INSTALLATION MANUAL

Intertek 9700771

DOWNFLOW OR UPFLOW SINGLE OR TWO STAGE ELECTRIC FURNACE WITH:

- **FACTORY INSTALLED ELECTRIC HEAT**
- **NO HEAT MODELS WITH FIELD INSTALLED ELECTRIC HEAT KITS**

FOR INSTALLATION ONLY IN HUD MANUFACTURED HOME PER CONSTRUCTION SAFETY STANDARD 24 CFR PART 3280

MODELS: E30 SERIES **THIS APPLIANCE HAS AN IPX1 RATING**

LIST OF SECTIONS

1 – General 1
2 – Safety 3
3 – Clearances 4
4 – Return Air Requirements & Supply Air Distribution System 5
5 – Downflow Furnace Installation 6
6 – Duct Connector Installation 7
7 – Upflow Coil Cabinet & Return Air Cabinet Installation 8
8 – Line Voltage Wiring 10
9 – Thermostat Wiring and Low Voltage Connections 14
10 – Blower Motor Speed Tap Selection 19
11 – Blower Performance 20
12 – Final System Checks and Startup 21
13 – Wiring Diagrams 22-27

LIST OF FIGURES

1 – Furnace Dimensions 2
2 – Clearances to Combustibles 4
3 – Service Access Clearances 4
4 – Typical Closet Installation 5
5 – Typical Alcove Installation 5
6 – Return Air Grille Frame Assembly 6
7 – Downflow "A" Coil Return Air Filter Location 6
8 – Duct Connector Depths 7
9 – Duct Connector and Combustible Floor Base 8
10 – Combustible Floor Base Dimensions 8
11 – Duct Connector Dimensions 8
12 – Typical Upflow Installation 9
13 – Upflow Coil Cabinet 9
14 – Upflow Furnace and Coil Cabinet 9
15 – Electrical Power Supply Wire Entrances 11
16 – Control Box Component Locations 13
17 – Control Box Cover and Circuit Breaker Location 13
18 – 1-Stage Heat & Cool Low Voltage Connections – 1 Transformer 16
19 – 2-Stage Ht/1-Stage Cool Low Voltage Connections – 1 Tfmr 16
20 – 1-Stage Ht/Cool Low Voltage Connections – Separate Tfmrs 17
21 – Low Voltage Connections – Separate Ht/Cool Tstats – 1 Tfmr 17
22 – Heat Pump Low Voltage Connections – 1 Transformer 17
23 – Heat Pump Low Voltage Connections – Separate Transformers 17
24 – Constant Torque Motor Terminals 19
25 – Wiring Diagram - No Heat 22
26 – Wiring Diagram - 6kW Electric Heat 23
27 – Wiring Diagram - 8 kW and 10 kW Electric Heat 24
28 – Wiring Diagram - 12 kW Electric Heat 25
29 – Wiring Diagram - 15 kW Electric Heat 26
30 – Wiring Diagram - 20 kW Electric Heat 27

LIST OF TABLES

1 – Electric Furnace Specifications 2
2 – Model Number Nomenclature 2
3 – Optional Cooling Cabinets & Return Grille Frames 2
4 – Clearances to Combustibles 4
5 – Duct Connector Models 7
6 – Wiring Requirements – Single Branch Circuit 12
7 – Wiring Requirements – Dual Branch Circuit 12
8 – Electrical Heat Performance Data 12
9 – Low Voltage Wire Gauge and Maximum Lengths 14
10 – Typ Heat/Cool Low Voltage Wire Color Codes & Connections 18
11 – Typ Heat Pump Low Voltage Wire Color Codes & Connections 18
12 – Constant Torque Motor Speed Tap Descriptions 19
13 – Constant Torque Motor Terminal Descriptions 19
14 – Blower Performance 20

CONTACT INFORMATION

Manufactured and Distributed by:

Mortex Products, Inc.
501 Terminal Rd
Fort Worth, TX 76106

www.mortx.com

SECTION 1: GENERAL

The following list includes important facts and information regarding this electric furnace.

1. Furnace is rated at 208/240 VAC at 60 Hz.
2. All furnace models have the same size cabinet.
3. Furnace is designed for A/C or heat pump operation.
4. Hold-down strap furnished with furnace.
5. This furnace is designed for downflow or upflow applications only.
6. This furnace must not be operated with the control box cover and front access panel removed.
7. This furnace is listed by ETL for the United States and Canada.
8. This air handler is for use at elevations of 10,000 ft (3,048m) or less.
9. 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. Children must not be allowed to play with this appliance.

SAVE THIS MANUAL FOR FUTURE REFERENCE

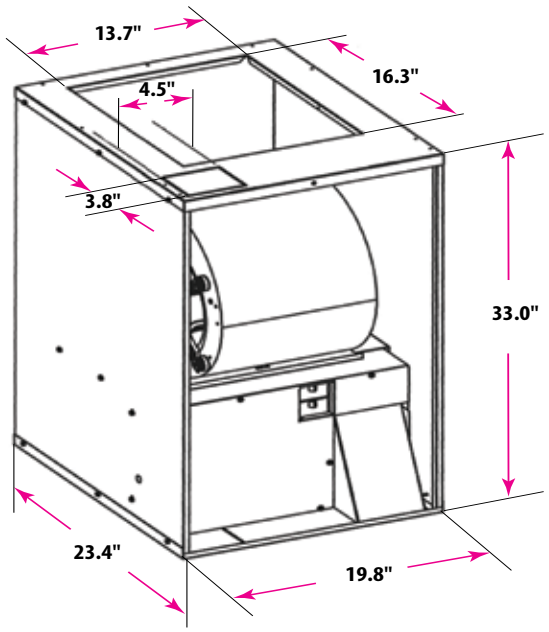

Figure 1: Electric Furnace Dimensions

Models	ALL	ALL	ALL
Input kW	6	8	10
With "A" Coil	NO	NO	NO
Air Temperature Rise - F	30-90	35-100	40-100
Air Temperature Rise - C	-1.1-32.2	1.6-37.7	4.4-37.7
Designed Max Outlet Air Temp, F/C	180 / 82.22	185 / 85	185 / 85
Blower Size	10 x 9	10 x 9	10 x 9
Max ESP In.W.C./kPa	0.3/0.075	0.3/0.075	0.3/0.075
Thermostat Circuit Electrical Specs.	24 VAC, 60 HZ, 40 VA		
Electric Furnace Cabinet Height, In/cm	33 / 83.82	33 / 83.82	33 / 83.82

Models	ALL	ALL	ALL
Input kW	12	15	20
With "A" Coil	NO	NO	NO
Air Temperature Rise - F	30-90	35-100	40-100
Air Temperature Rise - C	1.1-32.2	1.6-37.7	4.4-37.7
Designed Max Outlet Air Temp, F/C	180 / 82.22	185 / 85	185 / 85
Blower Size	10 x 9	10 x 9	10 x 9
Max ESP In.W.C./kPa	0.3/0.075	0.3/0.075	0.3/0.075
Thermostat Circuit Electrical Specs.	24 VAC, 60 HZ, 40 VA		
Electric Furnace Cabinet Height, In/cm	33 / 83.82	33 / 83.82	33 / 83.82

Table 1: Electric Furnace Specifications

Furnace Weights

E30B3DxxxA(A,B)F Models – 79 lbs. / 35.834 kg
E30B4DxxxA(A,B)F Models – 81 lbs. / 36.740 kg
E30B5DxxxA(A,B)F Models – 85 lbs. / 38.56 kg
E30B6DxxxA(A,B)F Models – 87 lbs. / 38.56 kg

Available Blower Motors

1. Standard Blower Motor - 5 SPD Constant Torque

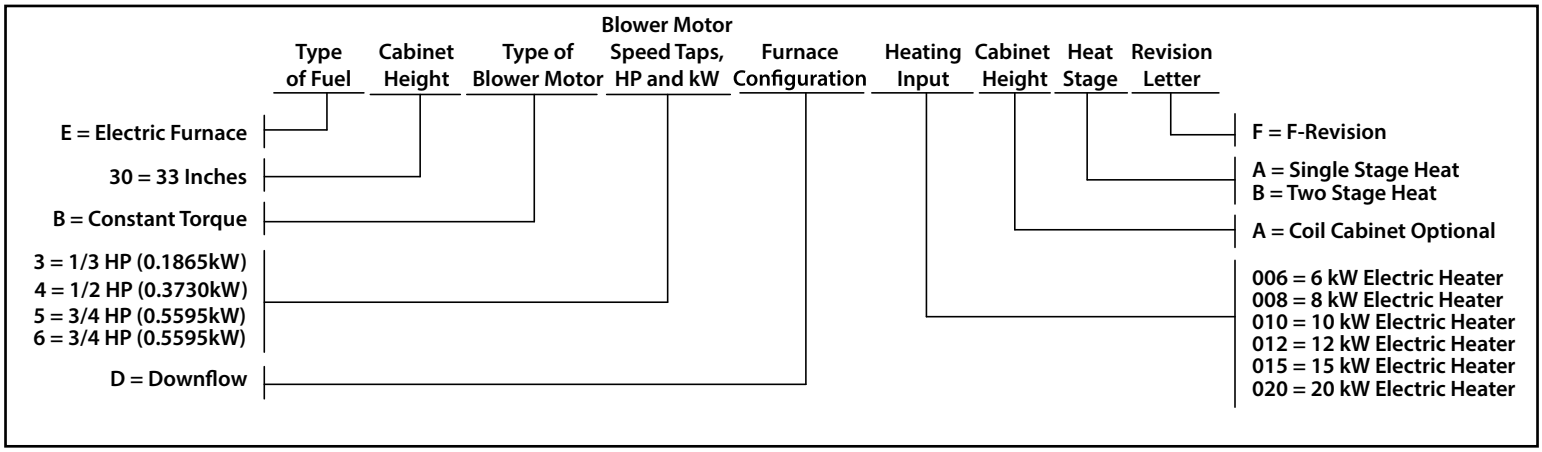

Table 2: Model Number Nomenclature

Coil Cabinet Model	Front Door of Cabinet	Open Top 17 3/4in (450.85m) x 21 3/4in (52.45m)	Maximum Air Flow CFM (L/s)	1 inPleated Air Filter, in the door	2 in Pleated Air Filter, Top of Cabinet	Height, In (m)	Depth, In (m)	Width In (m)	Coil Sizes
97-FLSB-21	Louvered	N/A	120 (56.369)	20 x 20		23 1/4 (590.5)	25 (635)	19 3/4 (501.65)	All Mortex 96 series coil will fit in Cabinet
97-FSOB-21	Solid		160 (75.159)		20 x 24	23 1/4 (590.5)	25 (635)	19 3/4 (501.65)	
97-FLOB-21	Louvered		180 (849.5054)	20 x 20	20 X 24	23 1/4 (590.5)	25 (635)	19 3/4 (501.65)	
97-FLSB-27	Louvered	N/A	160 (75.159)	20 x 30		30 1/2 (74.7)	25 (635)	19 3/4 (501.65)	96-97 series coil and 98 series coil sizes up to 98-8W7
97-FSOB-27	Solid		160 (75.159)		20 X 24	30 1/2 (74.7)	25 (635)	19 3/4 (501.65)	
97-FLOB-27	Louvered		180 (849.5054)	20 x 20	20 X 24	30 1/2 (74.7)	25 (635)	19 3/4 (501.65)	
97-FLSB-39	Louvered	N/A	180 (849.5054)	(2EA) 20 x 20		40 1/4 (1,02.35)	25 (635)	19 3/4 (501.65)	
97FSOB-39	Solid		200 (943.8949)		20 X 24	40 1/4 (1,02.35)	25 (635)	19 3/4 (501.65)	Frame & Grilles Non-Cabinet
97-FG-18	Louvered	N/A	120 (56.369)	N/A	N/A	18 (457.2)	N/A	19 3/4 (501.65)	
97-FG-24	Louvered	N/A	160 (75.159)	N/A	N/A	24 (609.6)	N/A	19 3/4 (501.65)	

Table 3: Optional Cooling Cabinets and Return Air Grille Frames

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. For additional information consult a qualified contractor, installer, or service agency.

⚠ 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.

⚠ 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.

Safety Requirements

1. This electric furnace should be installed in accordance with all national and local building, safety, plumbing, and wastewater codes along with all 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) (USA)
   - Canadian Electrical Code, Part I (CSA C22.1) (CANADA)
   - All local codes (State, City, and Township)

   NOTE: All applicable codes take precedence over any recommendation made in these instructions. The manufacturer assumes no responsibility for air handlers installed in violation of any code or regulation.
2. Provide clearances from combustible materials as listed under **Clearances to Combustibles.**
3. Provide clearances for servicing ensuring service access is allowed for the control box, electric elements and the blower.
4. Failure to carefully read and follow all instructions in this manual can result in malfunction of the furnace, personal injury, property damage and or death.
5. Check the rating plate and the power supply to be sure the electrical characteristics match.
6. Electric furnace shall be installed so the electrical components are protected from water.
7. Care should be given when installing and servicing this furnace due to live electrical components. Some components may have dual power supplies. Always be sure to disconnect all fuses or circuit breakers before installing or servicing this furnace.
8. Only trained and qualified personnel should install repair or service this furnace. Untrained service personnel can perform basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters. Observe all precautions in these instructions and on the attached labels when working on this furnace.
9. These instructions cover minimum requirements and conforms to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that have not kept up with changing mobile home, modular home and HUD construction practices. These instructions are to be followed and are the minimum requirement for a safe installation.
10. The size of the system should be based on an acceptable heat loss calculation for the structure. ACCA Manual J or other approved methods may be used.
11. All models use a nominal 208/240 VAC, 1- Phase, 60-Hz power supply.
    NOTE: DO NOT CONNECT THIS AIR HANDLER TO A 50 HZ POWER SUPPLY OR A VOLTAGE ABOVE 250 VOLTS.
12. Ground connections must be securely fastened to the ground lug located inside the control box.

Inspection

As soon as the furnace is received, it should be inspected for possible damage during transit. If damage is evident, 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. Before installing the furnace, check the cabinet for screws or bolts which may have loosened in transit. There are no shipping or spacer brackets requiring removal before startup.

Check to be sure all accessories such as heater kits and coils are available. Installation of these accessories should be accomplished before the furnace is set in place or the connecting of the wiring, ducts, or piping.

Clearances for Service

Access for servicing is an important factor in the location of any furnace. Provide a minimum of 24 inches (609.6 mm) in front of the furnace for access to the control box, heating elements, and blower. This access may be provided by a closet door or by locating the furnace so that a wall or partition is not less than 24 inches(609.6mm) from the front access door.

Clearance to Combustibles

This furnace is approved for the clearance to combustible material from the furnace exterior and ducts as shown in Table 4 and Figure 2.

				FRONT OF FURNACE		
Model	Top (in/m)	Back (in/m)	Sides (in/m)	Alcove (in/m)	Closet (in/m)	Duct (in/m)
AL	6 .0 / 152.4	0.0 / 0.0	0.0 / 0.0	18.0 / 457.2	6.0 / 152.4	0.0 / 0.0

Table 4: Clearances to Combustibles

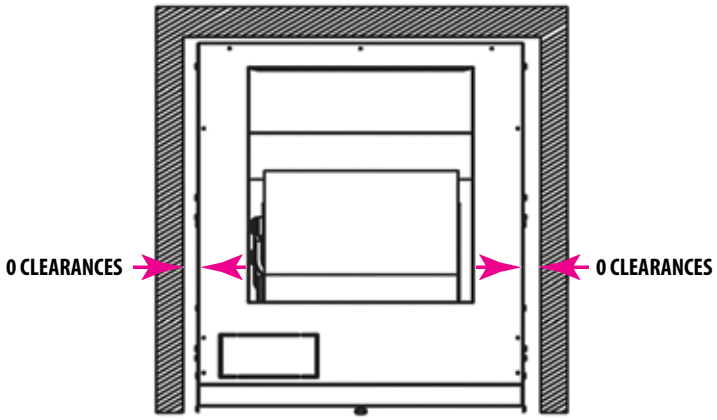

Figure 2: Clearances to Combustibles

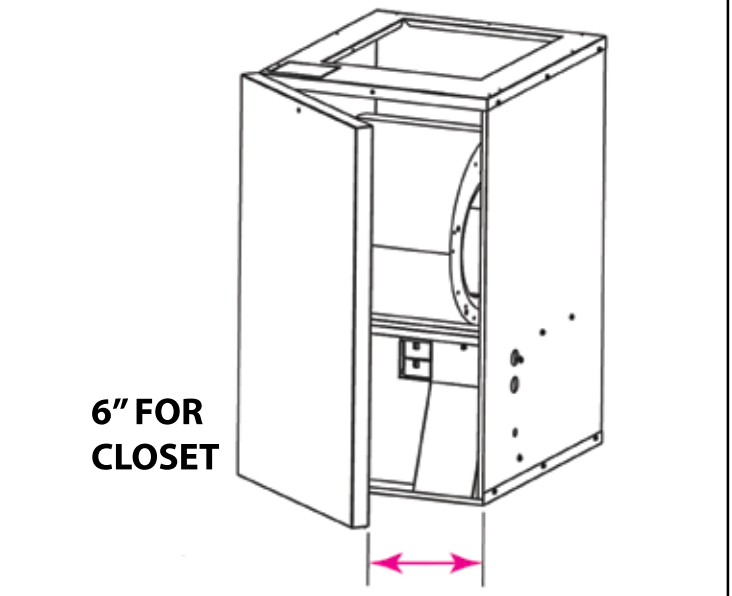

Figure 3: Service Access Clearances

Provisions must be provided for the air in the living spaces to return to the air handler. Failure to comply may cause a reduction in the amount of return air available to the blower, causing reduced air-flow. If a cooling coil is installed on the furnace, the pressure drop of the coil must be taken into account when selecting the furnace size and selecting the blower motor speed taps to assure proper air flow for the system in both the heating and cooling modes. Reduced air-flow may result in insufficient heating or cooling of the living space. Reduced air flow may also cause the air handler to cycle on the heating over-temperature limit and premature heating element failure in the heating mode or ice formation on the coil in the cooling mode.

For the furnace to work properly, a closet or alcove where it is installed must have a minimum total free area opening for the return air as shown below.

Furnaces With 1/3 HP Blower Motor

- Minimum 200 in^2 (129,032 mm^2) free area opening
- Use Return Grille, A/C Coil Cabinet, or any return grille with a minimum 200 in^2 (129.032 mm^2) free area opening.

Furnaces With 1/2 HP Blower Motor

- Minimum 250 in^2 (161,290 mm^2) free area opening
- Use Return Grille, A/C Coil Cabinet, or any return grille with a minimum 250 in^2 (161,290 mm^2) free area opening.

Furnaces With 3/4 HP Blower Motor

- Minimum 390 in^2 (251,612 mm^2) free area opening
- Use Return Grille, or A/C Coil Cabinet, or any return grille with a minimum 390 in^2 (251,612 mm^2) free area opening

Top Return Only – Recommended Return Grille Size

CFM / L/s	in x in (mm x mm)	in^2 / mm^2
800 / 377	20 x 20 (500 x 500)	324 / 209,032
1000 / 472	20 X 25 (500 x 630)	414 / 267,096
1200 / 566	25 X 25 (635 x 635)	414 / 267,096
1400 / 661	25 X 30 (635 x 760)	644 / 415,483
1600 / 755	25 X 30 (635 x 760)	644 / 415,483
1800 / 843	30 X 30 (762 x 762)	784 / 505,805

Louvered Door & Top Return – Recommended Return Grille Size

CFM / L/s	in x in (mm x mm)	in^2 / mm^2
800 / 377	10 x 20 (250 x 500)	144 / 92,903
1000 / 472	12 X 20 (300 x 500)	180 / 116,129
1200 / 566	14 X 20 (360 x 500)	216 / 139,355
1400 / 661	18 X 20 (460 x 500)	288 / 185,806
1600 / 755	18 X 20 (460 x 500)	288 / 185,806
1800 / 843	20 X 20 (500 x 500)	324 / 209,032

The return air opening can be located in a closet door, side wall above the furnace cabinet, or in a louvered door on the furnace. If the opening for the return air is located in the side wall of a closet or the closet door below the top of the furnace cabinet, a 6 inch (152.4 mm) minimum clearance must be provided on the side where the return is located to provide for proper air flow to the furnace return opening. The 6 inch (152.4 mm) minimum clearance is not required if the return grille is installed above the top of the furnace cabinet.

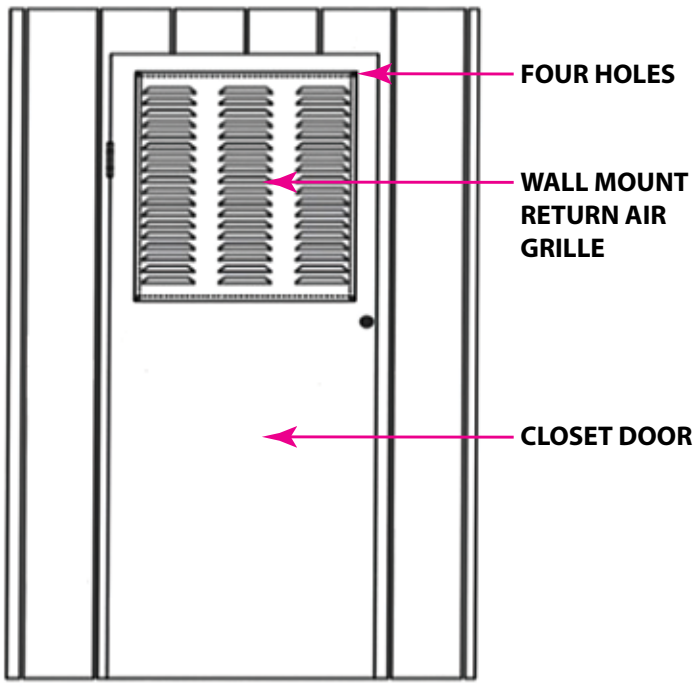

Figure 4: Typical Closet Installation

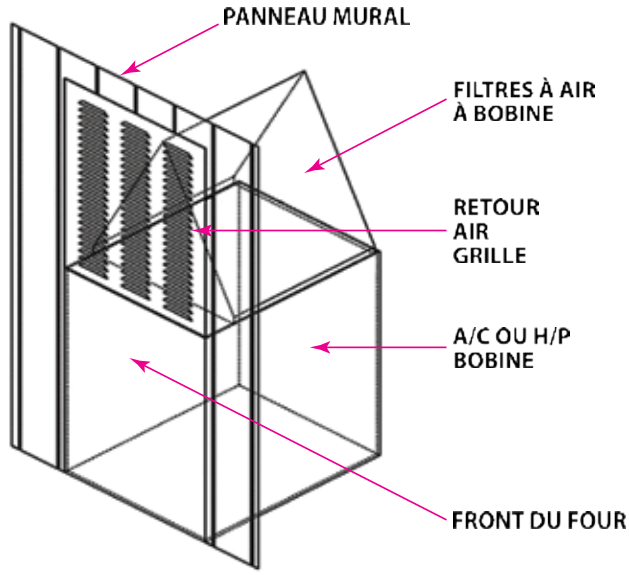

Figure 5: Typical Alcove Installation

Supply Air Distribution System

The furnace with a cooling coil installed is designed to operate against a maximum of 0.30-inch WC (0.074 kPa) external static pressure. In order to assure proper air-flow through the furnace and coil, the air distribution system (duct system) must not exceed a total static pressure of 0.30-inch WC (0.074 kPa). It is recommended that the manual **"Manufactured Housing Duct Systems Guide to Best Practices"** by Manufactured Housing Research Alliance (MHI-MHRA) be reviewed before selecting the air distribution system for use in the application.

Installing Downflow Furnace and Return Air Grille Frame Assembly in Alcove

The Return Air Grille kit is approved for use in an alcove for a heating only installation without an air-conditioning coil. The return air grille frame assembly is available in 18" (457.2mm) height and 24" (609.6mm) height. Follow the steps below to install the return air grille frame assembly to the furnace.

1. Before installing the return air grille frame on the furnace, confirm there is enough clearance to install the furnace and the return air grille assembly.
2. Holes for the electrical and thermostat wiring must be cut prior to installing the furnace and return air grille.
3. Remove the stretch wrap, top and bottom shipping covers, and corner posts from the furnace.
4. Remove the furnace front access panel.
5. Remove the return air grille frame assembly from its carton.
6. Set the return air grille frame assembly on the front of the furnace top cover as shown in Figure 6. Line up the screw holes in the frame assembly with the screw holes in the furnace top cover and attach the frame assembly to the furnace top cover using the provided screws.
7. Slide the furnace onto the floor base. Push the furnace back until the furnace cabinet is against the rear flange of the floor base.
8. Secure the furnace cabinet to the floor by drilling two holes through the furnace base and the floor base in the right and left front inside corners of the furnace cabinet. Use two screws to secure the furnace and floor base to the floor.
9. Place the air filter in the filter rack in the louvered door and install the louvered door on the frame assembly by inserting the tabs in the bottom of the louvered door into the slots in the furnace top cover.
10. Secure the louvered door to the frame assembly with the thumb screw in the top of the door.

Downflow "A" Coil Return Air Filter Rack Assembly For Alcove or Closet Installations

An air filter assembly is available that attaches to the "A" coil as shown in Figure 7. This assembly utilizes 2 filters, one for each coil slab. A return air grille with a sufficient free area opening must be installed in the closet door or wall of the closet.

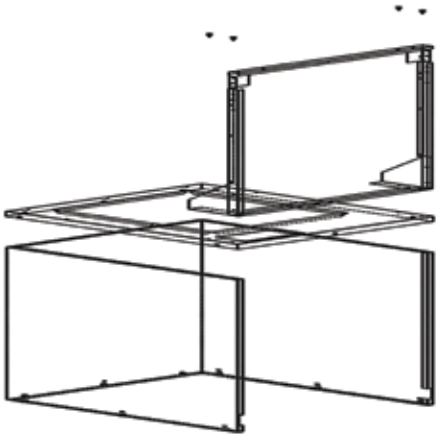

Figure 6: Return Air Grille Frame Assembly

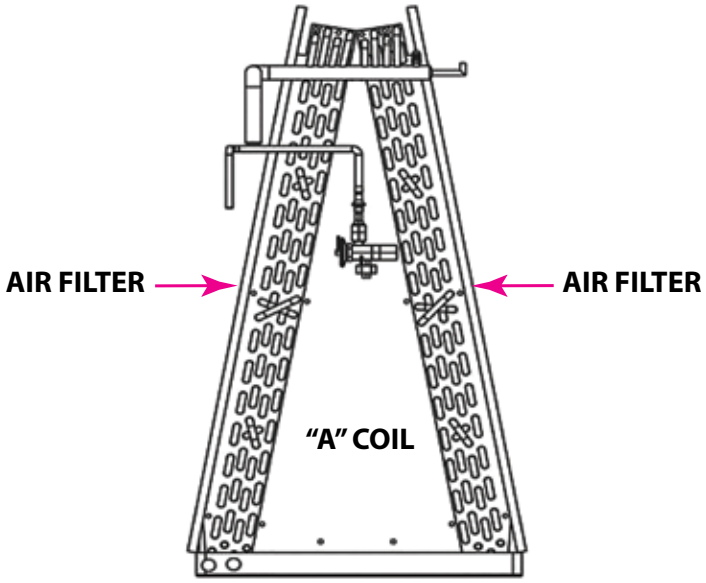

Figure 7: Downflow "A" Coil Return Air Filter Location

Installing the Downflow Furnace and Coil Cabinet in Alcove and Closet

The downflow coil cabinets are approved for use in an alcove or closet installations with an approved air conditioning coil. The downflow coil cabinets are available in 23.25in (590.55mm), 30.50in (774.7mm) and 41.25in (1,047.75mm) height. The furnace is 33in (838.2mm) in height making the combined furnace and coil cabinet height 56in (1,422.4mm), 63in (1,600.2mm) and 73in (1,854.2mm). Follow the steps below to install the coil cabinet assembly to the furnace.

1. Before installing the coil cabinet on the furnace, confirm there is enough clearance to install the furnace and the coil cabinet assembly.
2. Holes for the refrigerant tubing, condensate drain line, line voltage supply wiring, thermostat wiring, and outdoor unit control wiring must be cut prior to installing the furnace and coil cabinet.
3. Remove the stretch wrap, top and bottom shipping covers, and corner posts from the furnace.
4. Remove the furnace front access panel and lay the furnace on its back.
5. Remove the coil cabinet from its carton and assemble it per the instructions.
6. Lay the coil cabinet on its back and place the coil cabinet flanges against the furnace top cover.
7. Secure the cooling coil cabinet to the top cover of the furnace using the provided screws.
8. Slide the furnace onto the floor base. Push the furnace back until the furnace cabinet is against the rear flange of the floor base.
9. Drill two holes through the furnace base and the floor base at the right and left front inside corners of the cabinet. Use two screws to secure the furnace and floor base to the floor.

Duct Connectors

90-DCU0-XX Duct Connectors

A duct connector is used to provide a sealed connection between the furnace base and a below the floor supply duct system. The duct connector allows the furnace to be installed on a combustible floor without the use of a separate sub-base providing insulation is placed between the duct connector and the combustible floor. Table 5 shows the duct connector needed for various applications.

DEPTH FROM FLOOR TO DUCT-in (mm)	DUCT CONNECTOR MODEL NUMBER
1 in (25.4 mm)	90-DCUO-01
2 in (50.8 mm)	90-DCUO-01
3 in (76.2 mm)	90-DCUO-01
4 in (101.6 mm)	90-DCUO-01
5 in (127.0 mm)	90-DCUO-02
6 in (152.4 mm)	90-DCUO-02
7 in (177.8 mm)	90-DCUO-02
8 in (203.2 mm)	90-DCUO-02
9 in (228.6 mm)	90-DCUO-03
10 in (254.0 mm)	90-DCUO-03
11 in (279.4 mm)	90-DCUO-03
12 in (304.8 mm)	90-DCUO-03

Table 5: Duct Connector Models

⚠ WARNING

A duct connector can be installed on combustible flooring except for carpeting. It is recommended to use insulation having a rating of R-12 or higher between the floor base and the combustible floor to prevent the combustible floor from getting too hot.

Installing the Duct Connector

1. Refer to Figures 8 – 11 for dimensions necessary for duct connector installation.
2. Attach the four (seal-strip) foam tape gaskets provided with the duct connector around the perimeter of the duct opening in the main supply duct trunk to seal between the duct connector and the top of the duct opening.
3. Insert the duct connector through the opening in the floor and attach the duct connector to the top of the main trunk by inserting the tabs through the opening in the top of the duct and bending the tabs back 90 degrees against the inside of the duct. Confirm the seal-strip has sealed the area around the duct connector where it attaches to the main supply duct trunk.
4. Slit the corners of the duct connector that extend above the floor and then bend the sides over onto the floor surface.
5. It is recommended to place insulation between the floor base and the floor when used on a combustible floor to prevent the combustible floor from getting too hot. Cut the insulation around the perimeter of the duct connector opening.
6. Install the floor base over the floor opening with the flanges in the opening facing downward.
7. Insert the four screws provided in the kit through the four holes in the floor base and drive the screws into the floor to secure the floor base to the floor.

Additional Duct Connector Installation Information

The duct connector is designed to be installed in place of an existing duct connector and is designed for use on ducts wider than 12 inches (304.8mm). When using the duct connector on narrower ducts, there will be insufficient clearance to bend the tabs on four sides of the duct connector. Some of the tabs on the duct connector may need to remain unbent so it fits into the main trunk. In these cases, the tabs may be attached to the sides of the main trunk by using sheet metal screws or other suitable fasteners. Add holes in the tabs for sheet metal screws by drilling the required screw holes in 3 tabs on each side of the duct connector. If more than three tabs are needed to provide a more secure and air-tight connection, drill the remaining tabs so the additional tabs can also be fastened to the duct with screws. Use a duct sealer to seal any air leaks between the duct and the duct connector. High temperature metal tape can also be used to provide an air seal. The tape should be approved by applicable national or local codes.

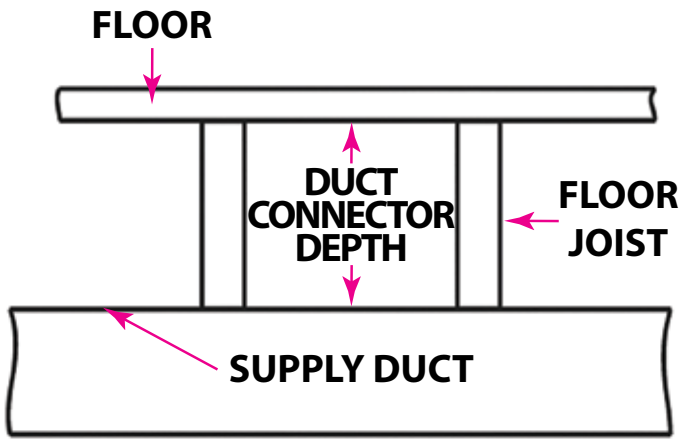

Figure 8: Duct Connector Depths

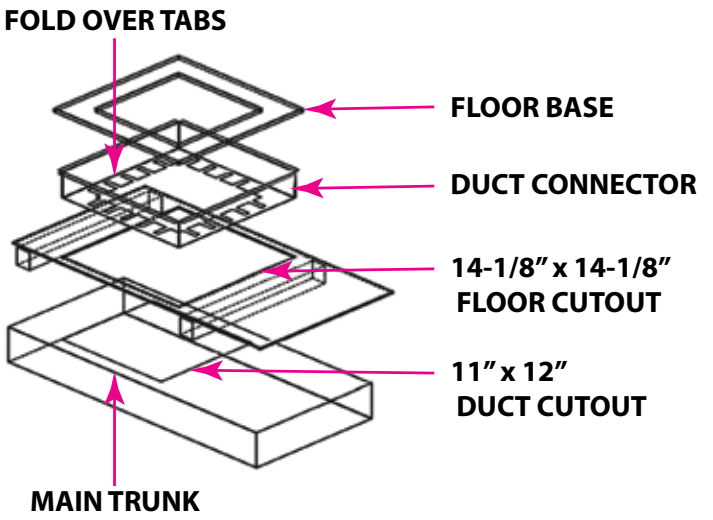

Figure 9: Duct Connector and Combustible Floor Base

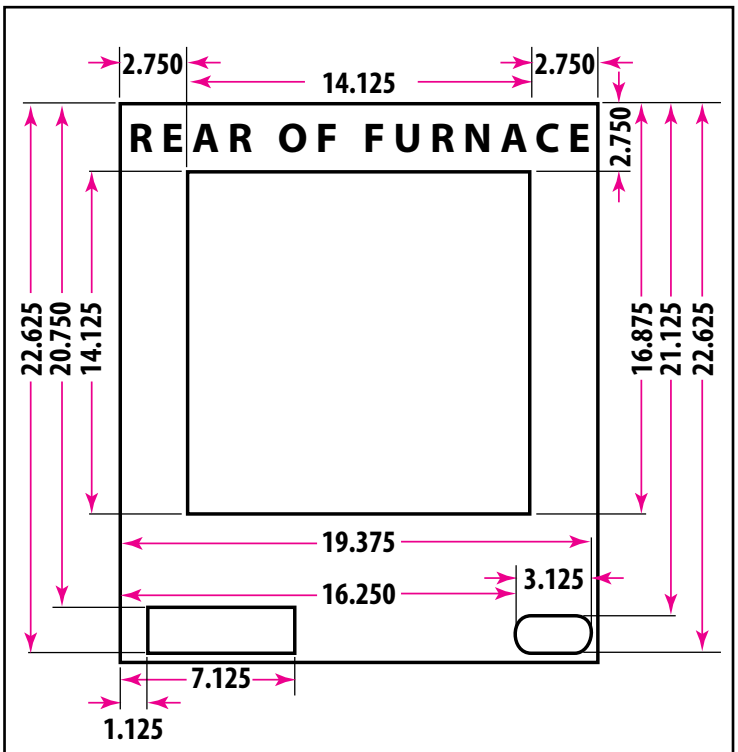

Figure 10: Combustible Floor Base Dimensions

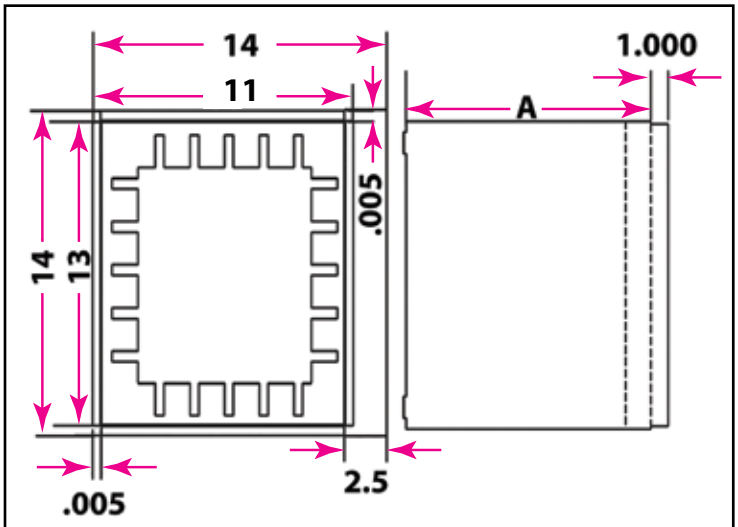

Figure 11: Duct Connector Dimensions

SECTION 7: UPFLOW COIL CABINET AND RETURN AIR CABINET INSTALLATION

Upflow coil and return air cabinets are approved for use in alcove or closet installations with an approved air-conditioning coil. Upflow coil cabinets are available in 28" (711.2 mm) and 36" (914.4 mm) heights. The return air cabinet height for applications with a 28" (711.2 mm) tall coil cabinet is 20" (508mm) and 24" (609.6 mm) for applications with a 36" (915.4 mm) tall coil cabinet. The total height of the furnace, coil cabinet and return air cabinet is as follows:

Return Air Cabinet Height = 20" (508 mm)
Coil Cabinet Height = 28" (711.2 mm)
Furnace height = 33" (838 mm):
Total Height = 81" (2,057.4 mm)

Return Air Cabinet Height = 24" (609.6 mm)
Coil Cabinet Height = 36" (914.4 mm)
Furnace Height = 33" (838 mm)
Total height = 93" (2,362.2 mm)

Follow the steps below to install the coil cabinet assembly.

1. Before beginning the installation, confirm there is enough clearance to install the furnace, coil cabinet, and return air cabinet.
2. Holes for the refrigerant tubing, condensate drain line, line voltage supply wiring, thermostat wiring, and outdoor unit control wiring must be cut prior to installing the furnace, coil cabinet, and return air cabinet.
3. Remove the stretch wrap, top and bottom shipping covers, and corner posts from the furnace.
4. Remove the furnace front access panel (door) and lay the furnace on its back.
5. Remove the coil and return air cabinets from their cartons.
6. If required, remove the left or right metal knockout (not both) in the bottom of the coil cabinet so the refrigerant lines and condensate drain line can be routed through it. Refer to Figure 13 for location of the metal knockouts.
7. Position the coil cabinet on top of the return air cabinet and secure it to the return air cabinet with at least 4 field supplied screws.

8. The installer must fabricate a duct connector that mounts below the coil cabinet for a return duct connected to a remote return air grille. The duct connector must allow for the refrigerant line set to be in front of the duct connector plenum.
9. Position the furnace on the top of the coil cabinet as shown in Figure 14 with the air discharge pointing upward and secure it to the coil cabinet with the at least 4 field supplied screws.
10. Use the upflow duct connector kit to attach the furnace to the overhead supply duct.
11. Stand the assembled furnace, coil cabinet, and return air cabinet up and seal all of the joints with mastic or tape.
12. Insulate the inside of the coil cabinet and the inside of the solid front door with a minimum 1/2 in (12.7 mm) thick insulation to prevent condensation from forming on the outside of the coil cabinet when the system is operating in the cooling mode.
13. Slide the furnace into position below the supply air duct and secure the return air cabinet to the floor with at least 4 field supplied screws.
14. Use the duct collar to secure the supply air duct to the top of the furnace.

⚠ WARNING

When installing the duct collar, do not drive pointed screws into the control box and make sure no screws are touching any components or wires.

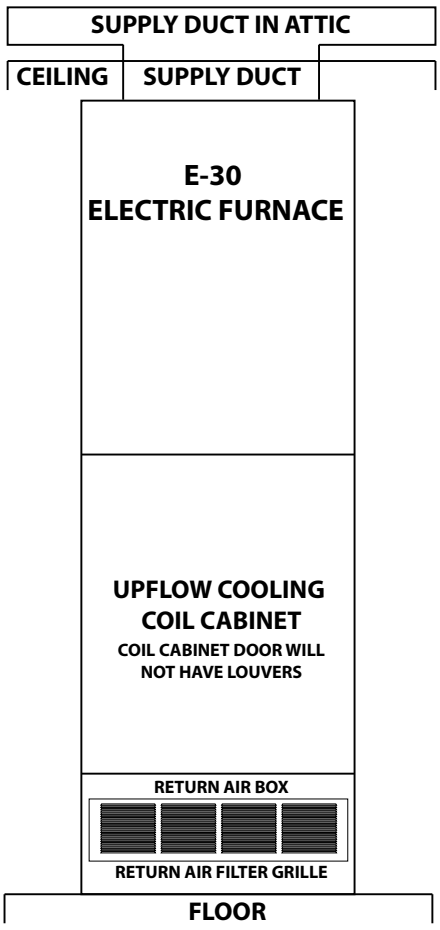

Figure 12: Typical Upflow Installation

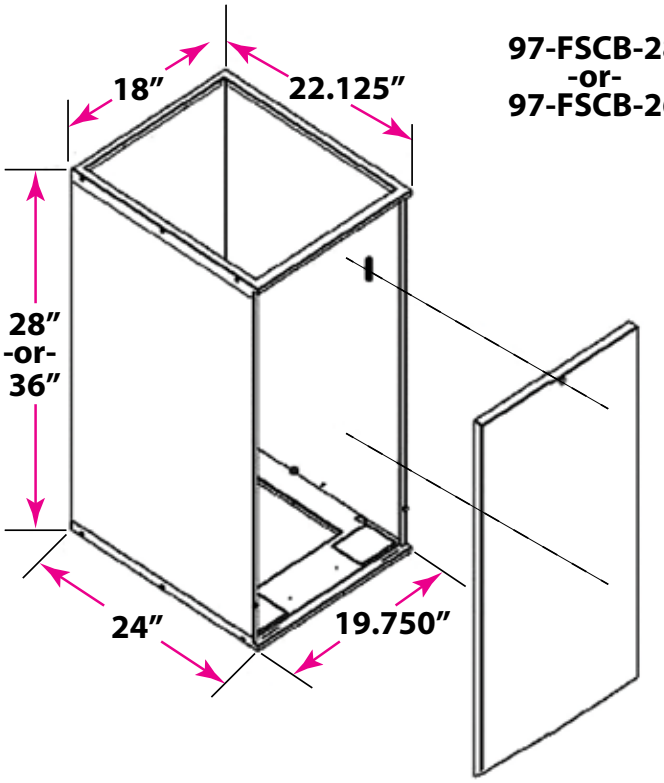

Figure 13: Upflow Coil Cabinet

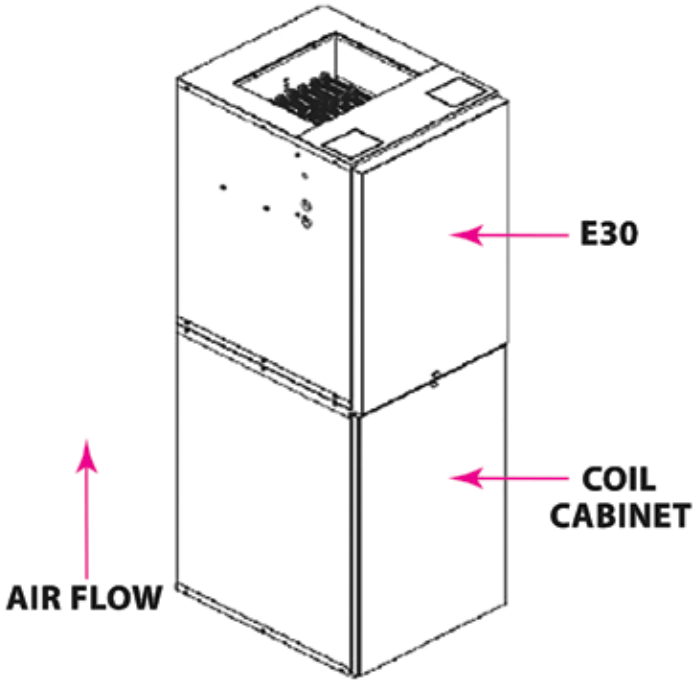

Figure 14: Upflow Furnace and Coil Cabinet

SECTION 8: LINE VOLTAGE WIRING

The furnace internal wiring is complete except for the 208/240 VAC power supply and the thermostat wiring. See wiring diagram and Tables 6 and 7 for wire size, fuse/circuit breaker size, and ground wire sizes. Power wires can enter through the right side of the furnace or through the auxiliary entrance located in the bottom of the furnace. When bringing wiring through the side of the furnace, a cable connector (strain relief) must be installed to hold wiring in place and to relieve any strain on the wiring.

NOTE: This furnace is shipped from the factory for 240VAC applications. The transformer must be reconfigured for 208VAC applications using the following steps to assure adequate control voltage (24VAC).

1) Remove the zip tie from the transformer wire bundle that secures the BLACK, ORANGE and WHITE wires together.
2) Disconnect the WHITE (240VAC) transformer primary wire with an insulated terminal from the load side of the circuit breaker and connect the ORANGE (208VAC) transformer primary wire with an insulated terminal to the same terminal on the circuit breaker.
3) Secure the loose BLACK, ORANGE and WHITE wires to the transformer wire bundle with a zip tie.

⚠ WARNING

Installation of surge protection circuit breakers is recommended to prevent supply line power surges to the furnace. Power surge protection is designed to prevent voltage spikes that can cause damage to heater contactors and limit controls. Voltage spikes can weld the contacts of heat contactors, relays and limit controls closed preventing them from opening. Welded heat contactor or heat relay contacts will result in the electric heaters remaining ON after the blower motor turns off following the end of a heat cycle. Welded limit control contacts will prevent the limit control from opening in an overtemperature condition due to insufficient air-flow. Either condition can result in a hazardous condition which may cause a fire, loss of property or loss of life.

Single Electrical Power Supply – 5kW, 6kW, 8kW, 10kW Electric Heat

1. Remove the furnace front access panel.
2. Remove the control box cover.
3. Install a cable connector (strain relief) in the 7/8" (22.2 mm) diameter hole on the right side of the control box.
   NOTE: Do not install the cable connector in the furnace exterior cabinet hole in the as the sheet metal gauge is too thin.
4. Strip ½" (12.7mm) of the insulation on the end of each wire.
5. Insert the incoming power supply cable through the hole in the left side of the casing and through the cable connector.
6. Insert the BLACK wire into the L1 screw terminal on the circuit breaker and tighten the setscrew until the wire is securely fastened to the circuit breaker screw terminal.
7. Insert the WHITE or RED wire into the L2 screw terminal on the circuit breaker and tighten the setscrew until the wire is securely fastened to the circuit breaker L2 screw terminal.
8. Insert the GREEN ground wire into the ground lug and tighten the set screw until the ground wire is securely fastened to the ground lug.
9. Once all of the wiring connections have been made, secure the incoming power supply cable by tightening the cable connector around the incoming power supply cable.
10. Refer to Table 6 for the required wire size and required overcurrent protection (fuse/circuit breaker) size.

Single Electrical Power Supply - 12kW, 15kW, 20kW Electric Heat

1. Remove the furnace front access panel.
2. Remove the control box cover.
3. Install a cable connector in the 7/8" (22.2 mm) diameter hole on the right side of the control box.
   NOTE: Do not install the cable connector in the furnace exterior cabinet hole in the as the sheet metal gauge is too thin.
4. Strip ½" (12.7mm) of the insulation on the end of each wire.
5. Insert the incoming power supply cable through the hole in the right side of the casing and through the cable connector.
6. Insert the GREEN ground wire into the ground lug and tighten the set screw until the ground wire is securely fastened to he ground lug.

7. Using Jumpers to Connect Power Supply to Stage 2 Circuit Breaker.

a. Insert the BLACK jumper wire along with the incoming BLACK power supply wire into the L1 screw terminal on the top (stage1) circuit breaker and tighten the set screw until the wires are securely fastened to the top circuit breaker L1 terminal.
b. Insert the other end of the BLACK jumper wire into the L1 screw terminal on the bottom (stage 2) circuit breaker and tighten the set screw until the wire is securely fastened to the bottom circuit breaker L1 screw terminal.
c. Insert the WHITE or RED jumper wire along with the incoming WHITE or RED power supply wire into the L2 screw terminal on the top (stage 1) circuit breaker and tighten the set screw until the wires are securely fastened to the top circuit breaker L2 terminal.
d. Insert the other end of the WHITE or RED jumper wire into the L2 screw terminal on the bottom (stage 2) circuit breaker and tighten the set screw until the wire is securely fastened to the bottom circuit breaker L2 screw terminal.
e. Once all of the wiring connections have been made, secure the incoming power supply cable by tightening the cable connector around the incoming power supply cable.
f. Refer to Table 6 for the required wire size and required overcurrent protection (fuse/circuit breaker) size.

8. Using Jumper Bar Assembly to Connect Power Supply to Stage 2 Circuit Breaker

NOTE: Use 100-amp 4 Pole Jumper Bar Assembly Part Number R68BAE003.

a. Remove the jumper bar cover by removing the 2 screws that secure the cover to the assembly.
b. Insert the 4 copper tabs on the jumper bar assembly into the L1 and L2 screw terminals on both of the top and bottom circuit breakers. Tighten the set screws on the screw terminals until the tabs are securely fastened to all 4 of the circuit breaker screw terminals.
c. Insert the incoming BLACK power supply wire into the L1 screw terminal on the jumper bar assembly and tighten the set screw until the wire is securely fastened to the L1 screw terminal.

d. Insert the incoming WHITE or RED power supply wire into the L2 screw terminal on the jumper bar assembly. Tighten the set screw until the wire is securely fastened to the L2. scew terminal.
e. Secure the jumper bar cover to the jumper bar assembly with the 2 screws removed in Step 6a above.
f. Once all of the wiring connections have been made, secure the incoming power supply cable by tightening the cable connector around the incoming power supply cable.
g. Refer to the instructions that came with the jumper bar assembly for additional installation information.
h. Refer to Table 6 for the required wire size and required overcurrent protection (fuse/circuit breaker) size.

Dual Circuit Electrical Power Supply - 12kW, 15kW, 20kW Electric Heat

1. Remove the furnace front access panel.
2. Remove the control box cover.
3. Install a cable connector in the top 7/8" (22.2 mm) diameter hole on the right side of the control box.

NOTE: Do not secure the cable connector in the hole in the casing as the casing sheet metal gauge is too thin.

4. Strip ½" (12.7 mm) of the insulation on the end of each wire.
5. Insert the first wire cable (stage 1 circuit) through the top hole in the right side of the casing and through the cable connector.
6. Insert the incoming BLACK power supply wire (stage 1 circuit) into the L1 screw terminal on the top (stage 1) circuit breaker. Tighten the set screw until the wire is securely fastened to the top circuit breaker L1 screw terminal.
7. Insert the incoming WHITE or RED power supply wire (stage 1circuit) into the L2 screw terminal on the top (stage 1) circuit breaker. Tighten the set screw until the wire is securely fastened to the top circuit breaker L1 screw terminal.
8. Install a cable connector in the bottom 7/8" (22.2 mm) diameter hole on the left side of the control box.

NOTE: Do not secure the cable connector in the hole in the casing as the casing sheet metal gauge is too thin.

9. Strip ½" (12.7 mm) of the insulation on the end of each wire.
10. Insert the second wire cable (stage 2 circuit) through the bottom hole in the left side of the casing and through the cable connector.
11. Insert the incoming BLACK power supply wire (stage 2 circuit) into the L1 screw terminal on the bottom (stage 2) circuit breaker. Tighten the set screw until the wire is securely fastened to the bottom circuit breaker L1 screw terminal.
12. Insert the incoming WHITE or RED power supply wire (stage 2 circuit) into the L2 screw terminal on the bottom (stage 2) circuit breaker. Tighten the set screw until the wire is securely fastened to the bottom circuit breaker L1 screw terminal.
13. Insert the GREEN ground wire from each incoming power supply cables into each ground lug inside the control box and tighten the screw terminal on each ground lug to secure the ground wires to the ground lugs.
14. Once all of the wiring connections have been made, secure the incoming power supply cables by tightening the cable connectors around the incoming power supply cables.
15. Refer to Table 7 for the required wire size and required overcurrent protection (fuse/circuit breaker) size.

IMPORTANT – The circuit breakers in the furnace control box protect the wiring inside of the furnace in the event of a short circuit. Additionally, these breakers provide a means of disconnecting the power to the unit. The circuit breakers in the furnace control box are not meant to protect the wiring between the furnace and the main electrical panel. Wire size and overcurrent protection requirements are shown in Tables 6 and 7. If sheathed cable is used, refer to NEC National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) and any local codes for additional requirements concerning supply circuit wiring. All field installed wiring must be rated for 60ºC or higher. Heating capacities can be found in Table 8.

IMPORTANT – 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.

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

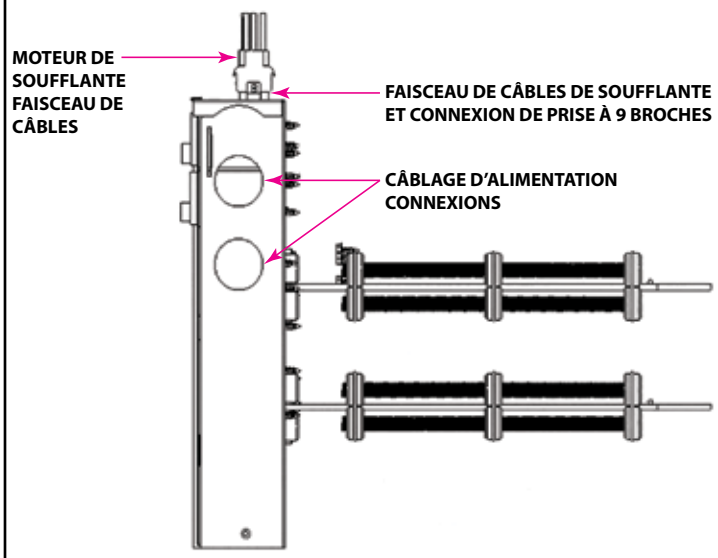

Figure 15: Electrical Power Supply Wire Entrances

ELECTRIC HEATER AND BLOWER MOTOR ELECTRICAL SPECIFICATIONS																		
Electric Heater Size - kW	6 kW			8 kW			10 kW			12 kW			15 kW			20 kW		
Electric Heater Load - FLA	25.00			33.33			41.67			50.00			62.5			83.34		
	AWG			AWG			AWG			AWG			AWG			AWG		
Minimum Wires Size (60° C)	#8	#8	#8	#6	#6	#6	#4	#4	#4	#4	#4	#4	#3	#3	#3	#1	#1	#1
Minimum Wires Size Size (75° C)	#10	#8	#8	#8	#8	#8	#6	#6	#6	#4	#4	#4	#4	#4	#4	#2	#2	#2
Minimum Wires Size (90° C)	#10	#10	#10	#8	#8	#8	#6	#6	#6	#6	#6	#6	#4	#4	#4	#3	#3	#3
Ground Wire Size	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Furnace Model	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6
Indoor Blower FLA	2.40	3.20	4.10	2.40	3.20	4.10	2.40	3.20	4.10	2.40	3.20	4.10	2.40	3.20	4.10	2.40	3.20	4.10
Minimum Circuit Ampacity	35	36	37	45	46	47	56	57	58	66	67	68	82	83	84	108	109	110
Max Overcurrent Protection Amps	35	40	40	45	50	50	60	60	60	70	70	70	90	90	90	110	110	110

Table 6: Wiring Requirements – Single Branch Circuit

6kW, 8kW and 10kW single-stage models can only be wired as a single branch circuit (single power supply).

+ 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 6.

ELECTRIC HEATER AND BLOWER MOTOR ELECTRICAL SPECIFICATIONS									
Electric Heater Size - kW	12 kW			15 kW			20 kW		
	FLA		kW	FLA		kW	F L A		kW
Heater Load Circuit 1 - FLA / kW	25.00		6.00	41.67		10.00	41.67		10.00
Heater Load Circuit 2 - FLA / kW	25.00		6.00	20.83		5.00	41.67		10.00
	AWG			AWG			AWG		
Minimum Wire Size (60° C) Circuit 1	#8	#8	#8	#4	#4	#4	#4	#4	#4
Minimum Wire Size (76° C) Circuit 1	#10	#8	#8	#6	#6	#6	#6	#6	#6
Minimum Wire Size (90° C) Circuit 1	#10	#10	#10	#6	#6	#6	#6	#6	#6
Minimum Wire Size (60° C) Circuit 2	#8	#8	#8	#10	#10	#10	#6	#6	#6
Minimum Wire Size (75° C) Circuit 2	#10	#10	#10	#10	#10	#10	#6	#6	#6
Minimum Wire Size (90° C) Circuit 2	#10	#10	#10	#12	#12	#12	#8	#8	#8
Ground Wire Size	*	*	*	*	*	*	*	*	*
Furnace Model	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6	E30B3	E30B4	E30B5 E30B6
Indoor Blower FLA (Circuit 1)	2.4	3.2	4.1	2.4	3.2	4.1	2.4	3.2	4.1
Minimum Circuit Ampacity (Circuit 1)	35	36	37	56	57	58	56	57	58
Minimum Circuit Ampacity (Circuit 2)	32	32	32	27	27	27	53	53	53
Max Overcurrent Protection Amps (Circuit 1)	35	40	40	60	60	60	60	60	60
Max Overcurrent Protection Amps (Circuit 2)	35	35	35	30	30	30	60	60	60

Table 7: Wiring Requirements – Dual Branch Circuit

12kW, 15kW and 20kW two-stage models may have a dual or single branch circuit (dual or single power supply).

A jumper bar assembly or jumper wires are used to connect a single power supply to the stage 2 (bottom) circuit breaker.

+ 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 7.

ELECTRIC HEATER PERFORMANCE DATA										
Electric Heater Size		6 kW	8 kW	10 kW	12 kW		15 kW		20 kW	
Branch Circuit Number		1	1	1	1	2	1	2	1	2
240 VAC, 60 HZ, 1 PH	BTU	20,439	27,297	34,121	20,473	20,473	17,027	34,121	34,121	34,121
	kW	5.99	8.00	10.00	6.00	6.00	4.99	10.00	10.00	10.00
230 VAC, 60 HZ, 1 PH	BTU	18,771	25,070	31,337	18,802	18,802	15,637	31,337	31,337	31,337
	kW	5.50	7.35	9.18	5.51	5.51	4.58	9.18	9.18	9.18
220 VAC, 60 HZ, 1 PH	BTU	17,174	22,937	28,671	17,203	17,203	14,307	28,671	28,671	28,671
	kW	5.03	6.72	8.40	5.04	5.04	4.19	8.40	8.40	8.40
208 VAC, 60 HZ, 1 PH	BTU	15,352	20,503	25,629	15,377	15,377	12,789	25,629	25,629	25,629
	kW	4.50	6.01	7.51	4.51	4.51	3.75	7.51	7.51	7.51

Table 8: Electric Heat Performance Data

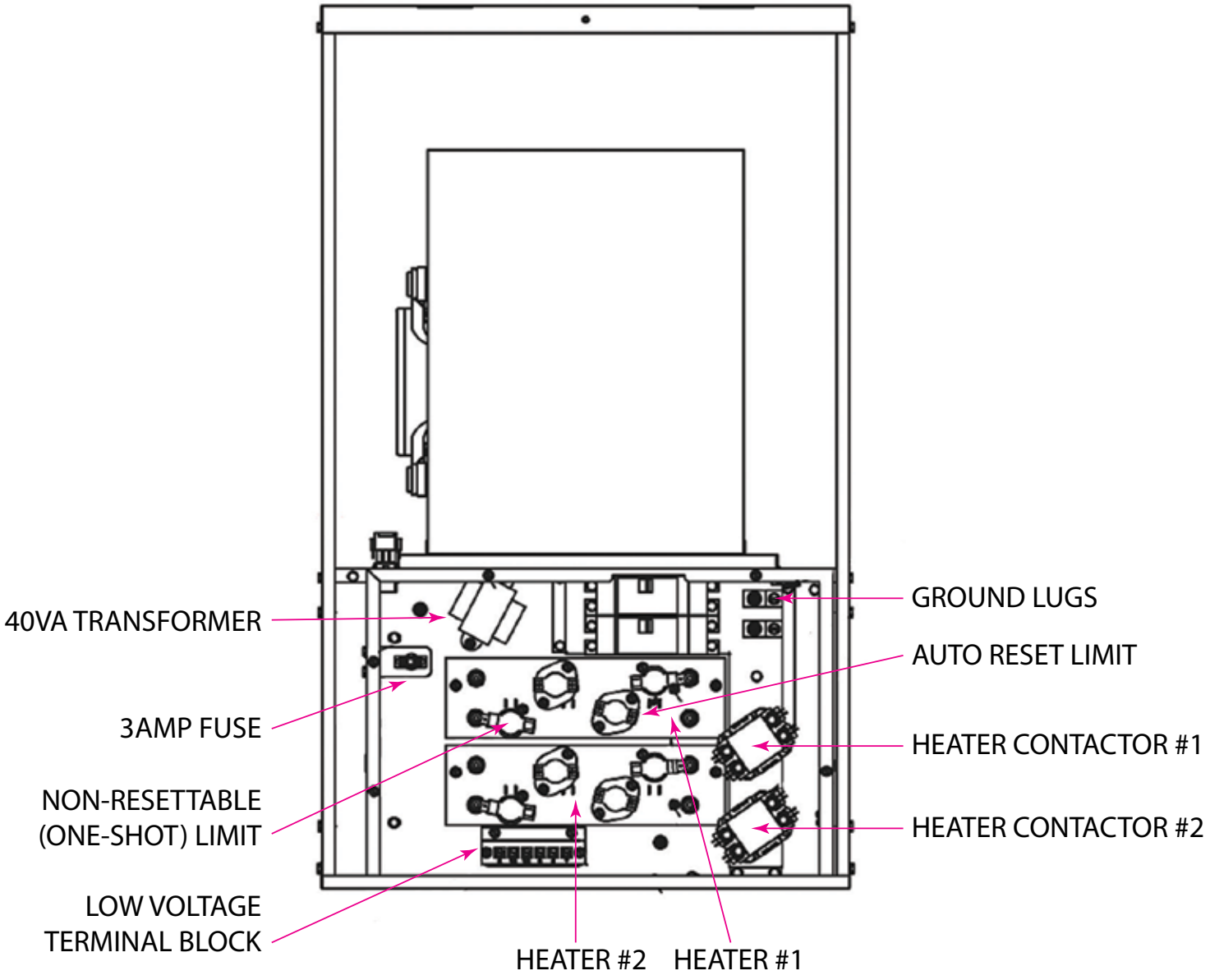

Figure 16: Control Box Component Locations

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

⚠ WARNING

For personal safety, turn the electrical power "OFF" at the main electrical panel (circuit breaker box) and switch the furnace control box circuit breakers to the "OFF" position before attempting any service or maintenance operations. Homeowners should never attempt to perform any maintenance which requires opening the furnace control box cover (See Figure 16).

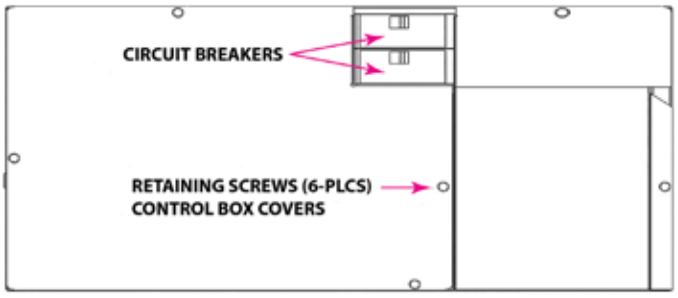

Figure 17: Control Box Cover & Circuit Breaker Location

SECTION 9: THERMOSTAT WIRING AND LOW VOLTAGE CONNECTIONS

Thermostat Wiring

Thermostat wires must on the right side of the furnace cabinet and must be no smaller than 20 AWG. Refer to Table 9 for recommended wire gauge, lengths and maximum current for each wire gauge.

NOTE: The thermostat wire cable must enter only on the left side of the furnace cabinet into the left side of the control box through the provided plastic bushing and CANNOT pass through the line voltage section (right side) of the control box.

Thermostat Wire Length	Thermostat Wire Gauge	Thermostat Wire Maximum Current
Feet/Meters	AWG	Amps
0-70/21.34	20	3.00
0-112/34.14	18	3.00

Table 9: Low Voltage Wire Gauge and Maximum Lengths

NOTE: A 3 Amp slow-blow fuse is located on the left side of the control box that protects the 24 VAC circuit. Replace this fuse only with the equivalent 3 Amp glass fuse.

The use of a five-conductor cable from the thermostat to the furnace is recommended for typical heating or heating/ cooling installations with a two or three-conductor cable from the furnace to the cooling-only outdoor unit.

A seven or eight conductor cable from the thermostat to the furnace is recommended for a typical heat pump installation with a five-conductor cable from the furnace to the heat pump outdoor unit.

The thermostat wire colors for typical heating, cooling and heat pump connections are shown in Tables 10 and 11.

Thermostat Installation

The thermostat should be located on an inside wall in an open area to more closely regulate average room air, preferably where there is air movement back to air handler. Locating height of thermostat is important. If possible, the thermostat should be located in a hall-way upstream from the air handler return airflow, not within 3 feet of from any windows and 52 to 66 inches above the floor. DO NOT place the thermostat within three feet of any of the air-distribution supply air registers.

Maintenance, operating and/ or programming instructions are in the envelope accompanying the thermostat. Give the envelope to the homeowner.

⚠ CAUTION

Do not locate thermostat within 3 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. **Any hot water**
10. **Within 15 feet of an electric space heater**
11. **Within 2 feet of sunlight**

Furnace and Outdoor Unit With Separate Transformers

If the furnace and the outdoor unit have separate transformers, it is important to use a thermostat with isolated heating and cooling contacts "RC" and "RH" to prevent interconnection of Class II 24 VAC systems. Most modern thermostats have separate heating and cooling contacts for use with homes that have an air handler and outdoor unit that are completely separate and each have a 24 VAC transformer for system control. These thermostats have a "RC" terminal for cooling and a "RH" terminal for heating. Connect the RED wire from the "R" terminal on the outdoor unit to the "RC" terminal on the thermostat and the "R" terminal from the furnace low voltage terminal block (LVTB) to the "RH" terminal on the thermostat. If the "R" circuits from the furnace and outdoor unit with separate transformers are both connected to the thermostat "R" terminal, a transformer burnout can occur or the outdoor unit control system could go into lockout mode. If a furnace and outdoor unit with separate transformers are being installed and the thermostat does not have the "RC" and "RH" terminals, a new thermostat with "RC" and "RH" terminals must be purchased and installed.

IMPORTANT: Cycle the air handler and outdoor unit separately to make sure both operate correctly.

Separate Thermostats For Heating and Cooling

If heating and cooling are controlled by separate thermostats, a thermostat interlock switch (See Figure 21) is required to prevent the furnace and the outdoor unit from operating at the same time.

⚠ CAUTION

When using separate thermostats for heating and cooling, a thermostat interlock must be placed in the thermostat "R" circuit. Simultaneous operation of heating and cooling can result in equipment overheating, equipment damage, and wasted energy.
Do not connect a wire to the thermostat Y terminal unless an outdoor unit is installed.

Thermostat Heat Anticipator

Some thermostats have a heat anticipator setting that must be set to the settings shown below in order to function correctly. If the heat anticipator setting is too low, the system will short cycle. If the heat anticipator setting is too high, the system will run long heat cycles thus causing the temperature to overrun the temperature setting. This will cause the homeowner or user to feel too warm by the time the blower completes its cycle and too cold by the time the system cycles on again. The heat anticipator should be set to 0.4 for all heating kW's.

The thermostat may be a "self-setting" type in which no heat anticipator will be found on the thermostat, eliminating the need for field adjustment.

Typical Heat/Cool Low Voltage Wiring Connections

1. Remove the front access panel.
2. Remove the control box cover.
3. Install a field supplied grommet in the 3/8" hole on the right side of the furnace cabinet to protect the thermostat wire cables.
4. Strip ½" of the insulation from the end of each wire in the low voltage cables.
5. Insert the wire cables from the thermostat and outdoor cooling unit through the grommet in the right side of the furnace cabinet and through the 3/8" strain relief installed in the control box.
6. Place the thermostat wire cable next to the furnace low voltage terminal block (LVTB).
7. Connect the RED thermostat wire (24 VAC) to the "R" screw terminal on the LVTB.
8. **Single-Stage Heat Wiring Connection** - Connect the WHITE thermostat wire (heat) to the "W1 " screw terminal on the LVTB. **Two-Stage Heat Wiring Connection** (12kW – 20kW Only) Remove the factory installed jumper wire between the W1 and W2 terminals on the LVTB and discard. Connect the WHITE wire from the thermostat "W1" terminal (1st stage heat) to the "W1" screw terminal on the LVTB. Connect the BLACK wire from the thermostat "W2" terminal (2nd stage heat) to the "W2" screw terminal on the LVTB.
9. Connect the GREEN thermostat wire (indoor fan) to the "G" screw terminal on the LVTB.
10. Connect the YELLOW thermostat wire (cool) and the YELLOW wire from the outdoor unit compressor contactor to the "Y" screw terminal on the LVTB.
11. Connect BROWN thermostat wire (24 VAC common) and the BROWN wire from the outdoor unit compressor contactor to the "C" screw terminal on the LVTB.

Typical Heat Pump Low Voltage Wiring Connections

1. Remove the front access panel.
2. Remove the control box cover.
3. Install a field supplied grommet in the 3/8" hole on the right side of the furnace cabinet to protect the thermostat wire cable(s).
4. Strip ½" of the insulation from the end of each wire in the low voltage cable(s).
5. Insert the wire cable(s) from the thermostat and outdoor unit through the grommet in the right side of the furnace cabinet and through the 3/8" strain relief installed in the control box.
6. Place the thermostat wire cable next to the furnace low voltage terminal block (LVTB).
7. Connect the RED wire (24 VAC) from the thermostat "R" terminal and the RED wire from the "R" terminal on the outdoor unit control board to the "R" screw terminal on the LVTB.
8. Connect the WHITE wire (emergency heat) from the thermostat "W/E" terminal to the "W1" screw terminal on the LVTB.
9. **Furnaces with 2-Stage Heat (12kW – 20kW Only):** Remove the factory installed jumper wire between the W1 and W2 terminals on the LVTB and discard. Connect the BLACK wire from the thermostat "W2" terminal (2nd stage heat) to the "W2" screw terminal on the LVTB.
10. Connect the GREEN wire (indoor fan) from the thermostat "G" terminal to the "G" screw terminal on the LVTB.
11. Connect the YELLOW wire (cool/heat pump heat) from the thermostat "Y" terminal and the YELLOW wire from the "Y" terminal on the outdoor unit control board to the "Y" screw terminal on the LVTB.
12. Connect BROWN wire (24 VAC common) from the thermostat "C" terminal and the BROWN wire from the "C" terminal on the outdoor unit control board to the "C" screw terminal on the LVTB.
13. Connect the ORANGE or BLUE thermostat wire from the thermostat "O" or "B" terminal to the ORANGE or BLUE (reversing valve solenoid) wire from the "O" or "B" terminal on the outdoor unit with a wire nut. The connections ("O" vs. "B") will depend on the outdoor unit brand. Refer to the outdoor unit installation instructions and wiring diagram before making this connection.
14. If the outdoor unit control board has a terminal for energizing electric heat during the defrost cycle and this feature is desired, connect a wire from that terminal to the "W1" terminal on the LVTB. Refer to the outdoor unit installation manual and wiring diagram for more information.

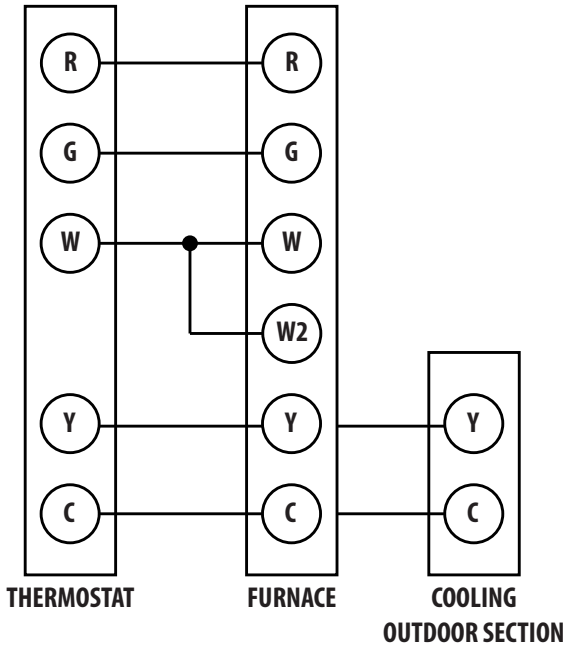

Figure 18: Typical Single-Stage Heat and Cool Low Voltage Connections With Single Transformer in Furnacees

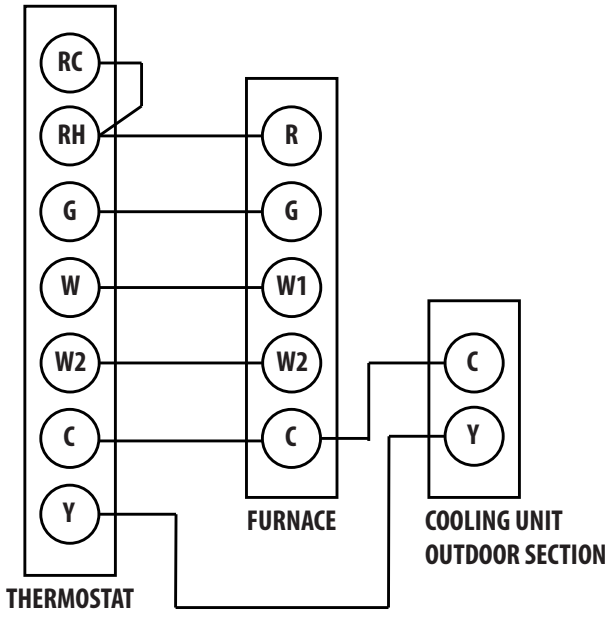

Figure 19: Typical Two-Stage Heat/Single-Stage Cool Low Voltage Connections With Single Transformer in Furnace

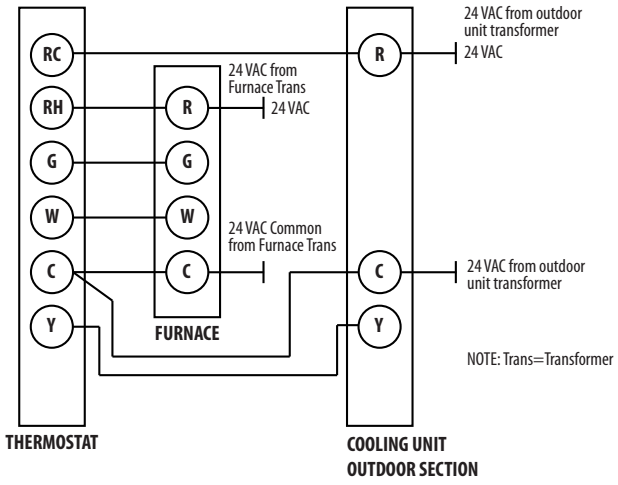

Figure 20: Typical Single-Stage Heat & Cool Low Voltage Connections With Separate Transformers in Furnace and Outdoor Unit

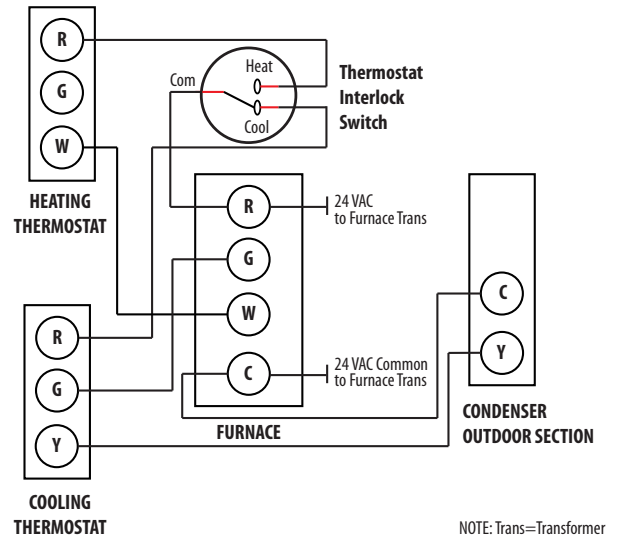

Figure 21: Typical Low Voltage Connections With Separate Thermostats For Heating and Cooling and Single Transformer in Furnace

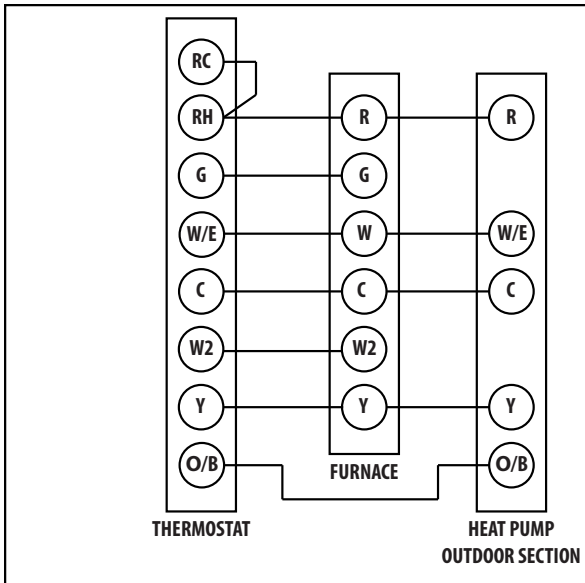

Figure 22: Typical Heat Pump Low Voltage Connections With Single Transformer in Furnace

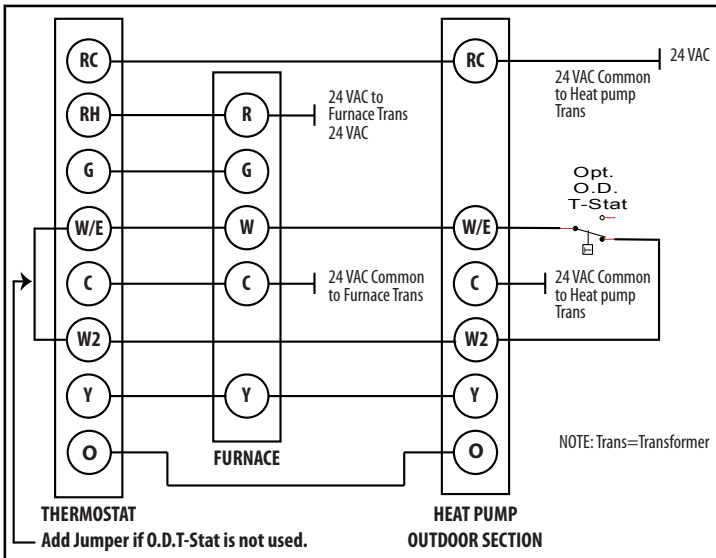

Figure 23: Typical Heat Pump Low Voltage Connections With Separate Transformers in Furnace and Outdoor Unit

THERMOSTAT WIRE COLOR	DESCRIPTION	LETTER CODE	THERMOSTAT AND FURNACE CONNECTIONS	OUTDOOR UNIT CONNECTIONS
RED	24 VAC	R	R	N/A
WHITE	1st Stage Electric Heat	W1	W/W1	N/A
BLACK	2nd Stage Electric Heat (12 - 20kW only)	W2	W2	N/A
GREEN	Indoor Fan	G	G	N/A
YELLOW	Cooling	Y	Y (Thermostat Only)	Y
BROWN	24 VAC Common	C	C	C

Table 10: Typical Heat / Cool Low Voltage Wire Color Codes and Connections

THERMOSTAT WIRE COLOR	DESCRIPTION	LETTER CODE	THERMOSTAT AND FURNACE CONNECTIONS	OUTDOOR UNIT CONNECTIONS
RED	24 VAC	R	R	R
WHITE	1st Stage Electric Heat	W1	E (Thermostat) W1 (Furnace)	See Outdoor Unit Instructions
BLACK	2nd Stage Electric Heat (12 - 20kW only)	W2	W2	See Outdoor Unit Instructions
GREEN	Indoor Fan	G	G	N/A
YELLOW	Cooling	Y	Y (Thermostat Only)	Y
ORANGE	Heat Pump Reversing Valve (Most Brands)	O	O (Thermostat Only)	O (See Outdoor Unit Instructions)
BLUE	Heat Pump Reversing Valve (Some Brands)	B	B (Thermostat Only)	B (See Outdoor Unit Instructions)
BROWN	24 VAC Common	C	C	C

Table 11: Typical Heat Pump Low Voltage Wire Color Codes and Connections

⚠ WARNING

To avoid personal injury or property damage, make certain that the motor leads cannot come into contact with non-insulated metal components of the unit.

⚠ WARNING

Be sure to disconnect the electrical power supply to the furnace by turning off the circuit breakers for the furnace in the home's main electrical panel (circuit breaker box) and the circuit breaker(s) in the furnace control box before removing the furnace front access panel and control box cover.

1. Switch the circuit breakers for the furnace in the main electrical panel (circuit breaker box) to the "OFF" position and switch the furnace circuit breaker(s) to the "OFF" position.
2. Remove the furnace front access panel.
3. Remove the control box cover.
4. Disconnect the speed tap wire to be changed from the ¼ in (6.35 mm) spade terminal on the back of the LVTB and connect the desired speed tap wire to that spade terminal. Refer to Table 12 for motor speed tap descriptions, Table 14 for factory speed tap settings, and the furnace wiring diagram for speed tap wire colors.
5. Reinstall the control box cover.
6. Reinstall the front access panel.
7. Switch the furnace circuit breaker(s) to the "ON" position.
8. Switch the circuit breakers for the furnace in the main electrical panel to the "ON" position.

Speed Tap 5: High Speed – Cooling or Heat Pump Heating Modes
Speed Tap 4: Med-High Speed – Cooling or Heat Pump Heating Modes
Speed Tap 3: Medium Speed – Cooling or Electric Resistance Heating Modes
Speed Tap 2: Med-Low Speed – Electric Resistance Heating Mode
Speed Tap 1: Low Speed – Constant Circulation Mode Only
NOTE: DO NOT USE SPEED TAP 1 FOR HEATING OR COOLING MODES! Speed Tap 1 airflow is approximately 200 CFM. This is not enough airflow for electric heating, cooling, or heat pump heating operation. If Speed Tap 1 is used for cooling, the evaporator will freeze up. If Speed Tap 1 is used for heat pump heating, the outdoor unit high pressure switch will trip. If Speed Tap 1 is used for electric resistance heating, the heater over temperature limits will cycle.

Table 12: Constant Torque Motor Speed Tap Descriptions

Terminal	Connection
C	Speed Tap Common - 24 VAC Common
L	Supply Voltage - 240 VAC Line 1
G	Ground Connection
N	Supply Voltage - 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 13: Constant Torque Motor Terminal Descriptions

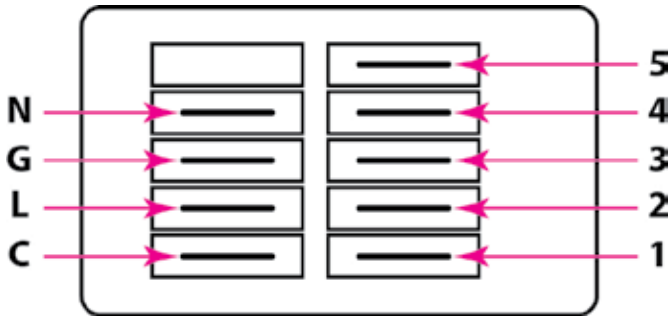

Figure 24: Constant Torque Motor Terminals

E30B3 Blower Airflow Performance Without Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B3	2.0	1/3	240	Constant Torque	10x9	1	805	577	193		
						2	1001	798	584	479	386
						3	1095	955	939	864	714
						4	1280	1205	1128	1045	939
						5	1415	1295	1247	1170	1098
E30B3 Blower Airflow Performance With Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B3	2.0	1/2	240	Constant Torque	10x9	1	575	323	64		
						2	742	642	517	452	378
						3	962	874	795	777	637
						4	1163	1086	1026	953	850
						5	1267	1164	1145	1069	984
E30B4 Blower Airflow Performance Without Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B4	3.0	1/2	240	Constant Torque	10x9	1	921	671	198		
						2	1094	943	891	807	644
						3	1393	1309	1226	1155	1080
						4	1561	1481	1371	1277	1158
						5	1665	1576	1460	1390	1291
E30B4 Blower Airflow Performance With Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B4	3.0	1/2	240	Constant Torque	10x9	1	655	409	167		
						2	959	880	780	662	590
						3	1224	1161	1094	1002	911
						4	1404	1311	1201	1204	1116
						5	1482	1390	1302	1191	1199
E30B5 Blower Airflow Performance Without Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B5	4.0	3/4	240	Constant Torque	10x9	1	981	775	261	190	
						2	1336	1241	1130	1035	1014
						3	1687	1618	1547	1463	1391
						4	1824	1692	1588	1499	1373
						5	1935	1791	1680	1610	1491
E30B5 Blower Airflow Performance With Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B5	4.0	3/4	240	Constant Torque	10x9	1	742	475	238	162	
						2	1238	1167	1102	998	941
						3	1585	1497	1421	1336	1215
						4	1679	1596	1476	1368	1250
						5	1794	1682	1540	1352	1380
E30B6 Blower Airflow Performance Without Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B6	5.0	3/4	240	Constant Torque	12x9T	1	1264	1086	882	834	705
						2	1322	1168	1035	957	879
						3	1393	1214	1226	1139	1036
						4	1593	1493	1398	1263	1285
						5	2100	2021	1943	1852	1762
E30B6 Blower Airflow Performance With Coil											
Blower Code	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Motor Type	Blower Wheel	Motor Tap	CFM @ 0.10″	CFM @ 0.20″	CFM @ 0.30″	CFM @ 0.40″	CFM @ 0.50″
B6	5.0	3/4	240	Constant Torque	12x9T	1	1007	923	828	716	689
						2	1183	1089	1015	926	824
						3	1375	1296	1228	1152	1074
						4	1552	1465	1386	1288	1193
						5	2047	1957	1862	1753	1605

Table 14: Blower Performance (With Air Filters)

Minimum CFM for Electric Heat: 6kW = 390 CFM
8kW = 520 CFM
10kW = 650 CFM
12kW = 780 CFM
15kW = 975 CFM
20kW = 1,300 CFM

SECTION 12: FINAL SYSTEM CHECKS AND STARTUP

NOTE: Only qualified service personnel can perform this procedure.

1. Remove the control box cover by removing the screws that secure the cover to the control box.
2. Confirm that the incoming supply power wires are connected to the correct terminals on the circuit breaker(s) and that they are securely fastened to the screw terminals.
3. Confirm that the incoming thermostat wires are connected to the correct terminals on the low voltage terminal block and that they are securely fastened to the screw terminals.
4. Reinstall the control box cover with the screws that were removed in step #1.
5. Switch the circuit breaker(s) in the main electrical panel (circuit breaker box) to the "ON" position.
6. Switch the circuit breaker(s) in the furnace control box to the "ON" position.
7. Set the thermostat FAN selector switch to the "ON" position and check for proper blower operation and check all duct connections for air leaks. Seal any leaks that are found.
8. Set the thermostat FAN selector switch to the "AUTO" position.
9. Set the thermostat to the HEAT mode and set the thermostat setpoint above the room temperature to check for proper operation of the electric heaters.
10. Set the thermostat to the COOL mode and set the thermostat setpoint to below the room temperature to check for proper operating of the cooling system (if applicable).
11. Set the thermostat to the desired mode and temperature.

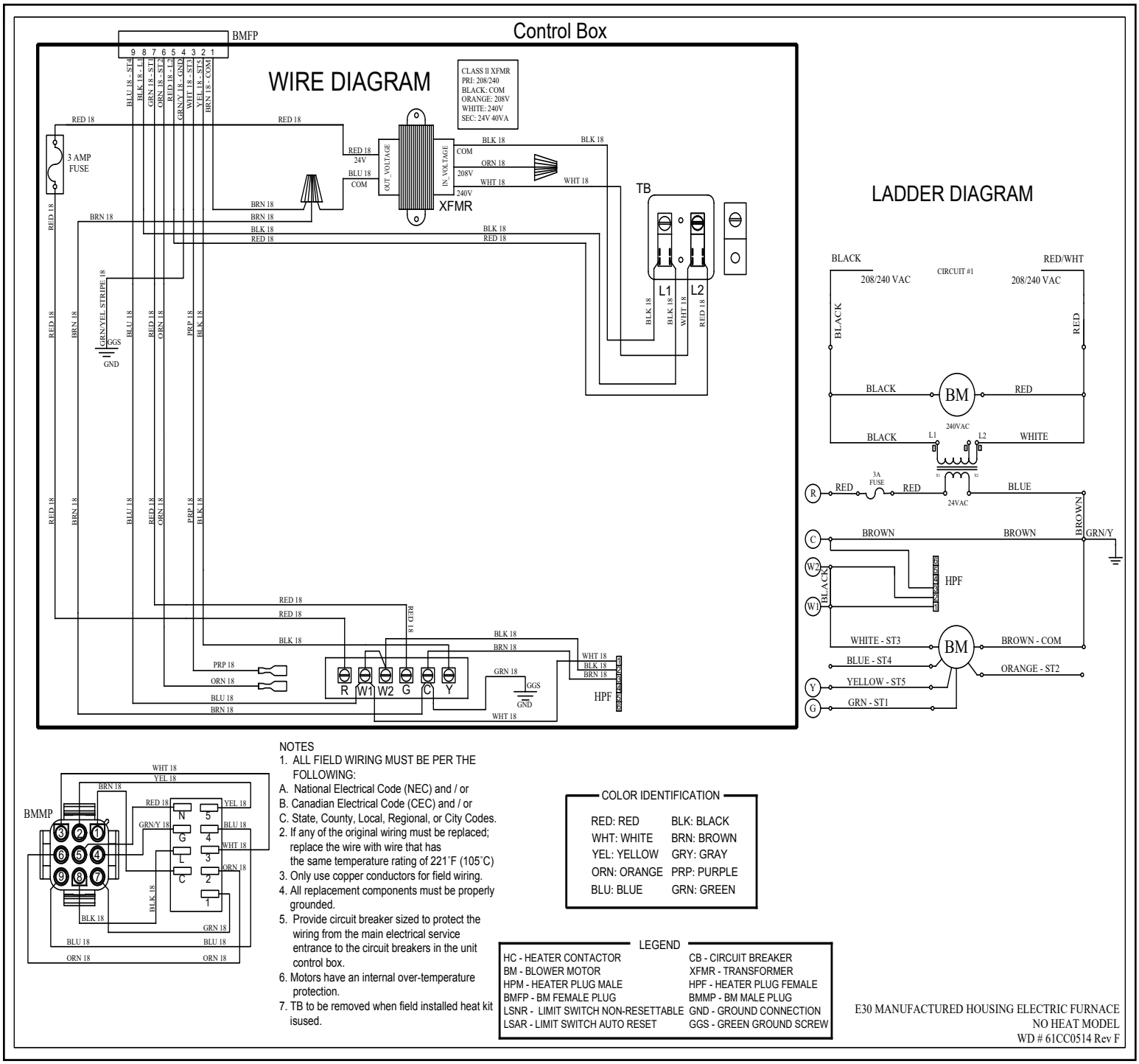

Figure 25: No Heat Wiring Diagram

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

BLOWER MOTOR SPEED TAP INFORMATION:

TAP 5 – High Speed – Used for cooling operation. Energized by the "Y" thermostat terminal.

TAP 4 – Med-High Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 3 – Medium Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 2 – Med-Low Speed – Used for heating operation only. Energized by the "W" thermostat terminal. TAP 1 – Low Speed – Used for constant circulation operation ONLY. This speed tap only delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits. Energized by the "G" thermostat terminal.

WARNING – LOW SPEED TAP IS TO BE USED FOR CONSTANT CIRCULATION ONLY!

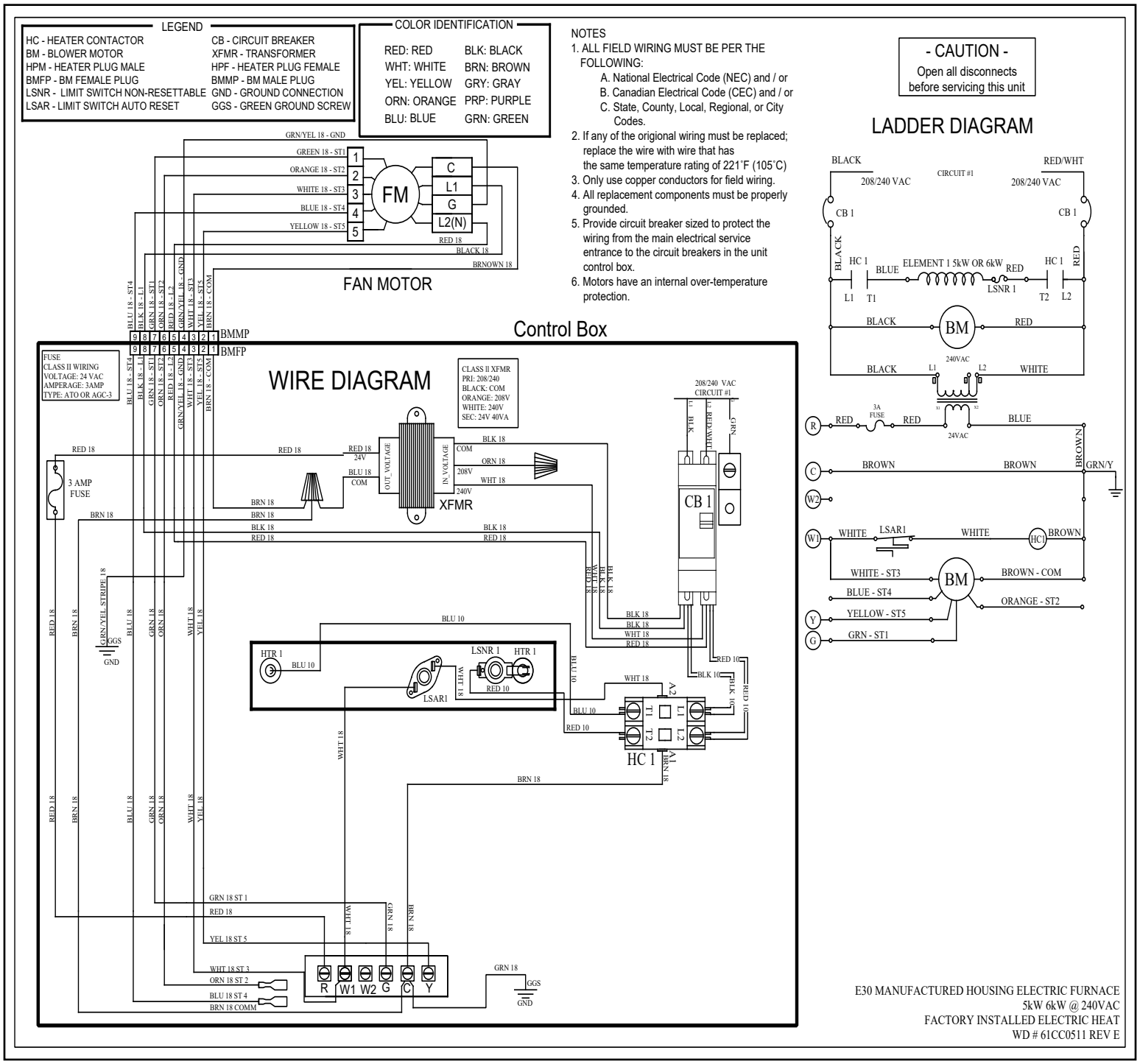

Figure 26: 6 kW Electric Heat Wiring Diagram

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

BLOWER MOTOR SPEED TAP INFORMATION:

TAP 5 – High Speed – Used for cooling operation. Energized by the "Y" thermostat terminal.

TAP 4 – Med-High Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 3 – Medium Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 2 – Med-Low Speed – Used for heating operation only. Energized by the "W" thermostat terminal. TAP 1 – Low Speed – Used for constant circulation operation ONLY. This speed tap only delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits. Energized by the "G" thermostat terminal.

WARNING – LOW SPEED TAP IS TO BE USED FOR CONSTANT CIRCULATION ONLY!

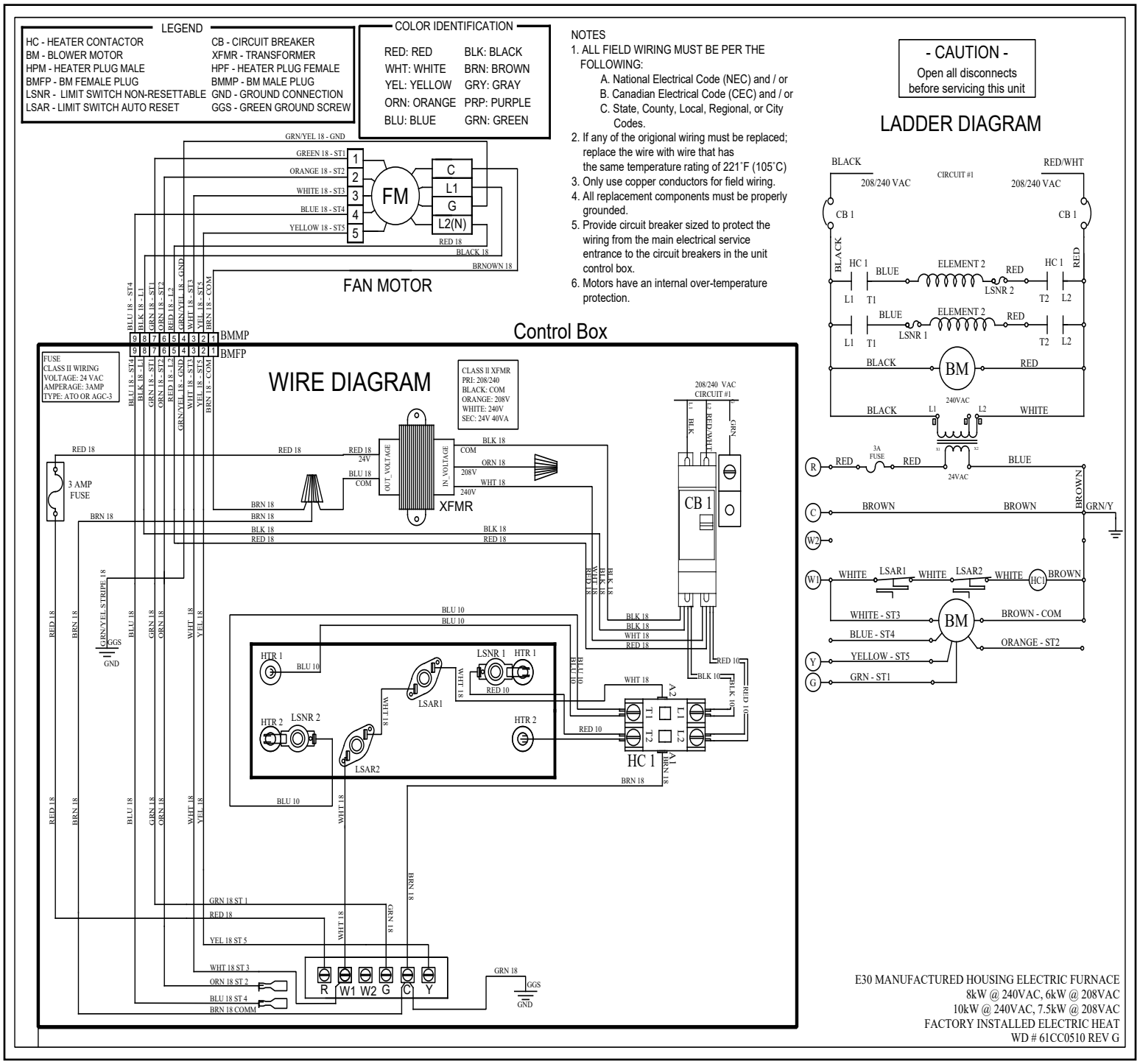

Figure 27: 8 kW and 10 kW Electric Heat Wiring Diagram

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

BLOWER MOTOR SPEED TAP INFORMATION:

TAP 5 – High Speed – Used for cooling operation. Energized by the "Y" thermostat terminal.

TAP 4 – Med-High Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 3 – Medium Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 2 – Med-Low Speed – Used for heating operation only. Energized by the "W" thermostat terminal. TAP 1 – Low Speed – Used for constant circulation operation ONLY. This speed tap only delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits. Energized by the "G" thermostat terminal.

WARNING – LOW SPEED TAP IS TO BE USED FOR CONSTANT CIRCULATION ONLY!

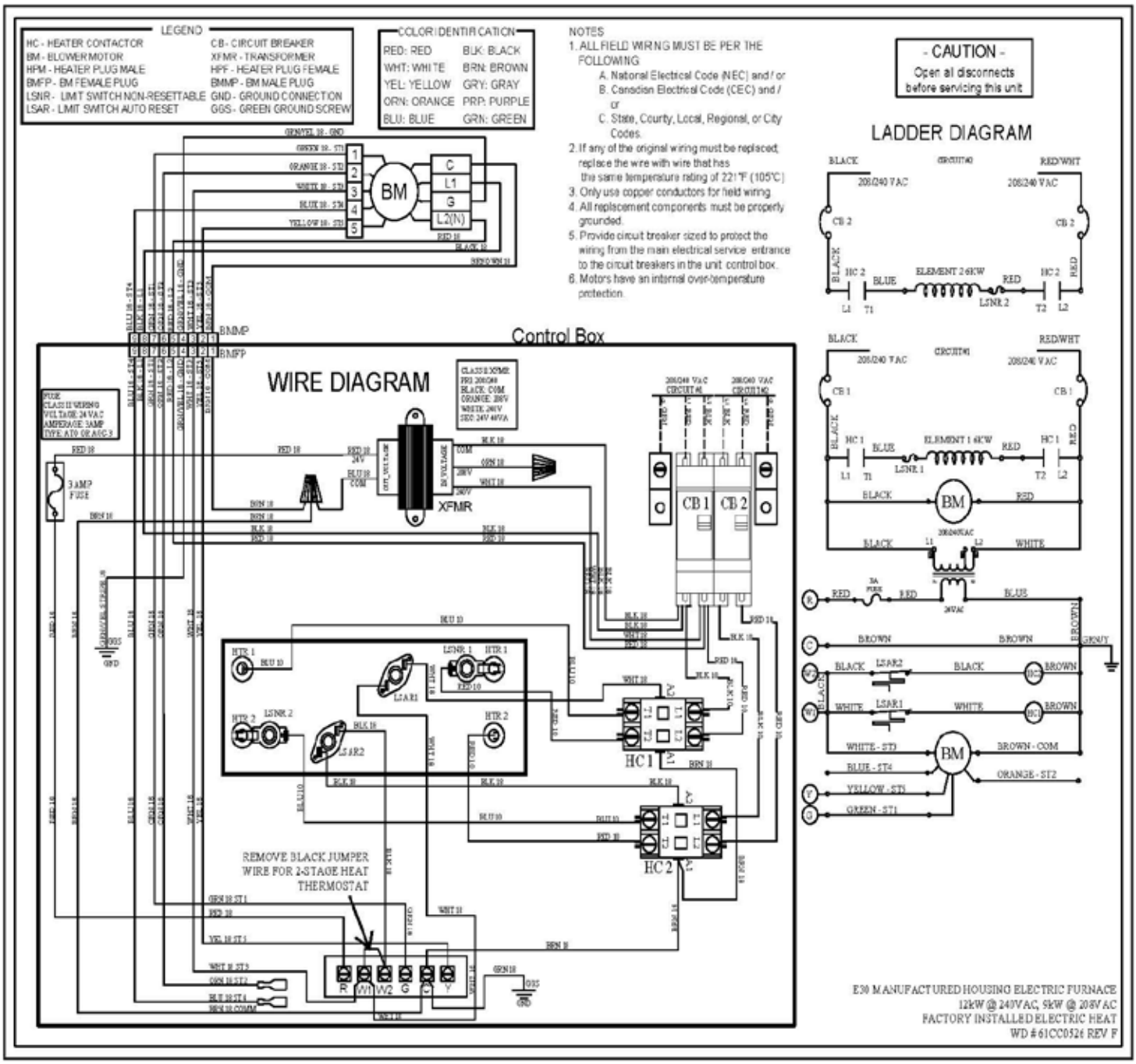

Figure 28: 12 kW Electric Heat Wiring Diagram

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

BLOWER MOTOR SPEED TAP INFORMATION:

TAP 5 – High Speed – Used for cooling operation. Energized by the "Y" thermostat terminal.

TAP 4 – Med-High Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 3 – Medium Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 2 – Med-Low Speed – Used for heating operation only. Energized by the "W" thermostat terminal. TAP 1 – Low Speed – Used for constant circulation operation ONLY. This speed tap only delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits. Energized by the "G" thermostat terminal.

WARNING – LOW SPEED TAP IS TO BE USED FOR CONSTANT CIRCULATION ONLY!

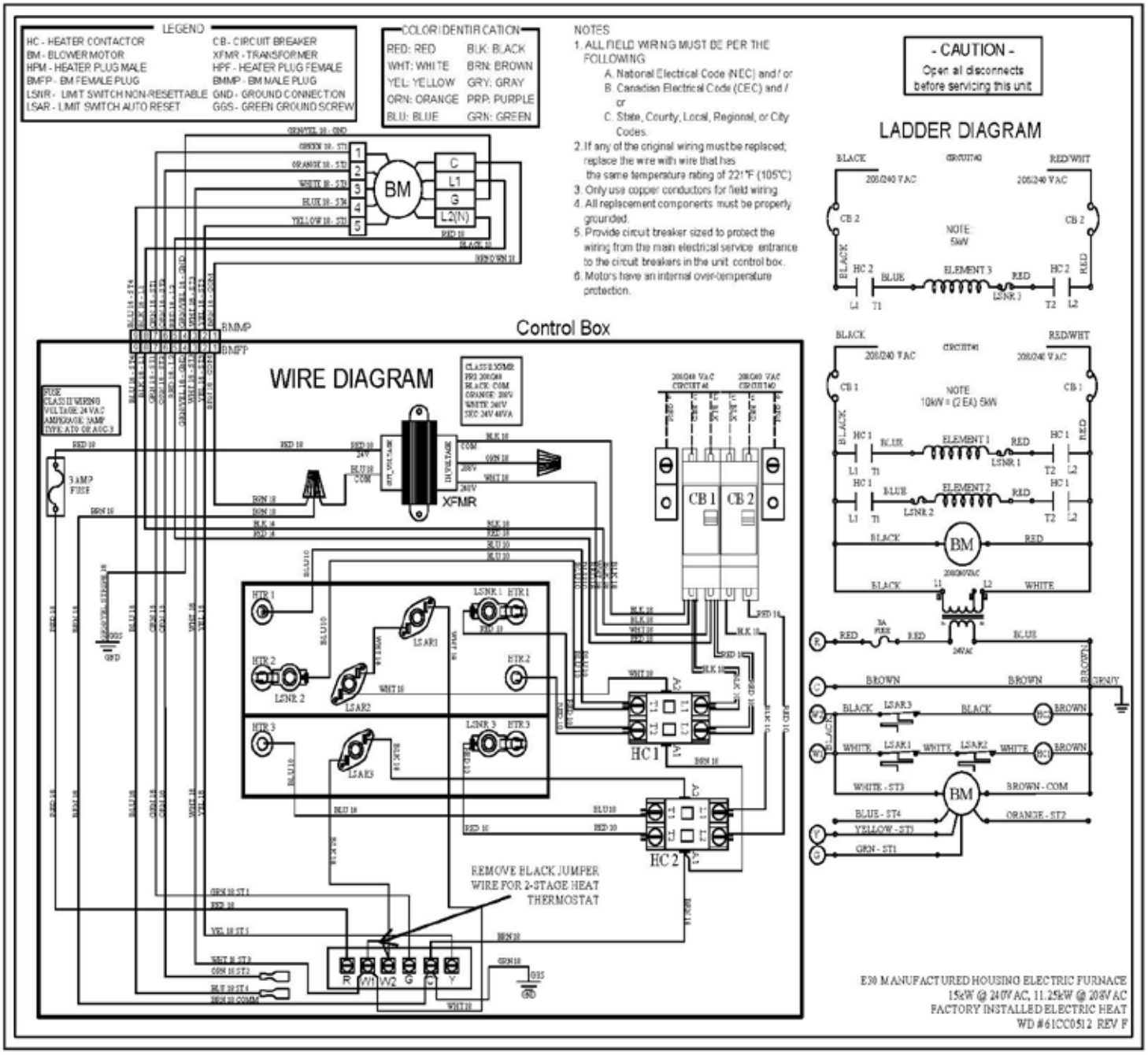

Figure 29: 15 kW Factory Installed Electric Heat Wiring Diagram

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

BLOWER MOTOR SPEED TAP INFORMATION:

TAP 5 – High Speed – Used for cooling operation. Energized by the "Y" thermostat terminal.

TAP 4 – Med-High Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 3 – Medium Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 2 – Med-Low Speed – Used for heating operation only. Energized by the "W" thermostat terminal. TAP 1 – Low Speed – Used for constant circulation operation ONLY. This speed tap only delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits. Energized by the "G" thermostat terminal.

WARNING – LOW SPEED TAP IS TO BE USED FOR CONSTANT CIRCULATION ONLY!

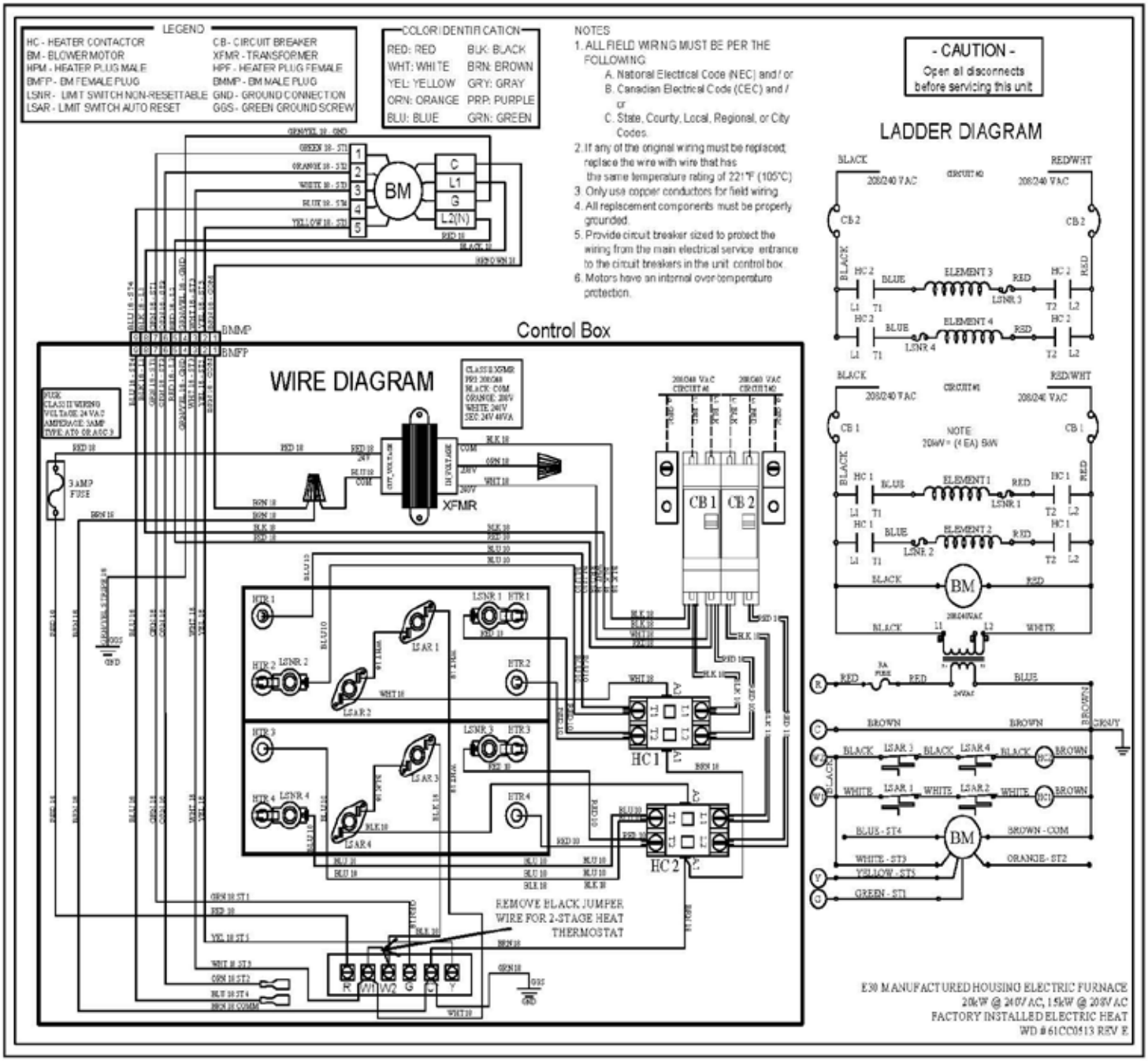

Figure 30: 20 kW Factory Installed Electric Heat Wiring Diagram

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT

BLOWER MOTOR SPEED TAP INFORMATION:

TAP 5 – High Speed – Used for cooling operation. Energized by the "Y" thermostat terminal.

TAP 4 – Med-High Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 3 – Medium Speed – Used for cooling or heating operation. Energized by the "Y" or "W" thermostat terminals. TAP 2 – Med-Low Speed – Used for heating operation only. Energized by the "W" thermostat terminal. TAP 1 – Low Speed – Used for constant circulation operation ONLY. This speed tap only delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits. Energized by the "G" thermostat terminal.

WARNING – LOW SPEED TAP IS TO BE USED FOR CONSTANT CIRCULATION ONLY!