# SUPPLEMENTAL INSTRUCTIONS

## CMH-37 Modulating Low Ambient Control and Outdoor Thermostat Kit

The CMH-37 is a field-installable modulating low ambient control (LAC) and outdoor thermostat to be used with a Bard W18HB wall-mounted heat pump.

The CMH-37 kit consists of:

- 910-2012 Relay and Outdoor Thermostat Assembly
- 8408-048 Freeze Protect Thermostat
- 910-2058 Outdoor Temperature Switch Assembly
- 8612-071 230V Head Pressure Control
- 1804-1613 Extension Tube Assembly
- 3000-1734 Plug for Head Pressure Control
- 113-353 Mounting Bracket
- 3/8" vinyl-covered clamps
- Required fasteners
- 7960-879B Supplemental Instructions

Field-supplied tools needed:

- Appropriate personal protection equipment, including gloves and safety glasses
- 5/16" nut driver
- 1/2" wrench (service port), 11/16" wrench (LAC control) and 3/4" wrench (LAC assembly)
- T20 Torx screwdriver
- Small flat-head screwdriver for securing wire in terminal blocks

**⚠ WARNING**

***Electrical shock hazard.***

***Disconnect the remote electric power supply or supplies before servicing.***

***Failure to do so can result in serious injury or death.***

**⚠ WARNING**

***Exposed moving parts.***

***Disconnect all electrical power before servicing.***

***Failure to do so can result in severe injury or amputation.***

**⚠ CAUTION**

***Sharp metallic edges.***

***Take care and wear appropriate protective devices to avoid accidental contact with sharp edges.***

***Failure to do so can result in personal injury.***

Bard® SINCE 1914
*Climate Control Solutions*

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**Modulating Low Ambient Control**

The low ambient control pressure sensor is attached to the liquid line of the system and monitors high-side system pressure. Operation of the LAC occurs as outdoor temperatures drop below the 65°F to 50°F range. Modulating LAC operation is factory adjusted and slows the condenser fan speed RPM based on outdoor temperature.

**Outdoor Thermostat Operation**

Heat pump compressor operation at outdoor temperatures below 0° is neither desirable nor advantageous in terms of efficiency. An outdoor thermostat can be applied to take the mechanical heating (compressor) offline, and send the (compressor) signal to energize electric heat in its place (to make electric heat first stage heating). This can also be applied to limit the quantity of available electric heat. ***Example:*** *Heat pump with 10KW second stage heat. Once the outdoor thermostat has switched, 15KW without compressor.*

## Installation

1. Disconnect all power to wall-mount unit.
2. Remove outer and inner control panel covers.
3. Remove right side condenser inlet grille.
4. Remove all three front service panels.
5. Install the pressure switch mounting bracket to the fan shroud using two (2) 1012-085 hex head screws as shown in Figure 2 on page 5.
6. Remove the upper service port cap from the liquid line. Install the extension tube assembly on the liquid line by screwing it onto the service port as shown in Figure 2. Use wrenches to make the connection snug and check for leaks.
7. Install the head pressure control and the plug and wire assembly on the extension tube as shown in Figure 2. Use wrenches to make the connection snug and check for leaks.
8. Install outdoor temperature switch assembly to the fan shroud as shown in Figure 2. This switch defeats Balanced Climate™ airflow when the temperature falls below 50°F to help prevent evaporator freeze up. Refer to the unit installation manual for more information on Balanced Climate operation.
9. Route low ambient control and outdoor temperature switch wires up through the bushing in the bottom of the control panel as shown in Figure 3 on page 6. Replace sealing compound after routing wires through the bushing.
10. Install freeze protect thermostat onto the evaporator coil as shown in Figure 4 on page 7. Route the wires down through the copper bushing and into the control panel with the blower motor wires.
11. Mount 910-2012 relay assembly to unit control panel as shown in Figure 3. Use Torx head screws included with kit to attach relay to control panel.
12. Remove cover from vertical gray cable duct on control panel to allow wire harness from installed relay to route into it (see Figure 3).

***NOTE:*** *The unit wiring diagram (included with unit literature assembly and also located on inner control panel cover) can be used to wire this kit. However, the following instructions listed here provide the necessary connections point-by-point.*

13. Find the purple and yellow/white wires not connected to anything that are tucked in the cable duct. Pull them out and connect them to each end of the outdoor temp switch wires. Refer the unit wiring diagram.
14. Locate the wire that is on the Y terminal of the defrost logic control board. This wire will either be yellow/white or yellow/black depending on the unit model. Remove from its original position and connect it to the freeze protection thermostat. Connect the other end of freeze protection thermostat to the yellow/white wire from the 910-2012 relay.
15. Locate the orange/black wire from the 910-2012 relay and connect it to the Y terminal on the defrost logic board.
16. Locate black/white wire from relay assembly and route through cable duct to defrost control logic board. Connect the wire to the C terminal.
17. Locate blue wire from relay assembly and route through cable duct to defrost control logic board. Connect to B terminal. Remove blue wire already connected to B terminal and stack it back onto the blue wire from the relay assembly.
18. Connect the low ambient control wires to terminals 1 and 3 on the 902-2012 relay.
19. Locate brown wire from relay assembly and route through cable duct to defrost control logic board. Connect to W2 terminal. Remove brown wire already connected to W2 terminal and stack it back onto the brown wire from the relay assembly.
20. Route orange/black, yellow/brown and brown wires up the cable duct in the control panel. After removing the permagum from around the blower motor wires, route the wires into the blower compartment and replace the permagum around all the wires (see Figure 3).

21. Locate the outdoor thermostat provided in kit along with two (2) Torx head screws. Use the two screws to attach the outdoor thermostat onto the side of the control panel adjacent to the indoor blower in the blower compartment (see Figure 5 on page 8).
22. Carefully unroll the capillary tube and sensing bulb of the outdoor thermostat and route it into the condenser section through the tubing grommet in the condenser partition as shown in Figure 5. Secure the capillary tubing to the insulated suction line with the supplied cable tie.
23. Continue routing the outdoor thermostat bulb within the condenser section as shown in Figure 5. Secure the bulb as per the drawing using the vinyl-covered clamps and hex head screws included in the kit. Dress the capillary tube to ensure no tube-rubs occur and secure with supplied cable ties in both the condenser and ventilation sections.
24. Connect the orange/black wire to outdoor thermostat terminal 1, the yellow/brown wire to terminal 2 and the brown wire to terminal 3.
25. Verify outdoor thermostat setpoint. Factory default is 10°F.
26. Apply "This unit is equipped with CMH-37 control module" label to the inside of the inner control panel cover above the unit wiring diagram.
27. Re-install all three front service panels.
28. Re-install right side condenser inlet grille.
29. Re-install electrical cable duct cover.
30. Re-install inner and outer control panel covers.
31. Restore unit power.

## Sequence of Operation for Low Ambient Control

Head pressure control kit CMH-37 helps maintain the correct condensing temperature/pressure, which results in a constant head pressure by adjusting the condenser fan speed, therefore controlling the airflow through the condenser. This head pressure controller has a cut-off mode at low condensing temperatures/pressures.

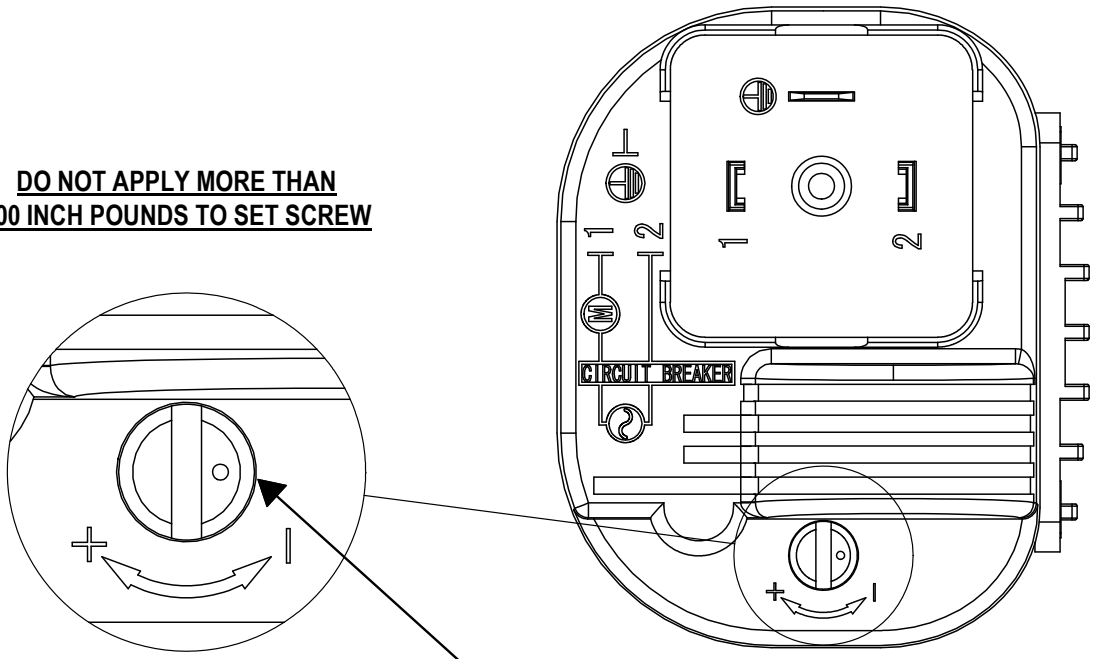
From the factory, this head pressure controller is set to have the condenser fan running at full speed at roughly 325 psi. If desired setpoint differs from factory setting, follow the procedure below to adjust the setting.

To adjust the pressure setting, use a flat-head screw to turn the setting screw. The set screw is a brass screw with a dimple located on the side of the LAC switch (see Figure 1 on page 4). The dimple is on the set screw to help track turns.

To make the adjustment to increase the pressures, start by inserting the screwdriver into the set screw turning it clockwise (+). To decrease the pressure, turn the set screw counterclockwise (-). Be careful not to over-tighten or loosen the screw. The maximum range of the switch is broad, so stick to the common practice of one (1) turn clockwise (+1) or two (2) turns counterclockwise (-2). Going beyond that may damage the device or affect its performance.

**FIGURE 1**

**DO NOT APPLY MORE THAN**
**300 INCH POUNDS TO SET SCREW**




NOTE: THE DIMPLE IN THE ADJUSTMENT KNOB WILL HAVE A RANDOM ORIENTATION. PLEASE DO NOT USE AS INDICATION FOR EQUIVALENT ADJUSTMENT.

**SETTING READJUSTMENT ONLY WHEN NECESSARY**

1. TURN COUNTER-CLOCKWISE UNTIL IT STOPS
2. TURN CLOCKWISE 6.5 FULL TURNS TO SET THE VALUE TO THE FULL VOLTAGE SET POINT OF 325PSI (2.24MPa)

NOTE: FAN WILL TURN AT LOW RPMS IF THE REGRIGERANT PRESSURE IS 224 ± 15PSI

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**FIGURE 2**
**Mounting Outdoor Thermostat Bulb and/or Low Ambient Fan Cycling Switch**

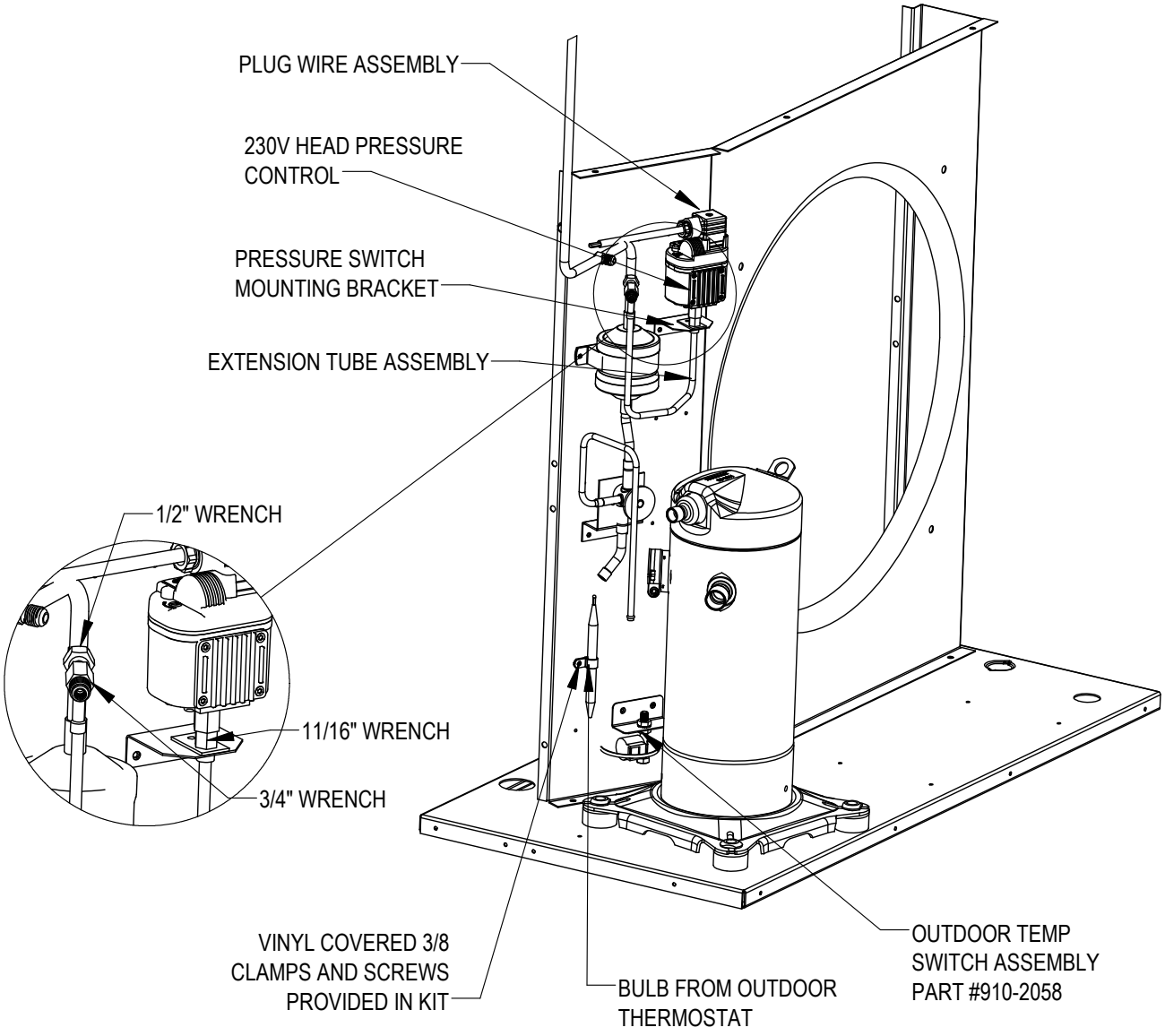


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**FIGURE 3**
**Unit Control Panel**

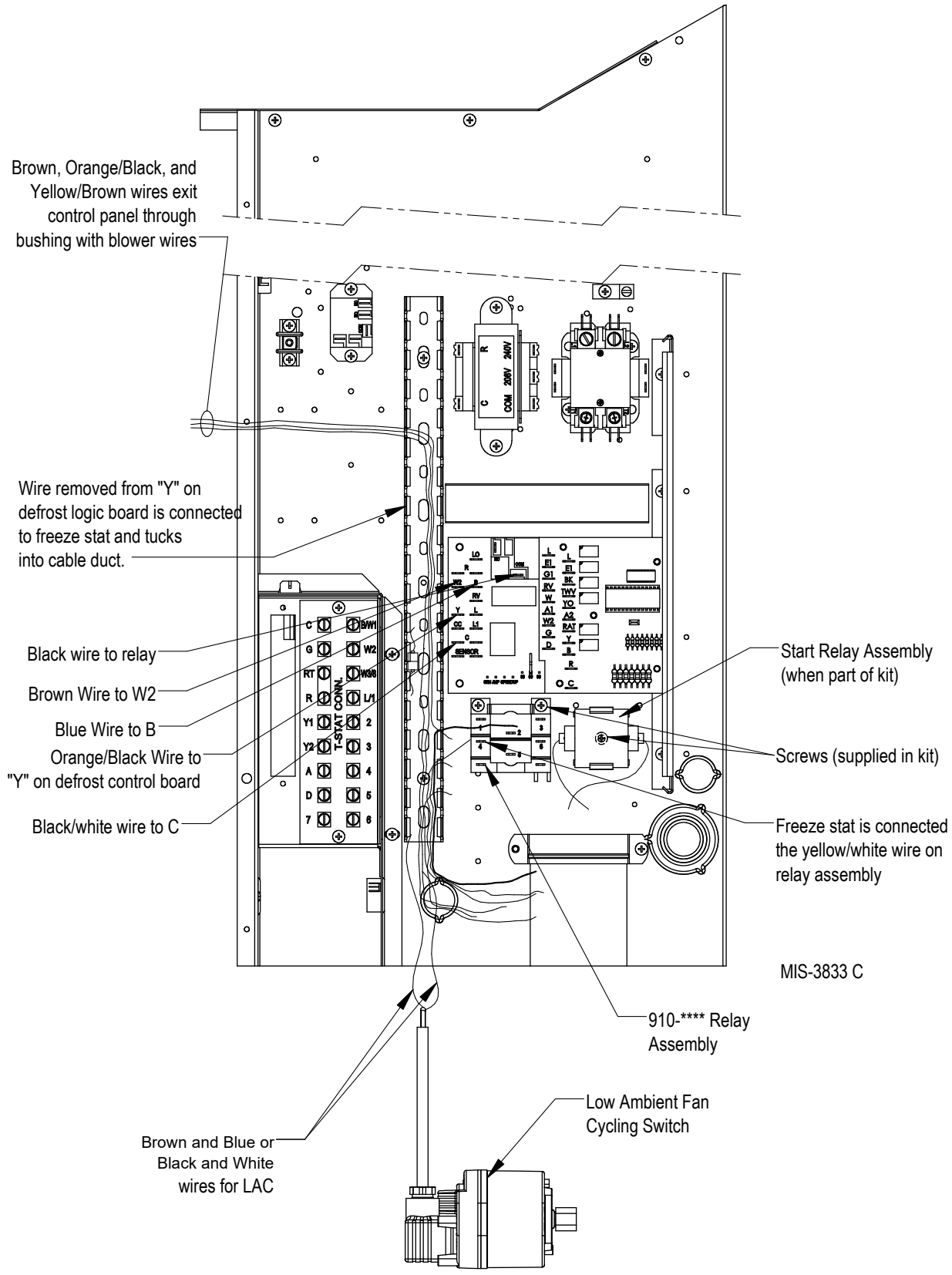

**FIGURE 4**
**Freeze Protection Thermostat Location and Wire Routing**

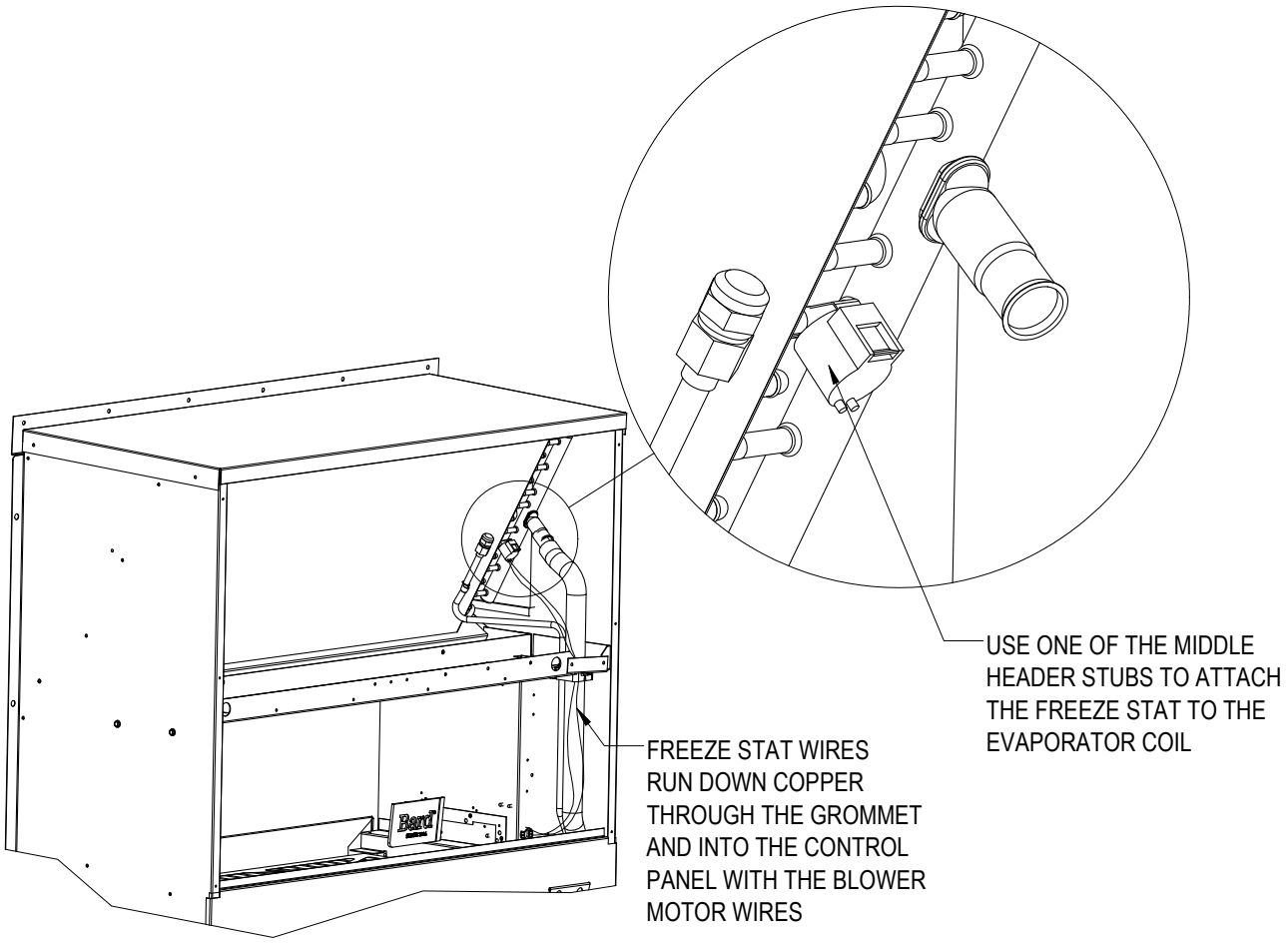

**FIGURE 5**
**Outdoor Thermostat Mounting and Wiring**