CHILLGRILLE
COLEMAN®-MACH® AIR CONDITIONERS

INSTALLATION INSTRUCTIONS
FOR 9330A633
CHILLGRILLE™
FLUSH MOUNT CEILING ASSEMBLY
INFRARED REMOTE CONTROL SYSTEM

DESIGNED AND MANUFACTURED BY THE MAKERS OF
COLEMAN®-MACH® AIR CONDITIONERS

RVProducts
A Division of AIRCOOL, Inc.
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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 during installation.

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) Wirebox Assembly
1) Mount Frame Assembly
1) Handheld Transmitter
1) Small Parts Package Consisting Of:
1) Duct Divider Board
4) Bolts
1) Strain Relief
1) Air Grille Assembly
1) Metal Wing Nuts
1) Installation Instructions
3) Wire Nuts
3) Screws - 3/4” Length
1) Evaporator Freeze Sensor
1) Patch Cord
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 with contacts that control the 115 VAC used to power the roof top unit.

A low voltage controller controls all air conditioning functions. The low voltage controller controls a 12 VDC electrical circuit, which is used to energize the relays in the ceiling plenum. The low voltage controller that RV Products provides for the system may be a combination (Heat/Cool).

These low voltage controllers are capable of operating both the roof top air conditioner and any furnace with a 12 VDC control circuit of 1 amp or less (continuous current).

All infrared control boxes are equipped with a 3.7 amp fuse that will automatically reset to protect the printed circuit board.

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 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 part of the ceiling plenum electrical circuit. The probe 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.

The 9330 series ceiling assemblies will mount to and operate all 8000 or 9000 series roof top air conditioners.

**CEILING PLENUM INSTALLATION REQUIREMENT**

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

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

2. Ceiling cavity depth (the measurement from the ceiling to the roof - maximum 6”).

3. Provided with the ceiling plenum is a divider board which is used to separate the conditioned air from the return air supply.

4. 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.

5. The wirebox has a 9 pin receptacle extending from the front. This mates with the roof unit 115 volt electrical conduit. When making this connection, verify that the plugs are properly aligned and have snapped together securely.

6. **LOW VOLTAGE CONTROL WIRING** (INFRARED REMOTE)

   **Note:** It is recommended to install a 2 amp fuse between the 12 VDC power supply and the control box “R+” (+12 VDC) to protect the control wiring.

   **A.** A low voltage terminal strip on the front of the box connects to the low voltage control wires. The wires attach by 1/4” quick connects.

   **B.** The low voltage power wiring must be run from the power source to the wirebox low voltage terminals. 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.
C. If a gas heating appliance is to be operated, the low voltage control wiring must be run from the gas heat appliance to the wirebox low voltage terminals. 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.

### IR CONTROL BOX

<table>
<thead>
<tr>
<th>Plenum Terminal Designation</th>
<th>Conventional Wire Connection</th>
<th>Function Of Low Voltage Terminal Extending From Ceiling Plenum</th>
</tr>
</thead>
<tbody>
<tr>
<td>R+</td>
<td>Red</td>
<td>Provides +12 VDC to upper unit control box</td>
</tr>
<tr>
<td>B-</td>
<td>Blue</td>
<td>Provides -12 VDC to upper unit control box</td>
</tr>
<tr>
<td>Freeze (2 terminals)</td>
<td>White</td>
<td>Freeze sensor attaches here</td>
</tr>
<tr>
<td>Comm</td>
<td>Telco Cable</td>
<td>Communication line between upper unit control box and receiver assembly</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
<td>Enable the gas heating appliance</td>
</tr>
<tr>
<td>WR</td>
<td>White/Red</td>
<td>Enable the gas heating appliance**</td>
</tr>
</tbody>
</table>

** Option of using a two wire gas heating appliance and the normally open relay contacts between WR and W if the +12V tab is removed (See Figure 3)

### 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 Figure 1).

2. Each duct must have a minimum height of 1 ½”, 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.

3. Where ducting secures to the ceiling plenum, maximum width is 8 inches.

4. All field fabricated cold air supply ducting must be insulated and must have a vapor barrier.

   **IMPORTANT**

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

B. **Registers**

Supply (cold air) registers should have a minimum discharge area of 48 square inches per system, or 24 square inches per duct. A minimum of 6 is recommended.
ROUTING IR WIRING

1. Following RV Products low voltage wiring specifications and all local and national electrical codes:

   A. Route the 12 VDC supply wiring from the power source to the control box mounting location in the front of the ceiling plenum opening. Two wires are required:
      (1) Red wire to +12 VDC circuit (R+)
      (1) Blue wire for -12 VDC circuit (B-)

   B. Route the control wiring from the gas heating appliance to the control box mounting location in the front of the ceiling plenum opening. This is not required for the units that do not have a gas heating appliance.

   Single wire gas heat appliance has a +12 VDC signal and only one wire is required:
      (1) White wire for the gas heating appliance (W)

   Two wire gas heat appliance will use the N.O. contacts of the heat relay if the +12 V tab is removed (See Figure 3). Two wires are required:
      (1) White wire for the gas heating appliance (W)
      (1) White/Red wire for the gas heating appliance (WR)

   RV Products low voltage wiring specifications:
   
   A. All 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.
   
   E. Insure that wires cannot contact screws or sharp edges in the wire race ways.
   
   F. If stapling the wire bundle during the routing process, be careful not to pierce the wire insulation.

ROUTING 115 VAC WIRING

1. 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. Allow 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 minimum #12 AWG.

   To prevent voltage drops greater than 10% during starting, adhere to the following guideline:

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

   Circuit Protection – Refer to upper unit nameplate.
A. Installing Unit (Refer to Figure 1)

1. Place the air conditioner over the roof opening.

2. Position the mount frame into the ceiling opening with the “FRONT” label to the front of the unit (See Figure 1).

3. Using the four bolts provided, secure the mount frame to the roof top unit. The four mounting bolts are to be applied up through the bottom of the mount frame and into the bottom of the roof top unit. See Figure 1. Tighten each bolt until the indicators of the gasket are at roof level.

4. Route the conduit into the return opening.

B. Installing Divider Board (Refer to Figure 1)

1. Measure the distance between the ceiling and the upper unit basepan, add ½" to this measurement and cut the duct divider to this height if necessary. ALWAYS CUT OFF THE BOTTOM EDGE (THE EDGE WITHOUT FOAM STRIP).

2. Carefully wedge this divider between the walls of the roof opening and up against the upper unit basepan with the silver side facing forward.
INSTALLING THE CONTROL BOX (IR)

1. Remove the control box assembly’s cover.

2. Optional to remove the “FURNACE” tab if no gas heating appliance is to be used. This will disable any future use of a gas heating appliance.

3. Remove the “+12V” tab if a two wire gas heating appliance is to be used.

4. Insert the strain relief into the 7/8” entry hole in the side of the control box. Feed the field wires and ground through the strain relief.

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. Secure the field wiring into the strain relief. Reinstall the control box lid.
9. Attach the low voltage control wires to the control box per the illustration below:

**FIGURE 4**

Note: Receiver patch cord will be connected to the receiver assembly when the air grille assembly is installed.

10. Connect the roof unit 115 volt electrical conduit to the wirebox 9 pin receptacle and verify that the plugs are properly aligned and have snapped together securely.

11. Locate the two machine screws inside the evaporator cover of the upper unit. Align the control box over the screws and use the wing nuts supplied with the control box to secure it to the upper unit enclosure.

12. Insert the evaporator freeze sensor between the evaporator fins near the bottom center of the evaporator and between the bottom two tubes (See Figure 2). 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. Then connect the sensor to the two terminals marked “FREEZE”.

13. Complying with the warnings listed below, connect the 115 VAC supply wiring to its power source. Be sure all power remains off until beginning the 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 IN THE SERVICE BOX OR THE MOTOR GENERATOR COMPARTMENT.

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). INSERT STRAIN RELIEF INTO ELECTRICAL BOX. INSERT THE SUPPLY WIRES THROUGH THE STRAIN RELIEF.

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).
INSTALL AIR GRILLE ASSEMBLY

1. Temporarily remove the air grille assembly filter door. A quarter-turn of the fastener will disengage the door. Attach the air grille frame to the mount frame with 3 screws as shown in Figure 1 - use 3/4" screws. Adjust as desired to insure that all foam parts are within the grille perimeter, and secure the corners of the grille to the ceiling. These 4 corner screws are not provided. Check all fits to insure that a reasonably air tight seal exists to separate unit supply air from unit return air.

2. Connect the communication wire (patch cord) from the control box to the receiver.

3. Re-install the filter door.

MOUNTING AND CONFIGURING THE HANDHELD TRANSMITTER

1. To attach the handheld transmitter on a wall, separate the transmitter from the wall mount bracket. Then attach the wall mount bracket to the wall at the desired mounting location using the two screws provided.

2. To configure the handheld transmitter, remove the battery compartment cover and batteries. The transmitter will come with the dip switches J1 and J4 in the “OFF” position. It is optional to move the dip switch J2 to the “OFF” position for those applications without a gas appliance installed. It is required to move the dip switch J4 to the “ON” position for those applications with an electric heat appliance installed. Then reinstall the batteries and cover.

3. Place the transmitter in the wall mount bracket and installation is now complete.

Note: The temperature sensor in the transmitter can be affected by the surrounding conditions: such as direct sunlight, windows, outside doors, supply registers or heat producing appliances (television, radio, wall lamp, etc.)

FIGURE 5