a maximum.

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 and maximum height is 3 1/2".
4. All field fabricated air supply ducting must be insulated and must have a vapor barrier.



**FIGURE 1**



**FIGURE 2**

**IMPORTANT**

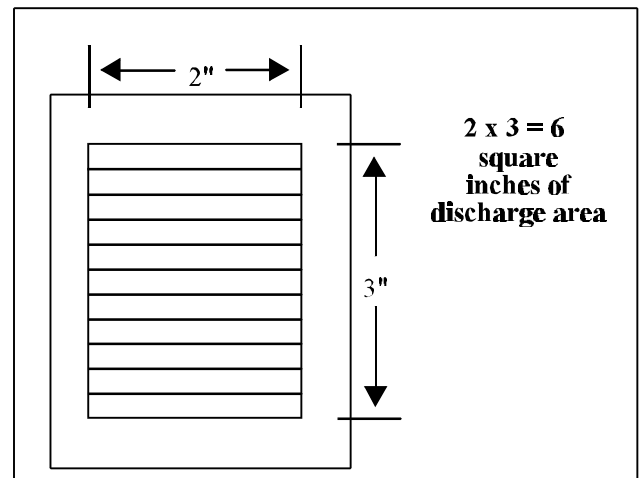
**Insulating reduces cooling loss and helps prevent water staining of the vehicle ceiling due to moisture condensation.**

**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.

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.



**FIGURE 3**

## 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 12 VDC supply wiring from the power source to the thermostat mounting location.  
  
Two wires are required:  
  
One supply lead must be +12 VDC and should be red in color.  
  
The second supply lead must be -12 VDC and should be blue in color.
  - B. To protect the wall mount thermostat from overcurrent damage, a 2 amp fuse has been provided with the thermostat.
  - C. Route the thermostat control wiring from the thermostat mounting location into the front of the ceiling plenum opening.  
  
(4) Four wires are required when using 7330C730.  
  
These wires are as follows:
    - (1) Blue wire for -12 VDC circuit
    - (1) Yellow wire for compressor circuit
    - (1) Green wire for high fan circuit
    - (1) Gray wire for low fan circuit
3. RV Products low voltage wiring specifications:
  - A. All low voltage wiring should be no smaller than 18 gauge.
  - B. All low voltage wiring should be a solid conductor.
  - C. Low voltage wiring must be routed into the front side of the ceiling plenum opening.

## ROUTING 115 VAC WIRING

Following RV Products high voltage wiring specifications and all local and national electrical codes, route the roof top unit 115 VAC supply wiring from its power source and into the front of the roof top 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. approval requires the power supply to be copper conductors only with a minimum sizing utilizing #12 AWG.

2. To prevent voltage drops of no 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

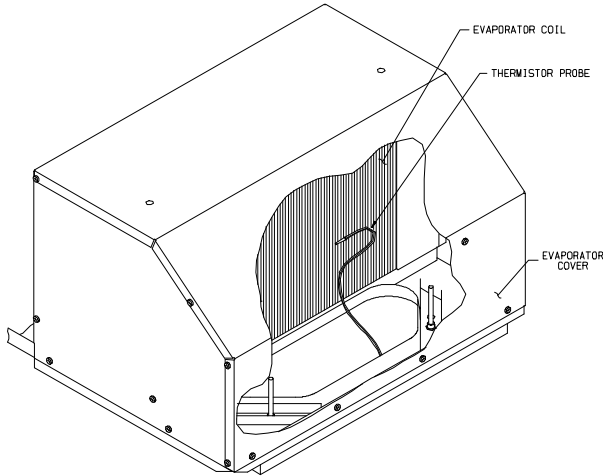
1. Consult Sections I through IV of the roof top unit installation instructions for the installation and mounting requirements of the roof top unit.
2. Prepare the roof top unit for installation with the ceiling plenum.

Attached to the electrical circuitry of the ceiling plenum is a low temperature sensor. The low

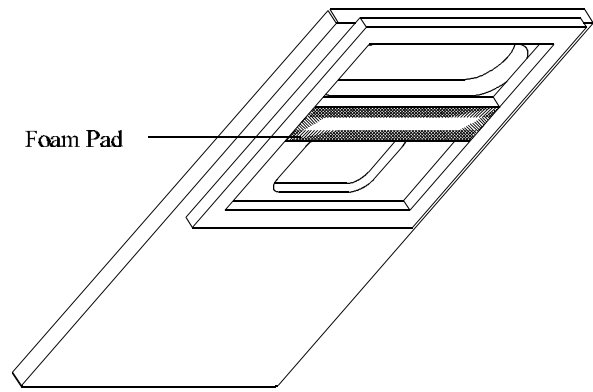
temperature sensor exits from the ceiling plenum electrical box. The freeze circuit thermistor probe (See Figure 4) installs by inserting it straight in between the two lower evaporator tubes until contacting a tube, then raising the back of the probe and continuing at a 45 degree angle until the probe is fully inserted.

To gain access to the fins of the evaporator coil, reach up through the return air opening in the bottom of the roof top unit (See Figure 4).

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**

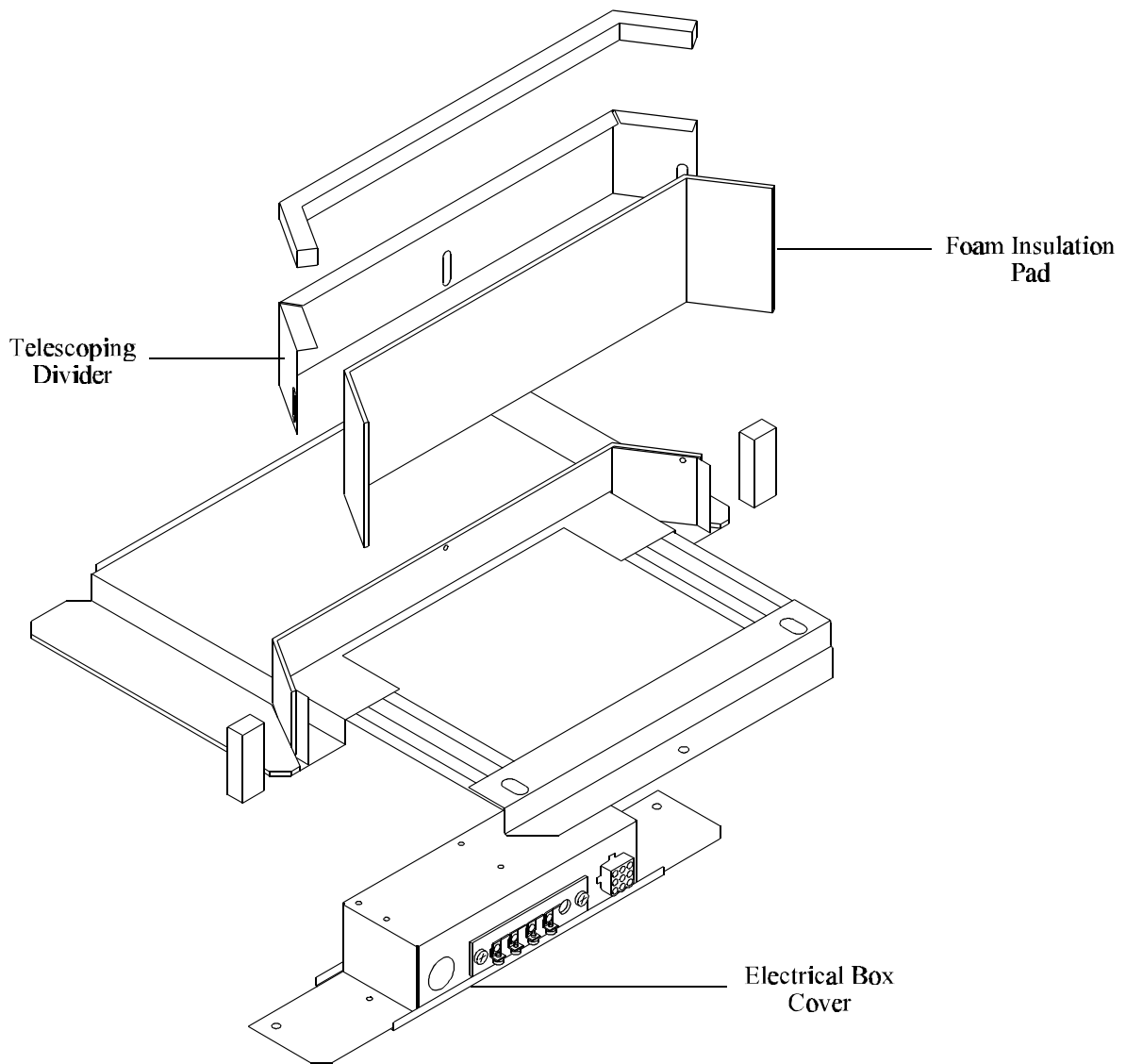
## **CEILING PLENUM PREPARATION AND MOUNTING**

### **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. For adjustment purposes, it may be necessary to loosen the sheet metal screws in the telescoping divider.
2. Remove ceiling plenum electrical box. Retain box and two screws for reattachment (See Figure 6).

Familiarize yourself with the high voltage wiring box, strain relief and wiring. The 115V supply wiring must be routed through the strain relief in the high voltage wiring box and secured to wiring inside. Extend the three high voltage wiring box leads and prepare them for attachment to the supply wiring.

3. A low voltage terminal strip on the front of the box connects to the thermostat wires.
4. Remove the tape securing the low temperature switch to the electrical box top. It is now ready for attachment to the evaporator coil.



**FIGURE 6**

**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 6.

**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 applied 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. Cut the plastic wire tie securing the roof top unit 115V electrical conduit to the basepan. 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.

Verify that the roof top unit 115V electrical conduit will mate (without pinching or straining any wiring), with the 115V plug and conduit from the ceiling plenum electrical box. Attach electrical box to ceiling plenum with the two supplied screws.

### **IMPORTANT**

#### **When connecting the 115V electrical conduit:**

- 1) **Make any adjustments required to relieve pinched or stressed wiring.**
- 2) **Verify that the “ridged” side of both plugs are properly aligned. Verify that the connectors have snapped together on both sides. Do not use excessive force when joining the connectors.**

5. 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 6).

### **NOTE**

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

6. Insert the freeze circuit thermistor probe into the roof top unit evaporator coil. Verify that the probe is located in the coil properly (See Figure 4).

## **CONNECT 115 VAC WIRING**

### **1. 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.**

2. Complying with the “Danger” notice below, bring the 115 VAC supply wiring previously routed into the frame of the roof opening, through the strain relief atop the electrical box and into the high voltage wiring area.

### **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).**

3. Gently fold all wiring into the electrical box while verifying that it is not either pinched or cut.
4. 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**

**TO PREVENT THE POSSIBILITY OF SHOCK INJURY FROM APPLIANCE OPERATION.**

**THE WHITE WIRE MUST BE CONNECTED TO NEUTRAL IN THE SERVICE BOX ENTRANCE AND THE MECHANICAL GROUND MUST BE CONNECTED TO A GROUNDING LUG EITHER IN THE SERVICE BOX OR THE MOTOR GENERATOR COMPARTMENT.**

**CONNECT THERMOSTAT WIRING**

**A. Ceiling Plenum Connections**

Bring the thermostat wiring previously routed into the roof opening over to the low voltage terminal board extending from the front of the ceiling plenum electrical box.

These low voltage ceiling plenum designations complete the following circuits:

- B -12 VDC for all relay coils
- Y +12 VDC for compressor relay coil
- GH +12 VDC for hi fan relay coil
- GL +12 VDC for low fan relay coil

Ceiling Plenum Low Voltage Wire Designations	Mate With	Wall Thermostat Control Wiring
B Y GH GL W		Blue Yellow Green Gray White



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