SunTherm™ HEATING PRODUCTS

# INSTALLATION MANUAL

Intertek 9700771

**Horizontal Fan Coil Models:**

**HEU1 - DX Cooling w/ Electric Heat, Uncased**
**HEC1 – DX Cooling w/ Electric Heat, Cased**
**HEU3 – Chilled Water Cooling w/Electric Heat, Uncased-2P**
**HEC3 – Chilled Water Cooling w/Electric Heat, Cased-2P**
**HEU2 - DX Cooling w/ Hot Water Heat, Uncased**
**HEC2 – DX Cooling w/ Hot Water Heat, Cased**
**HEU4 – Chilled Water Cool w/Hot Water Heat, Uncased-4P**
**HEC4 – Chilled Water Cooling w/Hot Water Heat, Cased-4P**

## LIST OF SECTIONS



## LIST OF FIGURES



## LIST OF TABLES



## CONTACT INFORMATION


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## SECTION 1: GENERAL

The following list includes important facts and information regarding this air handler.

1. This air handler is rated at 208/240 VAC (electric heat) or 115 VAC (hydronic heat), 60 Hertz, Single-Phase
2. This air handler is not designed to operate at 50 Hertz.
3. Air handler size varies by model.
4. This air handler is designed for both A/C and heat pump applications.
5. Use 4-wire thermostat cable for heating/cooling applications and 7-wire thermostat cable for heat pump applications.
6. This air handler is designed for horizontal applications only.
7. This air handler must not be operated without the access panels installed.
7. This air handler must not be operated without the access panels installed.
8. This air handler and its components listed are listed by ETL for the United States and Canada.
9. This air handler is for use at elevations of 10,000 ft (3,048m) or less.
10. This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of this appliance by a person responsible for their safety.

**SAVE THIS MANUAL FOR FUTURE REFERENCE**

## SECTION 2: SAFETY, GENERAL, DIMENSIONAL DATA, MODEL NUMBER NOMENCLATURE

This is a safety alert symbol. When you see this symbol on labels or in manuals, be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER, WARNING, or CAUTION.**

**DANGER:** Indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury.**
**WARNING:** Indicates a potentially hazardous situation, which if not avoided, **could result in death or serious injury.**
**CAUTION:** Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury.** It is also used to alert against unsafe practices and hazards involving property damage.

### ⚠ WARNING

**Improper installation may create a condition where the operation of the product could cause personal injury or property damage.**

**Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual for assistance; or for additional information consult a qualified contractor, installer, or service agency.**

### ⚠ WARNING

**FIRE OR ELECTRICAL HAZARD**

**Failure to follow the safety warnings exactly could result in serious injury, death, or property damage. A fire or electrical hazard may result causing property damage, personal injury or loss of life.**

### ⚠ CAUTION

**This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes including, but not limited to; building, electrical, and mechanical codes.**

### ⚠ IMPORTANT

**The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HFC's) as of July 1, 1992. Approved methods of reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.**

**Safety Requirements**

This air handler must be installed in accordance with all national and local building/safety codes and requirements, local plumbing and waste water codes, and other applicable codes. In the absence of local codes, install in accordance with the following codes.

- Standard for the Installation of Air Conditioning and Ventilating Systems (NFPA 90A)
- Standard for the Installation of Warm Air heating and Air Conditioning Systems (NFPA 90B)
- National Electrical Code (NFPA 70)
- Canadian Electrical Code, Part I (CSA C22.2) or ANSI/NFPA No. 70
- All local codes (State, City, and Township)

**NOTE:** All applicable codes take precedence over any recommendation made in these instructions. SunTherm assumes no responsibility for units installed in violation of any code or regulation.

1. Refer to the air handler rating plate for the air handler model number and refer to the dimensions page of this manual for return air plenum dimensions for the applicable model (see Figures 2 and 3 and Tables 9 and 10). The return air plenum must be installed according to the above listed codes or the instructions in this manual.
2. Refer to the dimensions page of these instructions to determine the proper location to install the air handler.
3. This air handler is **not ETL listed** or approved for installation in a **manufactured (mobile) home.**
4. Provide clearances from combustible materials as listed in the **LOCATION AND CLEARANCES** section.
5. Provide clearances for service access panel to allow access to the control box, electric heater elements, hot water coil, and blower.
6. Power supply wiring and circuit breakers/fuses must be sized for the electrical characteristics listed on the air handler rating plate.
7. Failure to carefully read and follow all instructions in this manual can result in malfunction of the air handler, death, personal injury, and/or property damage.
8. Electric heat air handlers must be installed so the electrical components are protected from water.
9. Installing and servicing heating/cooling equipment can be hazardous due to electrical components.

10. Only trained and qualified personnel should install, repair, or service heating/cooling equipment. Untrained service personnel only perform basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters.
11. Observe all precautions shown in the manuals and on labels attached to the air handler when servicing or conducting maintenance tasks.
12. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some cases, these instructions exceed certain local codes and ordinances, especially
    those who have not kept up with changing home practices. These instructions are to be followed and are the minimum requirement for a safe installation.
13. The capacity of the air handler should be based on an acceptable heat loss calculation for the structure such as ACCA Manual J or other approved methods.
14. 115 VAC models must be connected to a nominal 115 VAC, Single Phase, 60-Hertz power supply. **DO NOT CONNECT THIS APPLIANCE TO A 50 HZ POWER SUPPLY OR VOLTAGE ABOVE 132 VOLTS OR BELOW 98 VOLTS.**
15. 208/240 VAC models must be connected to a nominal 208 or 240 VAC, Single-Phase, 60-Hertz power supply. **DO NOT SUPPLY OR VOLTAGE ABOVE 253 VOLTS OR BELOW 187 VOLTS.**
16. Ground wire connections must be securely fastened to the ground lugs inside the control box.
17. Ductwork must be installed in accordance with the standards of the National Fire Protection Association (NFPA) Warm Air Heating and Ventilation Systems (NFPA Standards 90A and 90B). The air
    distribution duct should be sized for 0.2 inches of static pressure. See
    Air Conditioning Contractors of America (ACCA) Manual D for duct sizing.
18. The safety testing label appearing on this air handler covers the air handler and the factory installed coil only. It does not cover any other equipment.
19. Exterior surface of the cabinet may sweat when installed in a non conditioned space such as an attic or garage. Installer must provide protection for the building structure such as a full size auxiliary drain pan under all air handlers installed in the non-conditioned space. An auxiliary drain pan is needed to prevent building damage from condensation runoff from the unit casing.
20. Cabinet insulation used in this air handler is rated for R-2.1 (standard) and is 1⁄2" thick. Some jurisdictions require R-4.2 or R-6.0 on installations in a non-conditioned spaces. Add 1" thick insulation to the exterior casing of the air handler to comply in these jurisdictions and add a vapor barrier on the outside of the added insulation.

**⚠ WARNING**

**ALWAYS SHUT OFF ELECTRICITY AT THE DISCONNECT SWITCH OR TURN OFF THE CIRCUIT BREAKERS IN THE MAIN ELECTRICAL PANEL BEFORE PREFORMING ANY SERVICE ON THIS AIR HANDLER.**

**GENERAL INFORMATION**

This air handler provides the flexibility for installation in any horizontal application and may be used with or without electric heat or hydronic heat. The 5-speed constant torque motor is capable of providing sufficient air flow for most applications. Return air may enter the bottom or end of a cased air handler.

**Inspection**

As soon as the air handler is received, it should be inspected for damage that may have occurred during transit. If shipping damage is found, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. See the local wholesale distributor for more information. Mortex Products, Inc assumes no liability for freight damage.

Before installing the air handler, check the cabinet for screws or bolts which may have become loose during transit. Some air handler models have shipping supports for the blower motor shaft. Remove this support before operating the air handler unit.

Check the connecting of the wiring, electric heater, ducts or piping to make sure there is easy access to the air handler during the installation.

| Model No. | Nominal Cooling Tons | Motor HP | Unit Voltage VAC | Blower Code | CFM Range @ 0.2" ESP | Nominal Heating kW |
|---|---|---|---|---|---|---|
| HE*1/HE*3-**-*-AC | 1.5 - 2.0 | 0.33 | 208/240 | J | 482 - 851 | 00, 03, 05, 06, 08, 10 |
| HE*1/HE*3-**-*-BC | 1.5 - 2.5 | 0.33 | 208/240 | K | 480 - 851 | 00, 03, 05, 06, 08, 10 |
| HE*1/HE*3-**-*-BC | 1.5 - 2.5 | 0.50 | 208/240 | M | 837 - 1258 | 00, 03, 05, 06, 08, 10 |
| HE*1/HE*3-**-*-CC | 1.5 - 3.0 | 0.50 | 208/240 | M | 836 - 1267 | 00, 03, 05, 06, 08, 10 |
| HE*1/HE*3-**-*-DC | 1.5 - 3.0 | 0.50 | 208/240 | M | 922 - 1332 | 00, 03, 05, 06, 08, 10 |

**Table 1: HE*1/HE*3 General Specifications – Electric Heat Models**

| Model No. | Nominal Cooling Tons | Motor HP | Unit Voltage VAC | Blower Code | CFM Range @ 0.2" ESP |
|---|---|---|---|---|---|
| HE*2/HE*4-**-*-AC | 1.5 - 2.0 | 0.33 | 115 | N | 485-857 |
| HE*2/HE*4**-*-BC | 1.5 - 2.5 | 0.33 | 115 | O | 486-854 |
| HE*2/HE*4**-*-BC | 1.5 - 2.5 | 0.50 | 115 | R | 834-1253 |
| HE*2/HE*4-**-*-CC | 1.5 - 3.0 | 0.50 | 115 | R | 845-1261 |
| HE*2/HE*4-**-*-DC | 1.5 - 3.0 | 0.50 | 115 | R | 837-1252 |

**Table 2: HE*2/HE*4 General Specifications – Hydronic Heat Models**

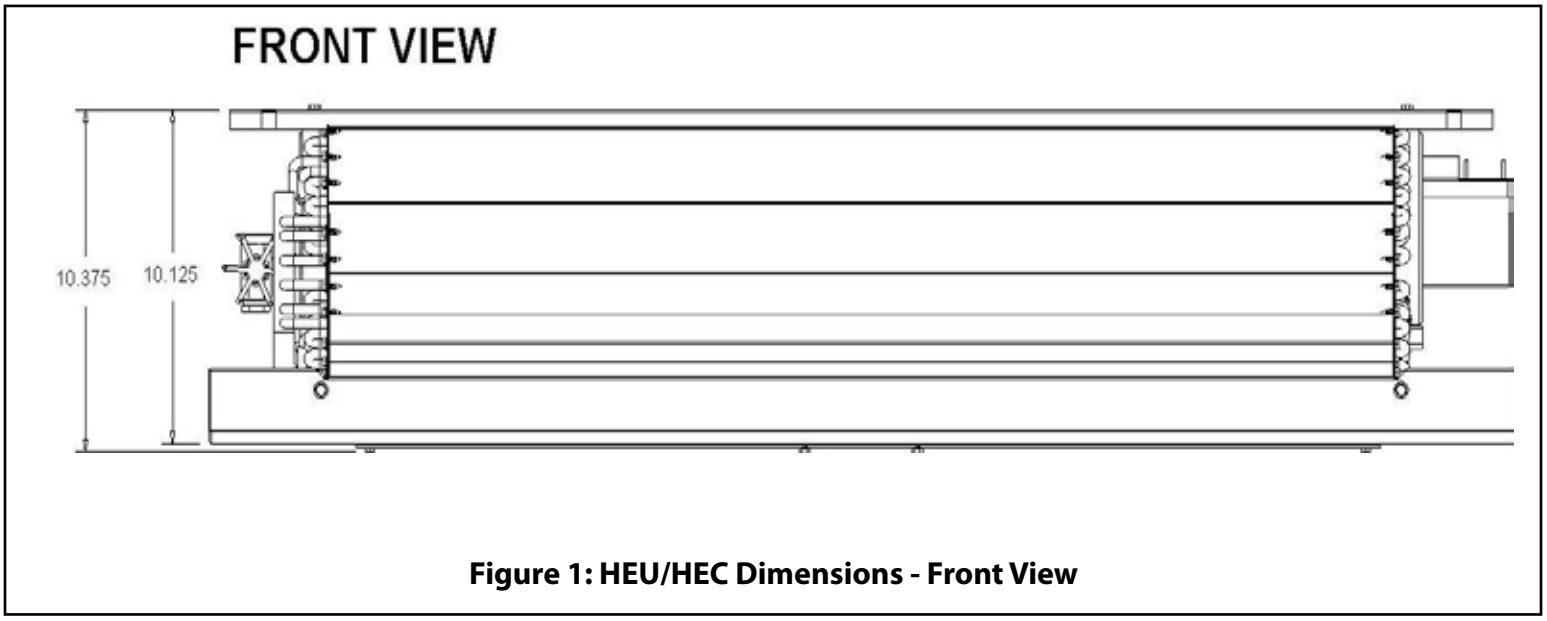



**Figure 1: HEU/HEC Dimensions - Front View**

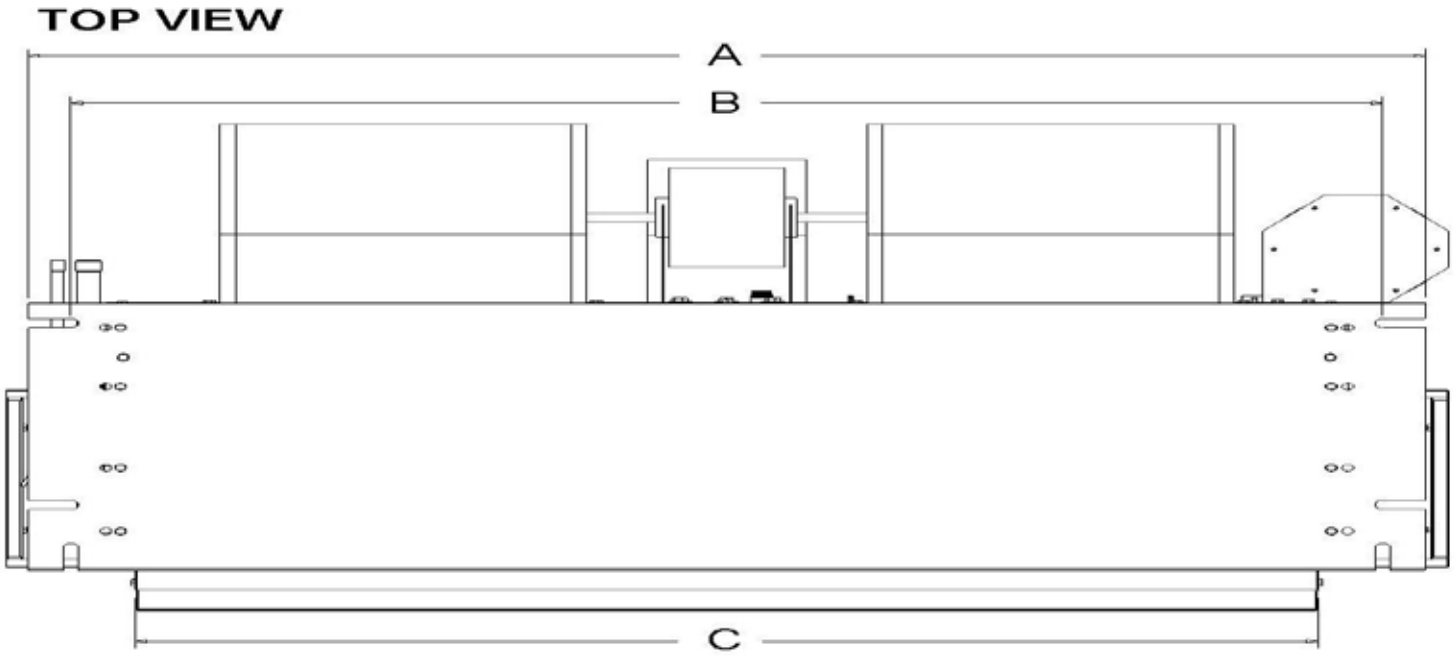



**Figure 2: HEU Dimensions – Top View**

| Model Nol | LIQUID LINE | SUCTION LINE | WATER LINE | A | B | C |
|---|---|---|---|---|---|---|
| HEUX-X-X-X-A | 3/8″ | 3/4″ | (2) 5/8″ | 37 | 34.25 | 30 |
| HEUX-X-X-X-B | 3/8″ | 3/4″ | (2) 5/8″ | 45 | 42.25 | 38 |
| HEUX-X-X-X-C | 3/8″ | 3/4″ | (2) 5/8″ | 49 | 46.25 | 42 |
| HEUX-X-X-X-D | 3/8″ | 3/4″ | (2) 5/8″ | 56 | 53.25 | 49 |

**Table 3: HEU Dimensional Data For Top View**

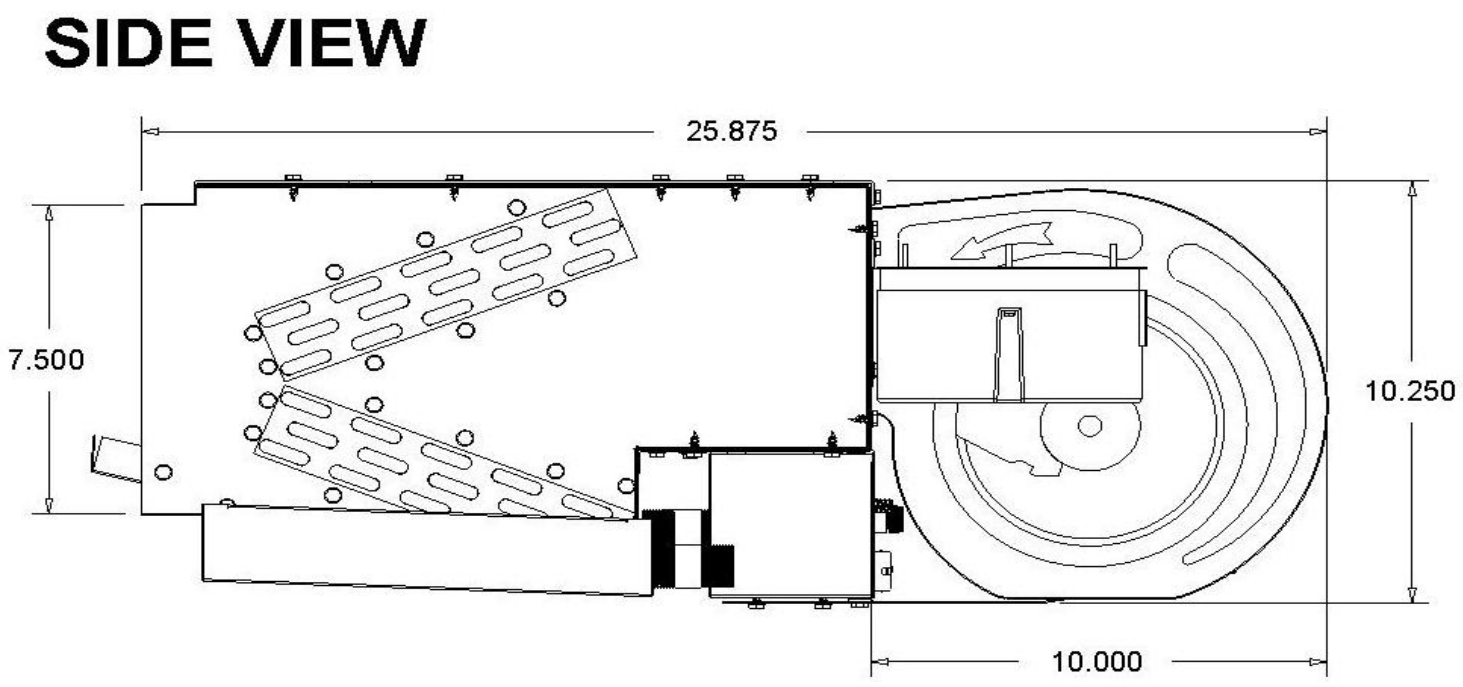



**Figure 3: HEU Dimensions – Side View**

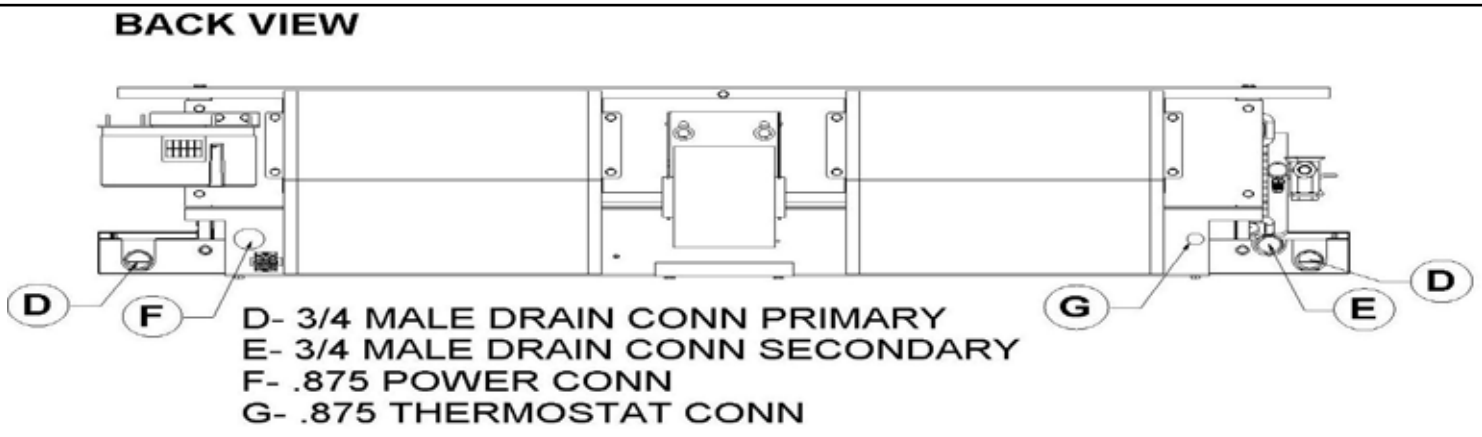



**Figure 4: HEU/HEC Condensate, Power, Thermostat Connections – Rear View**

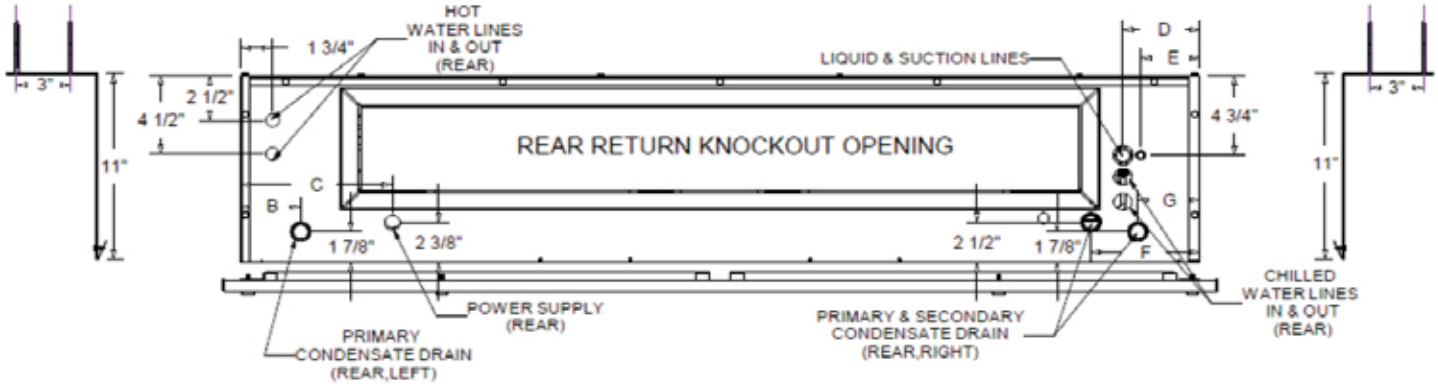



**Figure 5: HEC Dimensions – Rear View**

| Model | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| HEC***- *- AC | 41″ | 3 1/8″ | 7 5/8″ | 4″ | 3″ | 5 7/8″ | 3 3/16″ |
| HEC***- *- BC | 47″ | 2 1/8″ | 6″ | 3″ | 2″ | 4 3/4″ | 2 1/8″ |
| HEC***- *- CC | 53 1/2″ | 3 3/ ″ | 8 1/2″ | 4 1/4″ | 3 1/4″ | 6″ | 3 1/ ″ |
| HEC***- *- DC | 60 1/2″ | 3 1/2″ | 12″ | 4 1/4″ | 3 1/4″ | 6″ | 3 1/2″ |

**Table 4: HEC Dimensional Data For Top and Rear Views**

| Model | Knocket Opening |
|---|---|
| HEC***- *- AC | 30 7/8″ X 7 1/4″ |
| HEC***- *- BC | 38 3/8″ X 7 1/4″ |
| HEC***- *- CC | 42 3/8″ X 7 1/4″ |
| HEC***- *- DC | 49 3/8″ X 7 1/4″ |

**Table 5: HEC Rear Return Knockout Dimensions**

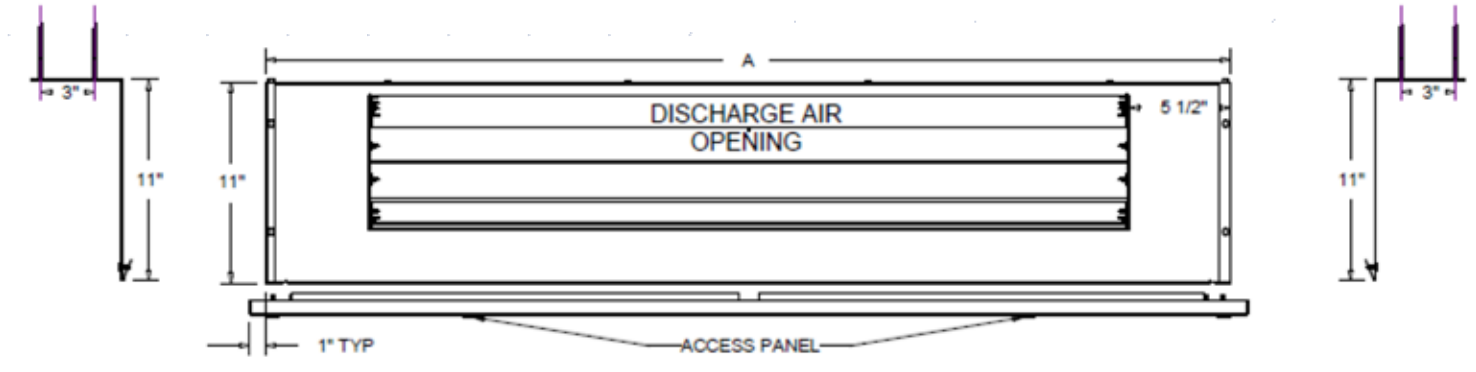



**Figure 6: HEU/HEC Dimensions – Front**

| MODEL | DISCHARGE OPENI NG |
|---|---|
| HE**- **- *- AC | 30 1/4″ X 7 1/2″ |
| HE**- **- *- BC | 38 1/4″ X 7 1/2″ |

| MODEL | DISCHARGE OPENI NG |
|---|---|
| HE**- **- *- CC | 42 1/4″ X 7 1/2″ |
| HE**- **- *- DC | 49 1/4″ X 7 1/2″ |

**Table 6: HEC/HEU Discharge Opening Dimensions**

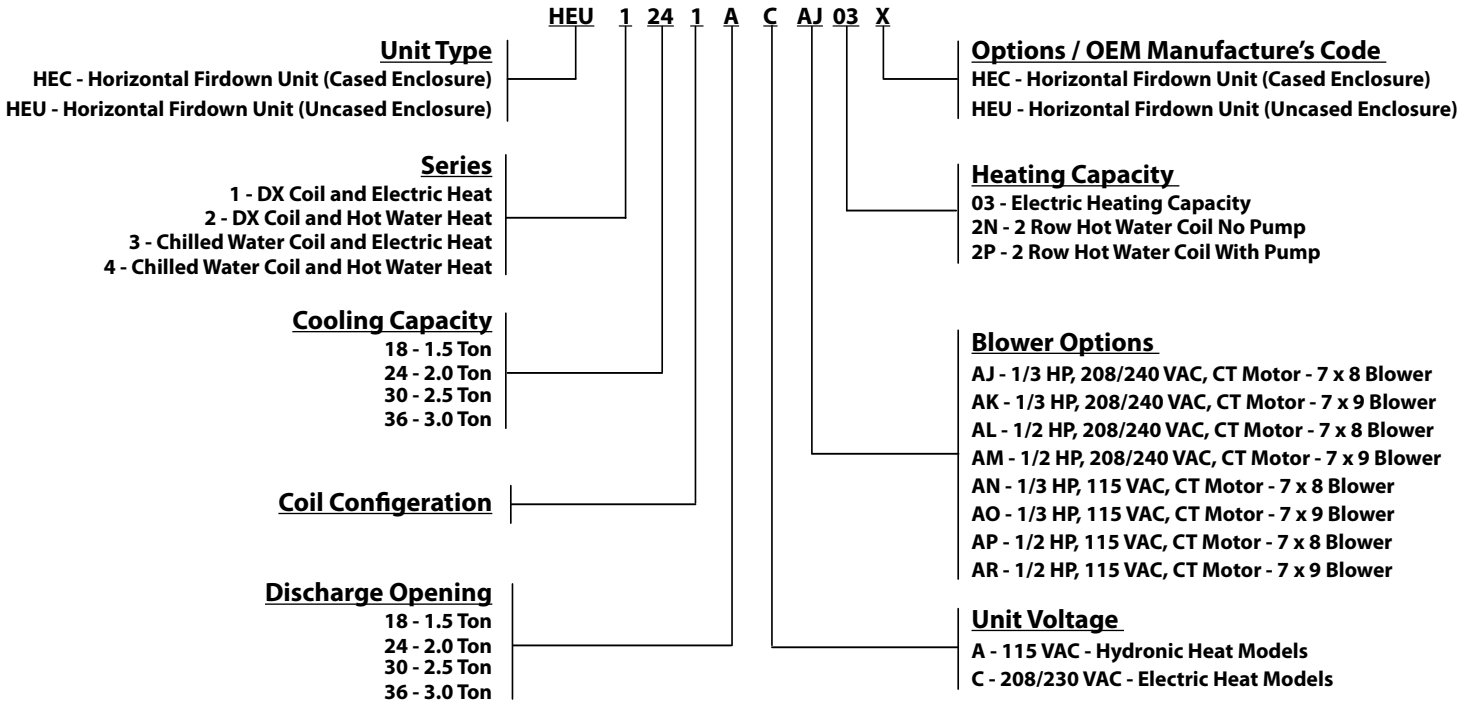



**Table 7: HEU/HEC Model Number Nomenclature**

## SECTION 3: LOCATION AND CLEARANCES

**Location**

Access for servicing is an important factor when selecting the location of an air handler. Provide a minimum of 30 inches under the air handler for access to the control box, heating elements, water pump, blower, and air filters. The air handler can be serviced entirely from the bottom, including replacing the air filter on models equipped with a louvered ceiling access panel with an integrated filter rack.

**NOTE:** The air handler is designed for horizontal applications only and is therefore **not** designed to be installed in a closet or flush mounted in a wall in an upflow vertical position.

Location is usually predetermined. Check with the homeowner or general contractor for predetermined installation plans. If location has not been decided, consider the following in choosing a suitable location.

1. Select a location with adequate structural support, space for service access, and clearance for return and supply duct connections. The air handler is designed to fit in a 12" high drop down space
2. Normal operating sound levels may be objectionable if the air handler is placed directly over or under some rooms such as bedrooms, study, etc.
3. Locate the air handler where the supply and return air ducts can
   provide even air distribution to and from the living spaces.
4. Locate the air handler where the electrical supply wiring can be easily routed from main electrical panel to the air handler and where electrical wiring will not be damaged.
5. Supply power wiring may be installed in a flexible conduit or armored cable. The installer must refer to National Electrical Code (NFPA 70), Canadian Electrical Code, Part I (CSA C22.2), ANSI/NFPA No. 70 and/or any local codes to ensure supply wiring complies with all applicable codes.
6. Locate appliance where thermostat wiring can be easily routed from the thermostat to the air handler and where the wiring will not be damaged. Make sure the wiring has enough length so it will not to block access to any components that may need to be replaced or serviced.
7. Locate the air handler where refrigerant lines can be easily routed from the air handler to the outdoor unit.
8. Primary and secondary drain lines must be routed so air filter replacement is not obstructed.
9. The blow-thru design of this air handler will cause the exterior surface of cabinet to sweat when installed in a non-conditioned space such as an attic or garage. The installer must provide protection such as a full size auxiliary drain pan under any unit installed in a non-conditioned space to prevent damage to the building structure from condensation runoff.

**Clearances**

This air handler is approved for 0 inches of clearance to combustible material on any part of the air handler exterior casing and the inlet or outlet ducts (See Table 8). A clearance of 30 inches below the air handler is required for the service access panel to swing open (See Figure 7).

| Top (inches) | Back (inches) | Sides (inches) | Supply Duct (inches) |
|---|---|---|---|
| 0 | 0 | 0 | 0 |

**Table 8: Clearance to Combustibles**

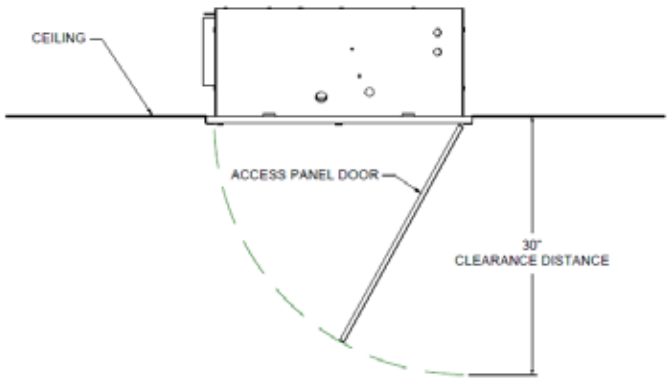



**Figure 7: Clearance For Service Access**

**⚠ WARNING**

**NON METALIC DUCTED RETURN SYSTEMS MAY NOT BE ALLOWED IN SOME STATES, COUNTIES, OR CITIES. CHECK ALL STATE, LOCAL AND FIRE CODES TO DETERMINE IF THIS TYPE OF RETURN SYSTEM IS ALLOWED WHERE THE AIR HANDLER IS BEING INSTALLED.**

**⚠ WARNING**

**FIRE HAZARD:**

**NON METALIC DUCTED RETURN SYSTEMS WILL COLLECT DUST AND DEBRIS WHICH CAN RESULT IN A FIRE HAZARD. BE SURE TO THOROUGHLY CLEAN THIS SYSTEM TO REMOVE ALL DUST AND DEBRIS ANNUALLY.**

## SECTION 4: RETURN AND SUPPLY AIR REQUIREMENTS

**RETURN AIR REQUIREMENTS**
Provisions shall be made to permit air in the conditioned space to return to the air handler. Failure to provide means for adequate return air will result in reduced airflow through the air handler causing improper heating and cooling of the living space. Reduced airflow may also cause the cooling coil to freeze up and the electric heat limit(s) to cycle, resulting in premature heating element failure.

**NOTE:** The return air must be filtered to prevent a buildup of lint, dust, and debris on the coil surface.

**Uncased Air Handler – Return Air**
An uncased air handler can utilize a louvered ceiling access panel with an integral filter (See Figure 8) as a means of returning the conditioned air from the conditioned space to the air handler. An uncased air handler may also utilize a non-louvered ceiling access panel with a return air duct routed between the ceiling joists from the furred-in area around the air handler to a return air filter grille located in the ceiling. The return air grille must never be located in a closet.

**Cased Air Handler – Return Air**
A cased air handler can utilize a louvered ceiling access panel with an integral filter (See Figure 8) as a means of returning the conditioned air from the conditioned space to the air handler. A cased air handler may also utilize a non-louvered ceiling access panel with a return air duct attached to the return air opening in the air handler. If a return air duct is used, the return air opening knock-out must be removed to allow the return air to enter the air handler through the return air opening. The return air duct may consist of an elbow that drops directly into a return air filter grille in the ceiling or the return duct may be routed between the ceiling joists to a return air filter grille located in the ceiling away from the air handler.

**Return Air Filter Location**
Horizontal air handlers are not factory equipped with an air filter. The air filter can be installed in the filter rack of the louvered ceiling access panel or it may be located remotely in a ceiling mounted return air filter grille. If a return duct and return air filter grille is used, a non-louvered ceiling access panel will be required.

The louvered ceiling panel air filter size for the HEC and HEU models is 20" x 20" x 1" (2 required).

**NOTE:** The recommended minimum filter sizes for a return air filter grille is shown below.

Standard Throw-Away Air Filter @ 300 ft/min or Less
600 CFM = 16" x 20" x 1"
700 CFM = 20" x 20" x 1"
800 CFM = 20" x 20" x 1"
900 CFM = 20" x 24" x 1"
1000 CFM = 20" x 24" x 1"

**NOTE:** Pleated filters are not recommended due to their higher pressure drop.

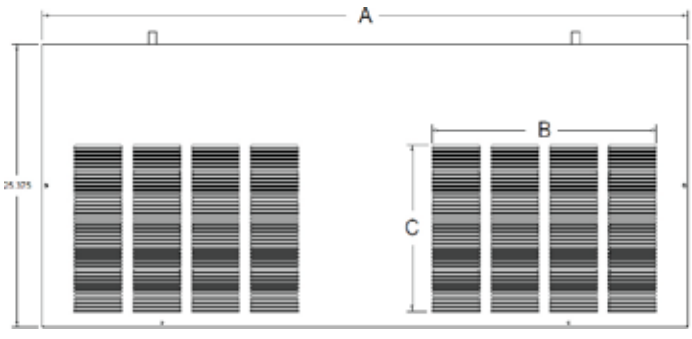



**Figure 8: Ceiling Access Panel**

| PART No. | OVERALL FRAME DIMENSIONS | TYPE | SUNTHERM HORIZONTAL FAN COIL MODELS |
|---|---|---|---|
| 87JUA020 | 40.875" X 25.375 | LOUVERED | HEXX-XX-X-A |
| 87JUA021 | 46.875" X 25.375 | LOUVERED | HEXX-XX-X-B |
| 87JUA022 | 53.875" X 25.375 | LOUVERED | HEXX-XX-X-C |
| 87JUA023 | 60.875" X 25.375 | LOUVERED | HEXX-XX-X-D |
| CPNL1 | 27.5" X 43" | NON-LOUVERED | HEXX-XX-X-A |
| CPNL2 | 27.5" X 49" | NON-LOUVERED | HEXX-XX-X-B |
| CPNL3 | 27.5" X 55.5" | NON-LOUVERED | HEXX-XX-X-C |
| CPNL4 | 27.5" X 62.5" | NON-LOUVERED | HEXX-XX-X-D |

**Table 9: Optional Ceiling Access Panels**

**⚠ WARNING**

**IMPACT HAZARD**

**Use extreme caution when removing the ceiling access panel screws. The panel is secured to the frame assembly with the thumb screws. Once the thumb screws have been removed, the ceiling access panel will swing down rapidly and can injure anyone standing underneath the panel. The panel must be supported from underneath as it swings downward to prevent injury.**

**The louvers can also have sharp edges which can cut hands or fingers. Using gloves is recommended when servicing the air handler.**

**⚠ IMPORTANT**

**USING A DUCTED RETURN WILL RESULT IN QUIETER OPERATION THAN USING A LOUVERED CEILING ACCESS PANEL USED FOR RETURN AIR.**

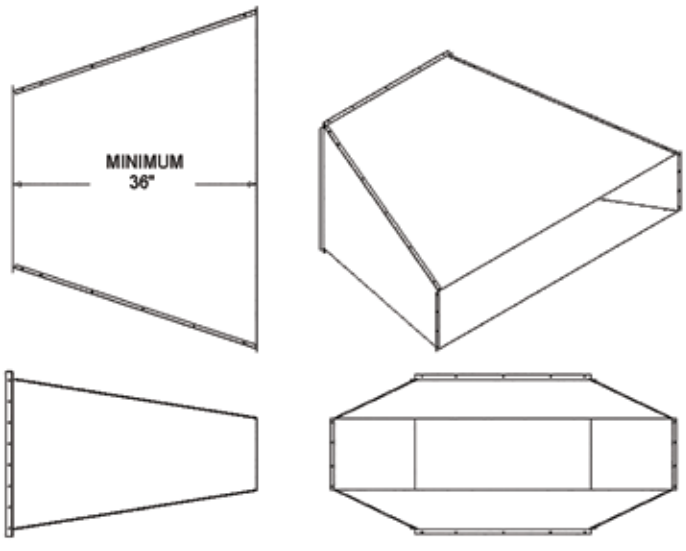



**Figure 9: Supply and Return Duct Transitions**

**SUPPLY AIR REQUIREMENTS**

The horizontal air handler can be mounted into the ceiling to allow horizontal left supply air flow or horizontal right supply air flow. The supply air plenum is attached and secured to the air handler duct flanges using screws. Use a non-tape sealant such as mastic or an aerosol sealant to seal the plenum to the air handler to prevent air leakage. The supply plenum must be the same size as the supply air opening.

The entire supply duct system must be designed for a total of 0.20" W.C. static pressure drop or less and each individual duct must be sized to deliver the proper amount of air to each room of the conditioned space. Holes cut in the supply plenum for ducts must be the same size as the supply ducts. Use a duct starting collar to attach the ducts to the plenum. Use a non-tape sealant such as mastic or an aerosol sealant to seal the ducts to the plenum to prevent air leakage.

If the supply duct system is installed in an unconditioned space, the duct system must be insulated and installed in accordance with local codes.

**NOTE: Cased air handlers require return and supply transition ducts to assure proper airflow. Uncased air handlers only require a supply duct transition. See Figure 9 below for factory recommendations.**

The area in the ceiling where the air handler is to be located should have a framed in structure so the air handler can be properly mounted and secured. The inside height of the area must be 12 inches. Prior to installing the air handler, holes must be cut into the frame for the refrigerant tubing, drain line(s), electrical wiring, thermostat wiring, and outdoor unit control wiring to enter the air handler. The air handler must be level in both directions to allow proper condensate drainage.

**⚠ WARNING**

***Extreme caution must be taken that no internal damage will result if screws or holes are drilled into the cabinet.***

**⚠ WARNING**

**The air handler and enclosure must be covered during the drywall installation, texturing, and painting process to prevent spray and debris from collecting on and entering the air handler and enclosure.**

**Cased Air Handler**

The following steps are required to properly install a cased air handler.

1. Remove the top shipping cover and corner posts.
2. Remove the bottom shipping cover.
3. Use screws to secure the 4 straps to the ceiling joists where the air handler will be installed (See Figure 10). The straps must be located so the hooks in the straps line up with the slots in the base of the air handler.
4. Raise the air handler into place and place the hooks into the slots in the base. Bend the hooks back to keep the hooks from slipping out of the slots in the base.
5. Connect the supply air plenum to the air handler supply air duct flanges as described in **SUPPLY DUCT REQUIREMENTS** found in **SECTION 4** of these instructions.
6. **New Installations Only:**
   a. If a non-louvered ceiling access panel is being used, connect the return air duct to the air handler as described in **RETURN AIR REQUIREMENTS / Cased Air Handler** found in **SECTION 4** of these instructions.
   b. After the air handler is mounted, a 2x2 or 2x4 frame must be installed around the base of the air handler to create an air-tight seal and support the ceiling access panel frame.
   c. Install the ceiling access panel.
   **NOTE**: The ceiling access panel is sold separately. It is not included with the air handler.
7. Remove the thumb screws that secure the ceiling access panel and slowly swing the panel down.
8. Remove the control box cover.
9. Connect the electrical supply wires and the thermostat control wires to the appropriate terminal block and pigtails in the control box as described in **SECTIONS 8 and 9** of these instructions.
   **NOTE:** An ON/OFF switch must be installed in the supply circuit to disconnect the power to the air handler during servicing.
10. Connect the refrigerant lines or chilled water lines to the coil as described in **SECTIONS 6 and 7** of these instructions.
11. Make the necessary blower motor speed changes as described in **SECTION 10** of these instructions.
12. Install the control box cover.
13. Raise the ceiling access panel into place and secure with the thumbscrews.
14. Turn the power on to the unit by following the procedure found in **SECTION 11** of these instructions and in the Users Information Manual to place the air-handler into service.
15. Set the thermostat to the desired operating mode and temperature.

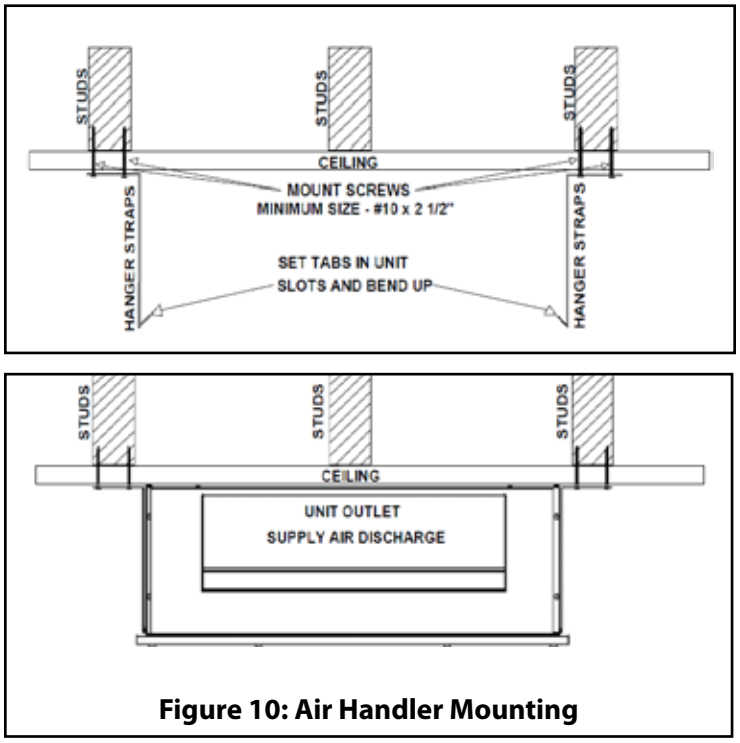



**Figure 10: Air Handler Mounting**

**Uncased Air Handler**

The following steps are required to properly install an uncased air handler.

1. Remove the top shipping cover and corner posts.
2. Remove the screws from the control box cover and remove the cover.
3. Remove the bottom shipping cover.
4. Raise the air handler into place and install the lag bolts with washers through the slots in the top cover. Tighten the lag bolts until the air handler is securely fastened to the ceiling.
5. Connect the supply air plenum to the air handler supply air duct flanges as described in **SUPPLY DUCT REQUIREMENTS** found in **SECTION 4** of these instructions.
6. **New Installations Only:**
   a. If a non-louvered ceiling access panel is being used, install the return air duct as described in **RETURN AIR REQUIREMENTS / Uncased Air Handler found in SECTION 4** of these instructions.
   b, After the air handler is mounted, a 2x2 or 2x4 frame must be installed around the base of the air handler to create an air tight seal and support the ceiling access panel frame.
   c. Install the ceiling access panel.
   **NOTE:** The ceiling access panel is sold separately. It is not

included with the air handler.

7. Remove the thumb screws that secure the ceiling access panel and slowly swing the panel down.
8. Remove the control box cover.
9. Connect the electrical supply wires and the thermostat control wires to the appropriate terminal block and pigtails in the control box as described in **SECTIONS 8 and 9** of these instructions.
   **Note:** An ON/OFF switch must be installed in the supply circuit to disconnect the power to the air handler during servicing.
10. Connect the refrigerant lines or chilled water lines to the coil as described in **SECTIONS 6 and 7** of these instructions.
11. Make the necessary blower motor speed changes as described in **SECTION 10** of these instructions.
12. Install the control box cover.
13, Raise the ceiling access panel into place and secure with the thumbscrews.
14. Turn the power on to the unit by following the procedure found in **SECTION 11** of these instructions and in the Users Information Manual to place the air-handler into service.
15. Set the thermostat to the desired operating mode and temperature.

## SECTION 6: REFRIGERANT PIPING, TXV, FLOWRATOR, CONDENSATE DRAIN

**DX Cooling / Chilled Water Cooling**

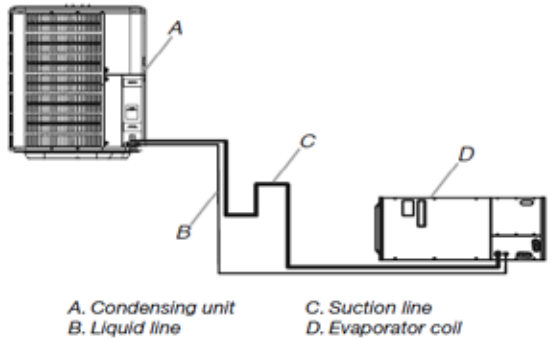
**DX Refrigerant Piping:**
Air handlers with DX type evaporator coils require liquid and suction piping sized in accordance with the outdoor unit manufacturer's instructions. The DX coil has sweat copper connections. Refrigerant lines should be soldered with silver solder or high temperature brazing alloy. The suction line must be insulated to prevent condensate from forming and dripping off. Armaflex (or equivalent) with 3/8" (1 cm) minimum wall thickness is recommended. In severe conditions, such as hot or high humidity areas, insulation with 1/2" (1.3 cm) minimum wall thickness may be required. If the outdoor unit is installed above air handler, oil traps are required at equal intervals along suction line (See Figure 11). Horizontal suction lines should slope downward 1 inch for every 20 feet toward the outdoor unit. Flow dry nitrogen through refrigerant lines during the soldering operation to prevent oxidation of the inside surface of the copper tubing which can result in debris plugging the TXV or orifice screen.

**SPECIAL INSTRUCTIONS FOR COILS WITH THERMAL EXPANSION VALVES (TXV)**

The thermal expansion valve (TXV) used in this air handler has a built-in check valve making it heat pump capable. The external equalizer line attached to the TXV has a female flare nut with built in Schrader valve depressor that attaches to the Schrader valve port located on the coil suction manifold.

A TXV has a thermostatic element separated from the valve body by a diaphragm designed to regulate the rate at which refrigerant flows into the evaporator.

- Install 1 oil trap for a height difference of 15 ft to 25 ft (4.6 m to 7.6 m) between indoor and outdoor units.
- Install 2 oil traps for a height difference of 26 ft to 50 ft (7.9 m to 15.2 m) between indoor and outdoor units.
- Install 3 oil traps for a height difference of 51 ft to 100 ft (15.5 m to 30.5 m) between indoor and outdoor units.
- Install 4 oil traps for a height difference of 101 ft to 150 ft (30.8 m to 45.7 m) between indoor and outdoor units.




*A. Condensing unit*
*B. Liquid line*
*C. Suction line*
*D. Evaporator coil*

**Figure 11: Air Handler Below Outdoor Unit Refrigerant Lines**

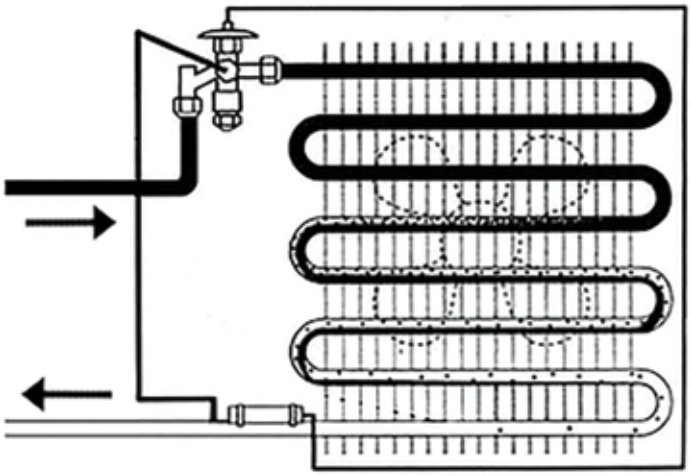
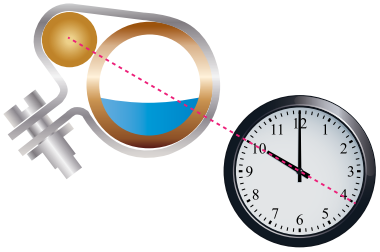


**Figure 12: TXV Sensing Bulb Location**



BULB PLACEMENT ANYWHERE FROM 10—2 O'CLOCK POSITION

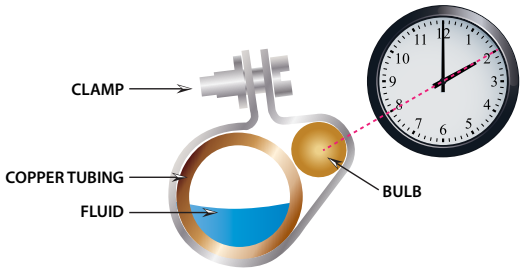



**Figure 13: TXV Sensing Bulb Placement**

The best location for the TXV sensing bulb is on a horizontal section of the suction line tube and positioned between 10 o'clock and 2 o'clock on the tube. (See Figures 7 and 8) .

**NOTE:** The sensing bulb must never be located at the bottom of the suction line due to the possibility of oil and refrigerant laying in the bottom of the pipe causing false signals.

The sensing bulb must be able to sense the temperature of the superheated suction vapor and must therefore not be located in a position that will expose it to extraneous heat/cold. The sensing bulb must be insulated to isolate it from the surrounding air.

The TXV must be the proper size and type to achieve the performance ratings of the system.

**NOTE:** If a non-bleed type TXV is used, the outdoor unit may require a hard start kit to allow the compressor to start under load.

**How the TXV Controls Superheat**

The TXV is a precision device designed to regulate the rate at which liquid refrigerant flows into the evaporator. This controlled flow is necessary to provide optimum performance and to prevent the return of liquid refrigerant to the compressor.
The TXV separates the high pressure and low-pressure sides of a refrigeration or air conditioning system. Liquid refrigerant enters the TXV under high pressure, but the pressure is reduced when the flow of the refrigerant is restricted by an internal moving pin and port.
It is important to remember that the TXV only controls the level of superheat of the refrigerant in the suction line. The TXV is not designed to control air temperature, head pressure, capacity, suction pressure, or humidity. Attempts to adjust the TXV to control any of these system variables will lead to poor system performance and possible compressor failure.

The TXV responds to the temperature of refrigerant gas as it leaves the evaporator. This temperature is detected by the sensing bulb which is located near the evaporator outlet. The TXV also responds to the refrigerant pressure within the evaporator, which is transmitted to the TXV by an equalizer tube connected to the coil suction manifold. By responding to these variables, the TXV maintains a predetermined superheat level exiting the evaporator which maintains proper system stability, performance, and reliability.

**TXV TROUBLESHOOTING**

The thermostatic expansion valve (TXV) is like the carburetor in a car engine. It opens and closes to allow the correct amount of refrigerant flow through the system. When the TXV isn't working properly, the capacity and efficiency of the system is reduced. If a faulty TXV is suspected, perform the following tests:

Connect refrigerant gauges to the system and check that the refrigerant pressures, liquid subcooling and suction superheat levels are correct according to the outdoor unit charging chart. Subcooling at the outdoor unit liquid service valve is normally around 10°F and superheat at the outdoor unit suction service valve is normally between 8-12°F, but these can vary depending on the manufacturer and model of the outdoor unit.

Check to see if the indoor airflow through the system is correct. Check to see if the indoor and outdoor coils and indoor air filters are dirty. Clean dirty coils and clean/replace dirty air-filters as necessary before measuring air-flow and checking pressures, superheat, and subcooling.

Make sure the refrigerant charge in the system is correct. This step may require weighing the refrigerant in the system. Once refrigerant charge weight has been adjusted as necessary, recheck the pressures, subcooling and superheat. If these values are still not correct, the TXV may be defective or the TXV inlet strainer or the liquid line filter dryer is plugged with debris.

A good way to determine if the TXV is defective is to remove the TXV's sensing bulb from the suction line and check the pressures, subcooling, superheat again. No change in the pressures, subcooling, and superheat levels is an indication the TXV is defective. Another test that can be performed is to place the sensing bulb in ice water and recheck the pressures, superheat, and subcooling levels. If these values don't change, the TXV is likely defective.

**Additional TXV Troubleshooting Information**

**Low Suction Pressure – High Superheat**

POSSIBLE CAUSES:

1. Undersized TXV
2. TXV superheat adjustment too high
3. High indoor coil pressure drop due to internal restriction
4. TXV sensing bulb installed on bottom of suction line
5. Restricted or capped TXV external equalizer tube
6. Improper TXV external equalizer location (must be located on suction manifold after the last feeder tube)
7. Low refrigerant charge
8. Plugged liquid line filter dryer
9. Plugged TXV inlet strainer
10. Low outdoor ambient temperature

**High Suction Pressure – Low Superheat**

POSSIBLE CAUSES:

1. Oversized TXV
2. TXV seat leakage
3. TXV superheat adjustment too low
4. Improper TXV sensing bulb installation

5. Bad compressor (low capacity)
6. Incorrectly located external equalizer line (must be located on suction manifold after the last feeder tube)

**Low Suction Pressure – Low Superheat**

POSSIBLE CAUSES:

1. Low system load:
   a. Insufficient indoor airflow
   b. Dirty indoor air filters
   c. Return air too cold
   d. Indoor coil icing or frosting
2. Poor air distribution over indoor coil
3. Improper indoor/outdoor coil internal volume balance on heat pump systems (improper air handler/outdoor unit match-up; indoor coil too big or too small causing incorrect refrigerant charge balance between cooling and heating modes)
4. Oil trapped in indoor coil

**Things to Check Before Replacing TXV**

1. Slowly loosen the flare nut on the TXV external equalizer connected to the suction line port with a flare nut. If there is a large pressure release when the nut has been loosened, tighten the nut. If this results in a slight pressure release or no pressure release; the Schrader valve stem is not being depressed. Install an anti-blow back fitting to the external equalizer line of the TXV to depress the Schrader valve stem and check for proper operation of the TXV.
2. Remove the sensing bulb from the suction line and hold in a warm hand. The high side pressure should drop and low side pressure should increase as the TXV opens. Place the sensing bulb in ice water. The high side pressure should increase and the low side pressure should decrease as the TXV closes. If the pressures do not change, the TXV is faulty.

## FLOWRATOR TO TXV CONVERSION

While thermal expansion valves can be factory installed, they are normally available in kit form for field installation. Follow the installation instructions provided with the TXV kit. The TXV must be installed before system is charged with refrigerant. Installation of the TXV requires no cutting or brazing.

**IMPORTANT NOTE:** The flowrator piston must be removed from the flowrator distributor prior to the installation of the TXV (See Figure 15).

**FIELD INSTALLED TXV KIT INFORMATION**

**R72DB0053HX:** R-410A, 1.5 – 2.5 Ton, 15% Bleed, Inlet: Male Rotolock. Outlet: Female Swivel Nut

**R72DB0054HX:** R-410A, 3.0 – 5.0 Ton, 15% Bleed, Inlet: Male Rotolock, Outlet: Female Swivel Nut

**⚠ WARNING**

**The indoor coil is pressurized with nitrogen. Relieve pressure before installing TXV by depressing Schrader valve on coil suction manifold.**

**Field Installed TXV Installation Procedure**

1. Remove the cap on Schrader valve port on coil suction manifold.
2. Depress the Schrader valve to relieve the pressure inside the coil.
3. Only after coil pressure has been relieved, turn the female swivel nut counter-clockwise to separate it from the distributor.
4. Remove the piston orifice from the flowrator distributor assembly using a small diameter wire or paper clip.
5. As shown in Figure 14, the TXV assembly must be installed between the distributor and the liquid line connector.
6. Attach the TXV by connecting the female swivel nut on TXV outlet to the flowrator distributor (aligning Teflon seal first) and torque swivel nut to 10-30 ft. lbs.
7. Attach the liquid line connector with female swivel nut to male rotolock fitting on TXV inlet (aligning Teflon seal first) and torque swivel nut to 10-30 ft. lbs.
8. Attach equalizer tubing with 1/4" female flare nut that includes depressor to the male Schrader port on the coil suction manifold and torque nut to 10-30 ft. lbs.
9. Install the TXV bulb to the suction line using the two bulb clamps furnished with kit.
   a. The sensing bulb should be installed on a horizontal run of the suction line if possible and should be positioned between 10 o'clock and 2 o'clock as shown in Figure 13.
   b. If the sensing bulb is installed on a vertical run of the suction line, the bulb should be located at least 6 inches away from any bend and on the side of the tube that is above the inside of the bend. On vertical run bulb installations, the bulb should be positioned with the bulb capillary tube at the top.
   c. The bulb should be insulated using thermal insulation to protect it from the effect of the surrounding ambient temperature.
10. After completing the TXV installation, leak check all TXV fittings and thoroughly evacuate the coil through the service ] access fittings on the outdoor unit liquid and suction service valves prior to charging the system with refrigerant.

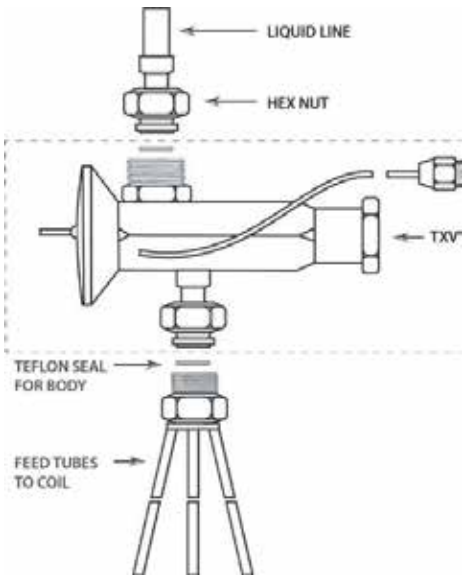



**Figure 14: Typical TXV Connections**

**SPECIAL INSTRUCTIONS FOR COILS WITH FLOWRATOR DISTRIBUTOR ASSEMBLIES**

The sizing of the orifice piston should be based on the rated capacity of the outdoor unit and air handler match-up.

Summit provides capacity performance ratings that match both same size and upsized air handlers with specific manufacturer's outdoor units. Consult the local Summit distributor for the proper size orifice piston to be used for a specific outdoor unit model number. The factory installed orifice piston size is marked on the flowrator distributor assembly and the air handler carton.

Failure to install the proper size orifice piston can lead to poor system performance and possible compressor damage. A variation of one piston size smaller or larger is not normally critical. Mortex/Summit reserves the right to substitute a factory installed piston one size smaller or greater if the piston size ordered is out of stock. A selection of replacement orifice pistons is available from the local Summit distributor.

**ORIFICE PISTON REPLACEMENT**

If the flowrator is being used instead of a TXV, the piston must be installed oriented as shown in Figure 15 in the distributor body and the existing liquid line attached to the flowrator distributor.

1. Remove the cap on Schrader valve port on coil manifold.
2. Depress the Schrader valve to relieve the pressure inside the coil.
3. Only after coil pressure has been relieved, turn the female swivel nut counter-clockwise to separate it from the distributor.
4. Replace the orifice piston with the correct size piston for the application. Make sure the tapered end of the piston is facing the feeder tubes on the distributor body.
5. Turn the female swivel nut on clockwise the flowrator distributor (aligning Teflon seal first) ***and torque swivel nut to 10-30 ft. lbs.***
6. After completing the installation of the correct size orifice piston, leak check the flowrator distributor fitting and thoroughly evacuate the system through the service fittings on the outdoor unit liquid and suction service valves.

**Figure 15: Flowrator Distributor Assembly**

**FIELD INSTALLED SUPPLEMENTAL HEAT LOCKOUT (SHL) KIT**

A field installed supplemental heat lockout (SHL) kit must be used with models equipped with electric heat when used in a heat pump system. The purpose of the SHL is to prevent excessive refrigerant pressures due to the indoor coil being located downstream of the electric heating elements. If the electric heater is energized while the heat pump is operating in the heat mode, the additional heat imparted to the indoor coil by the electric heater elements can cause the refrigerant pressures to be excessively high. The SHL temperature switch contacts will open and lock out the electric heat when the hot gas line temperature entering the indoor coil reaches approximately 120°F. The contacts will close when the hot gas line temperature falls to approximately 109°F which will allow the electric heat to operate.

**Installation of the SHL Kit**

After brazing and leak testing of the refrigerant lines is completed and the lines have sufficiently cooled, mount the SHL temperature sensor securely to the suction/hot gas refrigerant line that connects to the coil manifold (larger line; suction in cooling mode; hot gas in heating mode) with the 2 plastic wire ties provided in the kit assuring that the temperature switch has good contact with the refrigerant line and is not located where it may be damaged. Wrap the sensor on the refrigerant line using the insulation tape provided in the kit and secure with the insulation with the 2 plastic wire ties provided in the kit (See Figure 17).

SHL Switch Wiring:

One of the SHL switch pigtail leads is connected to the air handler white pigtail wire with a wire nut (See Figure 18). The other SHL switch pigtail lead is connected to the white thermostat wire from the thermostat W terminal and secured with a wire nut. Check the outdoor unit and thermostat wiring diagrams to assure the SHL will prevent the supplemental electric heat from being energized when the switch contacts are open.

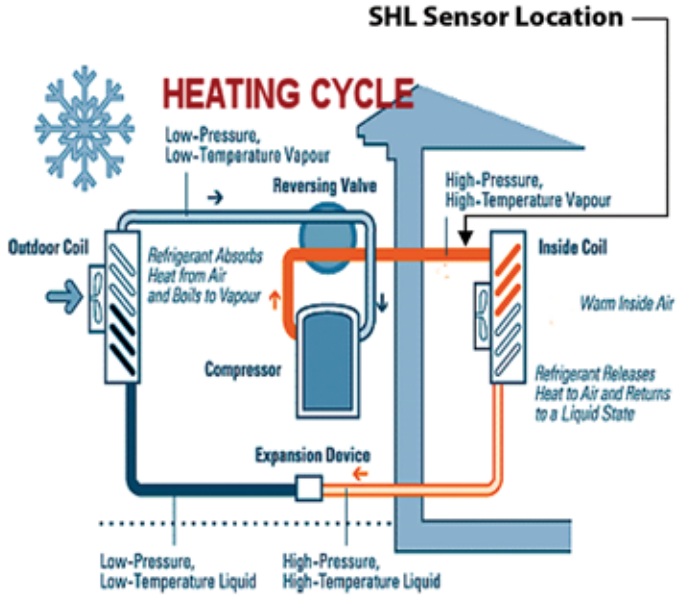



**Figure 16: Supplemental Heat Lockout (SHL) Temperature Sensor Location**

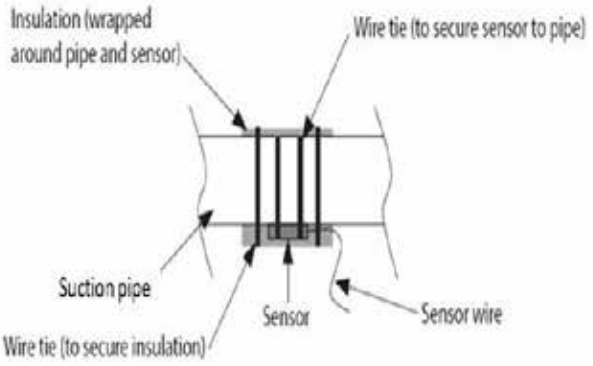



**Figure 17: Supplemental Heat Lockout (SHL) Temperature Sensor Mounting**

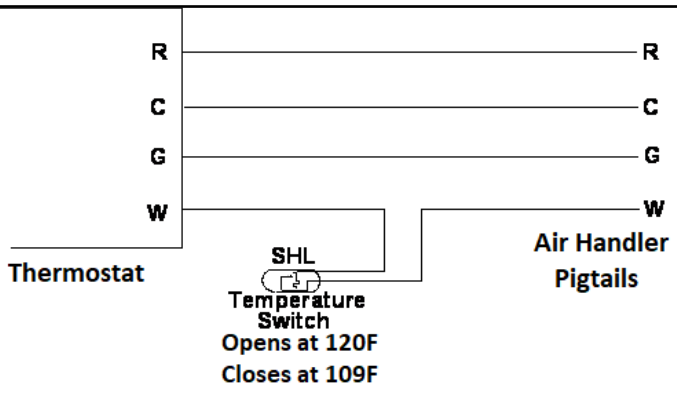



**Figure 18: Supplemental Heat Lockout (SHL) Switch Wiring**

**CONDENSATE DRAIN PIPING**

The blow-through DX coil design of this air handler will create positive pressure in the condensate drain system. To prevent air from being blown out of the primary condensate drain line, it is recommended that a minimum 2-inch trap with an anti-siphon air vent be installed as shown in Figure 19. Piping from the condensate drain connection must have adequate slope for drainage to a visible area. Do not pipe the condensate drains from two different air handlers into one common drain. Cap any unused condensate drain pan connections.

**NOTE:** A condensate trap may be required by local codes.

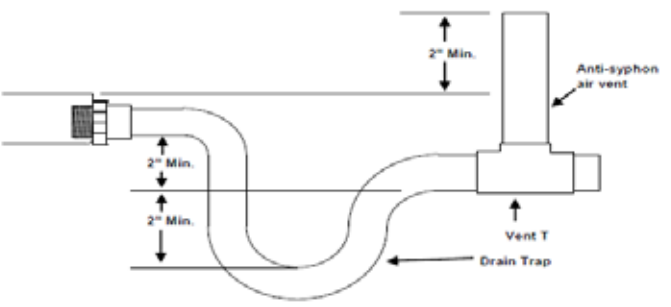



**Figure 19: Typical Condensate Trap**

The cooling DX coil condensate drain pan has a 3/4" NPT male primary connection on each side and one 3/4" NPT male secondary connection on one side. The two primary drain connections may need to be tied together before the trap to allow the drain pan to fully drain because of the high air velocity across the coil. Refer to Figure 20 for options for the primary drain connections.

**NOTE:** The condensate drain connections are located on the condensate drain pan inside the cabinet of a cased air handler. Condensate drain piping must enter through the holes in the cabinet and then connect to the drain pan connections within the cabinet. Refer to Figure 5 for condensate drain pipe entrances for condensate drain pipe entrances for cased air handlers.

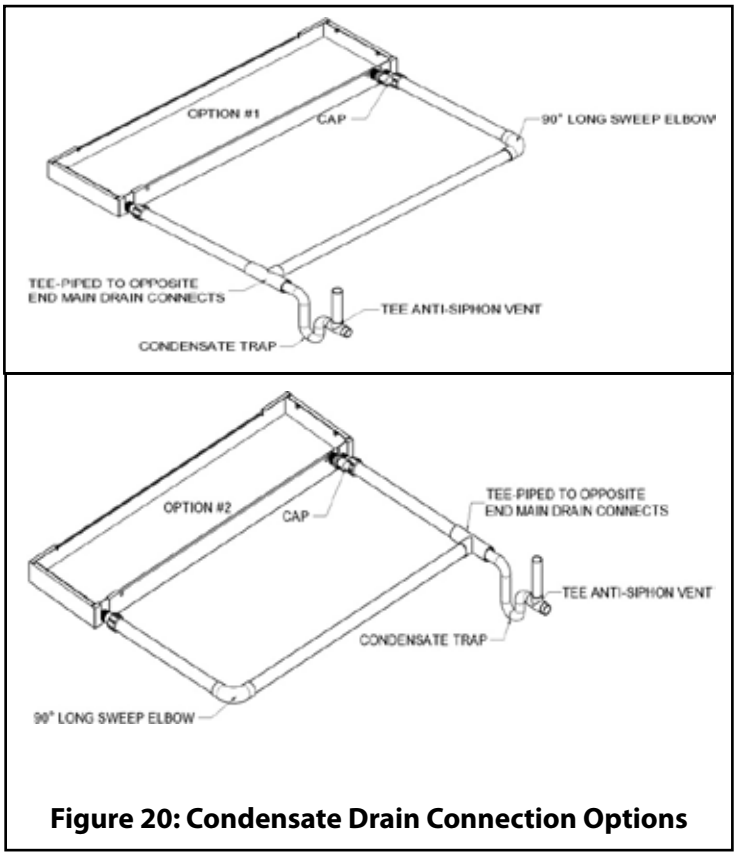



**Figure 20: Condensate Drain Connection Options**

**Secondary Drain Line**

Installing a trapped secondary drain line is recommended to prevent condensate pan overflow should the primary drain become clogged. The secondary drain should not be connected to a trap and must be routed to an area like a bathtub or outside roof soffit where water dripping out of it is visible indicating a plugged primary drain line. If secondary drain is dripping, the primary drain needs to be cleaned out. A secondary drain float switch that will shut the cooling system off should the primary drain become clogged may be installed instead of a secondary drain line.

**NOTE:** Do not pipe the primary and secondary drains together. If the secondary drain is not used, it must be capped.

**⚠ WARNING**

**This air handler must not be located where water can cause damage to the adjacent area if the condensate drain pan should overflow or if any condensate drain connections should leak.**

**When such locations can't be avoided, a suitable auxiliary drain pan must be installed under the air handler and connected to an adequate drain. The auxiliary drain pan should be at least 2" greater in length and width than the air handler dimensions and should be at least 1.5" deep. The manufacturer of this air handler is not liable for any water damage related to the air handler.**

## SECTION 7: HOT AND CHILLED WATER

### Hot Water Piping

All water piping must be supported independent of the air handler to prevent vibration and stress on the coil headers. Swing joints or flexible fittings must be provided to absorb expansion and contraction of the piping. Rigid piping reduces the effectiveness of vibration isolators. Water pipes must be adequately vented in order to prevent air binding. The air handler is equipped with manual air vents mounted on the coil manifold.

Total hot water piping length should not exceed 140 feet. All hot water piping to the coil should be 3/4 inch ID (7/8 inch OD) copper. CPVC and PEX piping may also be used in applications where the water temperature does not exceed 150°F. It is recommended a water isolation valve and a union be placed in the water lines to and from the coil, near the coil, for serviceability, repair or replacement of the coil. A thermal expansion tank is recommended on any closed loop system to relieve thermal expansion due to pressure increase.

After piping has been installed, allow the system to fill with water and check connections for leaks. To ensure complete filling of the system, follow the Filling Hydronic Heating System With Water, Purging Air From System, and System Startup procedure found in **SECTION 10: Final System Checkout and Startup** in these instructions.

**⚠ WARNING**

**Hot water from a boiler used to satisfy heating requirements can be heated to temperatures of 180°F. Parts containing water this hot can scald very quickly. Use extreme caution when servicing or performing maintenance on any parts containing hot water.**

**⚠ WARNING**

**Toxic chemicals used for treatment of boilers or non-potable water heating appliances shall never be introduced into a potable water space heating system.**

**⚠ WARNING**

**The air handler must not be located where water will cause damage to the adjacent area should any water connection leak.**

**When such locations can't be avoided, a suitable auxiliary drain pan must be installed under the air handler and connected to an adequate drain. The auxiliary drain pan should be at least 2 inches greater in length and width than the air handler dimensions and should be at least 1.5 inches deep.**

**The manufacturer of this air handler is not liable for any water damage related to the air handler.**

**"Massachusetts requires an electronically controlled pump timer that activates the pump every 6 hours for 60 seconds and limits the distance between the water heater and air handler to 50 feet max."**

**⚠ WARNING**

**When system requires water at temperatures higher than required for other uses, a means such as a mixing valve must be installed to temper the water temperature for those uses in order to reduce the potential of a scald hazard.**

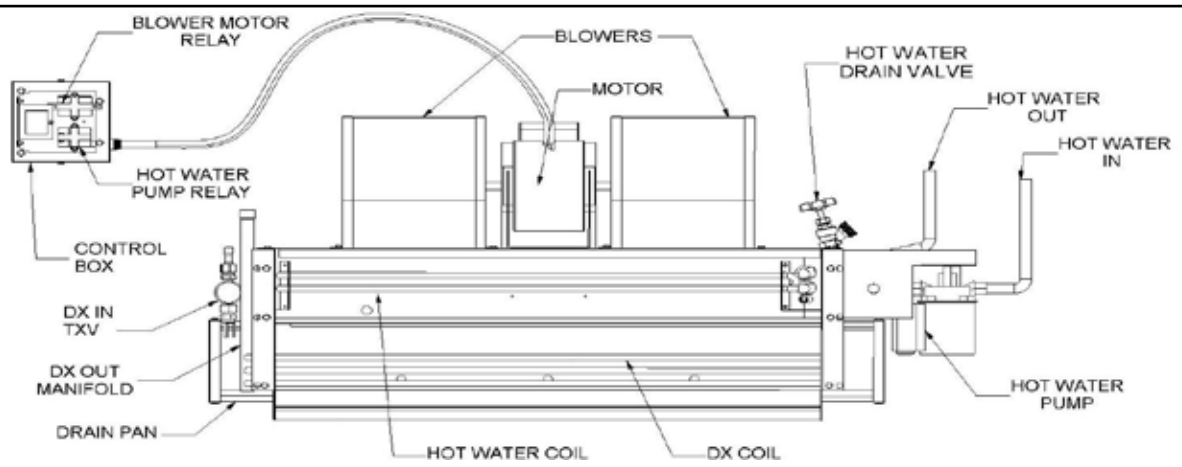



**Figure 21: Components and Water Connections**

## Performance Data - Hot Water Slab Coils

***HEATING PERFORMANCE DATA:***

| | HOT W ATER CAPACITIES @ | | | | | | | | | | | PRESS. | PRESS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HOT WATER** | **70°F ENTERING AIR TEMPERATURE** | | | | | | | | | | | **DROP** | **DROP** |
| **SLAB-COIL** | **ENTERING W ATER TEM PERATURE** | | | | | | | | | | | **WATER** | **AIR** |
| **MODEL** | **100°F** | **110°F** | **120°F** | **130°F** | **140°F** | **150°F** | **160°F** | **170°F** | **180°F** | **CFM** | **GPM** | **(FT-W TR)** | **(IW C)** |
| **HE*2***A<br>HE*4***A** | 6,516 | 8,735 | 10,974 | 13,228 | 15,496 | 17,777 | 20,067 | 23,367 | 24,674 | 480 | 2.0 | 0.78 | 0.10 |
| | 6,987 | 9,357 | 11,742 | 14,141 | 16,550 | 18,970 | 21,399 | 23,835 | 26,277 | | 3.0* | 1.61 | |
| | 7,253 | 9,706 | 12,174 | 14,651 | 17,138 | 19,634 | 22,137 | 24,647 | 27,162 | | 4.0 | 2.68 | |
| | 7,425 | 9,932 | 12,450 | 14,979 | 17,515 | 20,059 | 22,609 | 25,165 | 27,726 | | 5.0 | 3.97 | |
| | 7,547 | 10,090 | 12,644 | 15,208 | 17,779 | 20,356 | 22,938 | 25,526 | 28,118 | | 6.0 | 5.49 | |
| | 7,280 | 9,682 | 12,170 | 14,677 | 17,201 | 19,740 | 22,293 | 24,856 | 27,428 | 590 | 2.0 | 0.78 | 0.15 |
| | 7,812 | 10,467 | 13,141 | 15,832 | 18,537 | 21,255 | 23,984 | 26,722 | 29,469 | | 3.0* | 1.61 | |
| | 8,152 | 10,914 | 13,694 | 16,487 | 19,292 | 22,108 | 24,935 | 27,768 | 30,610 | | 4.0 | 2.68 | |
| | 8,374 | 11,205 | 14,052 | 16,911 | 19,780 | 22,659 | 25,547 | 28,441 | 31,342 | | 5.0 | 3.97 | |
| | 8,531 | 11,410 | 14,304 | 17,209 | 20,123 | 23,045 | 25,976 | 28,912 | 31,854 | | 6.0 | 5.49 | |
| | 7,791 | 10,456 | 13,147 | 15,862 | 18,597 | 21,349 | 24,116 | 26,897 | 29,689 | 695 | 2.0 | 0.78 | 0.20 |
| | 8,497 | 11,390 | 14,305 | 17,240 | 20,193 | 23,160 | 26,141 | 29,133 | 32,134 | | 3.0* | 1.61 | |
| | 8,906 | 11,929 | 14,371 | 18,030 | 21,105 | 24,192 | 27,291 | 30,400 | 33,517 | | 4.0 | 2.68 | |
| | 9,175 | 12,281 | 15,406 | 18,546 | 21,698 | 24,862 | 28,036 | 31,219 | 34,410 | | 5.0 | 3.97 | |
| | 9,366 | 12,531 | 15,714 | 18,910 | 22,117 | 25,334 | 28,561 | 31,795 | 35,036 | | 6.0 | 5.49 | |
| | 8,291 | 11,131 | 14,002 | 16,899 | 19,819 | 22,758 | 25,714 | 28,686 | 31,670 | 800 | 2.0 | 0.78 | 0.25 |
| | 9,105 | 12,208 | 15,339 | 18,491 | 21,664 | 24,854 | 28,060 | 31,278 | 34,508 | | 3.0* | 1.61 | |
| | 9,581 | 12,837 | 16,115 | 19,413 | 22,730 | 26,061 | 29,405 | 32,761 | 36,127 | | 4.0 | 2.68 | |
| | 9,895 | 13,250 | 16,626 | 20,018 | 23,427 | 26,849 | 30,282 | 33,726 | 37,179 | | 5.0 | 3.97 | |
| | 10,120 | 13,544 | 16,988 | 20,448 | 23,921 | 27,406 | 30,902 | 34,402 | 37,920 | | 6.0 | 5.49 | |
| | 8,508 | 11,425 | 14,373 | 17,350 | 20,350 | 23,371 | 26,410 | 29,465 | 32,533 | 850 | 2.0 | 0.78 | 0.28 |
| | 9,372 | 12,568 | 15,792 | 19,041 | 22,311 | 25,599 | 28,904 | 32,222 | 35,552 | | 3.0* | 1.61 | |
| | 9,878 | 13,238 | 16,621 | 20,025 | 23,448 | 26,887 | 30,340 | 33,806 | 37,282 | | 4.0 | 2.68 | |
| | 10,215 | 13,680 | 17,167 | 20,672 | 24,194 | 27,730 | 31,280 | 34,839 | 38,409 | | 5.0 | 3.97 | |
| | 10,455 | 13,995 | 17,555 | 21,132 | 24,723 | 28,328 | 31,944 | 35,570 | 39,204 | | 6.0 | 5.49 | |
| **HE*2***B<br>HE*4***B** | 7,165 | 9,597 | 10,046 | 14,509 | 16,984 | 19,470 | 21,965 | 24,468 | 26,977 | 480 | 2.0 | 0.96 | 0.06 |
| | 7,665 | 10,258 | 12,863 | 15,481 | 18,109 | 20,746 | 23,390 | 26,040 | 28,696 | | 3.0* | 1.96 | |
| | 7,943 | 10,624 | 13,316 | 16,018 | 18,728 | 21,446 | 24,170 | 26,900 | 29,635 | | 4.0 | 3.27 | |
| | 8,122 | 10,858 | 13,604 | 16,360 | 19,122 | 21,891 | 24,665 | 27,445 | 30,228 | | 5.0 | 4.86 | |
| | 8,247 | 11,021 | 13,805 | 16,597 | 19,396 | 22,200 | 25,009 | 27,822 | 30,639 | | 6.0 | 6.71 | |
| | 7,974 | 10,686 | 13,419 | 16,170 | 18,935 | 21,715 | 24,505 | 27,304 | 30,113 | 590 | 2.0 | 0.96 | 0.09 |
| | 8,614 | 11,532 | 14,467 | 17,418 | 20,381 | 23,356 | 26,340 | 29,332 | 32,332 | | 3.0* | 1.96 | |
| | 8,974 | 12,008 | 15,055 | 18,116 | 21,188 | 24,269 | 27,359 | 30,456 | 33,559 | | 4.0 | 3.27 | |
| | 9,208 | 12,314 | 15,434 | 18,564 | 21,705 | 24,854 | 28,010 | 31,173 | 34,340 | | 5.0 | 4.86 | |
| | 9,372 | 12,529 | 15,698 | 18,878 | 22,066 | 25,261 | 28,463 | 31,671 | 34,884 | | 6.0 | 6.71 | |
| | 8,637 | 11,579 | 14,545 | 17,533 | 20,538 | 23,559 | 26,593 | 29,638 | 32,693 | 695 | 2.0 | 0.96 | 0.12 |
| | 9,406 | 12,596 | 15,808 | 19,037 | 22,283 | 25,542 | 28,812 | 32,092 | 35,980 | | 3.0* | 1.96 | |
| | 9,845 | 13,176 | 16,525 | 19,890 | 23,268 | 26,658 | 30,058 | 33,467 | 36,883 | | 4.0 | 3.27 | |
| | 10,130 | 13,552 | 16,990 | 20,441 | 23,904 | 27,377 | 30,859 | 34,350 | 37,847 | | 5.0 | 4.86 | |
| | 10,332 | 13,816 | 17,316 | 20,827 | 24,349 | 27,881 | 31,420 | 34,967 | 38,519 | | 6.0 | 6.71 | |
| | 9,217 | 12,361 | 15,533 | 18,728 | 21,944 | 25,178 | 28,426 | 31,688 | 34,960 | 800 | 2.0 | 0.96 | 0.16 |
| | 10,110 | 13,544 | 17,002 | 20,482 | 23,979 | 27,492 | 31,019 | 34,556 | 38,104 | | 3.0* | 1.96 | |
| | 10,626 | 14,226 | 17,846 | 21,485 | 25,140 | 28,809 | 32,489 | 36,180 | 39,879 | | 4.0 | 3.27 | |
| | 10,964 | 14,672 | 18,397 | 22,138 | 25,894 | 29,662 | 33,441 | 37,229 | 40,024 | | 5.0 | 4.86 | |
| | 11,203 | 14,985 | 18,785 | 22,599 | 26,425 | 30,262 | 34,109 | 37,965 | 41,827 | | 6.0 | 6.71 | |
| | 9,469 | 12,701 | 15,962 | 19,249 | 22,557 | 25,883 | 29,225 | 32,581 | 35,948 | 850 | 2.0 | 0.96 | 0.18 |
| | 10,420 | 13,961 | 17,528 | 21,118 | 24,726 | 28,351 | 31,991 | 35,643 | 39,304 | | 3.0* | 1.96 | |
| | 10,972 | 14,690 | 18,432 | 22,192 | 25,970 | 29,763 | 33,568 | 37,384 | 41,208 | | 4.0 | 3.27 | |
| | 11,334 | 15,169 | 19,022 | 22,893 | 26,780 | 30,679 | 34,590 | 38,511 | 42,440 | | 5.0 | 4.86 | |
| | 11,592 | 15,507 | 19,440 | 23,389 | 27,351 | 31,325 | 35,310 | 39,303 | 43,304 | | 6.0 | 6.71 | |

**Note: "3*" = Optional factory installed hot water circulating pump flow rate.**

**Table 10: HE*2/HE*4***A and HHE*2/HE*4***B Hot Water Slab Coil Capacity**

## Performance Data - Hot Water Slab Coils

***HEATING PERFORMANCE DATA:***

| | HOT W ATER CAPACITIES @ | | | | | | | | | | | PRESS. | PRESS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HOT WATER** | **70°F ENTERING AIR TEMPERATURE** | | | | | | | | | | | **DROP** | **DROP** |
| **SLAB-COIL** | **ENTERING W ATER TEM PERATURE** | | | | | | | | | | | **WATER** | **AIR** |
| **MODEL** | **100°F** | **110°F** | **120°F** | **130°F** | **140°F** | **150°F** | **160°F** | **170°F** | **180°F** | **CFM** | **GPM** | **(FT-W TR)** | **(IW C)** |
| **HE*2***A<br>HE*4***A** | 9,217 | 12,361 | 15,533 | 18,728 | 21,944 | 25,178 | 28,246 | 31,688 | 34,960 | 800 | 2.0 | 0.96 | 0.16 |
| | 10,110 | 13,544 | 17,002 | 20,482 | 23,979 | 27,492 | 31,019 | 34,556 | 38,104 | | 3 .0 * | 1.96 | |
| | 10,626 | 14,226 | 17,846 | 21,485 | 25,140 | 28,809 | 32,489 | 36,180 | 39,879 | | 4.0 | 3.27 | |
| | 10,964 | 14,672 | 18,397 | 22,138 | 25,894 | 29,662 | 33,441 | 37,229 | 40,024 | | 5.0 | 4.86 | |
| | 11,203 | 14,985 | 18,785 | 22,599 | 26,425 | 30,262 | 34,109 | 37,965 | 41,827 | | 6.0 | 6.71 | |
| | 9,754 | 13,086 | 16,448 | 19,837 | 23,249 | 26,681 | 30,129 | 33,592 | 37,067 | 910 | 2.0 | 0.96 | 0.20 |
| | 10,773 | 14,436 | 18,127 | 21,842 | 25,578 | 29,331 | 33,099 | 36,880 | 40,673 | | 3 .0 * | 1.96 | |
| | 11,368 | 15,222 | 19,101 | 23,001 | 26,919 | 30,854 | 34,802 | 38,761 | 42,730 | | 4.0 | 3.27 | |
| | 11,759 | 15,739 | 19,770 | 23,759 | 27,996 | 31,847 | 35,909 | 39,482 | 44,064 | | 5.0 | 4.86 | |
| | 12,038 | 16,105 | 20,193 | 24,296 | 28,415 | 32,547 | 36,690 | 40,842 | 45,002 | | 6.0 | 6.71 | |
| | 10,212 | 13,704 | 17,299 | 20,784 | 24,364 | 27,965 | 31,585 | 35,220 | 38,868 | 1,015 | 2.0 | 0.96 | 0.24 |
| | 11,345 | 15,207 | 19,100 | 23,020 | 26,962 | 30,923 | 34,903 | 38,896 | 42,901 | | 3 .0 * | 1.96 | |
| | 12,014 | 16,091 | 20,195 | 24,323 | 28,472 | 32,639 | 36,820 | 41,015 | 45,221 | | 4.0 | 3.27 | |
| | 12,455 | 16,675 | 20,917 | 25,181 | 29,464 | 33,763 | 38,075 | 42,399 | 46,733 | | 5.0 | 4.86 | |
| | 12,771 | 17,090 | 21,431 | 25,791 | 30,167 | 34,559 | 38,962 | 43,376 | 47,800 | | 6.0 | 6.71 | |
| | 10,645 | 14,288 | 17,968 | 21,680 | 25,418 | 29,180 | 32,962 | 36,760 | 40,574 | 1,125 | 2.0 | 0.96 | 0.29 |
| | 11,893 | 15,946 | 20,032 | 24,147 | 28,288 | 32,449 | 36,630 | 40,827 | 45,037 | | 3 .0 * | 1.96 | |
| | 12,636 | 16,928 | 21,250 | 25,599 | 29,970 | 34,361 | 38,769 | 43,192 | 47,626 | | 4.0 | 3.27 | |
| | 13,129 | 17,580 | 22,057 | 26,559 | 31,080 | 35,620 | 40,175 | 44,743 | 49,323 | | 5.0 | 4.86 | |
| | 13,483 | 18,047 | 22,634 | 27,243 | 31,871 | 36,515 | 41,173 | 45,843 | 50,523 | | 6.0 | 6.71 | |
| | 11,020 | 14,795 | 18,608 | 22,456 | 26,333 | 30,324 | 34,157 | 38,098 | 42,054 | 1,230 | 2.0 | 0.96 | 0.34 |
| | 12,394 | 16,593 | 20,849 | 25,137 | 29,452 | 33,790 | 38,148 | 42,524 | 46,914 | | 3.0 | 1.96 | |
| | 13,185 | 17,666 | 22,181 | 26,726 | 31,294 | 35,884 | 40,493 | 45,117 | 49,754 | | 4.0 | 3.27 | |
| | 13,727 | 18,383 | 23,069 | 27,781 | 32,515 | 37,270 | 42,041 | 46,825 | 51,623 | | 5.0 | 4.86 | |
| | 14,116 | 18,898 | 23,705 | 28,536 | 33,388 | 38,257 | 43,142 | 48,040 | 52,950 | | 6.0 | 6.71 | |
| **HE*2***B<br>HE*4***B** | 9,607 | 12,879 | 16,177 | 19,498 | 22,838 | 26,195 | 29,566 | 32,949 | 36,341 | 800 | 2.0 | 1.04 | 0.13 |
| | 10,535 | 14,109 | 17,706 | 21,322 | 24,957 | 28,605 | 32,267 | 35,939 | 39,621 | | 3 .0 * | 2.14 | |
| | 11,069 | 14,814 | 18,579 | 22,362 | 26,160 | 29,971 | 33,793 | 37,625 | 41,465 | | 4.0 | 3.57 | |
| | 11,417 | 15,273 | 19,146 | 23,036 | 26,939 | 30,853 | 34,777 | 38,710 | 42,651 | | 5.0 | 5.30 | |
| | 11,662 | 15,596 | 19,546 | 23,510 | 27,485 | 31,472 | 35,467 | 39,470 | 43,480 | | 6.0 | 7.32 | |
| | 10,177 | 13,647 | 17,146 | 20,671 | 24,217 | 27,782 | 31,363 | 34,956 | 38,561 | 910 | 2.0 | 1.04 | 0.17 |
| | 11,238 | 15,055 | 18,897 | 22,763 | 26,648 | 30,551 | 34,467 | 38,396 | 42,375 | | 3 .0 * | 2.14 | |
| | 11,856 | 15,870 | 19,908 | 23,967 | 28,044 | 32,135 | 36,239 | 40,554 | 44,478 | | 4.0 | 3.57 | |
| | 12,260 | 16,405 | 20,570 | 24,753 | 28,952 | 33,165 | 37,389 | 41,622 | 45,865 | | 5.0 | 5.30 | |
| | 12,547 | 16,783 | 21,037 | 25,308 | 29,592 | 33,889 | 38,197 | 45,513 | 46,837 | | 6.0 | 7.32 | |
| | 10,633 | 14,301 | 17,973 | 21,672 | 25,395 | 29,138 | 32,899 | 36,673 | 40,460 | 1,015 | 2.0 | 1.04 | 0.20 |
| | 11,847 | 15,873 | 19,929 | 24,011 | 28,115 | 32,237 | 36,376 | 40,527 | 44,690 | | 3 .0 * | 2.14 | |
| | 12,542 | 16,792 | 21,069 | 25,370 | 29,690 | 34,027 | 38,377 | 42,741 | 47,114 | | 4.0 | 3.57 | |
| | 13,000 | 17,398 | 21,819 | 26,261 | 30,720 | 35,195 | 39,683 | 44,182 | 48,690 | | 5.0 | 5.30 | |
| | 13,326 | 17,828 | 22,351 | 26,892 | 31,450 | 36,021 | 40,604 | 45,198 | 49,800 | | 6.0 | 7.32 | |
| | 11,122 | 14,921 | 18,755 | 22,619 | 26,510 | 30,421 | 34,352 | 38,299 | 42,258 | 1,125 | 2.0 | 1.04 | 0.24 |
| | 12,429 | 16,658 | 20,918 | 25,207 | 29,521 | 33,854 | 38,205 | 42,571 | 46,949 | | 3 .0 * | 2.14 | |
| | 13,203 | 17,682 | 22,190 | 26,724 | 31,279 | 35,853 | 40,443 | 45,047 | 49,622 | | 4.0 | 3.57 | |
| | 13,716 | 18,360 | 23,030 | 27,723 | 32,436 | 37,166 | 41,910 | 46,667 | 51,434 | | 5.0 | 5.30 | |
| | 14,083 | 18,844 | 23,629 | 28,434 | 33,257 | 38,096 | 42,948 | 47,812 | 52,685 | | 6.0 | 7.32 | |
| | 11,520 | 15,458 | 19,433 | 23,441 | 27,477 | 31,536 | 35,614 | 39,710 | 43,819 | 1,230 | 2.0 | 1.04 | 0.28 |
| | 12,940 | 17,345 | 21,786 | 26,258 | 30,755 | 35,275 | 39,813 | 44,368 | 48,937 | | 3 .0 * | 2.14 | |
| | 13,788 | 18,468 | 23,180 | 27,921 | 32,685 | 37,469 | 42,271 | 47,088 | 51,918 | | 4.0 | 3.57 | |
| | 14,353 | 19,215 | 24,106 | 29,022 | 33,960 | 38,917 | 43,890 | 48,876 | 53,874 | | 5.0 | 5.30 | |
| | 14,757 | 19,749 | 24,767 | 29,808 | 34,868 | 39,947 | 45,039 | 50,144 | 55,260 | | 6.0 | 7.32 | |

**Note: "3*" = Optional factory installed hot water circulating pump flow rate.**

**Table 11: HE*2/HE*4***B and HE*2/HE*4***C Hot Water Slab Coil Capacity**

## Performance Data - Hot Water Slab Coils

***HEATING PERFORMANCE DATA:***

| | HOT W ATER CAPACITIES @ | | | | | | | | | | | PRESS. | PRESS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HOT WATER** | **70°F ENTERING AIR TEMPERATURE** | | | | | | | | | | | **DROP** | **DROP** |
| **SLAB-COIL** | **ENTERING W ATER TEM PERATURE** | | | | | | | | | | | **WATER** | **AIR** |
| **MODEL** | **100°F** | **110°F** | **120°F** | **130°F** | **140°F** | **150°F** | **160°F** | **170°F** | **180°F** | **CFM** | **GPM** | **(FT-W TR)** | **(IW C)** |
| **HE*2***D<br>HE*4***D** | 10,205 | 13,671 | 17,162 | 20,674 | 24,204 | 27,748 | 31,305 | 34,873 | 38,448 | 800 | 2.0 | 1.20 | 0.10 |
| | 11,188 | 14,975 | 18,784 | 22,612 | 26,455 | 30,313 | 34,181 | 38,058 | 41,944 | | 3.0* | 2.46 | |
| | 11,749 | 15,717 | 19,704 | 23,707 | 27,723 | 31,755 | 35,794 | 39,842 | 43,898 | | 4.0 | 4.09 | |
| | 12,112 | 16,197 | 20,298 | 24,414 | 28,543 | 32,682 | 36,830 | 40,985 | 45,148 | | 5.0 | 6.07 | |
| | 12,368 | 16,534 | 20,716 | 24,909 | 29,115 | 33,330 | 37,553 | 41,783 | 46,019 | | 6.0 | 8.39 | |
| | 10,824 | 14,505 | 18,213 | 21,945 | 25,697 | 29,465 | 33,248 | 37,042 | 40,844 | 910 | 2.0 | 1.20 | 0.12 |
| | 11,954 | 16,005 | 20,281 | 24,178 | 28,294 | 32,424 | 36,567 | 40,721 | 44,884 | | 3.0* | 2.46 | |
| | 12,607 | 16,868 | 21,152 | 25,454 | 29,773 | 34,106 | 38,450 | 42,804 | 43,166 | | 4.0 | 4.09 | |
| | 13,032 | 17,430 | 21,848 | 26,282 | 30,732 | 35,194 | 39,666 | 44,147 | 48,636 | | 5.0 | 6.07 | |
| | 13,332 | 17,827 | 22,338 | 26,865 | 31,405 | 35,957 | 40,518 | 45,087 | 49,663 | | 6.0 | 8.39 | |
| | 11,353 | 15,217 | 19,111 | 23,031 | 26,973 | 30,933 | 34,908 | 38,895 | 42,893 | 1,015 | 2.0 | 1.20 | 0.15 |
| | 12,619 | 16,898 | 21,206 | 25,537 | 29,888 | 34,257 | 38,640 | 43,034 | 47,439 | | 3.0* | 2.46 | |
| | 13,356 | 17,874 | 22,418 | 26,983 | 31,566 | 36,164 | 40,776 | 45,398 | 50,030 | | 4.0 | 4.09 | |
| | 13,840 | 18,514 | 23,211 | 27,926 | 32,658 | 37,404 | 42,163 | 46,931 | 51,707 | | 5.0 | 6.07 | |
| | 14,183 | 18,967 | 23,771 | 28,592 | 33,429 | 38,278 | 43,138 | 48,007 | 52,884 | | 6.0 | 8.39 | |
| | 11,853 | 15,890 | 19,960 | 24,058 | 28,179 | 32,321 | 36,479 | 40,650 | 44,832 | 1,125 | 2.0 | 1.20 | 0.18 |
| | 13,255 | 17,754 | 22,284 | 26,840 | 31,418 | 36,015 | 40,628 | 45,254 | 49,891 | | 3.0* | 2.46 | |
| | 14,080 | 18,846 | 23,641 | 28,459 | 33,298 | 38,154 | 43,025 | 47,908 | 52,801 | | 4.0 | 4.09 | |
| | 14,624 | 19,566 | 24,534 | 29,523 | 34,530 | 39,553 | 44,589 | 49,637 | 54,694 | | 5.0 | 6.07 | |
| | 15,011 | 20,078 | 25,167 | 30,275 | 35,401 | 40,541 | 45,693 | 50,856 | 56,026 | | 6.0 | 8.39 | |
| | 12,286 | 16,474 | 20,697 | 24,949 | 29,227 | 33,526 | 37,842 | 42,173 | 46,515 | 1,230 | 2.0 | 1.20 | 0.21 |
| | 13,814 | 18,506 | 23,231 | 27,985 | 32,763 | 37,561 | 42,377 | 47,206 | 52,048 | | 3.0* | 2.46 | |
| | 14,719 | 19,707 | 24,724 | 29,767 | 34,833 | 39,912 | 45,017 | 50,131 | 55,246 | | 4.0 | 4.09 | |
| | 15,321 | 20,502 | 25,710 | 30,943 | 36,195 | 41,465 | 46,749 | 52,046 | 57,353 | | 5.0 | 6.07 | |
| | 15,750 | 21,069 | 26,412 | 31,778 | 37,162 | 42,361 | 47,975 | 53,400 | 58,834 | | 6.0 | 8.39 | |

**Note: "3*" = Optional factory installed hot water circulating pump flow rate.**

**Table 12: HE*2/HE*4**D Hot Water Slab Coil Capacity**

## Chilled Water Piping

Supply and return chilled water piping to the coil should be 3⁄4 inch ID for models with a capacity up to 42,000 BTU/H and 1 inch on models with a capacity greater than 42,000 BTU/H. Water piping must always be connected so that the entering water is on the leaving side of the coil for best performance.

### Performance Data - Firdown Chilled Water A-Coils

***COOLING PERFORMANCE DATA:***

| CHILLED WATER A-COIL MODEL | | | 45°F Entering Water | | | | | | | | 42°F Entering Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PRESS. DROP WATER | 80°F DB / 67°F W B | | | 75°F DB / 63°F W B | | | | PRESS. DROP WATER | 80°F DB / 67°F W B | | | 75°F DB / 63°F W B | | | PRESS. DROP AIR |
| | Rows | Circuits | GPM | (FT-WTR) | TH | SH | TR | TH | SH | TR | GPM | (FT-WTR) | TH | SH | TR | TH | SH | TR | CFM | (IN-W C) |
| HE*3/HE*4**4A | 2 | 4 | 3.8 | 4.55 | 20,469 | 14,267 | 10.0 | 16,406 | 12,503 | 8.6 | 4.4 | 5.89 | 23,828 | 15,709 | 10.0 | 19,375 | 13,946 | 8.8 | 480 | 0.06 |
| HE*3/HE*4**4A | 2 | 4 | 4.4 | 5.89 | 23,750 | 16,745 | 10.0 | 18,984 | 14,798 | 8.6 | 5.2 | 7.92 | 27,813 | 18,498 | 10.0 | 22,578 | 16,356 | 8.7 | 590 | 0.10 |
| HE*3/HE*4**4A | 2 | 4 | 5.2 | 7.92 | 26,870 | 19,260 | 10.0 | 21,719 | 17,901 | 8.3 | 5.6 | 9.04 | 30,625 | 20,846 | 10.0 | 25,000 | 18,580 | 8.9 | 695 | 0.12 |
| HE*3/HE*4**4A | 2 | 4 | 5.6 | 9.04 | 29,375 | 21,377 | 10.0 | 23,594 | 19,059 | 8.4 | 6.2 | 10.82 | 33,750 | 23,179 | 10.0 | 27,578 | 20,604 | 8.9 | 800 | 0.15 |
| HE*3/HE*4**6A | 3 | 6 | 6.8 | 6.21 | 36,563 | 25,436 | 10.0 | 29,219 | 22,292 | 8.6 | 7.8 | 7.92 | 42,188 | 27,723 | 10.0 | 34,453 | 24,865 | 8.8 | 850 | 0.27 |
| HE*3/HE*4**4B | 2 | 4 | 4.4 | 7.06 | 22,891 | 15,213 | 10.0 | 18,242 | 13,432 | 8.3 | 5.0 | 8.85 | 26,250 | 16,831 | 10.0 | 21,250 | 14,889 | 8.5 | 480 | 0.05 |
| HE*3/HE*4**4B | 2 | 4 | 5.0 | 8.85 | 26,484 | 17,956 | 10.0 | 21,094 | 15,785 | 8.4 | 5.6 | 10.82 | 30,391 | 19,732 | 10.0 | 24,688 | 17,561 | 8.8 | 590 | 0.07 |
| HE*3/HE*4**6B | 3 | 6 | 7.0 | 7.83 | 35,078 | 23,155 | 10.0 | 29,496 | 19,847 | 8.4 | 7.6 | 9.06 | 39,688 | 25,281 | 10.0 | 32,221 | 22,210 | 8.5 | 695 | 0.09 |
| HE*3/HE*4**6B | 3 | 6 | 7.0 | 7.83 | 38,164 | 25,501 | 10.0 | 30,469 | 22,517 | 8.7 | 8.4 | 10.82 | 44,219 | 28,214 | 10.0 | 35,938 | 24,958 | 8.6 | 800 | 0.14 |
| HE*3/HE*4**6B | 3 | 6 | 8.4 | 10.82 | 41,406 | 27,634 | 10.0 | 32,866 | 24,180 | 7.8 | 8.8 | 11.75 | 46,446 | 29,937 | 10.0 | 37,752 | 26,482 | 8.6 | 850 | 0.17 |
| HE*3/HE*4**6B | 3 | 6 | 7.8 | 9.49 | 40,174 | 26,875 | 10.0 | 31,953 | 23,480 | 8.2 | 8.6 | 11.28 | 45,781 | 29,421 | 10.0 | 37,109 | 26,026 | 8.6 | 800 | 0.18 |
| HE*3/HE*4**6B | 3 | 8 | 8.0 | 4.42 | 42,344 | 28,869 | 10.0 | 33,750 | 25,661 | 8.4 | 8.8 | 5.24 | 48,128 | 31,435 | 10.0 | 39,375 | 28,227 | 8.9 | 910 | 0.20 |
| HE*3/HE*4**6B | 3 | 8 | 8.8 | 5.24 | 45,428 | 31,511 | 10.0 | 36,324 | 27,660 | 8.3 | 9.6 | 6.11 | 51,680 | 33,962 | 10.0 | 42,266 | 30,461 | 8.9 | 1015 | 0.24 |
| HE*3/HE*4**6B | 3 | 8 | 9.8 | 6.34 | 49,375 | 34,324 | 10.0 | 39,434 | 30,081 | 8.0 | 10.4 | 7.04 | 55,625 | 37,023 | 10.0 | 45,508 | 33,167 | 8.7 | 1125 | 0.28 |
| HE*3/HE*4**6B | 3 | 8 | 10.4 | 7.04 | 52,188 | 36,333 | 10.0 | 41,719 | 32,157 | 8.0 | 10.8 | 7.53 | 58,750 | 39,256 | 10.0 | 48,047 | 35,080 | 8.9 | 1230 | 0.34 |
| HE*3/HE*4**6C | 3 | 8 | 8.0 | 4.79 | 40,469 | 26,930 | 10.0 | 32,205 | 23,812 | 8.0 | 8.4 | 5.23 | 45,469 | 29,198 | 10.0 | 37,031 | 26,079 | 8.8 | 800 | 0.15 |
| HE*3/HE*4**6C | 3 | 8 | 8.8 | 5.68 | 44,492 | 30,078 | 10.0 | 35,313 | 26,238 | 8.0 | 9.2 | 6.14 | 50,000 | 32,318 | 10.0 | 40,781 | 28,798 | 8.9 | 910 | 0.16 |
| HE*3/HE*4**6C | 3 | 8 | 9.2 | 6.14 | 47,985 | 32,560 | 10.0 | 38,125 | 28,624 | 8.3 | 10.0 | 7.12 | 54,531 | 35,780 | 10.0 | 44,355 | 31,487 | 8.9 | 1015 | 0.19 |
| HE*3/HE*4**6C | 3 | 8 | 10.0 | 7.12 | 51,250 | 35,136 | 10.0 | 41,094 | 31,232 | 8.2 | 10.8 | 8.16 | 58,281 | 38,259 | 10.0 | 47,500 | 33,965 | 8.8 | 1125 | 0.22 |
| HE*3/HE*4**6C | 3 | 8 | 10.8 | 8.16 | 54,844 | 38,043 | 10.0 | 43,750 | 33,393 | 8.8 | 11.4 | 8.98 | 61,875 | 41,002 | 10.0 | 50,469 | 36,352 | 8.8 | 1230 | 0.27 |
| HE*3/HE*4**6D | 3 | 8 | 9.8 | 7.79 | 46,642 | 30,638 | 10.0 | 37,018 | 26,887 | 7.8 | 10.4 | 8.66 | 52,500 | 33,452 | 10.0 | 42,648 | 29,388 | 8.2 | 800 | 0.13 |
| HE*3/HE*4**6D | 3 | 8 | 10.4 | 8.66 | 50,020 | 33,095 | 10.0 | 39,688 | 28,984 | 7.6 | 10.8 | 9.26 | 56,016 | 35,803 | 10.0 | 45,563 | 31,711 | 8.4 | 910 | 0.15 |
| HE*3/HE*4**6D | 3 | 8 | 11.0 | 9.56 | 54,078 | 36,190 | 10.0 | 42,969 | 31,601 | 7.8 | 11.4 | 10.19 | 60,781 | 39,216 | 10.0 | 49,375 | 34,647 | 8.7 | 1015 | 0.19 |
| HE*3/HE*4**6D | 3 | 8 | 11.4 | 10.19 | 57,792 | 39,923 | 10.0 | 45,898 | 34,314 | 8.0 | 12.0 | 11.16 | 65,097 | 42,271 | 10.0 | 53,047 | 37,668 | 8.8 | 1125 | 0.21 |
| HE*3/HE*4**6D | 3 | 8 | 12.0 | 11.16 | 60,625 | 41,205 | 10.0 | 48,438 | 36,279 | 8.1 | 12.6 | 12.16 | 68,438 | 44,788 | 10.0 | 55,849 | 39,414 | 8.9 | 1230 | 0.23 |

**TH** - Total Heat **SH** - Sensible Heat **TR** - Water Temperature Rise

**Table 13: HE*3/HE*4 A-Coil Chilled Water Performance Data**

## SECTION 8: LINE VOLTAGE WIRING

**⚠ WARNING**

**To prevent accidental electrical shock, turn the electrical power "OFF" at the main electrical panel (circuit breaker box) and at the local service disconnect before removing the ceiling access panel to perform installation, maintenance and service on this air handler. Homeowners should never attempt to perform any maintenance which requires opening the ceiling access panel. Refer to Figures 7 and 8 for images of the ceiling access panel.**

General wire and breaker sizes are shown in Tables 26-29. If sheathed cable is used, refer to NEC National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) and local codes for additional requirements concerning supply circuit wiring. Electrical data can be found in Tables 14-17.

**IMPORTANT -** All field wiring must be rated for 60ºC or higher. Refer to the wiring diagram on the air handler or the tables in these instructions for more information. Refer to the NEC National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) and local codes for wiring material requirements.

**Line Voltage Wiring Connections**

The unit internal wiring is complete except for the power supply and the thermostat wires. See wiring diagram and/or Tables 14-17 for wire size, fuse/circuit breaker size, and ground wire sizes. The use of cable connectors on incoming power supply wires to relieve any strain on wiring is recommended. Follow the steps below to connect the power supply wires.

1. Remove the thumb screws that secure ceiling access panel and slowly swing the panel down to access the air handler.
2. Remove the control box cover.
3. Install the cable connector in the 7/8 inch diameter hole on the bottom right side of the control box.
4. Strip 1⁄2 inch of the insulation off the end of each wire.
5. Insert the wires through the cable connector located in the 7/8 inch diameter hole in the air handler control box.
6. Connect the power supply wires to the power supply terminal block or pigtails located on the right side of the control box as follows.
   Insert the BLACK line voltage wire into the L1 screw terminal on the power supply terminal block and tighten the set screw to clamp down on the wire or connect it to the BLACK line voltage pigtail with a wire nut or suitable electrical connector rated for the wire size. Insert the WHITE neutral (115 VAC) wire or RED line
   voltage wire (208/240 VAC) into the L2 screw terminal on the power supply terminal block and tighten the set screw to clamp down on the wire or connect the RED line voltage wire (208/240 VAC) to the RED line voltage pigtail with a wire nut or suitable electrical connector rated for the wire size.
7. Insert the GREEN ground wire into the ground lug inside the control box and tighten the set screw.
   **NOTE:** Casing or cabinet must be permanently grounded in accordance with the National Electrical Code or other applicable codes.

| | FAN COIL MODELS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HE*1/HE*3-**-*-AC | | | | | HE*1/HE*3**-*-BC | | | | |
| 3 Kw Heater Amps - 208 / 240 VAC | 10.9 / 12.5 | | | | | 10.9 / 12.5 | | | | |
| 5 Kw Heater Amps - 208 / 240 VAC | 18.2 /2 0.83 | | | | | 18.2 / 20.83 | | | | |
| 6 Kw Heater Amps - 20/ 240 VAC | 21.9 / 25.00 | | | | | 21.9 /25.00 | | | | |
| 8 Kw Heater Amps - 208 / 240 VAC | 29.2 / 33.33 | | | | | 29.2 / 33.33 | | | | |
| 10 Kw Heater Amps - 208 / 240 VAC | 36.5 / 41.66 | | | | | 36.5 / 41.66 | | | | |
| Indoor Blower Motor Code | *J | | | | | *K | | | | |
| Indoor Blower Type | 1/3 HP Constant Torque | | | | | 1/3 HP Constant Torque | | | | |
| Indoor Blower Amps - 208 / 240 VAC | 0.86 / 0.75 | | | | | 0.78 / 0.68 | | | | |
| Heater - kW | 3 | 5 | 6 | 8 | 10 | 3 | 5 | 6 | 8 | 10 |
| Circuit Load - FLA - 240 VAC | 13.36 | 21.69 | 25.86 | 34.19 | 42.53 | 13.28 | 21.61 | 25.78 | 34.11 | 42.45 |
| Minimum Wire Size (60°C) Wire | 12 | 10 | 8 | 6 | 6 | 12 | 10 | 8 | 6 | 6 |
| Minimum Wire Size (75°C) Wire | 12 | 10 | 8 | 8 | 6 | 12 | 10 | 8 | 8 | 6 |
| Minimum Wire Size (90°C) Wire | 12 | 10 | 8 | 8 | 8 | 12 | 10 | 8 | 8 | 8 |

**Table 14: Wiring Requirements – 208/240 VAC Electric Heat HE*1/HE*3-**-*-AC and HE*1/HE*3-**-*-BC**

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

* Ground conductor **must be the same size and temperature rating** as the other conductors listed in Table 14.

| | FAN COIL MODELS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HE*1/HE*3**-*-BC | | | | | HE*1/HE*3**-*-CC | | | | | HE*1/HE*3**-*-DC | | | | |
| 3 Kw Heater Amps - 208 / 240 VAC | 10.9 / 12.5 | | | | | 10.9 / 12.5 | | | | | 10.9 / 12.5 | | | | |
| 5 Kw Heater Amps - 208 / 240 VAC | 18.2 /20.83 | | | | | 18.2 /20.83 | | | | | 18.2 /20.83 | | | | |
| 6 Kw Heater Amps - 20/ 240 VAC | 21.9 / 25.00 | | | | | 21.9 / 25.00 | | | | | 21.9 / 25.00 | | | | |
| 8 Kw Heater Amps - 208 / 240 VAC | 29.2 / 33.33 | | | | | 29.2 / 33.33 | | | | | 29.2 / 33.33 | | | | |
| 10 Kw Heater Amps - 208 / 240 VAC | 36.5 / 41.66 | | | | | 36.5 / 41.66 | | | | | 36.5 / 41.66 | | | | |
| Indoor Blower Motor Code | *M | | | | | *M | | | | | *M | | | | |
| Indoor Blower Type | 1/2 HP Constant Torque | | | | | 1/2 HP Constant Torque | | | | | 1/2 HP Constant Torque | | | | |
| Indoor Blower Amps - 208 / 240 VAC | 1.62 / 1.41 | | | | | 1.30 / 1.13 | | | | | 1.99 / 1.73 | | | | |
| Heater - kW | 3 | 5 | 6 | 8 | 10 | 3 | 5 | 6 | 8 | 10 | 3 | 5 | 6 | 8 | 10 |
| Circuit Load - FLA - 240 VAC | 14.12 | 22.45 | 26.62 | 34.95 | 43.29 | 13.80 | 22.13 | 26.30 | 34.63 | 42.97 | 14.49 | 22.82 | 26.99 | 35.32 | 43.66 |
| Minimum Wir e Size ( 60°C) Wire | 12 | 10 | 8 | 6 | 6 | 12 | 10 | 8 | 6 | 6 | 12 | 10 | 8 | 6 | 6 |
| Minimum Wir e Size ( 75°C) Wire | 12 | 10 | 8 | 8 | 6 | 12 | 10 | 8 | 8 | 6 | 12 | 10 | 8 | 8 | 6 |
| Minimum Wir e Size ( 90°C) Wire | 12 | 10 | 8 | 8 | 8 | 12 | 10 | 8 | 8 | 8 | 12 | 10 | 8 | 8 | 8 |

**Table 15: Wiring Requirements – 208/240 VAC Electric Heat HE*1/HE*3-**-*-BC, HE*1/HE*3-**-*-CC, HE*1/HE*3-**-*-DC**

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

* Ground conductor **must be the same size and temperature rating** as the other conductors listed in Table 15.

| | HYDRONIC FAN COIL MODELS | | | | |
|---|---|---|---|---|---|
| | HE*2/HE*4- **- *- AA | HE*2/HE*4- **- *- BA | HE*2/HE*4- **- *- BA | HE*2/HE*4- **- *- CA | HHE*2/HE*4- **- *- DA |
| Indoor Blower Motor Code | *N | *O | *R | *R | *R |
| Indoor Blower Type | 1/ 3 HP C.T. | 1/ 3 HP C.T. | 1/ 2 HP C.T. | 1/ 2 HP C.T. | 1/ 2 HP C.T. |
| Indoor Blower Amps - 115VAC | 1. 63 | 1. 67 | 3. 64 | 3. 02 | 3. 25 |
| Water Pump Amps | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 |
| Circuit Load - FLA - 115 VAC | 2. 15 | 2. 19 | 4. 16 | 3. 54 | 3. 77 |
| Minimum Wire Size ( 6 0°C) Wire | 14 | 14 | 14 | 14 | 14 |
| Minimum Wire Size ( 7 5°C) Wire | 14 | 14 | 14 | 14 | 14 |
| Minimum Wire Size ( 9 0°C) Wire | 14 | 14 | 14 | 14 | 14 |

**Table 16: Wiring Requirements – 115 VAC Hot Water Heat HE*2/HE*4-**-*-AA, HE*2/HE*4-**-*-BA, HE*2/HE*4-**-*-CA, HE*2/HE*4-**-*-DA**

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

* Ground conductor mu**st be the same size and temperature rating a**s the other conductors listed in Table 16.

| | | ELECTRIC HEATER SIZES | | | | |
|---|---|---|---|---|---|---|
| | | 3 kW | 5 kW | 6 kW | 8 kW | 10 kW |
| 240 VAC, 60 HZ, 1 PH | BTU | 10,236 | 17,061 | 20,473 | 27,297 | 34,121 |
| | Kw | 3 | 5 | 6 | 8 | 10 |
| 230 VAC, 60 HZ, 1 PH | BTU | 9,539 | 15,989 | 19,078 | 25,437 | 31,767 |
| | Kw | 2.7956 | 4.6593 | 5.5912 | 7.4549 | 9.3186 |
| 220 VAC, 60 HZ, 1 PH | BTU | 8,859 | 14,765 | 17,718 | 23,624 | 29,530 |
| | Kw | 2.5496 | 4.3273 | 5.1927 | 6.9236 | 8.6545 |
| HEATING ELEMENT CAPACITY | BTU | 10,236 | 17,061 | 20,473 | 27,297 | 34,121 |
| | Kw | 3 | 5 | 6 | 8 | 10 |

**Table 17: Electric Heater Electrical Data**

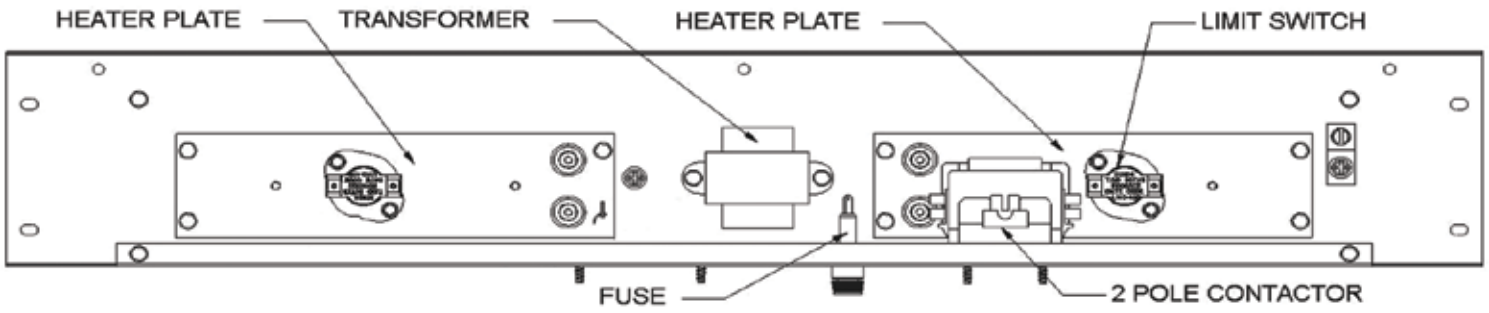



**Figure 22: Component Locations – Electric Heat Control Box**

Casing or cabinet must be permanently grounded in accordance with the National Electrical Code or other applicable codes.

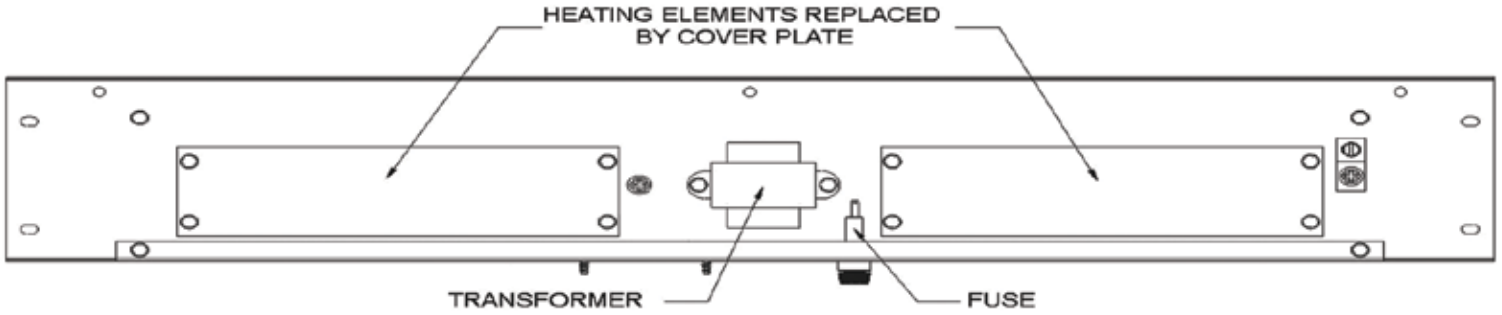



**Figure 23: Component Locations – No Heat Control Box**

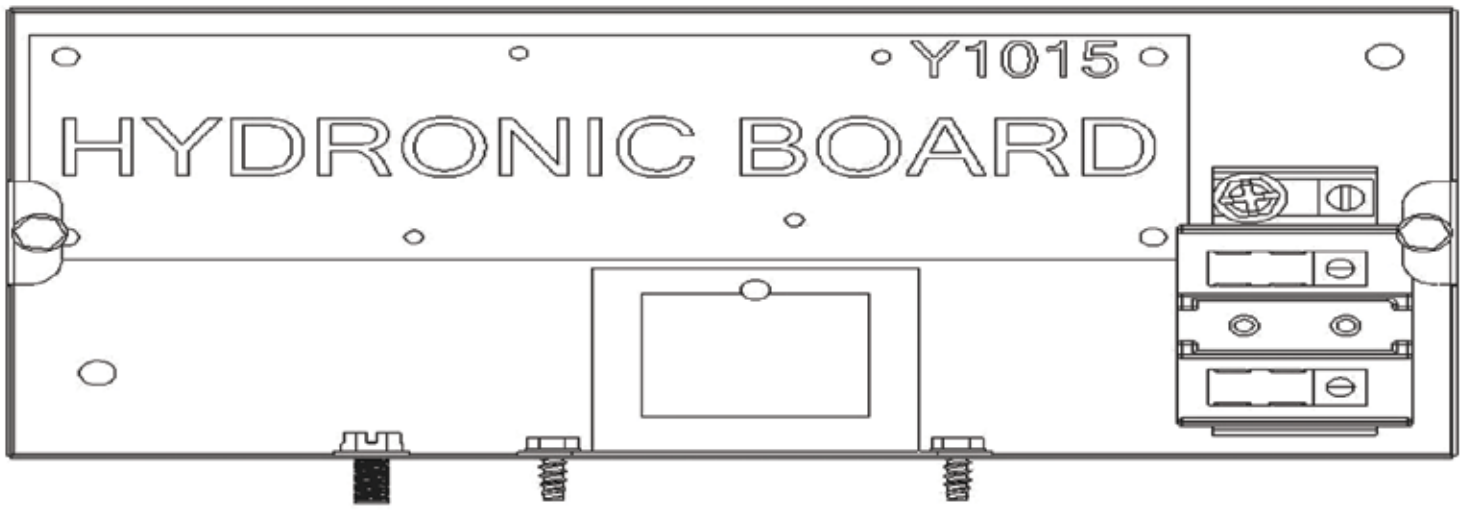



**Figure 24: Component Locations – Hydronic Control Box**

## SECTION 9: THERMOSTAT WIRING AND CONNECTIONS

**Thermostat Wiring**
Thermostat wires connect through side of furnace and should be no smaller than 22 gauge. Refer to Table 18 for recommended wire gauge, lengths and maximum current for each wire gauge.

| Max.Thermostat Wire Length | Thermostat Wire Gauge | Thermostat Wire Maximum Current |
|---|---|---|
| 0 - 100 Feet | 22 | 3.0 Amps |
| 0 - 125 Feet | 20 | 3.0 amps |
| 0 - 250 Feet | 18 | 3.0 amps |

**Table 18: Low Voltage Wire Gauge and Max Lengths**

Thermostat wires can enter through the side of the unit. When bringing wiring through the side of the air handler, cable connectors must be installed to hold wiring in place and to relieve any strain on the wiring.

The use of a five-conductor cable from the thermostat to the air handler is recommended for typical heating or heating/cooling installations with a two or three-conductor cable from the air handler to the outdoor unit. The thermostat wire colors and the typical heating/cooling connections are listed in Tables 20 and 21.

A seven-conductor cable from the thermostat to the air handler is recommended for a typical heat pump installation with a five-conductor cable from the air handler to the outdoor unit. Typical heat pump thermostat wire colors and connections are shown in Table 22.

**Thermostat Installation**
The thermostat heat anticipator must be set at 0.4 amps if the thermostat has a manual heat anticipator adjustment. This setting should be checked at the time of installation. The thermostat may be a "self-setting" type in which no heat anticipator setting will be found on the thermostat, eliminating the need for field adjustment.

The thermostat should be located on an inside wall in an open area or hallway to more closely sense average room air, preferably where there is air movement back to air handler. The thermostat should not be located within 3 feet of from any windows or supply air registers and should be 52 to 66 inches above the floor.

Maintenance, operating, and/or programming instructions are in the envelope shipped with the thermostat. The envelope should be given to the homeowner or user after the thermostat installation is completed.

**⚠ CAUTION**

**Do not locate thermostat within three feet of any of the following items:**
**1. Supply air registers**
**2. Lights or heat lamps**
**3. Aquariums**
**4. Televisions, stereo, amplifiers, surround sound systems**
**5. Stoves or any cooking appliance**
**6. Refrigerator**
**7. Washer and/or dryer**
**8. Hot water tank**
**9. Sink or near any hot water**
**10. Within 15 feet of any electric space heater**
**11. Within two feet of any sunlight**

**Separate Heating and Cooling System Using Same Thermostat**
If both the air handler and the outdoor unit have transformers, it is necessary to use a thermostat with isolated heating and cooling contacts "RC" and "RH" to prevent interconnection of the two 24 VAC systems. Most newer thermostats have separate heating and cooling contacts for use with an air handler and outdoor unit that each have a 24 VAC transformer. These thermostats have a "RC" terminal for cooling and a "RH" terminal for heating. Connect the RED thermostat wire ("R" circuit) from the outdoor unit to the "RC" terminal on the thermostat and the RED wire ("R" circuit) from the air handler to the "RH" terminal on the thermostat. Refer to Figures 25 - 29 for typical low voltage wire connections.

If the air handler and outdoor unit both have transformers and the thermostat does not have the "RC" and "RH" terminals, connecting the RED wires from the air handler and outdoor unit to the same "R" terminal on the thermostat can result in transformer burnout or it can cause either the air handler or outdoor unit control systems to enter lockout mode. If the thermostat does not have the "RC" and "RH" terminals, purchase a new thermostat with these terminals.

**Separate Heating and Outdoor Units Using Separate Thermostats**
If the application has a central heating and cooling system, but the hydronic heat and DX cooling are controlled by separate thermostats, the use of a thermostat interlock switch is required in order to prevent heating and cooling from operating at the same time.

**⚠ CAUTION**

**When using separate heating and cooling thermostats, a thermostat interlock system must be provided to prevent simultaneous operation of heating and cooling operation. Simultaneous operation can result in equipment overheating, equipment damage, and wasted energy.**

**Do Not connect the YELLOW wire (cooling) to the thermostat unless an outdoor unit is installed.**

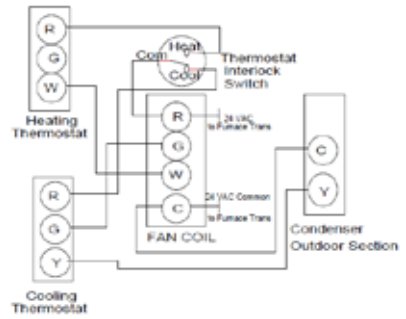



**Figure 25: Heat/Cool Thermostat Connections - Separate Thermostats & Single Transformer in Air Handler**

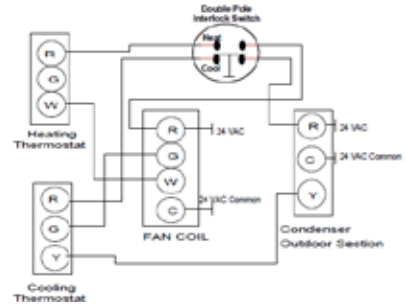



**Figure 26: Heat/Cool Thermostat Connections - Separate Thermostats & Separate Transformers in Air Handler and Outdoor Unit**

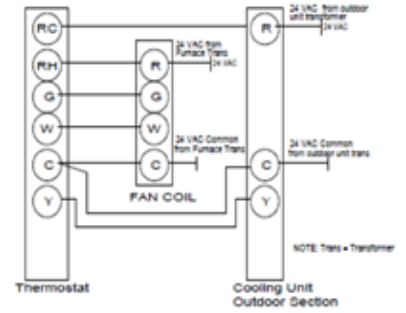



**Figure 27: Heat/Cool Thermostat Connections – Single Thermostat & Separate Transformers in Air Handler & Outdoor Unit**

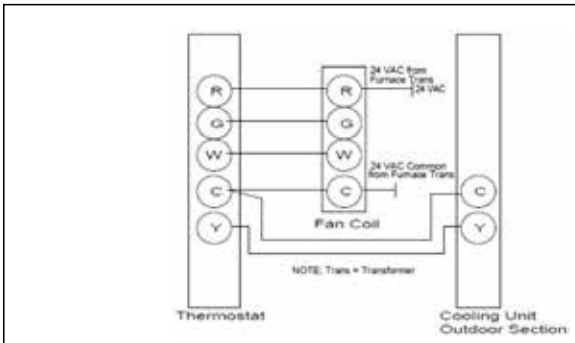



**Figure 28: Heat/Cool Thermostat Connections - Single Thermostat & Single Transformer in Air Handler**

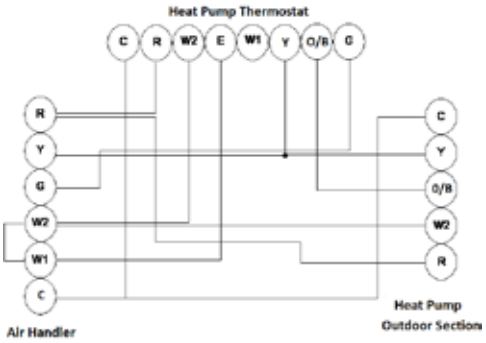



**Figure 29: Heat Pump Thermostat Connections - Single Thermostat & Single Transformer in Air Handler**

| Terminal Designation | Description |
|---|---|
| O/B | Changeover valve for heat pump energized constantly in cooling and off/heating |
| Y2 | 2nd Stage Compressor |
| Y | Compressor Relay |
| G | Fan Relay |
| RC | Power for Cooling |
| RH | Power for Heating |
| C | Common wire from secondary side of cooling (Optional). Required for fault indication, continuous backlight operation or remote temperature sensor operation 6 Powered closed 3rd wire for 3-wire zone valve |
| W/E | Heat Relay/Emergency Heat Relay (Stage 1) (3rd Stage Heat in HP2) |
| W2 | 2nd Stage Heat (4th Stage Heat in HP2) |
| - | Common (DC) for wired remote temperature sensor |
| S | Frequency signal from remote temperature sensor |
| + | Power (DC) to remote temperature sensor |
| A1 | Economizer/Time of Day Output energized in occupied (Morn, Day, and Eve) periods, powered by RC or RH terminal |
| L | Compressor diagnostic indicator for systems with diagnostic connection typically found on Heat pump systems or with Copeland's Comfort Alert |

**Table 19: Typical Thermostat Terminal Designations**

| Wire Color | Description | Letter Code | Thermostat Connection |
|---|---|---|---|
| RED | 24 VAC | RED / R | R |
| WHITE | Heat (1stStage Heat) | WHT / W | W or W1 |
| GREEN | Indoor Fan | GRN / G | G |
| YELLOW | 24 VAC Common (Electric Heat Models) | YEL / C | C |
| BROWN | 24 VAC Common (Hydronic Heat Models) | BRN / C | C |

**Table 20: Air Handler Low Voltage Pigtail Wire Colors and Connections**

| Wire Color | Description | Letter Code | Thermostat Connection |
|---|---|---|---|
| RED | 24 VAC | RED / R | R |
| WHITE | Heat (1stStage Heat) | WHT / W | W or W1 |
| GREEN | Indoor Fan | GRN / G | G |
| YELLOW | Cooling | YEL / Y | Y or Y1 |
| BROWN | 24 VAC Common | BRN / C | C |

**Table 21: Typical Heat/Cool Thermostat Wire Colors and Connections**

| Wire Color | Description | Letter Code | Thermostat Connection |
|---|---|---|---|
| RED | 24 VAC | RED / R | R |
| WHITE | Heat (1stStage Heat) | WHT / W | E |
| GREEN | Indoor Fan | GRN / G | G |
| YELLOW | Cooling | YEL / Y | Y or Y1 |
| BROWN | 24 VAC Common | BRN / C | C |
| ORANGE | Heat Pump Reversing Valve Solenoid (Most Brands) | ORN / O | O |
| BLUE | Heat Pump Reversing Valve Solenoid (Some Brands) | BLU / B | B |

**Table 22: Typical Heat Pump Thermostat Wire Colors and Connections**

**Typical Heating/ Cooling Wiring Connections**

1. Open the ceiling access panel.
2. Remove the control box cover.
3. Install a grommet or a strain relief in the 9/16 inch diameter hole on the top and the left side of the air handler to protect the thermostat wire cable.
4. Strip 1⁄2 inch of the insulation off the end of each wire.
5. Insert the wire cable from the thermostat thru the 9/16 inch hole into the control box and place the thermostat wire cable next to the low voltage pigtails. Secure the thermostat wire cable with a strain relief to prevent wire connections from being pulled apart.
6. Connect the RED (24 VAC) thermostat wire to the RED air
7. Connect the WHITE (1st stage heating) thermostat wire to the WHITE air handler low voltage pigtail wire with a wire nut.
8. Connect the GREEN (indoor fan) thermostat wire to the GREEN air handler low voltage pigtail wire with a wire nut.
9. Connect the YELLOW (cooling) wire from the thermostat to the YELLOW (cooling) wire from the outdoor unit compressor contactor coil with a wire nut.
   **NOTE:** For models with hydronic heat, also connect these two YELLOW wires to the YELLOW air handler low voltage pigtail wire.
10. Connect the BROWN (24 VAC common) wire from the thermostat to the air handler low voltage pigtail (YELLOW for electric heat; BROWN for hydronic heat) wire and to the BROWN (24 VAC common) wire from the compressor contactor on the outdoor unit. Fasten the 3 wires together securely with a wire nut.

**Typical Heat Pump Wiring Connections**

1. Open the ceiling access panel.
2. Remove the control box cover.
3. Install a grommet or a strain relief in the 9/16 inch diameter hole on the top and the left side of the air handler to protect the thermostat wire cable.
4. Strip 1⁄2 inch of the insulation from the end of each wire.
5. Insert the wire cable from the thermostat thru the 9/16 inch hole into the control box and place the thermostat wire cable next to the low voltage pigtails. Secure the thermostat wire cable with a strain relief to prevent wire connections from being pulled apart.

6. Connect the RED (24 VAC) wire from the thermostat to the RED air handler low voltage pigtail wire and the RED wire from the "R" terminal on the outdoor unit. Fasten the three wires together securely with a wire nut.
7. Connect the WHITE (1ststage heating) wire from the thermostat to the WHITE air handler low voltage pigtail wire and the WHITE wire from the "E" terminal on the outdoor unit. Fasten the three wires together securely with a wire nut.
8. Connect the GREEN (indoor fan) wire from the thermostat to the GREEN air handler low voltage pigtail wire with a wire nut.
9. Connect the YELLOW (cooling) wire from the thermostat to the YELLOW wire from the outdoor unit compressor contactor coil with a wire nut.
   **NOTE:** For models with hydronic heat, also connect these two YELLOW wires to the YELLOW air handler low voltage pigtail wire.
10. Connect the BROWN (24 VAC common) wire from the thermostat to the air handler low voltage pigtail (YELLOW for electric heat; BROWN for hydronic heat) wire and to the BROWN (24 VAC common) wire from the "C" terminal on the outdoor unit. Fasten the 3 wires together securely with a wire nut.
11. Connect the BROWN (24 VAC common) wire from the thermostat to the air handler low voltage pigtail (YELLOW for electric heat; BROWN for hydronic heat) wire and to the BROWN (24 VAC common) wire from the "C" terminal on the outdoor unit. Fasten the 3 wires together securely with a wire nut.
12. Connect the ORANGE (reversing valve solenoid) wire from the thermostat "O" terminal to the ORANGE wire from the "O" terminal on the outdoor unit. Fasten the two wires together securely with a wire nut.
    **NOTE:** If the outdoor unit has a "B" terminal instead of an "O" terminal, connect the BLUE (reversing valve solenoid) wire from the thermostat "B" terminal to the BLUE wire from the "B" terminal on the outdoor unit.

## SECTION 9: THERMOSTAT WIRING AND CONNECTIONS

**NOTICE: The factory motor speed tap settings are appropriate for most applications. Refer to the blower performance tables in Section 12 before changing the motor speeds from the factory settings.**

**⚠ WARNING**

**To avoid personal injury or property damage, make certain that the motor leads cannot contact non-insulated metal components of the air handler.**

## SECTION 10: BLOWER MOTOR SPEED SELECTION AND MOTOR REPLACEMENT

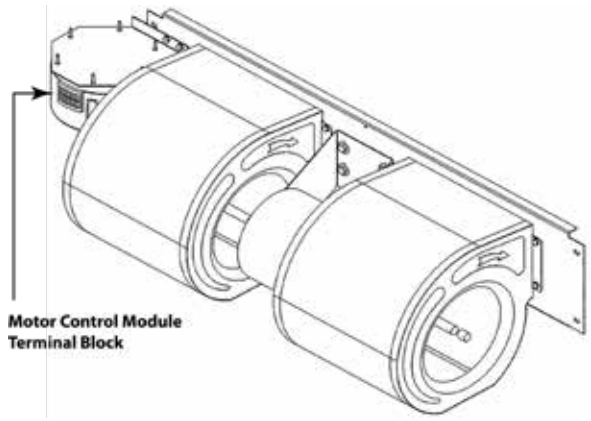



**Figure 30: Constant Torque Blower Assembly and Blower Deck**

### CONSTANT TORQUE MOTOR

This air handler is equipped with a high efficiency constant torque motor that operates on 208/240 VAC for electric heat models and 115 VAC for hydronic heat models. The motor speed tap inputs are 24 VAC. The speed taps can be changed by removing the BLACK wire from the blower motor control module terminal 5 or the RED wire from the blower motor control module terminal 1 and connecting the wires to blower motor control module terminals 2, 3 or 4. Figure 31, Table 23, and Table 24 show the constant torque motor control module terminals and connection definitions.

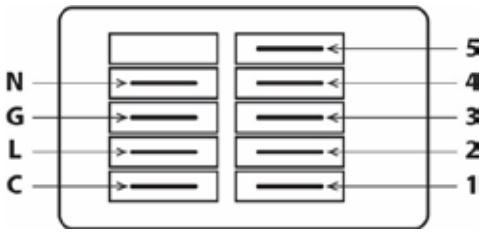



**Figure 31: Constant Torque Motor Control Module Terminals**

| TERMINAL | CONNECTION |
|---|---|
| C | Speed Tap Common - 24 VAC Common |
| L | Supply Voltage – 208/240 VAC – Line 1 |
| G | Ground Connection |
| N | Supply Voltage – 208/240 VAC – Line 2 |
| 1 | Low Speed Tap - 24 VAC Input |
| 2 | Medium - Low Speed Tap - 24 VAC Input |
| 3 | Medium Speed Tap - 24 VAC Input |
| 4 | Medium - High Speed Tap - 24 VAC Input |
| 5 | High Speed Tap - 24 VAC Input |

**Table 23: Constant Torque Motor Terminals – Electric Heat Models**

| TERMINAL | CONNECTION |
|---|---|
| C | Speed Tap Common - 24 VAC Common |
| L | Supply Voltage - 115 VAC |
| G | Ground Connection |
| N | Supply Voltage - Neutral |
| 1 | Low Speed Tap - 24 VAC Input |
| 2 | Medium - Low Speed Tap - 24 VAC Input |
| 3 | Medium Speed Tap - 24 VAC Input |
| 4 | Medium - High Speed Tap - 24 VAC Input |
| 5 | High Speed Tap - 24 VAC Input |

**Table 24: Constant Torque Motor Terminals – Hydronic Heat Models**

**Changing Motor Speeds – Constant Torque Motor**

1. Turn off all electrical supply circuits to the air handler at the main electrical panel (circuit breaker box) and turn the local air handler service disconnect to the OFF position.
2. Loosen the ceiling access panel thumbscrews and lower access panel. Disconnect the speed tap wire(s) connected to blower motor control module terminals 1 through 5 (See Figure 31) and reconnect to the desired terminal(s). Speed tap wire colors are as follows:
   **Speed Tap Wire Colors:**
   Speed Tap 5 (High): Black
   Speed Tap 4 (Med. High): Orange
   Speed Tap 3 (Medium): Blue
   Speed Tap 2 (Med. Low): Purple
   Speed Tap 1 (Low): Red
3. Close the ceiling access panel and secure the panel with the thumb screws.
4. Turn on **all** electrical supply circuits to the air handler at the main electrical panel (circuit breaker box) and turn the local air handler service disconnect to the ON position.
5. Set the thermostat to the desired operating mode and temperature.

## SECTION 11: FINAL SYSTEM CHECKOUT AND STARTUP

1. Refer to appropriate wiring diagram and recheck all wiring connections. Ensure that all wiring connections are tight.
2. Check blower motor connectors to make sure they are not damaged or loose.
3. If the control box cover was removed; reinstall control box cover.
4. Swing the service access panel into place and secure with the thumbscrews.
5. Switch the air handler circuit breakers in the main electrical panel to the ON position.
6. Switch the air handler service disconnect switch to the ON position.
7. Set the thermostat FAN Switch to the ON position to enable the continuous fan mode.
8. Check for air leaks at all duct connections and seal any leaks that are found.
9. Set the thermostat FAN switch to the AUTO position.
10. Set the thermostat HEAT/COOL switch to the COOL position and adjust the set point below the room temperature to enable the cooling mode.
11. Check for proper cooling operation per the outdoor unit installation and operating instructions.
12. ***Electric Heat Models Only:*** Switch the thermostat HEAT/COOL switch to the HEAT position and adjust the set point above the room temperature to enable the heating mode.
    Check for proper heating operation.
    Set the thermostat to the desired operating mode and adjust the temperature setting for comfort conditions.
13. **Hydronic Heat Models Only:** Switch the thermostat HEAT/COOL switch to the OFF position. The heating mode in models with hydronic heating system should not be switched on until system is filled and air is purged from hot water coil using the following procedure.

**Filling Hydronic Heating System With Water, Purging Air From System, and System Startup**

1. The thermostat HEAT/COOL switch must be in the OFF position.
2. Fill and pressurize the water heater and water coil.
3. Check for water leaks and seal any leaks that are found.
4. Turn the water heater on and set water temperature at 130°F for now.
5. Vent air from the water tank by opening a hot water spigot or faucet.
6. Vent and flush the supply and return water lines by attaching a hose to the volume purge valve and running purge water to a safe location. Run approximately 5 gallons of water at a high flow rate to purge.
7. Switch the air handler circuit breaker in the main electrical panel to the ON position if it is not already in the ON position.
8. Switch the air handler service disconnect switch to the ON position if it is not already in the ON position.
9. Set the thermostat HEAT/COOL switch to the HEAT position and adjust the set point above the room temperature to call for heat. The fan and pump should start simultaneously. The water coil should be warm after a few minutes of operation.
10. The air-handler is rated for water temperatures of 130°-180°F. Set water heater temperature at design temperature and take proper safeguards for water usage at supply points per local codes and safety considerations.
    **NOTE:** If CPVC or PEX hot water tubing is used, do not set the water temperature above 150°F.
11. Set thermostat HEAT/COOL switch to the desired operating mode and adjust the temperature setting for comfort conditions.

## SECTION 12: BLOWER PERFORMANCE TABLES

| Model No. | Nominal Cooling Tons | Blower Motor | | Motor Code | Blower Wheel Size | Motor Speed Tap | CFM@ 0.10"W.C. | CFM@ 0.20"W.C. | CFM@ 0.30"W.C. | CFM@ 0.40"W.C. | CFM@ 0.50"W.C. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | HP | Volts | | | | | | | | |
| HE1-**-*-A Electric<br>HE3-**-*-A Electric | 1.5 - 2.0 | 0.33 | 240 | *J | (2) 7 x 8 | 1 | 541 | 482 | 416 | 357 | 315 |
| | | | | | | 2 | 646 | 598 | 541 | 482 | 438 |
| | | | | | | 3 | 735 | 694 | 659 | 597 | 549 |
| | | | | | | 4 | 840 | 804 | 770 | 735 | 672 |
| | | | | | | 5 | 888 | 851 | 819 | 785 | 739 |
| HE1-**-*-B Electric<br>HE3-**-*-B Electric | 1.5 - 2.5 | 0.33 | 240 | *K | (2) 7 x 9 | 1 | 570 | 480 | 398 | 327 | 257 |
| | | | | | | 2 | 669 | 588 | 512 | 450 | 387 |
| | | | | | | 3 | 761 | 691 | 618 | 557 | 499 |
| | | | | | | 4 | 865 | 797 | 730 | 667 | 609 |
| | | | | | | 5 | 915 | 851 | 782 | 724 | 657 |
| HE1-**-*-B Electric<br>HE3-**-*-B Electric | 1.5 - 2.5 | 0.5 | 240 | *M | (2) 7 x 9 | 1 | 906 | 837 | 762 | 701 | 627 |
| | | | | | | 2 | 1019 | 955 | 887 | 822 | 768 |
| | | | | | | 3 | 1101 | 1043 | 987 | 922 | 846 |
| | | | | | | 4 | 1202 | 1151 | 1098 | 1041 | 981 |
| | | | | | | 5 | 1312 | 1258 | 1209 | 1151 | 1105 |
| HE1-**-*-C Electric<br>HE3-**-*-C Electric | 1.5 - 3.0 | 0.5 | 240 | *M | (2) 7 x 9 | 1 | 928 | 836 | 750 | 689 | 617 |
| | | | | | | 2 | 1024 | 948 | 866 | 798 | 739 |
| | | | | | | 3 | 1131 | 1062 | 989 | 917 | 846 |
| | | | | | | 4 | 1225 | 1160 | 1091 | 1026 | 957 |
| | | | | | | 5 | 1327 | 1267 | 1211 | 1138 | 1075 |
| HE1-**-*-D Electric<br>HE3-**-*-D Electric | 1.5 - 3.0 | 0.5 | 240 | *M | (2) 7 x 9 | 1 | 987 | 922 | 849 | 769 | 696 |
| | | | | | | 2 | 1073 | 1008 | 945 | 880 | 817 |
| | | | | | | 3 | 1191 | 1127 | 1071 | 1006 | 949 |
| | | | | | | 4 | 1285 | 1241 | 1186 | 1127 | 1047 |
| | | | | | | 5 | 1400 | 1332 | 1290 | 1246 | 1191 |

**Table 25: HE*1/HE*3 Blower Performance – CFM – Without Air Filters**

Minimum CFM for Electric Heat: 3kW = 195 CFM; 5kW = 325 CFM; 6kW = 390 CFM; 8kW = 520 CFM; 10kW = 650 CFM

| Model No. | Nominal Cooling | Blower Motor | | Motor Code | Blower Wheel | Motor Speed | CFM@ 0.10"W.C. | CFM@ 0.20"W.C. | CFM@ 0.30"W.C. | CFM@ 0.40"W.C. | CFM@ 0.50"W.C. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | HP | Volts | | | | | | | | |
| HE1-**-*-A Electric<br>HE3-**-*-A Electric | 1.5 - 2.0 | 0.33 | 240 | *J | (2) 7 x 8 | 1 | 0.28 | 0.30 | 0.33 | 0.36 | 0.38 |
| | | | | | | 2 | 0.36 | 0.39 | 0.43 | 0.45 | 0.48 |
| | | | | | | 3 | 0.47 | 0.50 | 0.53 | 0.56 | 0.59 |
| | | | | | | 4 | 0.62 | 0.64 | 0.67 | 0.70 | 0.74 |
| | | | | | | 5 | 0.69 | 0.72 | 0.75 | 0.78 | 0.81 |
| HE1-**-*-B Electric<br>HE3-**-*-B Electric | 1.5 - 2.5 | 0.33 | 240 | *K | (2) 7 x 9 | 1 | 0.27 | 0.30 | 0.33 | 0.35 | 0.37 |
| | | | | | | 2 | 0.35 | 0.38 | 0.41 | 0.44 | 0.47 |
| | | | | | | 3 | 0.44 | 0.47 | 0.50 | 0.53 | 0.56 |
| | | | | | | 4 | 0.55 | 0.59 | 0.62 | 0.66 | 0.69 |
| | | | | | | 5 | 0.62 | 0.65 | 0.68 | 0.72 | 0.75 |
| HE1-**-*-B Electric<br>HE3-**-*-B Electric | 1.5 - 2.5 | 0.5 | 240 | *M | (2) 7 x 9 | 1 | 0.61 | 0.65 | 0.66 | 0.68 | 0.71 |
| | | | | | | 2 | 0.74 | 0.78 | 0.81 | 0.83 | 0.86 |
| | | | | | | 3 | 0.87 | 0.92 | 0.95 | 0.97 | 0.99 |
| | | | | | | 4 | 1.08 | 1.11 | 1.13 | 1.16 | 1.20 |
| | | | | | | 5 | 1.33 | 1.36 | 1.41 | 1.43 | 1.46 |
| HE1-**-*-C Electric<br>HE3-**-*-C Electric | 1.5 - 3.0 | 0.5 | 240 | *M | (2) 7 x 9 | 1 | 0.51 | 0.54 | 0.57 | 0.61 | 0.64 |
| | | | | | | 2 | 0.62 | 0.66 | 0.70 | 0.72 | 0.76 |
| | | | | | | 3 | 0.75 | 0.78 | 0.82 | 0.85 | 0.88 |
| | | | | | | 4 | 0.88 | 0.92 | 0.96 | 0.98 | 1.04 |
| | | | | | | 5 | 1.08 | 1.12 | 1.13 | 1.16 | 1.21 |
| HE1-**-*-D Electric<br>HE3-**-*-D Electric | 1.5 - 3.0 | 0.5 | 240 | *M | (2) 7 x 9 | 1 | 0.75 | 0.78 | 0.81 | 0.85 | 0.88 |
| | | | | | | 2 | 0.90 | 0.94 | 0.95 | 1.00 | 1.03 |
| | | | | | | 3 | 1.10 | 1.13 | 1.16 | 1.16 | 1.20 |
| | | | | | | 4 | 1.35 | 1.38 | 1.42 | 1.46 | 1.50 |
| | | | | | | 5 | 1.66 | 1.70 | 1.73 | 1.77 | 1.80 |

**Table 26: HE*1/HE*3 Blower Performance – Motor Amps – Without Air Filters**

| Model No. | Nominal Cooling Tons | Blower Motor | | Motor Code | Blower Wheel Size | Motor Speed | CFM@ 0.10"W.C. | CFM@ 0.20"W.C. | CFM@ 0.30"W.C. | CFM@ 0.40"W.C. | CFM@ 0.50"W.C. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | HP | Volts | | | | | | | | |
| HE*2***A Hydronic<br>HE*4***A Hydronic | 1.5 - 2.0 | 0.33 | 115 | *N | (2) 7 X 8 | 1 | 533 | 485 | 439 | 397 | 350 |
| | | | | | | 2 | 629 | 589 | 546 | 508 | 457 |
| | | | | | | 3 | 728 | 694 | 658 | 625 | 579 |
| | | | | | | 4 | 832 | 801 | 761 | 727 | 680 |
| | | | | | | 5 | 886 | 857 | 818 | 786 | 740 |
| HE*2***B Hydronic<br>HE*4***B Hydronic | 1.5 - 2.5 | 0.33 | 115 | *O | (2) 7 X 9 | 1 | 556 | 486 | 426 | 363 | 291 |
| | | | | | | 2 | 646 | 593 | 541 | 476 | 423 |
| | | | | | | 3 | 749 | 699 | 651 | 598 | 555 |
| | | | | | | 4 | 844 | 798 | 749 | 704 | 657 |
| | | | | | | 5 | 897 | 854 | 809 | 764 | 721 |
| HE*2***B Hydronic<br>HE*4***B Hydronic | 1.5 - 2.5 | 0.50 | 115 | *R | (2) 7 X 9 | 1 | 883 | 834 | 787 | 737 | 700 |
| | | | | | | 2 | 978 | 926 | 885 | 834 | 791 |
| | | | | | | 3 | 1075 | 1033 | 991 | 946 | 905 |
| | | | | | | 4 | 1192 | 1149 | 1105 | 1071 | 1029 |
| | | | | | | 5 | 1302 | 1253 | 1213 | 1176 | 1138 |
| HE*2***C Hydronic<br>HE*4***C Hydronic | 1.5 - 3.0 | 0.50 | 115 | *R | (2) 7 X 9 | 1 | 903 | 845 | 791 | 732 | 665 |
| | | | | | | 2 | 1016 | 958 | 903 | 853 | 789 |
| | | | | | | 3 | 1118 | 1065 | 1010 | 958 | 912 |
| | | | | | | 4 | 1232 | 1179 | 1135 | 1089 | 1047 |
| | | | | | | 5 | 1310 | 1261 | 1221 | 1180 | 1137 |
| HE*2***D Hydronic<br>HE*4***D Hydronic | 1.5 - 3.0 | 0.50 | 115 | *R | (2) 7 X 9 | 1 | 901 | 837 | 781 | 716 | 658 |
| | | | | | | 2 | 992 | 939 | 876 | 823 | 753 |
| | | | | | | 3 | 1090 | 1043 | 987 | 934 | 878 |
| | | | | | | 4 | 1200 | 1152 | 1107 | 1061 | 1012 |
| | | | | | | 5 | 1297 | 1252 | 1205 | 1161 | 1111 |

**Table 27: HE*2/HE*4 Blower Performance – CFM – Without Air Filters**

| Model No. | Nominal Tons | Motor HP | Volts 1 Ph. 50/60 | Motor Code | Blower Wheel | Motor Tap | AMPS @ 0.10" W.C. | AMPS @ 0.20" W.C. | AMPS @ 0.30" W.C. | AMPS @ 0.40" W.C. | AMPS @ 0.50" W.C. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HE*2***A Hydronic<br>HE*4***A Hydronic | 1.5 - 2.0 | 0.33 | 115 | *N | (2) 7 X 8 | 1 | 0.52 | 0.56 | 0.61 | 0.65 | 0.70 |
| | | | | | | 2 | 0.75 | 0.79 | 0.84 | 0.88 | 0.92 |
| | | | | | | 3 | 1.02 | 1.06 | 1.08 | 1.14 | 1.21 |
| | | | | | | 4 | 1.30 | 1.36 | 1.42 | 1.46 | 1.50 |
| | | | | | | 5 | 1.53 | 1.56 | 1.63 | 1.66 | 1.71 |
| HE*2***B Hydronic<br>HE*4***B Hydronic | 1.5 - 2.5 | 0.33 | 115 | *O | (2) 7 X 9 | 1 | 0.54 | 0.58 | 0.63 | 0.68 | 0.74 |
| | | | | | | 2 | 0.71 | 0.76 | 0.81 | 0.88 | 0.94 |
| | | | | | | 3 | 1.01 | 1.04 | 1.08 | 1.14 | 1.22 |
| | | | | | | 4 | 1.32 | 1.37 | 1.45 | 1.49 | 1.54 |
| | | | | | | 5 | 1.57 | 1.63 | 1.67 | 1.72 | 1.78 |
| HE*2***B Hydronic<br>HE*2***B Hydronic | 1.5 - 2.5 | 0.50 | 115 | *R | (2) 7 X 9 | 1 | 1.39 | 1.44 | 1.51 | 1.53 | 1.55 |
| | | | | | | 2 | 1.72 | 1.76 | 1.82 | 1.88 | 1.93 |
| | | | | | | 3 | 2.20 | 2.25 | 2.29 | 2.32 | 2.41 |
| | | | | | | 4 | 2.77 | 2.90 | 2.94 | 3.04 | 3.02 |
| | | | | | | 5 | 3.54 | 3.53 | 3.64 | 3.68 | 3.65 |
| HE*2***C Hydronic<br>HE*4***C Hydronic | 1.5 - 3.0 | 0.50 | 115 | *R | (2) 7 X 9 | 1 | 1.20 | 1.25 | 1.31 | 1.36 | 1.41 |
| | | | | | | 2 | 1.59 | 1.62 | 1.68 | 1.71 | 1.76 |
| | | | | | | 3 | 1.93 | 1.99 | 2.06 | 2.08 | 2.15 |
| | | | | | | 4 | 2.52 | 2.57 | 2.61 | 2.66 | 2.74 |
| | | | | | | 5 | 3.15 | 3.19 | 3.25 | 3.29 | 3.35 |
| HE*2***D Hydronic<br>HE*4***D Hydronic | 1.5 - 3.0 | 0.50 | 115 | *R | (2) 7 X 9 | 1 | 1.21 | 1.29 | 1.32 | 1.38 | 1.44 |
| | | | | | | 2 | 1.47 | 1.53 | 1.63 | 1.66 | 1.68 |
| | | | | | | 3 | 1.89 | 1.93 | 2.01 | 2.04 | 2.08 |
| | | | | | | 4 | 2.40 | 2.45 | 2.52 | 2.54 | 2.60 |
| | | | | | | 5 | 2.86 | 2.96 | 3.02 | 3.04 | 3.10 |

**Table 28: HE*2/HE*4 Blower Performance – Motor Amps – Without Air Filters**

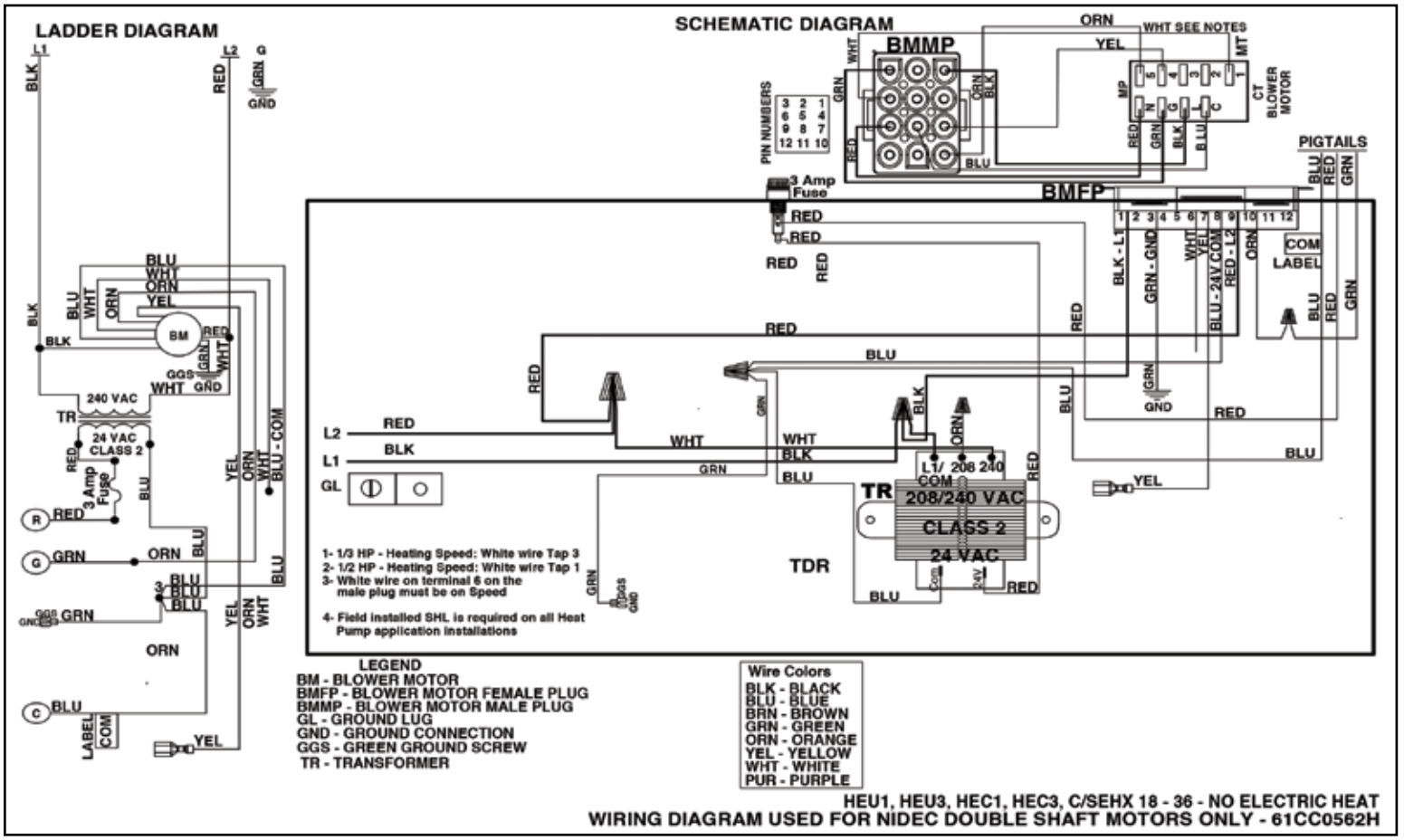



**Figure 32: HE*1/HE*3 – No Electric Heat – Constant Torque Motor**

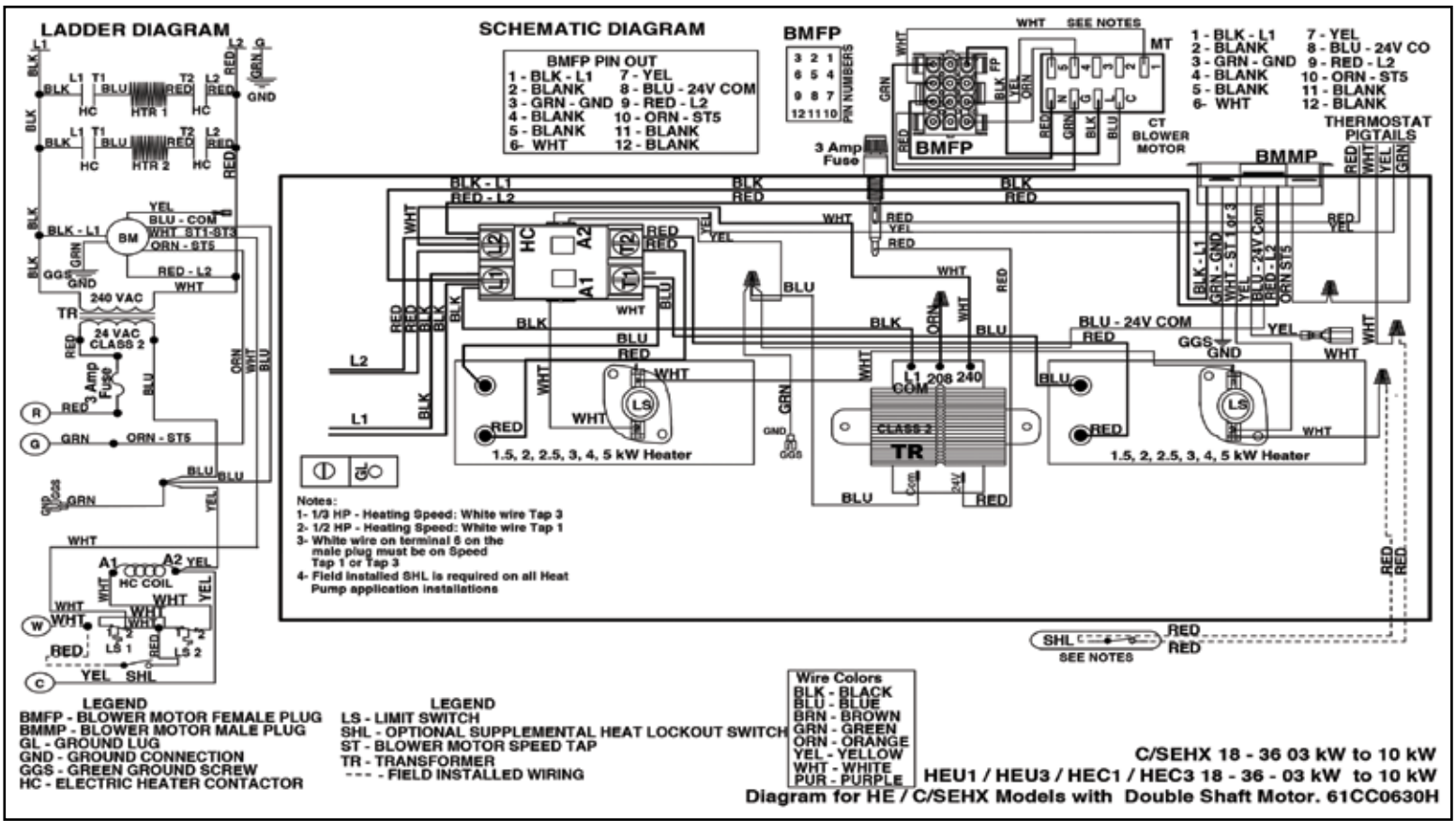



**Figure 33: HE*1/HE*3 – 03kW to 10kW Electric Heat – Constant Torque Motor**

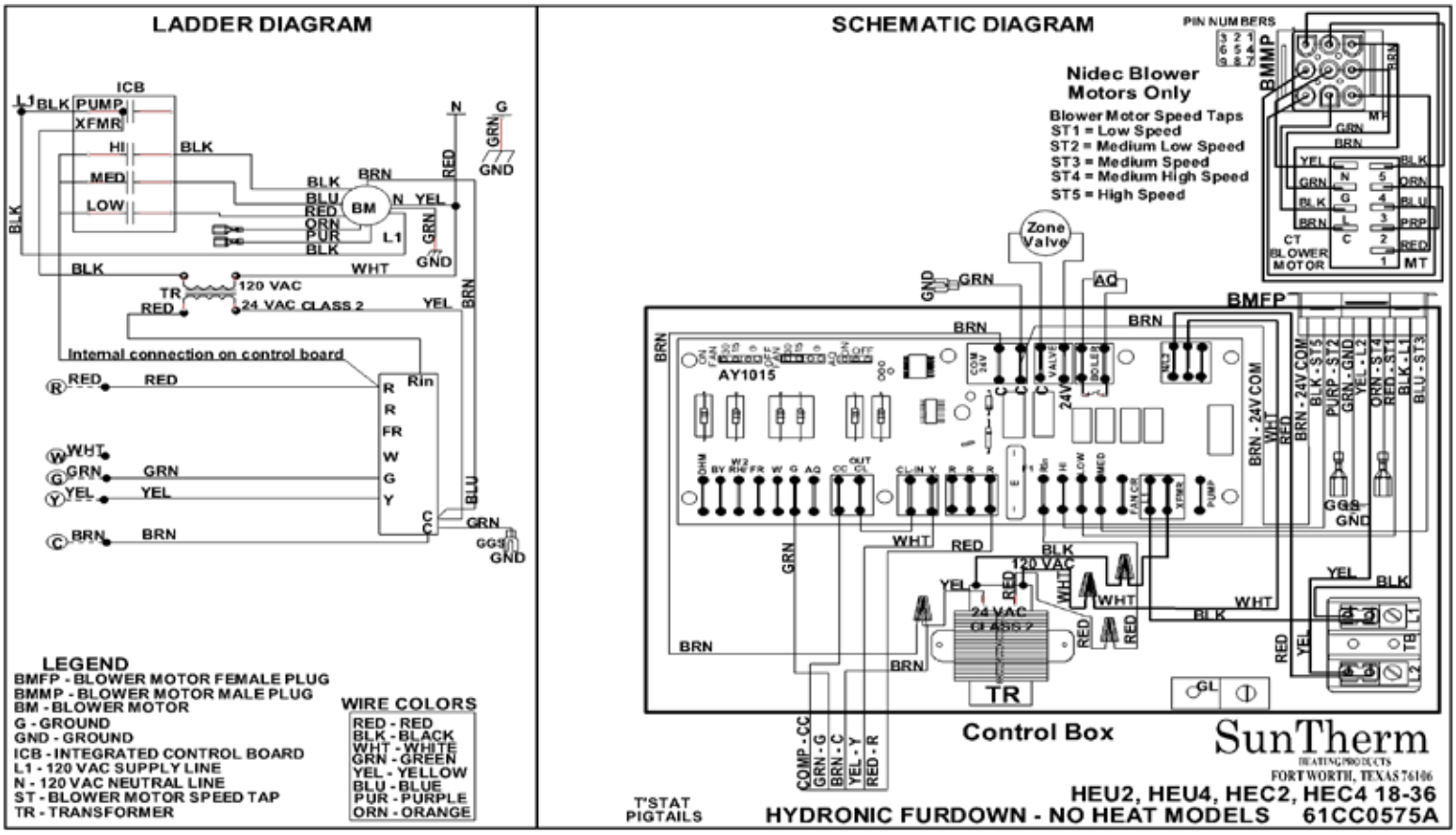



**Figure 34: HE*2/HE*4 – No Hydronic Heat – Constant Torque Motor**

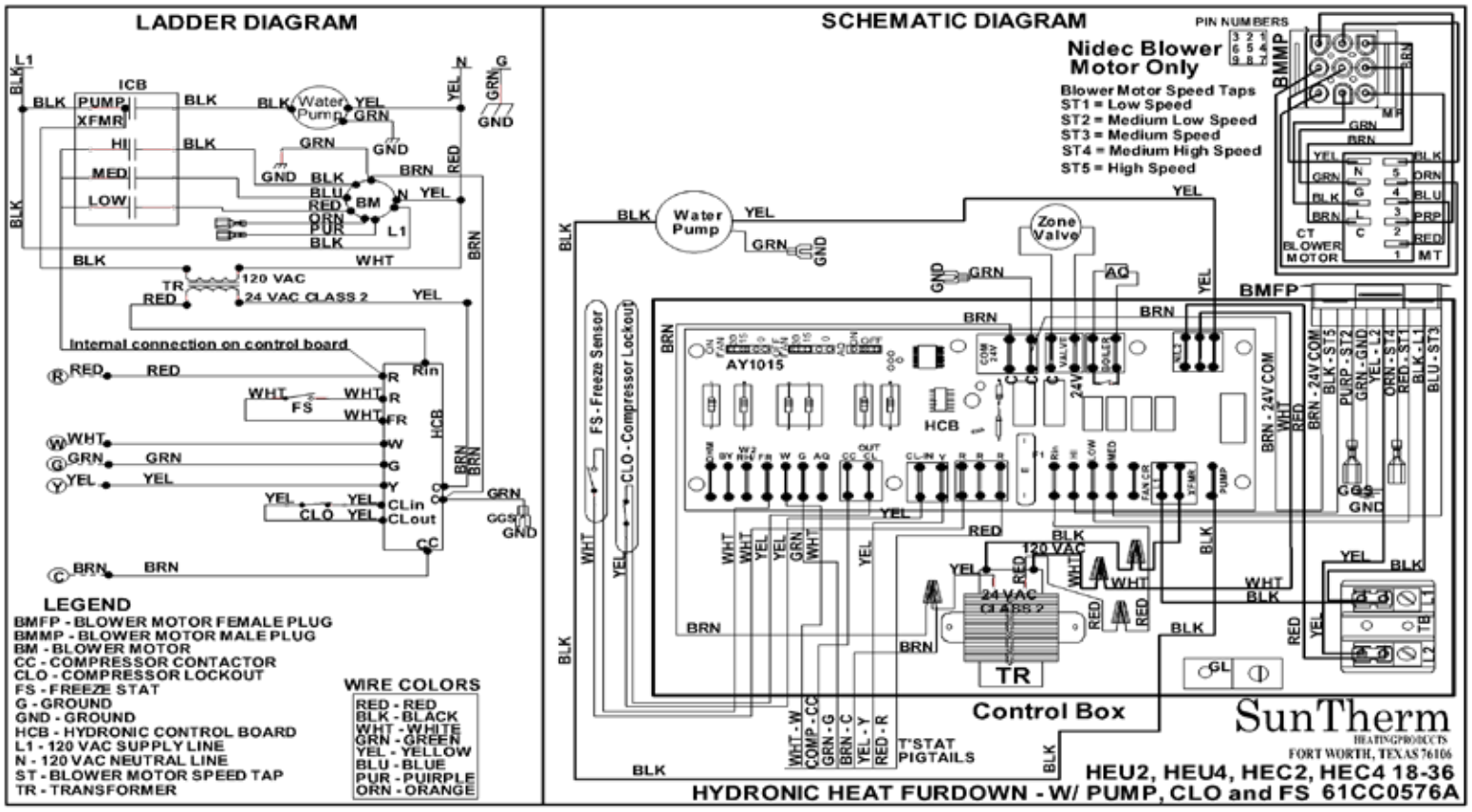



**Figure 35: HE*2/HE*4 – Hydronic Heat With Pump – Constant Torque Motor**

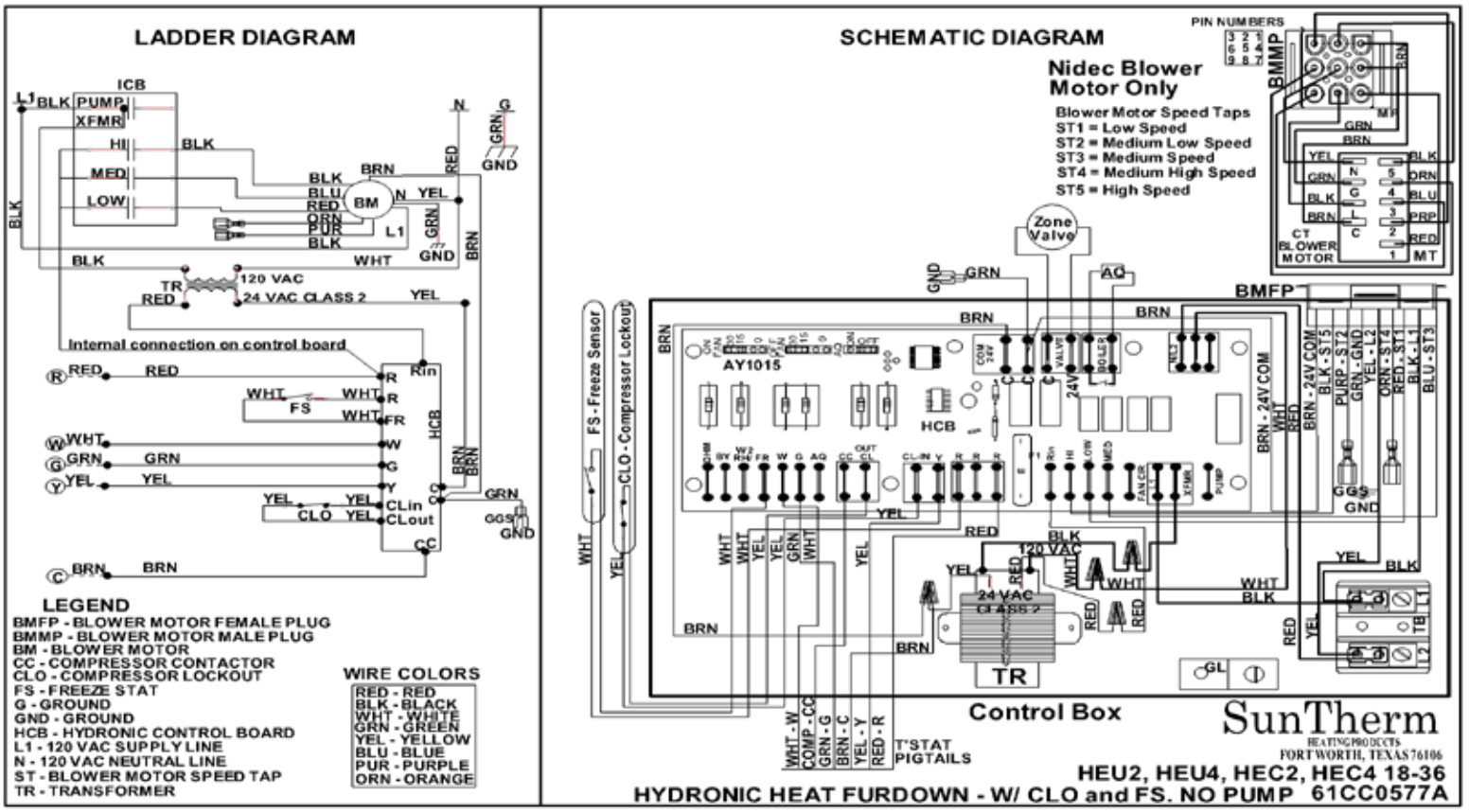



**Figure 36: HE*2/HE*4 – Hydronic Heat No Pump – Constant Torque Motor**