

INSTALLATION MANUAL

DOWNFLOW SINGLE AND TWO STAGE ELECTRIC FURNACE WITH:

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



MODELS: E30 SERIES

LIST OF SECTIONS

1 – General	1	7 – Line Voltage and Control Box Wiring	9
2 – Safety	3	8 – Field Installed Heat Kit	12
3 – Downflow Return Air and Clearance Requirements	4	9 – Thermostat Wiring and Connections	13
4 – Downflow Supply Air and Duct Connector Installation	5	10 – Motor, Blower and Furnace Startup	16
5 – Furnace Installation	7	11 – Final System Checkout	17
6 – Upflow Configuration	8	12 – Wiring Diagrams	19

LIST OF FIGURES

1 – Furnace Dimensions	2	22 – Same T'stat, Separate Furnace, Trans and Cool Unit	14
2 – Closet Clearances	4	23 – Single Stage Heat / Cool T'stat, Two Stage Furnace	15
3 – Typical Closet Installations	4	24 – Two Stage Heating / Cooling T'stat, Furnace	16
4 – Typical Alcove Installations	5	25 – Typical Two Stage Heating / Heat Pump T'stat, Furnace	16
5 – Clearance – Access for Service	5	26 – X-13 motor Terminals	17
6 – Duct Connector Depths	5	27 – Blower Assembly and Blower Deck	17
7 – Duct Connector and Floor Base Installations	6	28 – Wiring Diagram No Heat Model w/ X-13 Blower Motor	19
8 – Duct Connector Measurements	6	29 – Wiring Diagram 5 kW w/ X-13 Blower Motor	20
9 – Duct Connector and Floor Base Measurements	6	30 – Wiring Diagram 8 kW, 10 kW, 12kW w/ X-13 Blower Motor	21
10 – Return Air Grille and Frame Assembly	7	31 – Wiring Diagram 12 kW w/ X-13 Blower Motor	22
11 – Grille and Frame Assembly Filter Locations	7	32 – Wiring Diagram 15 kW w/ X-13 Blower Motor	23
12 – Coil Cabinet Door Bracket Location	8	33 – Wiring Diagram 20 kW w/ X-13 Blower Motor	24
13 – Typical Upflow Installation	8	34 – Wiring Diagram No Heat Model w/ PSC Blower Motor	25
14 – Control Box Component Locations	11	35 – Wiring Diagram 5 kW w/ PSC Blower Motor	26
15 – Control Box Cover and Circuit Breaker Location	11	36 – Wiring Diagram 8 kW, 10 kW w/ PSC Blower Motor	27
16 – Line Voltage Electrical Shield	11	37 – Wiring Diagram 12 kW w/ PSC Blower Motor	28
17 – Line Voltage Electrical Shield Location	12	38 – Wiring Diagram 15 kW w/ PSC Blower Motor	29
18 – Control Box Power, Blower & Fuse Connections	13	39 – Wiring Diagram 20 kW w/ PSC Blower Motor	30
19 – Separate Thermostats, Same Furnace Wiring Diagram	14		
20 – Separate Thermostats, Same Furnace Wiring Diagram	14		
21 – Same T'stat, Separate Furnace, Trans and Heat Pump	14		

LIST OF TABLES

1 – Electric Furnace Model Specifications	2	9 – Field Installed Electric Heat Kit Model Number Chart	12
2 – Model Nomenclature	2	10 – Field Installed Electric Heat Kit Model Nomenclature	12
3 – Optional Cooling Cabinets and Return Air Grille	2	11 – Low Voltage Wire Gauge and Max Lengths	13
4 – Clearances to Combustibles	4	12 – Recommended Heat/Cool T'stat Wire Color Code	15
5 – Duct Connectors	5	13 – Recommended Heat/Cool/HP T'stat Color Code	15
6 – Wiring Requirements – Single Branch Circuit	9	14 – X-13 Motor Terminal Connections	16
7 – Wiring Requirements – Dual Branch Circuit	10	15 – X-13 Motor Factory Speed Tap Settings	18
8 – Electrical Data	10		

SECTION I: GENERAL

The following list includes important facts and information regarding the electric furnace and its inclusions.

1. Furnace is rated at 240 volts AC at 60 Hertz
2. Furnace is the same size for all models
3. Four-wire thermostat operation for heating and cooling
4. A/C ready furnaces equipped with blower for A/C or Heat Pump operation
5. Holding Strap furnished with furnace
6. This furnace is designed for downflow application

7. This furnace must not be operated without furnace door installed

NOTE: This furnace and its components listed on the A/C and Heat Pump equipment sticker were listed in combination as a system by ETL for the United States.

SAVE THIS MANUAL FOR FUTURE REFERENCE

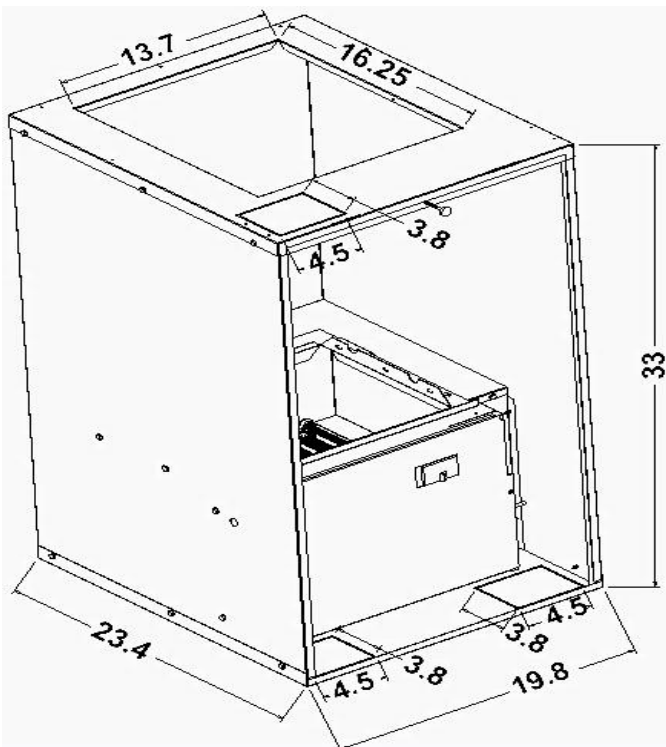


Figure 1: Furnace Dimensions

Models	ALL	ALL	ALL
Input, kW	5	8	10
With A-Coil Cabinet	NO	NO	NO
Air Temperature Rise, Range - F	20-80	20-80	30-90
Designed Max Outlet Air Temp-F	170	170	180
Blower-Heat or Heat/Cool	10 X 9 BLOWER		
Max. External SP (Duct), In. W.C.	0.3		
Thermostat Circuit	24 VAC, 60 Hz, 40VA		
Electric Furnace Cabinet Height	33 inches		

Models	ALL	ALL	ALL
Input, kW	12	15	20
With A-Coil Cabinet	NO	NO	NO
Air Temperature Rise, Range - F	30-90	35-100	40-100
Designed Max Outlet Air Temp-F	180	185	185
Blower-Heat or Heat/Cool	10 X 9 BLOWER		
Max. External SP (Duct), In. W.C.	0.3		
Thermostat Circuit	24 VAC, 60 Hz, 40VA		
Electric Furnace Cabinet Height	33 inches		

Table 1: Electric Furnace Model Specifications

Available Blower Motors

1. Standard Blower Motor - 5 SPD X-13 MOTOR
2. Optional Blower Motor – 3 SPD PSC MOTOR

	Type of Fuel	Cabinet Height	Type of Blower Motor	Blower Motor Speed Taps and HP	Furnace Configuration	Heating Input (kW)	Furnace Cabinet Height	Furnace Coil Cabinet	Revision Letter
E = Electric Furnace		30 = 33"	A = PSC B = X-13						A = New release A = Single Stage Heat B = Two Stage Heat A = Coil Cabinet Optional
1 = 3 SPD 1/2 HP PSC 2 = 3 SPD 1/3 HP PSC 3 = 5 SPD 1/3 HP X-13 4 = 5 SPD 1/2 HP X-13 5 = 5 SPD 3/4 HP X-13 6 = 3 SPD 3/4 HP PSC									005 = 5 kW Heater 008 = 8 kW Heater 010 = 10 kW Heater 012 = 12 kW Heater 015 = 15 kW Heater 017 = 17 kW Heater 020 = 20 kW Heater
D = Downflow									

Table 2: Furnace Model Nomenclature

Coil Cabinet Model	Front Door of Cabinet	Open Top 17 3/4" x 21 3/4"	Maximum Air Flow CFM	1" Pleated Air Filter, In The Door	2" Pleated Air Filter, Top of Cabinet	Height	Depth	Width	Coil Sizes
97-FLSB-21	Louvered	N/A	1200	20x20		23 1/4"	25"	19 3/4"	All Mortex 96 series coils will fit in cabinet
97-FSOB-21	Solid		1600		20x24	23 1/4"	25"	19 3/4"	
97-FLOB-21	Louvered		1800	20x20	20x24	23 1/4"	25"	19 3/4"	
97-FLSB-27	Louvered	N/A	1600	20x30		30 1/2"	25"	19 3/4"	96-97 series coils and 98 series coils sizes up to 98-8W7
97-FSOB-27	Solid		1600		20x24	30 1/2"	25"	19 3/4"	
97-FLOB-27	Louvered		1800	20x20	20x24	30 1/2"	25"	19 3/4"	
97-FLSB-39	Louvered	N/A	1800	2ea 20x20		40 1/4"	25"	19 3/4"	All Mortex series coils will fit in cabinet
97-FSOB-39	Solid		2000		20x24	40 1/4"	25"	19 3/4"	
97-FG-18	Louvered	N/A	1200	N/A	N/A	18"	N/A	19 3/4"	Frame & Grills Non-Cabinet
97-FG-24	Louvered	N/A	1600	N/A	N/A	24"	N/A	19 3/4"	

Table 3: Optional Cooling Cabinets and Return Air Grille Frame Assemblies

SECTION II: SAFETY




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: indicated 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.

 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.

Furnace Weights

E30A1DxxxAAA Models – 82 lbs
E30A2DxxxAAA Models – 82 lbs
E30B3DxxxAAA Models – 79 lbs
E30B4DxxxAAA Models – 81 lbs

E30B5DxxxAAA Models – 85 lbs
E30A6DxxxAAA Models – 85 lbs
Safety Requirements

1. This electric furnace should be installed in accordance with all national and local; building, safety, plumbing, and wastewater codes and requirements; along with all other applicable codes.
2. Refer to the furnace rating plate for the furnace model number.
3. Refer to the dimensions page of this instruction for the duct connector dimensions shown in Figures 6 thru 9. The duct connector must be installed according to the instructions in this manual.
4. Provide clearances from combustible materials as listed under **Clearances to Combustibles.**
5. Provide clearances for servicing ensuring service access is allowed for the control box, electric elements and the blower.
6. Failure to carefully read and follow all instructions in this manual can result in malfunction of the furnace, death, personal injury, and/or property damage.
7. Check the rating plate and the power supply to be sure the electrical characteristics match.
8. Electric furnace shall 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 can perform basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters. Observe all precautions in the manuals and on the attached labels when working on this appliance.
11. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances these instructions exceed certain local codes and ordinances, especially those who 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.

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 you should check the cabinet for screws or bolts which may have loosened in transit. There are no shipping or spacer brackets which need to be removed before startup.

Also 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, electric heat, ducts or piping.

Codes

The furnace must be installed 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 C22.1)
- All local codes (State, City, and Township)

NOTE: All applicable codes take precedence over any recommendation made in these instructions.

SECTION III: RETURN AIR AND CLEARANCE REQUIREMENTS LOCATION

Access for servicing is an important factor in the location of any furnace. Provide a minimum of 24 inches 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 from the front access door.

Furnace Clearances

This furnace is approved for zero (0 inches) clearance to combustible material on any part of the furnace exterior and the inlet or outlet ducts. Refer to Table 4 for clearance to combustibles information.

CLEARANCES

MODEL	TOP (in)	BACK (in)	SIDES (in)	FRONT OF FURNACE		DUCT (in)
ALL	6	0	0	ALCOVE (in)	CLOSET (in)	0
				18	6	

Table 4: Clearances to Combustibles

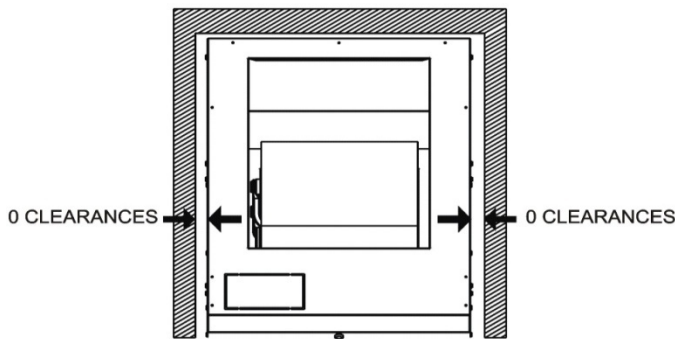


Figure 2: Closet Clearances

Return Air

In order for the furnace to work properly, a closet or alcove must have a certain total free area opening for the return air.

For A/C and HP Furnaces (1/3 HP Blower)

- Minimum 200 in² free area opening
- Use Return Grille or Coil Cabinet

For A/C and HP Furnaces (1/2 HP Blower)

- Minimum 250 in² free area opening
- Use Return Grille, A/C Coil Cabinet, or any return grille with a minimum 250 in² free area opening

For A/C and HP Furnaces (3/4 HP Blower)

- Minimum 390 in² free area opening
- Use Return Grille, or A/C Coil Cabinet, or any return grille with a minimum 390 in² free area opening

Top Return Only – Recommended Grille Size

- 800 CFM – 20 X 20 Grille – 324 in²
- 1000 CFM – 20 X 25 Grille - 414 in²

- 1200 CFM – 25 X 25 Grille - 414 in²
- 1400 CFM – 25 X 30 Grille - 644 in²
- 1600 CFM – 25 X 30 Grille - 644 in²
- 1800 CFM – 30 X 30 Grille - 784 in²

Louvered Door and Top Return – Recommended Grille Size

- 800 CFM – 10 X 20 Grille – 144 in²
- 1000 CFM – 12 X 20 Grille -180 in²
- 1200 CFM – 14 X 20 Grille - 216 in²
- 1400 CFM – 18 X 20 Grille - 288 in²
- 1600 CFM – 18 X 20 Grille - 288 in²
- 1800 CFM – 20 X 20 Grille - 324 in²

The return air opening can be located in a closet front door or a side wall above the furnace casing, or in a louvered door on the furnace. If opening for the return air is located in the floor, side walls, or closet door anywhere below the furnace casing height, a 6 inch minimum clearance must be provided on the furnace side where the return is located to provide for proper air flow. The 6 inch minimum clearance is not required if there is a return grille installed above the furnace with the sufficient return air opening.

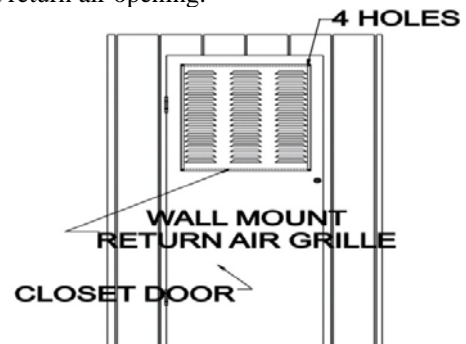


Figure 3: Typical Closet Installations

Provisions shall be made to permit the air in the rooms and the living spaces to return to the furnace. Failure to comply may cause a reduction in the amount of return air available to the blower, causing reduced air flow resulting in improper heating of the living space. The reduced air flow may cause the furnace to cycle on the limit causing premature heating element failure.

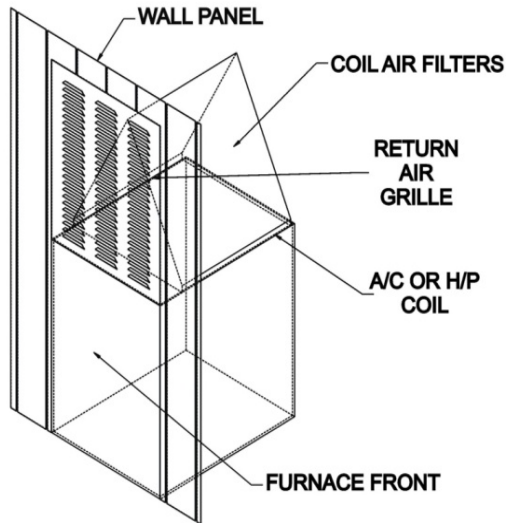


Figure 4: Typical Alcove Installations

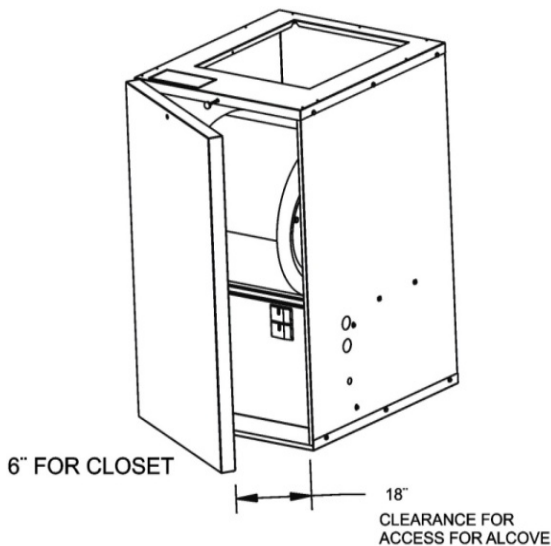


Figure 5: Clearance – Access for Service

Air Distribution System

The furnace is designed to operate at a 0.30 inch WC static pressure. In order to assure proper air flow through the furnace the duct distribution system must be designed so that the external static pressure from the furnace, thru the duct system must not exceed 0.30 inch WC. It is recommended you review the manual “**Manufactured Housing Duct Systems Guide to Best Practices**” by Manufactured Housing Research Alliance (MHI-MHRA) before selecting the air distribution system you are going to use.

SECTION IV: SUPPLY AIR AND DUCT CONNECTOR INSTALLATION

Duct Connectors

90-DCU0-XX Duct Connectors

The duct connector is used to provide a sealed connection between the furnace base and a under the floor 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 indicates the duct connector needed for your application.

DEPTH FROM FLOOR TO DUCT	FINGERED STYLE
1"	90-DCU0-01
2"	90-DCU0-01
3"	90-DCU0-01
4"	90-DCU0-01
5"	90-DCU0-02
6"	90-DCU0-02
7"	90-DCU0-02
8"	90-DCU0-02
9"	90-DCU0-03
10"	90-DCU0-03
11"	90-DCU0-03
12"	90-DCU0-03

Table 5: Duct Connectors

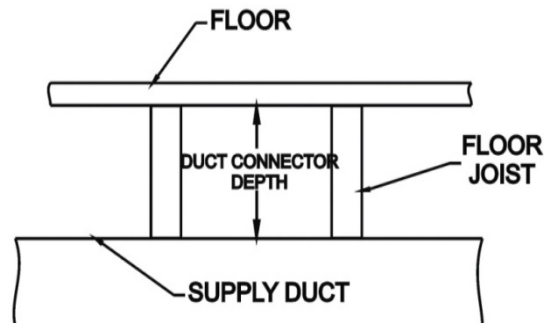


Figure 6: Duct Connector Depths

⚠ WARNING

Duct connector can be installed on combustible flooring, **except carpeting**. It is recommended to use insulation having a rating of R-12 or higher is used between the floor base and the combustible floor.

The use of insulation with a rating of R-12 or higher between the floor base and a combustible floor is a precautionary measure to prevent the combustible floor from getting to warm. The use of R-12 insulation between the duct connector and the floor is not a requirement.

Installing the Duct Connector

1. Attach the four (seal strip) foam tape gaskets provided with the duct connector alongside the perimeter of the duct opening to seal the duct connector where it attaches to the top of the duct as shown in Figures 7, 8 and 9.
2. Insert the duct connector thru the opening in the floor and attach the duct connector to the top of the duct 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, so the top of the duct is securely fastened to the duct connector. Be sure the seal strip has sealed the area around the duct connector where it attaches to the duct.
3. Slit the corners of the duct connector that extend above the floor, and then bend the sides over onto the floor surface. Refer to Figures 7, 8 and 9.
4. It is recommended to place insulation with a rating of R-12 or higher between the floor base and the floor when used on a combustible floor. The use of insulation between the duct connector and a combustible floor is not a requirement, it is a precautionary measure to guard against the combustible floor from getting to warm. If insulation is used, be sure to cut the insulation around the perimeter of the duct connector opening.
5. Install the floor base over the floor opening with the flanges on the 11 x 13 inch opening facing down. Refer to Figures 8 and 9.
6. Locate the four (4) screws provided with the duct connector kit and install the four screws through the four holes provided in the floor base to secure the floor base to the floor.

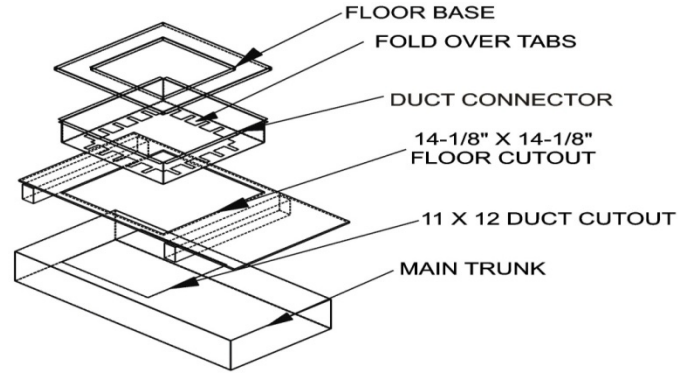


Figure 7: Duct Connector and Floor Base Installation

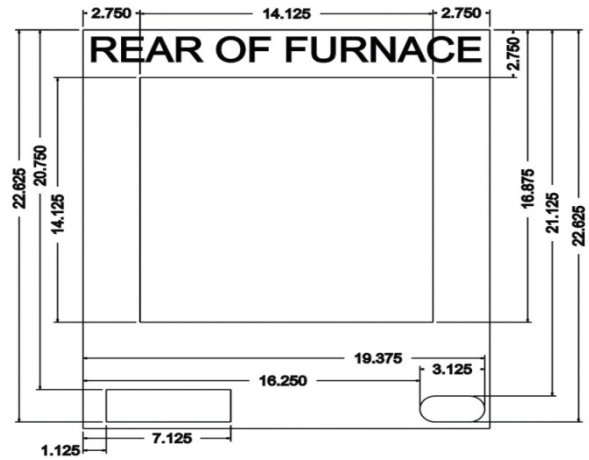


Figure 8: Duct Connector Measurements

The duct connector is designed for use on ducts wider than 12 inches. When using the connector on smaller width ducts, there will not be sufficient clearance to bend the tabs on two sides of the duct connector. This furnace is designed to be installed on an existing duct connector.

In such cases the tabs may be attached to the sides of the duct by using sheet metal screws or other suitable fasteners. Place holes in the tabs for sheet metal screws by drilling the required screw holes in three (3) tabs on each side of the duct connector. If more than three tabs need to be used to provide a more secure and air tight connection, then 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.

Tape can be used to provide a better air seal. The tape should be a type approved by applicable national or local codes.

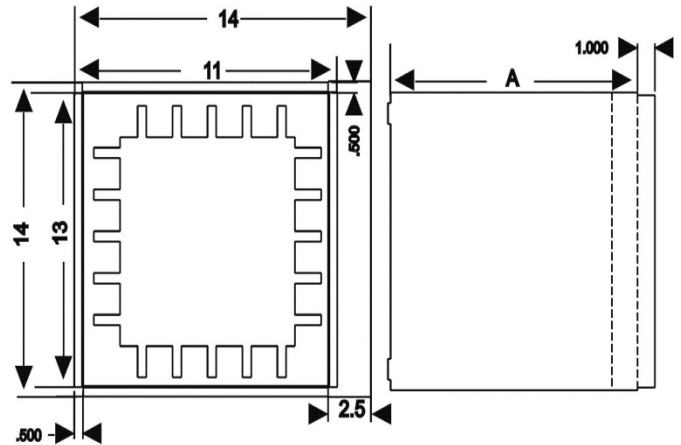


Figure 9: Duct Connector Installation in the Floor

SECTION V: FURNACE INSTALLATION

Installing the Furnace with a Return Air Grille Frame Assembly

Alcove Installation

This kit is approved for use in an alcove – heating only installation without an air conditioning coil. The return air grille frame assembly is available in 18” height and 24” height. To install the return air grille frame assembly to the furnace, follow the steps below:

Prior to installing the furnace make sure the holes are cut into the floor for the refrigerant tubing, the electrical wiring are in place, the thermostat wiring and the condenser control wiring should be in place.

1. Before installing the return air grille frame on the furnace, be sure you have enough clearance to install the furnace and the return air grille assembly.
2. Remove the top shipping cover and corner posts.
3. Remove the front access panel (door).
4. Remove the return air grille frame assembly from the box.
5. Set the return air grille frame assembly on the top-front part of the furnace. Be sure to line up the screw holes in the frame with the screw holes in the furnace top cover as shown in Figure 10.
6. Insert the screws provided with the louvered door assembly through the holes in the louvered door frame and into the holes in the furnace top cover.
7. Tighten the screws to secure the louvered door frame assembly to the top cover of the furnace.
8. Remove the bottom shipping cover.
9. Slide the furnace on to the floor base. Push the furnace back until the furnace casing is against the rear flange.
10. Secure the furnace to the floor by drilling 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 to the floor.

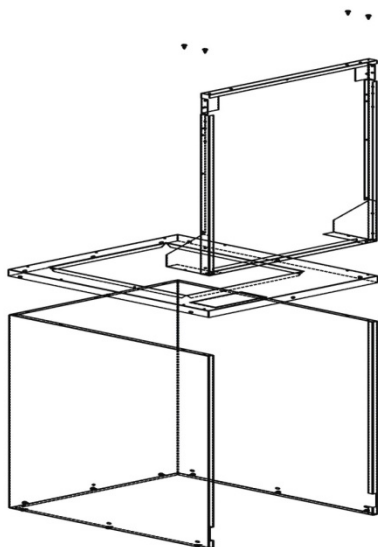


Figure 10: Return Air Grille Frame Assembly

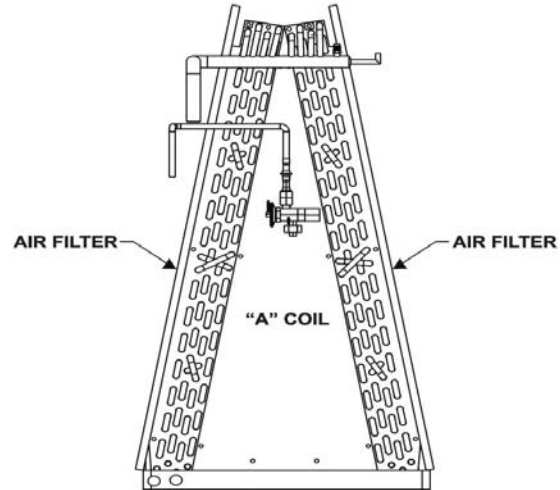


Figure 11: Return Air Frame Assembly Filter Location

Installing the Furnace and Coil Cabinet

Closet Installation

This kit is approved for use in an alcove or closet installations with an approved air conditioning coil. The coil cabinets are available in 23.25”, 30.50” and 41.25” height. The furnace is 33” in height making the total furnace and coil cabinet heights 56”, 63” and 73”. To install the coil cabinet assembly to the furnace, follow the steps below:

Prior to installing the furnace make sure the holes are cut into the floor for the refrigerant tubing, the drain line, the electrical wiring, the thermostat wiring and the condenser control wiring.

1. Before installing the coil cabinet on the furnace, be sure you have enough clearance to install the furnace and the filter door assembly.
2. Remove the top shipping cover and corner posts.
3. Remove the bottom shipping cover.
4. Remove the front access panel (door) and lay the furnace on its back.
5. Remove the coil cabinet from the box and assemble per the instructions.
6. Lay the coil cabinet on its back and place the coil cabinet flanges against the furnace top cover.
7. Place coil cabinet door bracket between the coil cabinet flanges and the furnace top as shown in Figure 12.
8. Install the screws through the holes provided in order to secure the cooling coil cabinet to the top of the furnace.
9. Slide the furnace on to the floor base. Push the furnace back until the furnace casing is against the rear flange.
10. Secure the furnace to the floor by drilling 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 to the floor.

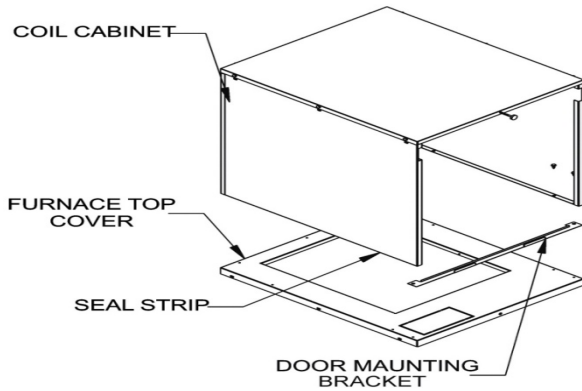


Figure 12: Coil Cabinet Door Bracket Location

SECTION VI: UPFLOW CONFIGURATION

This kit is approved for use in an alcove or closet installations with an approved air conditioning coil. The upflow broke down coil cabinets are available in a 20" and 27.5" height. The upflow configuration requires either a 16" tall return air cabinet or a 19.75" tall return air cabinet under the coil cabinet making the total height of the furnace, coil cabinet and return air cabinet heights 69" or 80". To install the coil cabinet assembly and the return air assembly follow the steps below:

Prior to installing the furnace make sure the holes are cut into the floor for the refrigerant tubing, the drain line, the line voltage supply wiring, the thermostat wiring and the condenser control wiring.

1. Before installing the coil cabinet on the furnace, be sure you have enough clearance to install the furnace, the coil cabinet and the return air cabinet.
2. Remove the top shipping cover and corner posts.
3. Remove the bottom shipping cover.
4. Remove the front access panel (door) and lay the furnace on its back.
5. Remove the coil cabinet from the shipping box.
6. Place the rear panel against the left side panel. Place the angle bracket against the sides and back, align the screw holes and install the three (3) screws on the side and the three screws on the back. The angle brackets must be used for rigidity so the coil cabinet can support the weight of the furnace.
7. Place the rear panel against the right side panel. Place the angle bracket against the sides and back, align the screw holes and install the three (3) screws on the side and the three screws on the back. The angle brackets must be used for rigidity so the coil cabinet can support the weight of the furnace.
8. Place the coil shelf inside the coil cabinet at the bottom of the cabinet and secure to the sides and rear panels with the nine (9) screws.
9. Place the coil cabinet top cover on top of the cabinet. Make sure the flanges overlap the side panels and back panel, then, secure by installing the nine (9) screws through the clearance holes in the top cover flanges and tighten the screws into the engagement holes in the side panels and the back panel.

10. Place the 1/2 inch seal strip around the opening in the bottom of the coil shelf and place seal strip around the opening in the top cover. This will seal the air leaks between the cabinets.
 11. Push the coil cabinet up to the top of the furnace and secure to the furnace top cover to the coil cabinet with screws thru the nine holes on the panel.
 12. Place the return air cabinet at the bottom of the coil cabinet. Use the nine screws provided in the kit to secure the return air cabinet to the coil cabinet.
 13. Stand up the assembled unit and slide it into position below the supply air duct. Use the duct collar to secure the supply air duct to the top of the furnace. Be careful when installing the duct collar not to use pointed screws in the control box and make sure no screws are touching any components or wires.
 14. Place the cooling coil on to the coil shelf and follow the instructions provided with the outdoor cooling unit and the evaporator coil to properly connect the refrigerant piping to the evaporator coil and the drain lines to the condensate drain pan. Make sure the coil and drain pan are all the way to the back of the shelf so the hole in the center of the drain pan lines up with the hole in the center of the coil shelf.
 15. Place the cooling cabinet front door on the unit by inserting the tabs in the bottom of the door into the slots in the coil shelf, line up the strike in the front flange of the top cover and push the two strikes into the both latches on the front flange on the door.
- NOTE: The installer must provide a strap that attaches to the top of the furnace and is secured to the alcove or closet wood framing
16. The 19.75" tall return air cabinet requires two standard 20" x 25" x 1" disposable air filters in the filter tracks located inside the return air cabinet.
 17. The 16" tall return air cabinet requires two standard 16" x 20" x 1" disposable air filters in the filter tracks located inside the return air cabinet.
 18. Install a louvered grille in the front of the return air cabinet.

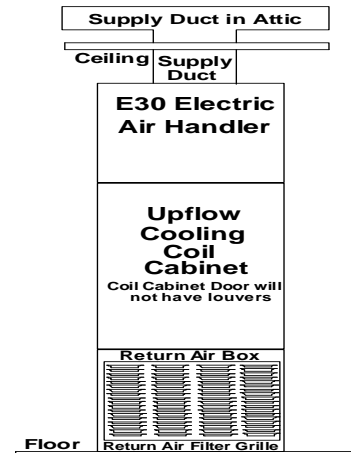


Figure 13: Typical Upflow Installation

SECTION VII: LINE VOLTAGE WIRING

Power Supply

The furnace internal wiring is complete except for the power supply and the thermostat wires. See wiring diagram and/or Tables 6 and 7 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.

Single Circuit Line Wiring Connections

1. Remove the control box cover.
2. Install the cable connectors on the 7/8" dia holes on the right side of the control box.
3. Strip 1/2" of the insulation on the end of each wire.
4. Insert the wires through the holes in the casing and through the cable connectors.
5. Insert the black wire into the L1 screw terminal on the first circuit breaker from the top and tighten the set screw to clamp down on the wire.
6. Insert the white or red wire into the L2 screw terminal on the first circuit breaker down from the top and tighten the set screw to clamp down on the wire.
7. If you are using a single circuit for a 8kW, 10kW, 12kW, 15kW or 20kW model you will need to install a black jumper wire from the L1 terminal on circuit breaker #1 to the L1 terminal on circuit breaker #2 and a white or red jumper wire from the L2 terminal on circuit breaker #1 to the L2 terminal on circuit breaker #2. Refer to Figure 14 for circuit breaker locations.

Note: The 100 amp 4 Pole Jumper Bar Assembly part number 68BAE001 can be used in place of the jumper wires.

8. Insert the green wire into the ground lug and tighten the set screw.

Dual Circuit Line Wiring Connections: 8kW, 10kW, 12kW, 15kW or 20kW Models

9. You will need to insert the black wire from the second power supply into the L1 screw terminal on the second

circuit breaker down from the top and tighten the set screw to clamp down on the wire.

10. You will need to insert the white or red wire from the second power supply into the L2 screw terminal on the second circuit breaker down from the top and tighten the set screw to clamp down on the wire.
11. You will need to insert both green wires into the ground lug and tighten the set screw.
12. Tighten the screws on the cable connectors until the power supply wires are securely fastened to the connector.

NOTE: The furnaces are equipped with either one or two circuit breakers. These circuit breakers 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 are not meant to protect the branch circuit wiring between the furnace and the home's breaker panel. General wire and breaker sizes are shown in Table 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 local codes for additional requirements concerning supply circuit wiring. Electrical data can be found in Tables 6, 7, and 8.

IMPORTANT - All installation on field wiring must be rated at 60°C or higher. Please refer to the wiring diagrams on the furnace or this book for more information.

The 8kW, 10kW, 12kW 15kW and 20kW models may be connected to a single or dual branch circuit.

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.

	ELECTRIC HEATER SIZES					
	5 kW	8 kW	10 kW	12 kW	15 kW	20 kW
Circuit Load - FLA	25.83	38.33	46.50	55.00	67.33	88.16
Minimum Wire Size (90°C)	#10	#8	#8	#6	#4	#3
Minimum Wire Size (75°C)	#10	#8	#6	#4	#3	#2
Minimum Wire Size (60°C)	#10	#8	#6	#4	#2	N/A
Ground Wire Size	*	*	*	*	*	*
Max Fuse Amps	35	50	60	70	90	110

Table 6: Wiring Requirements – Single Branch Circuit

5kW Single Stage model can only be wired as a single power supply.

12kW, 15kW and 20kW Two Stage models may have a dual or single power supply.

Single power supply will require circuit breaker jumper bar or a jumper wire.

+ 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 SIZES									
	8 kW		10 kW		12 kW		15 kW		20 kW	
Circuit Number	1	2	1	2	1	2	1	2	1	2
Circuit Load - FLA	21.67	16.67	25.833	20.833	30	25.0	46.5	20.83	46.5	41.66
Minimum Wire Size (90°C)	#10	#12	#8	#10	#8	#10	#8	#10	#8	#8
Minimum Wire Size (75°C)	#10	#12	#8	#10	#8	#10	#6	#10	#6	#6
Minimum Wire Size (60°C)	#10	#12	#8	#10	#8	#10	#6	#10	#6	#6
Ground Wire Size	*	*	*	*	*	*	*	*	*	*
Max Fuse Amps	30	20	35	25	40	30	60	25	60	50

Table 7: Wiring Requirements – Dual Branch Circuit

5kW Single Stage model can only be wired as a single power supply.
8kW, 10kW, 12kW, 15kW, and 20kW Two Stage models may have a dual or single power supply.
Single power supply will require circuit breaker jumper bar or a jumper wire.
+ 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 SIZES										
		5 kW		8 kW		10 kW		12 kW		15 kW		20 kW
Branch Circuit Number		1	1	2	1	2	1	2	1	2	1	2
240 VAC, 60 HZ, 1 PH	BTU	17,033	13,651	13,651	17,060	17,060	20,473	20,473	34,067	17,033	34,067	34,067
	kW	4.99	4.000	4.000	4.99992	4.99992	6.000	6.000	10	4.99	10	10
230 VAC, 60 HZ, 1 PH	BTU	15,876	13,080	13,080	16,349	16,349	19,620	19,620	33,686	15,876	33,686	33,686
	kW	4.65	3.833	3.833	4.79159	4.79159	5.750	5.750	9.78	4.65	9.78	9.78
220 VAC, 60 HZ, 1 PH	BTU	14,736	12,511	12,511	15,369	15,369	18,767	18,767	30,222	14,736	30,222	30,222
	kW	4.32	3.667	3.667	4.58326	4.58326	5.500	5.500	8.86	4.32	8.86	8.86
Heating Element Capacity	BTU	17,027	27,263		34,114		40,946		51,149		68,232	
	kW	4.99	7.990		9.998		12		14.9904		19.9968	
Blower Motor @ 240 VAC	AMPS	5.3	5.3		5.3		5.3		5.3	N/A		N/A
	kW	1.032	1.032		1.032		1.032		1.032	N/A	1.032	N/A

Table 8: Electrical Data

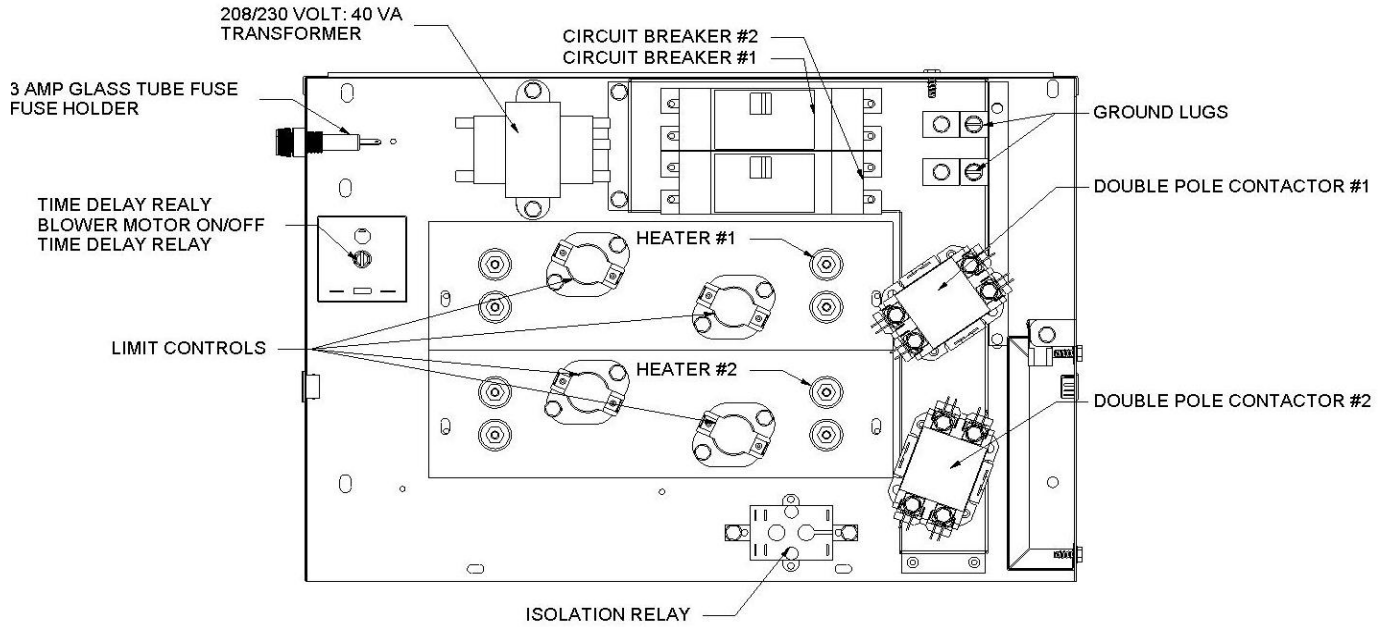


Figure 14: Control Box Component Locations

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

Note: The isolation relay for the PSC and X-13 motors is not optional relay.

⚠ WARNING

For personal safety be sure to turn the electrical power “OFF” at the main entrance (Home Circuit Breaker Box) and at the control box circuit breakers before attempting any service or maintenance operations. Homeowners should never attempt to perform any maintenance which requires opening the furnace control box door. Refer to Figure 15.

⚠ WARNING

This furnace is equipped with a shield that covers the line voltage electrical supply wires and the circuit breaker connections to prevent accidental electrical shock. Be sure to turn the electrical power “OFF” at the main entrance (Home Circuit Breaker Box) and at the control box circuit breakers before removing the shield.

“Refer to Figure 16.

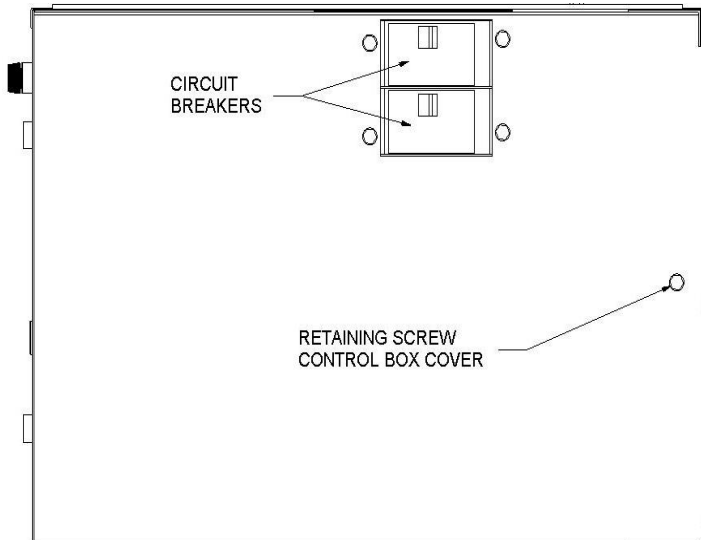


Figure 15: Control Box Cover and Circuit Breaker Location – Dual Element Box

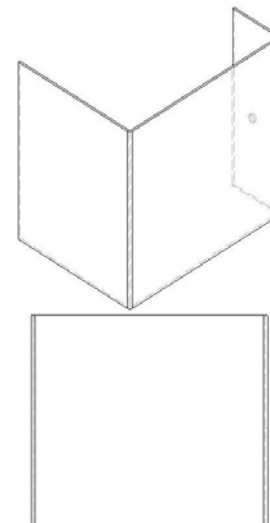


Figure 16: Line Voltage Electrical Shield Location

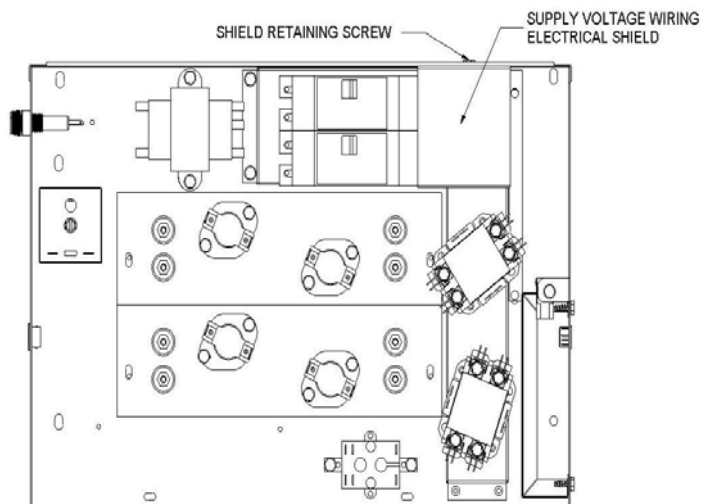


Figure 17: Line Voltage Electrical Shield Location

SECTION VIII: FIELD INSTALLED ELECTRIC HEATER KITS

This instruction covers the physical installation of the following electric heat kits on the E30 series models. Refer to Tables 6-8 for electrical specifications.

Field Installed Electric Heat Kits				
Model No.	Voltage	Phase	Hertz	Heater kW
BE30HK-05A	208-240	1	60	5
BE30HK-08A	208-240	1	60	8
BE30HK-10A	208-240	1	60	10
BE30HK-12A	208-240	1	60	12
BE30HK-15A	208-240	1	60	15
BE30HK-20A	208-240	1	60	20

Table 9: Field Installed Electric Heater Kit Model Numbers.

The field installed electric heat accessories are used on cooling or heat pump models that were not purchased with electric heat from the factory. Each air handler model is approved for use with the field installed accessory electric heat kit.

INSTALLING THE HEATERS

1. Follow the instructions in the USERS INFORMATION MANUAL to properly shut down the air handler.
2. Remove the block off plate shown in Figure 14 and discard. Retain the screws, they will be used to secure the electric heater mount plate.
3. Insert electric heat kit into the opening where the block off plate was removed. Secure the mounting plate with the screws that were removed from the block off plate.

4. Connect the six pin male plug on the electric heater assembly to the six pin female plug mounted on the side of the low voltage control box divider panel.
5. Remove the wiring diagram from the kit, remove the paper that covers the adhesive back and place the electric heat wiring diagram over the wiring diagram located on the blower housing.
6. Follow the instructions in the USERS INFORMATION MANUAL to properly start up the air handler.

CAUTION

To prevent damage, carefully insert the electric heating assembly through the rectangular opening in the front of the discharge opening so the heat element support rod is seated into the hole on the back side of the discharge opening.

CAUTION

After installing the electric heater, a one inch clearance must be maintained on all sides of the supply air duct and/or plenum for a minimum of thirty six inches from the air handler discharge opening.

POWER SUPPLY CONNECTIONS

If the air handler has been installed prior to installing the electric heaters or if an older unit is being replaced, the supply power wires must be checked to make sure the wires are the proper sizes to handle the current load for the heaters Refer to Tables 6-8 for correct wire size. If the supply power wire size is incorrect, new wires will need to be installed. Follow the instructions “Power Supply Wiring” on page 8 of these instructions for proper installation.

For circuit breaker models only - After the supply wiring has been connected to the circuit breakers you must remove the transformer and indoor blower motor wires from the terminal block and connect them to load side of circuit breaker #1.

LOW VOLTAGE CONNECTIONS

If the air handler was previously installed, nothing will need to change on the low voltage wiring. If this is a new installation refer to SECTION VII on page 12 of these instructions.

Type	Series	Accessory	Heating Capacity @240 Volts 1 PH	Revision
B = Breaker				A
E30 = MH Electric Unit				05 = 5 kW 08 = 8 kW 10 = 10 kW 12 = 12 kW 15 = 15 kW 20 = 20 kW
HK = Heat Kit				

Table 10: Field Installed Electric Heater Kit Nomenclature

SECTION IX: THERMOSTAT WIRING AND CONNECTIONS

Thermostat Wiring

Thermostat wires connect through side of furnace and should be no smaller than 20 gauge. Refer to Table 11 for recommended wire gauge, lengths and maximum current for each wire gauge.

Thermostat Wire Length	Thermostat Wire Gauge	Thermostat Wire Maximum Current
0 - 70 Feet	20	3.0 amps
0 - 112 Feet	18	3.0 amps

Table 11: Low Voltage Wire Gauge and Max Lengths

NOTE: There is a 3 Amp slow blow bar fuse located on the right side of the control box that protects the 24 VAC circuit. Replace this fuse only with the equivalent 3 Amp fuse. Power wires can enter through the side of the unit or through the auxiliary entrance, located in the bottom of the unit. When bringing wiring through the bottom of the furnace, cable connectors must be installed to hold wiring in place and to relieve any strain on the wiring. These connectors will also serve as a seal between the furnace and the floor. Thus, additional sealing is not required.

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 condenser. The thermostat wire colors and the typical heating/cooling connections are listed in Tables 10 and 11.

A seven-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 condenser.

The thermostat wire colors and the typical heat pump heating/cooling connections are listed in Tables 10 and 11.

NOTE: If the thermostat cable is on the left side of the furnace move the grommet in the 3/8" hole on the left side of the furnace casing to the 3/8" hole on the right side of the furnace casing. Run the thermostat wire cable through the control box to the low voltage control box. Place the thermostat wire next to the low voltage pigtails. Attach the strain relief to the control box. Do not attach the strain relief to the furnace casing because the sheet metal is too thin.

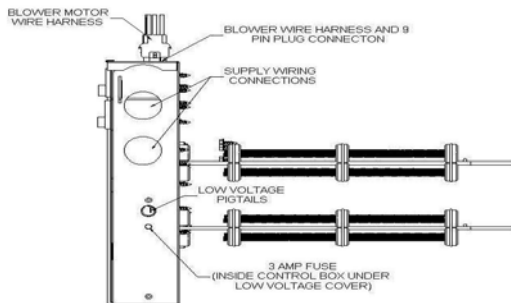


Figure 18: Control Box In-coming Power, Low Voltage Wiring, Blower wiring, and Low voltage Fuse Locations

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 case no heat anticipator setting will be found on the thermostat, eliminating the need for any field adjustment.

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 furnace. Locating height of thermostat is important. Thermostat should be located preferably in a hall way upstream from the furnace return airflow, not within three feet of any windows and 52 to 66 inches above the floor.

DO NOT place the thermostat within three feet of any of the furnace supply air registers

DO NOT place the thermostat within three feet of any of the air conditioner supply air registers

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

CAUTION

Do not locate thermostat within three feet of any of the following items:

- 1 Furnace supply air registers
- 2 Cooling unit supply air registers
- 3 Lights or heat lamps
- 4 Aquariums
- 5 Televisions, stereo, amplifiers, surround sound systems
- 6 Stoves or any cooking appliance
- 7 Refrigerator
- 8 Washer and/or dryer
- 9 Hot water tank
- 10 Sink or near any hot water
- 11 Within 15 feet of any electric space heater
- 12 Within two feet of any sunlight

Separate Heating and Cooling System; Same Thermostat

If the furnace and the cooling unit have separate transformers be sure to use a thermostat with isolated heating and cooling contacts "RC" and "RH" to prevent interconnection of Class II 24 Volt Systems Refer to Figures 21 and 22. Cycle furnace and the air conditioner separately to make sure it will operate correctly.

Most new thermostats have separate heating and cooling contacts for use with homes that have a furnace and air conditioner 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 cooling unit red wire from the "R" terminal on the outdoor unit to the "RC" terminal on the thermostat and the RED furnace pigtail wire to the "RH" terminal on the thermostat. Refer to Figures 21 and 22 for typical low voltage wire connections.

If you have separate furnace and air conditioner with separate transformers and your thermostat does not have the "RC" and "RH" terminals it is recommended that you purchase a new thermostat. If the furnace and air conditioner are both connected to the thermostat "R" terminal it can cause transformer burnout or it can cause either the furnace or air conditioner control system to go into lockout.

Separate Heating and Cooling Units, Separate Thermostats

If the heating/cooling system in your house is a central heating and cooling system using the furnace transformer but the furnace and the cooling unit are controlled by separate thermostats then the use of a thermostat interlock switch is required in order to prevent the furnace and the air conditioner from operating at the same time. Refer to Figures 19 and 20.

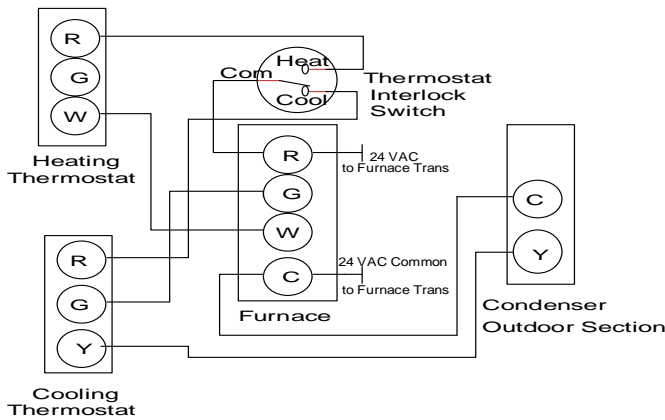


Figure 19: Separate Thermostats; Separate Furnace and Cooling Unit

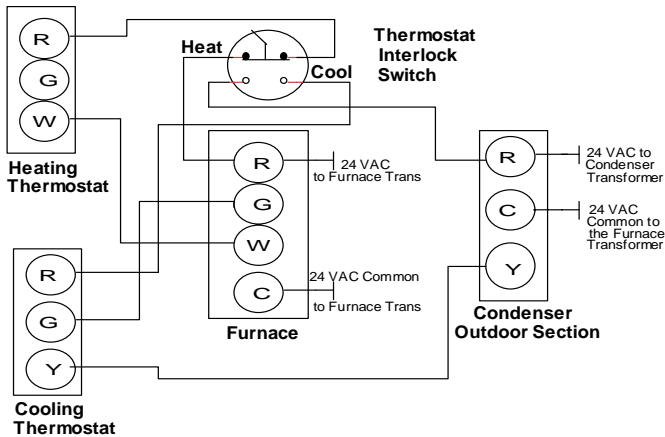


Figure 20: Separate Thermostats; Separate Transformers, Separate Furnace and Cooling Unit

CAUTION

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

Do Not connect the Yellow wire to the thermostat unless an outdoor unit is installed.

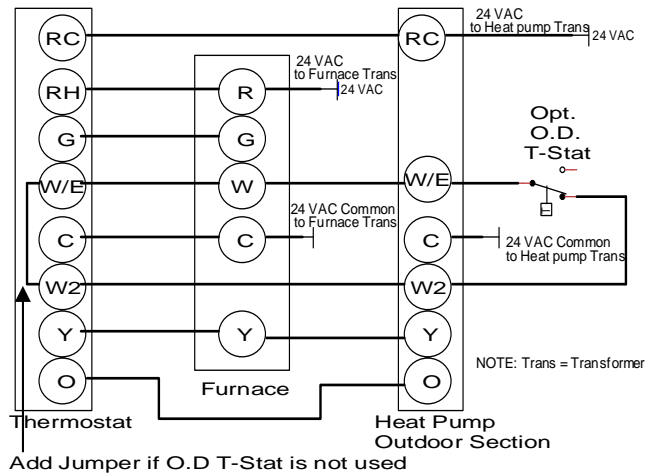


Figure 21: Same Thermostat; Separate Furnace and Heat Pump Unit with separate transformers

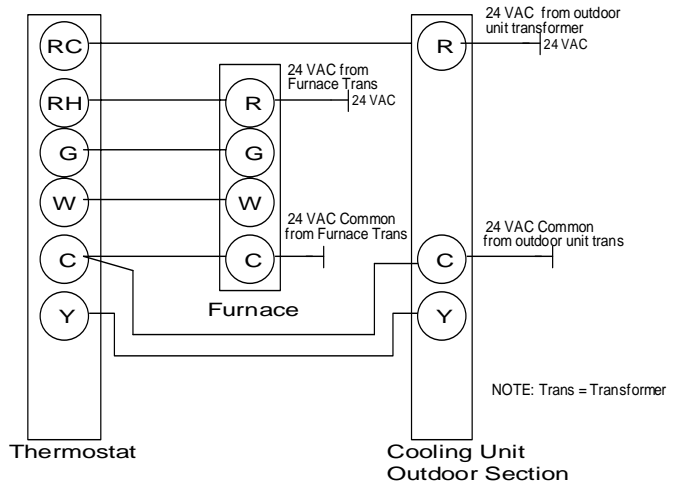


Figure 22: Same Thermostat; Separate Furnace and Cooling Unit with separate transformers

Wire Color	Description	Letter Code	Furnace Pig Tail Wire Connection	Thermostat Connection	Condenser Connections
RED	24 VAC	R	Red	R	N/A
WHITE	Heat (1st Stage Heat)	W	White	W or W1	N/A
GREEN	Indoor Fan	G	Green	G	N/A
YELLOW	Cooling - Stage 1	Y	Yellow	Y or Y1	Y or Y1
BROWN	24 VAC Common	BRN	Brown	C	C

Note: Single stage thermostat on two stage models must connect white (W1) pigtail wire and black (W2) pigtail wire together in low voltage box with W wire from the thermostat.

Table 12: Recommended Heating / Cooling Thermostat Wire Color Codes and Connections.

Heat Pump - Heating / Cooling Thermostat Wire Color Code					
Wire Color	Description	Letter Code	Furnace Pig Tail Wire Connection	Thermostat Connection	Condenser Connections
RED	24 VAC	R	Red	R	N/A
WHITE	Heat (1st Stage Heat)	W	White	E	N/A
GREEN	Indoor Fan	G	Green	G	N/A
YELLOW	Cooling - Stage 1	Y	Yellow	Y or Y1	Y or Y1
BROWN	24 VAC Common	BRN	Brown	C	C
BLACK	Heat (Optional 2nd Stage Heat)	BLK	Black	W2	N/A
ORANGE	Heat Pump Reversing Valve Solenoid	O	N/A	O	O
BLUE	Cooling - (Optional 2nd Stage Cooling)	BLU	N/A	Y2	Y2

Table 13: Recommended Heating / Cooling / Heat Pump Thermostat Wire Color Codes and Connections.

Typical Heating/Cooling Thermostat Wiring Connections

1. Remove lower access door.
2. Remove the control box cover.
3. Install a grommet in the 3/8" hole on the right side of the furnace casing to protect the thermostat wire cable.
4. Strip 1/2" of the insulation on the end of each wire.
5. Insert the wire cable from the thermostat through the grommet in the right side of the casing, thru the 3/8" strain relief in the control box and place the thermostat wire cable next to the low voltage pigtails.
6. Connect the Red (24 VAC) supply thermostat wire to the Red low voltage pigtail wire and secure with a wire nut.
7. Connect the White (First stage heating) thermostat wire to the White low voltage pigtail wire and secure with a wire nut.
8. Connect the Green (Indoor fan) thermostat wire to the Green low voltage pigtail wire and secure with a wire nut.
9. Connect the Yellow (Air conditioning) wire from the thermostat with the Yellow low voltage pigtail wire on the furnace and with the Red wire from the compressor contactor on the condenser unit. Fasten the three wires together securely with a wire nut.
10. Connect the Brown (24 VAC Common) wire from the thermostat with the Brown low voltage pigtail wire on the furnace and with the Brown (Common) wire from the compressor contactor on the outdoor unit. Fasten the three wires together securely with a wire nut.

11. Connect the Black (2nd stage heating) thermostat wire to the black low voltage pigtail wire and secure with a wire nut.
12. If a two stage outdoor unit is used then connect the "W2" wire from the outdoor unit to the black wires discussed in step 11 and secure with a wire nut.

NOTE: If single stage thermostat is used on a two stage furnace connect the black and the white furnace pigtail wires and the white thermostat wire together; then, secure all three wires with a wire nut.

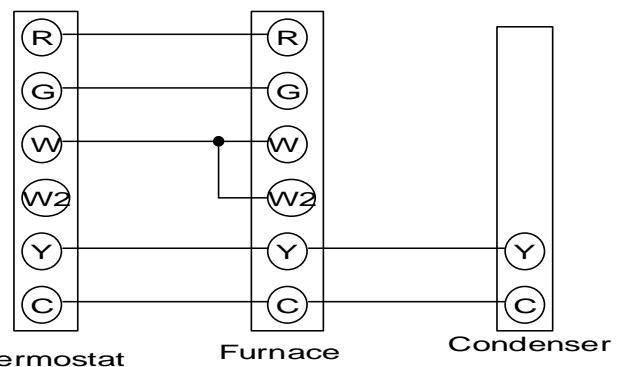


Figure 23: Typical Connections for a Single Stage Heating/Cooling Digital Thermostat with Two Stage Furnace

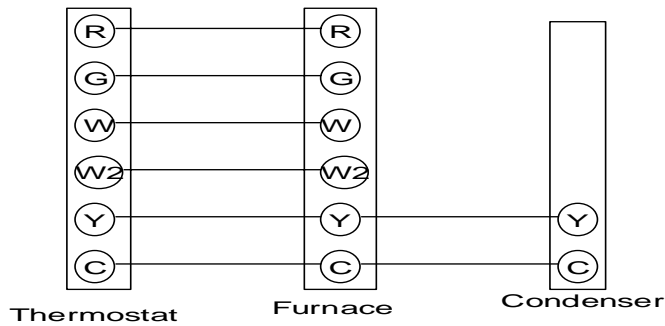


Figure 24: Typical Two Stage Heating/Cooling Digital Thermostat Connections

Typical Heat Pump - Heating/Cooling Thermostat Wiring Connections

1. Remove the lower access panel.
2. Remove the control box cover.
3. Install a grommet in the 3/8" dia hole on the right side of the furnace casing to protect the thermostat wire cable.
4. Strip 1/2" of the insulation on the end of each wire.
5. Insert the wire cable from the thermostat through the grommet in the right side of the casing, thru the 3/8" grommet in the control box and place the thermostat wire cable next to the low voltage pigtailed.
6. Connect the Red (24 VAC) supply wire from the thermostat to the Red low voltage pigtail wire on the furnace and with 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 (first stage heating) wire from the thermostat to the White low voltage pigtail wire on the furnace 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 low voltage pigtail wire on the furnace and securely fasten the two wires together with a wire nut.
9. Connect the Red wire from the "Y" terminal on the outdoor unit. Fasten the three wires together securely with a wire nut.
10. Connect the (24 VAC Common) wire from the thermostat with the Brown low voltage pigtail wire on the furnace and with the Brown (Common) wire from the "C" terminal on the outdoor unit. Fasten the three wires together securely with a wire nut.
11. Connect the Orange (Reversing Valve Solenoid) wire from the thermostat with the Orange wire from the "O" terminal on the condenser unit. Fasten the two wires together securely with a wire nut.
12. Connect the Black (2nd stage heating) thermostat wire to the black low voltage pigtail wire and secure with a wire nut.
13. If a two stage outdoor unit is used then connect the "W2" wire from the outdoor unit to the black wires discussed in step 12 and secure with a wire nut. Refer to Figure 25.

NOTE: If single stage thermostat is used on a two stage furnace connect the black and the white furnace

pigtail wires and the white thermostat wire together; then, secure all three wires with a wire nut.

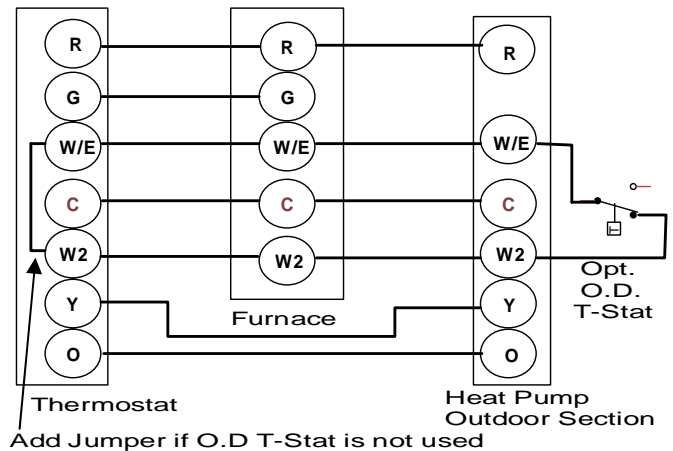


Figure 25: Typical Heat Pump / Heating / Cooling Connections

SECTION X: MOTOR, BLOWER AND FURNACE STARTUP SECTION

⚠ 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.

Selecting the X-13 Blower Speed

This furnace uses the new X-13 high efficiency motor. This motor operates on 240 VAC. The motor speed tap are 24 VAC, 0.03 amps, 60 Hz, 1 PH. The speed taps can be changed by removing the black wire from the isolation relay terminal #4 or the red wire from the isolation relay terminal #6 and connecting either the blue, orange, or purple wire to the terminal. Table 14 shows the X-13 motor lead connection labeling and the connection definitions.

Terminal	Connection
C	Speed Tap Common - 24 VAC Common
L	Supply Voltage to Motor - 240 VAC Line 1
G	Ground Connection
N	Supply Voltage to Motor - 240 VAC Line 2
1	Low Speed Tap - 24 VAC
2	Med-Low Speed Tap - 24 VAC
3	Medium Speed Tap - 24 VAC
4	Med-High Speed Tap - 24 VAC
5	High Speed Tap - 24 VAC

Table 14: X-13 Motor Terminal Connections

Total 24 VAC circuit amps are 0.14 amps.

Change Motor Speeds

1. Turn off **all** electrical supply circuits to the furnace at the main service (House Circuit Breaker) panel.
2. Remove furnace front door and switch furnace circuit breaker(s) to “OFF”.
3. Disconnect the wire from the isolation relay terminal and reconnect the desired wire to the terminal. Refer to Table 14 for speed tap wire colors
4. Turn the circuit breakers on and reinstall furnace front door.
5. Turn on **all** electrical supply circuits to the furnace at the main service (House Circuit Breaker) panel.

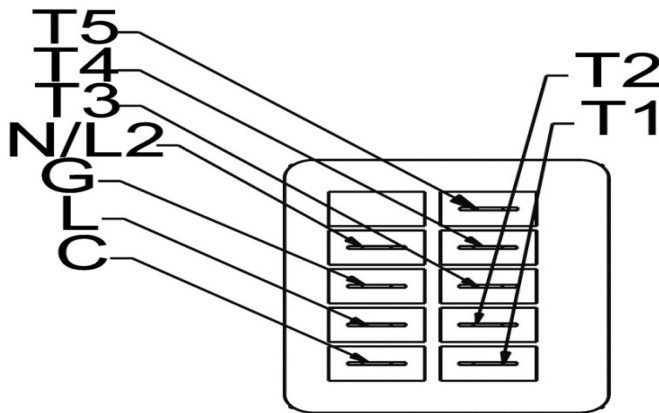


Figure 26: X-13 Motor Terminals

Replacing the Blower Motor

1. Turn off all electrical supply circuits to the furnace at the main service panel.
2. Remove furnace front door and switch furnace circuit breaker(s) to “OFF”
3. Disconnect the plastic wire plug that has the wires that go to the motor terminals from the right side of the control box.
4. Remove the screw on the right side of the blower mounting plate.
5. Slide the blower out of the blower compartment and set on the floor.
6. Remove the wires from the terminals. Be sure to write down the motor terminal identifier and wire color so the wires do not get mistakenly placed on the wrong terminals.
7. Remove the blower motor from the mounting bracket by removing the screws on the sides of the blower that secure the blower to the bracket.
8. Insert the new blower motor into the blower mounting bracket and insert the screws.
9. Connect the wires to the same terminals on this motor that they were connected to on the motor that was removed.
10. Slide the blower assembly into the blower deck and insert the screw on the right side of the mounting bracket.
11. Connect the pin plug to the mating pin plug on the right side of the control box.

12. Switch the circuit breakers to ON and replace furnace front door.
13. Turn on all electrical supply circuits to the furnace at the main service (House Circuit Breaker) panel.
14. Set the thermostat to the desired temperature.

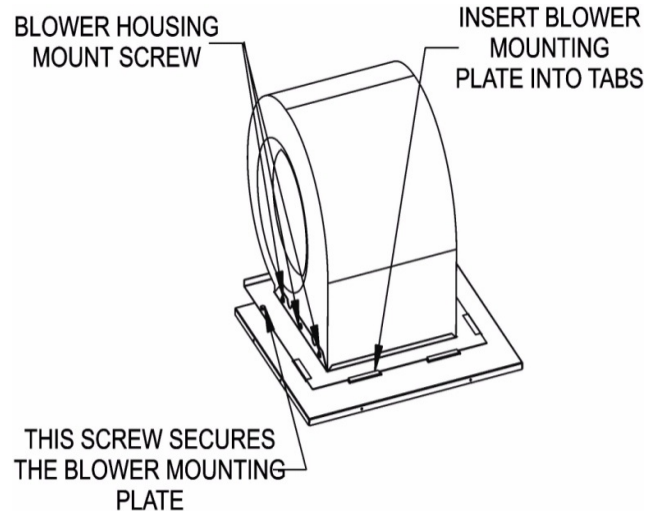


Figure 27: Blower Assembly and Blower Deck

SECTION XI: FINAL SYSTEM CHECKOUT

1. Refer to appropriate wiring diagram and recheck all wiring connections. Ensure that all wiring connections are tight.
2. Check blower motor connectors for proper connection.
3. If the control box cover is removed; reinstall control box cover.
4. Switch circuit breaker(s) to “ON” position.
5. Switch the furnace circuit breakers in the main service (House Circuit Breaker) panel to the ON position.
6. Set the blower selector switch to the ON position and check all of the duct connections for air leaks. Seal any leaks found.
7. Set the blower selector switch to the AUTO position.
8. Set the thermostat above the room temperature to check for proper operation of the electric heaters.
9. Set the thermostat to the desired temperature.

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 furnace will short cycle. If the heat anticipator setting is too high the furnace will run long cycles thus causing the temperature to overrun the temperature setting. This will cause the home owner to feel hot by the time the blower completes its cycle; then cold, by the time the furnace cycles on again.

The heat anticipator should be set to the following settings. For 5kW, 8kW, 10kW, 12kW 15kW and 20 kW Models Set at 0.4

Factory Speed Tap Settings @ .3 ESP with Filter and Coil						
Series Model	Sp Tap	Nom-Tons	CFM	Coil Range (See Coil Face Velocity Chart Below)	Max kW	Blower Setting
E30A2DxxxAAA or E30A2DxxxABB	Low	2.0-2.5	950	96-Series, 97-Series, 98-Series	12	Factory Setting High
	Med	2.5-3.0	1100		15	
	High	3.0-3.5	1400		20	
E30B3DxxxAAA or E30B3DxxxABB	T-1	1.5	580	96-Series, 97-Series, 98-Series	5	Factory Setting T-5
	T-2	2.0	750		8	
	T-3	2.5	925		8	
	T-4	3.0	1120		10	
	T-5	3.5	1300		12	
E30B4DxxxAAA or E30B4DxxxABB	T-1	2.0	800	96-Series (Do Not use T-5 w/96-), 97-Series, 98-Series	12	Factory Setting T-4
	T-2	2.5	950		15	
	T-3	3.0	1120		15	
	T-4	3.5	1260		17	
	T-5	4.0	1380		20	
E30B5DxxxAAA or E30B5DxxxABB	T-1	3.0	1080	98-Series only	17	Factory Setting T-3
	T-2	3.5	1300		20	
	T-3	4.0	1440		20	
	T-4	4.0	1520		20	
	T-5	5.0	1680		20	
E30A2**** 1/2 HP PSC Motor E30B3**** 1/3 HP X-13 Motor E30B4**** 1/2 HP X-13 Motor E30B5**** 3/4 HP X-13 Motor (+) Metering device, Piston, TXV (++) Refrigerant Connection, 0P, 2P, 3P, 4P or 6P xxx Designates Kilowatts, 015 = 15kW CFM Shown with Dry Coil and Filter in place, Wet Coil Correction 4-6%				Electric Furnace temperature rise (TR) can be used to determine air flow delivered. This result can then be used to determine FPM velocity across the coil face area using the chart below. Set Furnace (Isolate the Heat Pump, just operate the Furnace) to run all the heater strips and then check return air and supply air temperature. Make sure all strips are operating. The difference is the TR CFM = (kW x 3412) x (Voltage Correction Less Than 240V) x 1.08 / TR Example: CFM = (15kW x 3412) x .96 x 1.08 / 56 TR 51180 x .96 x 1.08 / 56 = 948 CFM		Voltage Correction < 240V .96 = 230 Volts .92 = 220 Volts .87 = 208 Volts
Coil Face Velocity Formula & Maximum Allowances when using the X-13 Motor						
Coil Series	CFM	Face Area	Nominal FPM	Coil Models (See Note Below)	Max FPM	Note
96-Series	750	3.11	242	96-8(Z,5,G,8,W)2(+)-(++)P	300	WARNING Exceeding these nominal and / or maximum allowances may cause water blow off from the coil, which; may damage furnace, void furnace warranty and limit liability from those damages
	925	3.32	279	96-(R,M)(2,3,4)4(+)-(++)P	300	
	1120	3.56	315	96-8(Z,2,3,4,5,G,8,W)(3,5)(+)-(++)P	320	
	1300	4.06	321	96-(8,R,M)(Z,2,3,4,5,G,8,W)(4,6)(+)-(++)P	325	
97-Series	1380	4.44	311	97-(8,R,M)(Z,2,3,4,5,G,8,W)(5,7)(+)-(++)P	325	
98-Series	1440	5.33	270	98-(8,R,M)(Z,2,3,4,5,G,8,W)(7,10)(+)-(++)P	330	
	1520	5.78	263	98-(8,R,M)(Z,2,3,4,5,G,8,W)(8,11)(+)-(++)P	330	
	1520	6.22	245	98-(8,R,M)(Z,2,3,4,5,G,8,W)(9,12)(+)-(++)P	330	
	1680	6.67	252	98-(8,R,M)(Z,2,3,4,5,G,8,W)(10,13)(+)-(++)P	330	
	1680	7.11	237	98-(8,R,M)(Z,2,3,4,5,G,8,W)(11,14)(+)-(++)P	330	
	1680	7.56	223	98-(8,R,M)(Z,2,3,4,5,G,8,W)(12,15)(+)-(++)P	330	
	1680	8.00	210	98-(8,R,M)(Z,2,3,4,5,G,8,W)(13,17)(+)-(++)P (See Example)	330	
Air Velocity Formula: CFM / Coil Face Area = Air FPM.				Example of Coil Complete Model # 98-8G13Y-0P.		
Note: When setting up the speed tap on the E30B furnaces with the X-13 motor the coil face area must be taken into account so as not to exceed 330 Feet Per Minute of air across the coil. Anything higher will blow water off the coil and will be the responsibility of the installing contractor.						

Table 15: X-13 Motor Factory Speed Tap Settings

SECTION XII: WIRING DIAGRAMS

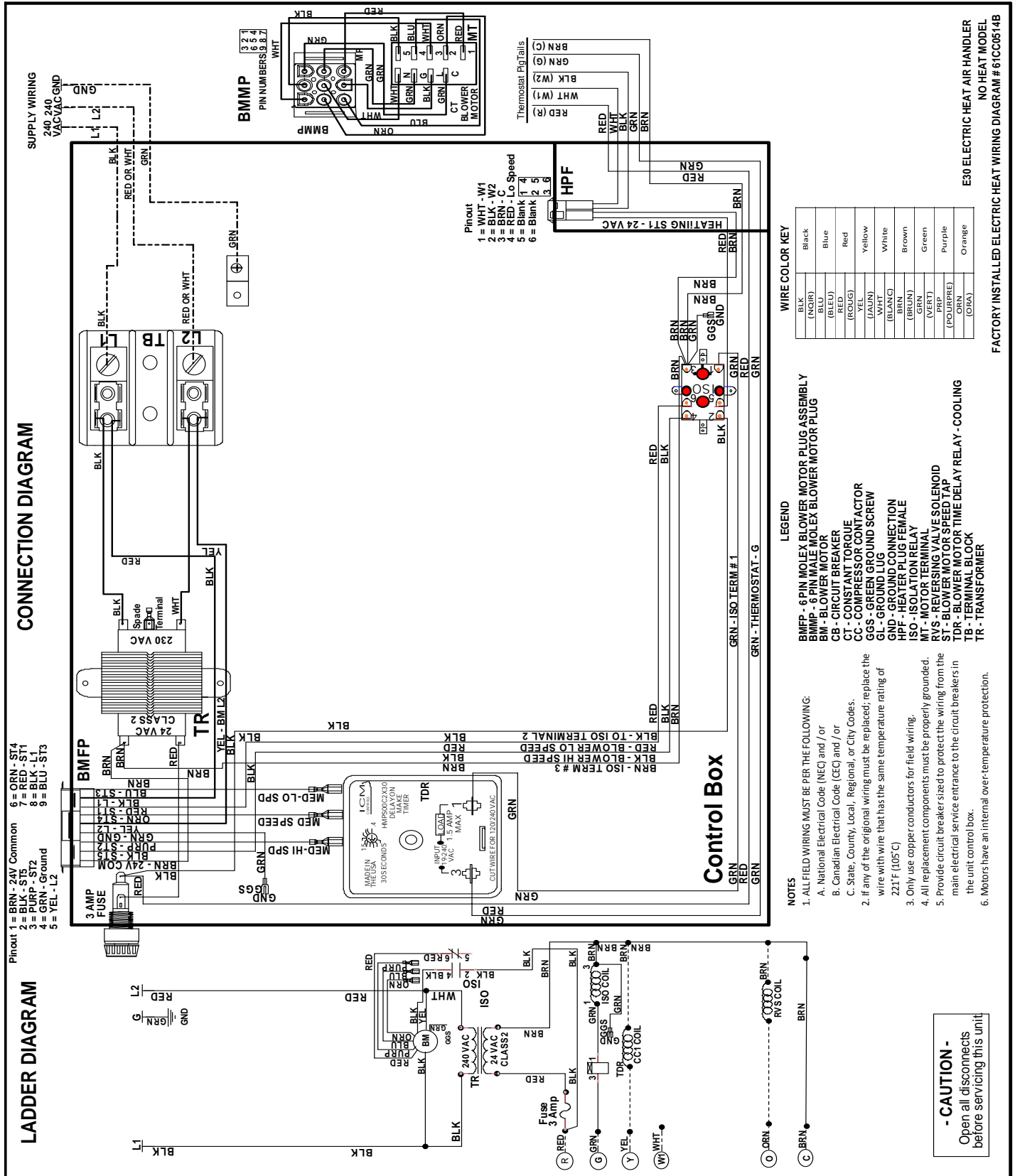


Figure 28: No Electric Heater (0 kW) Wiring Diagram with a Constant Torque blower motor.

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.

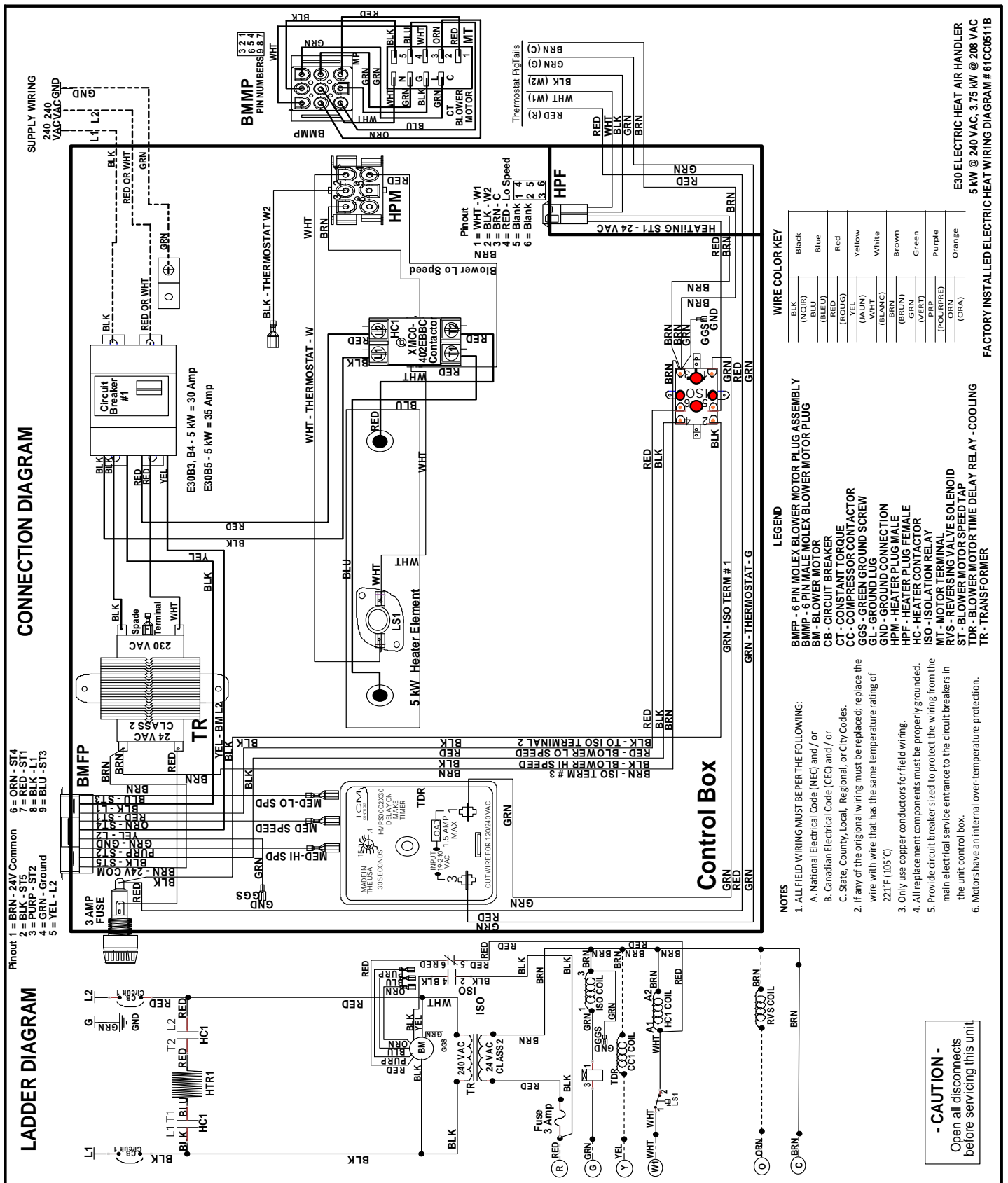


Figure 29: 5kW Factory Installed Electric Heat Wiring Diagram with a Constant Torque blower motor.

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.

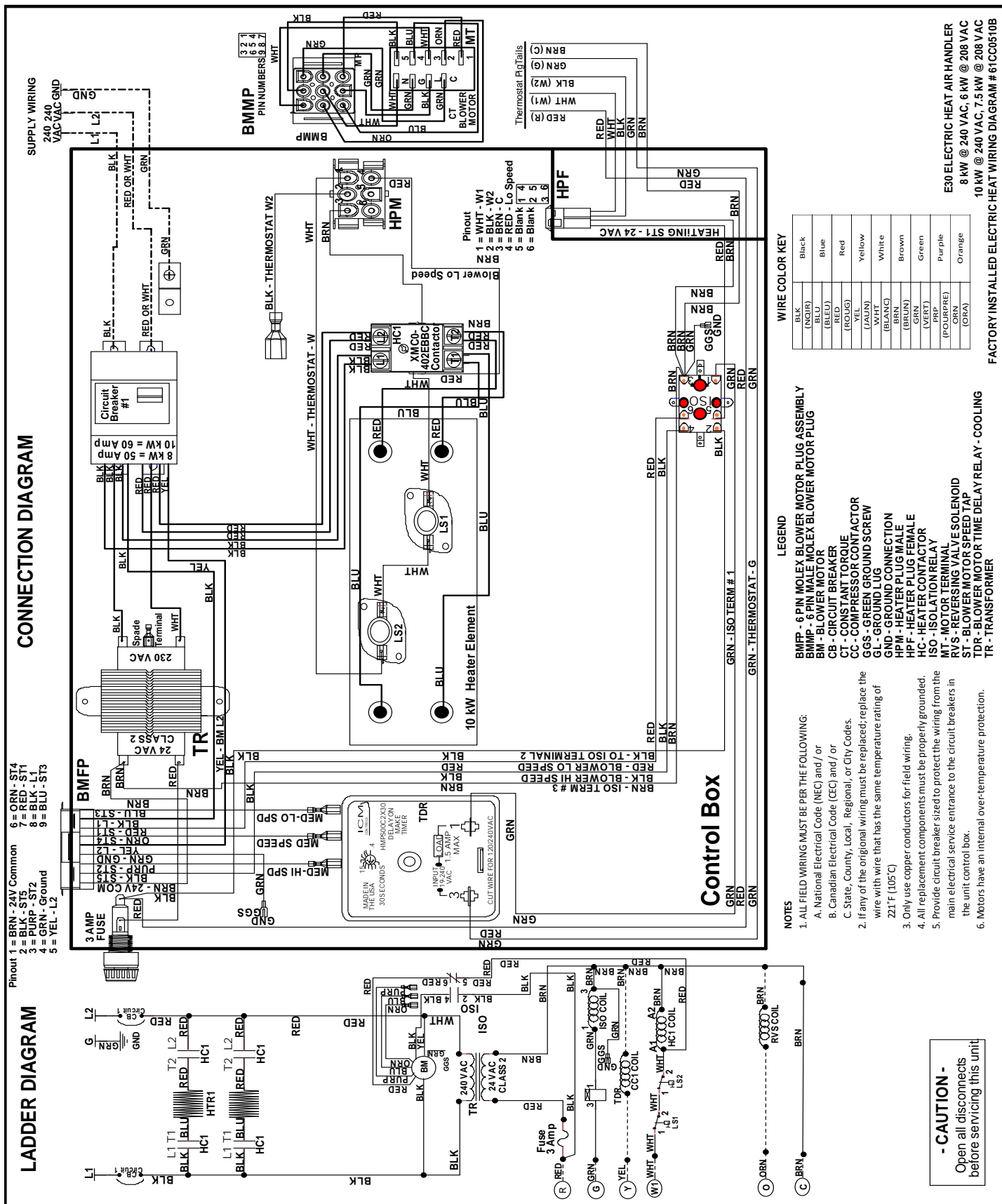


Figure 30: 8 kW / 10 kW Factory Installed Electric Heat Wiring Diagram with a Constant Torque Blower Motor.

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.

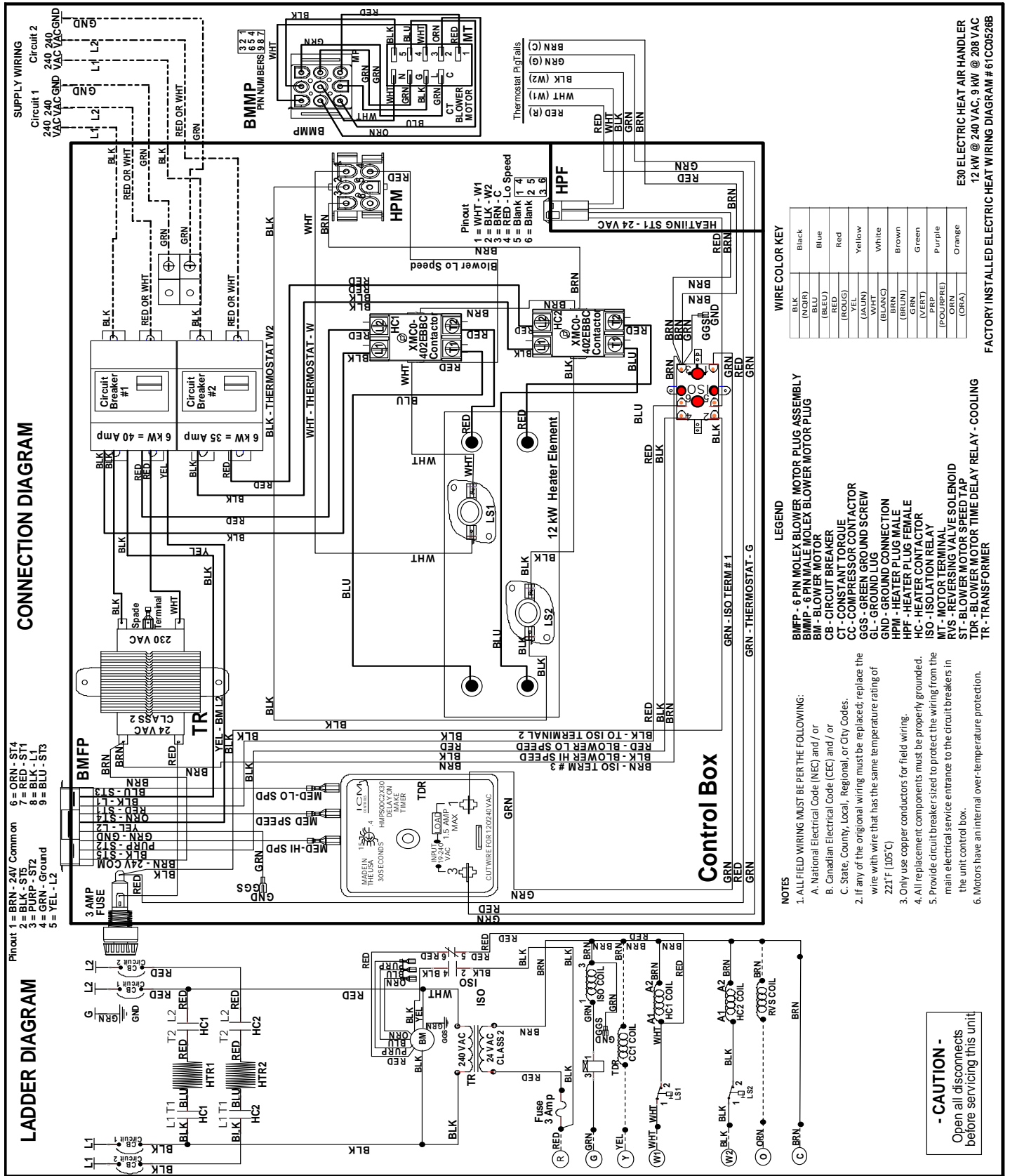


Figure 31: 12 kW Factory Installed Two Stage Electric Heat Wiring Diagram with a Constant Torque Blower Motor.

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.

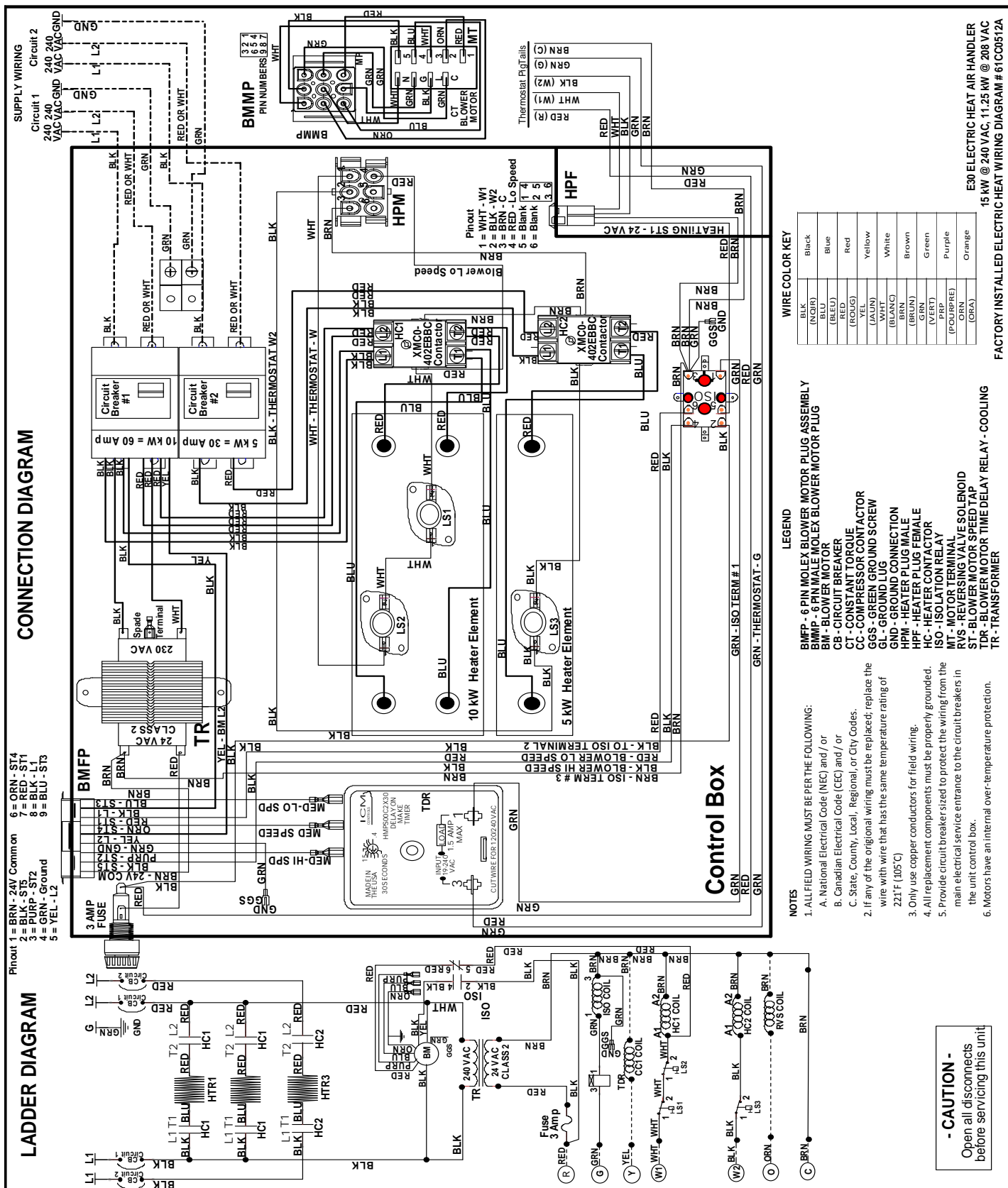


Figure 32: 15 kW Factory Installed Two Stage Electric Heat Wiring Diagram with a Constant Torque Blower Motor.

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.

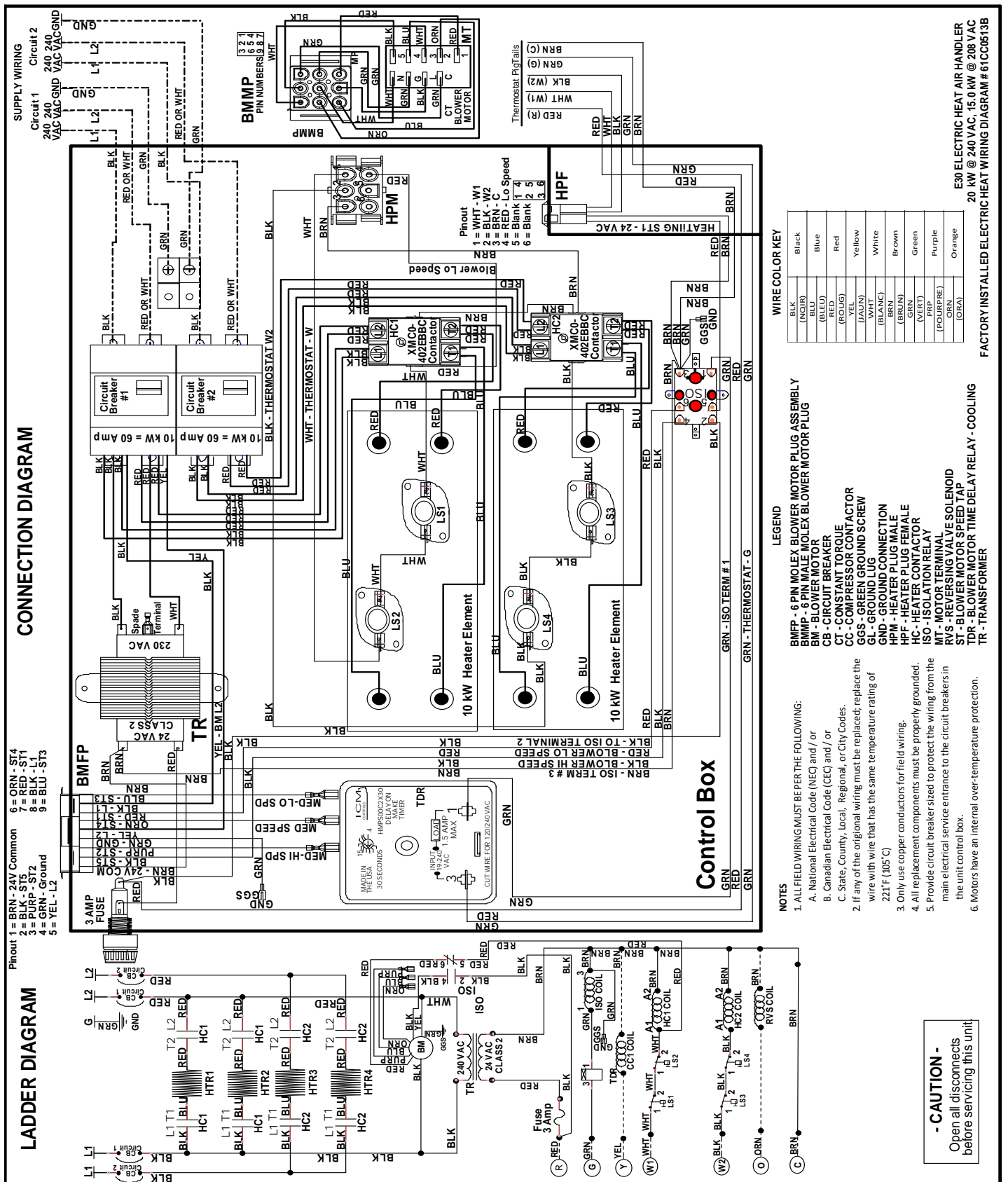


Figure 33: 20 kW Factory Installed Two Stage Electric Heat Wiring Diagram with a Constant Torque Blower Motor.

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

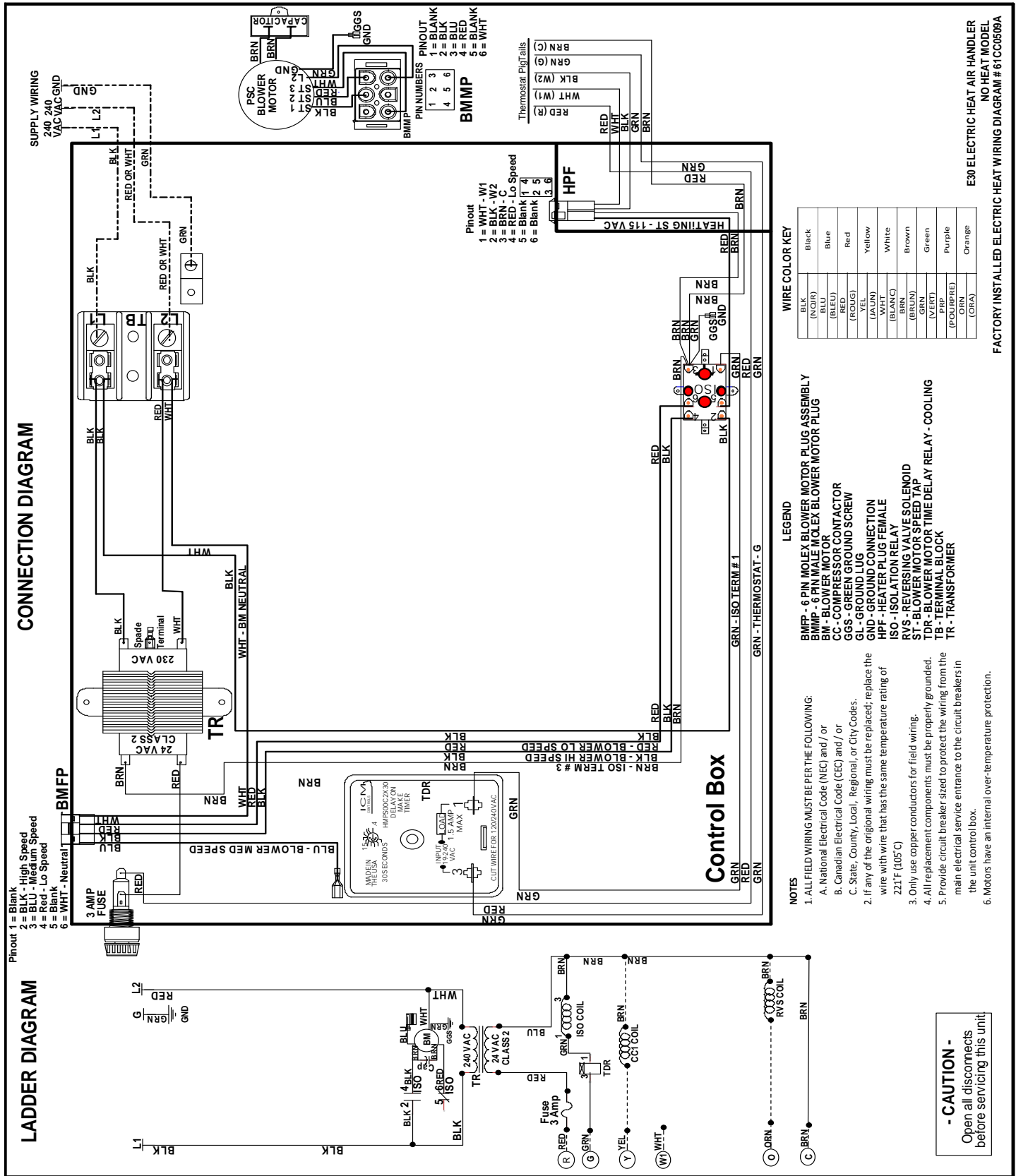


Figure 34: No Factory Installed Electric Heat (0 kW) Wiring Diagram with a PSC Blower Motor.

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

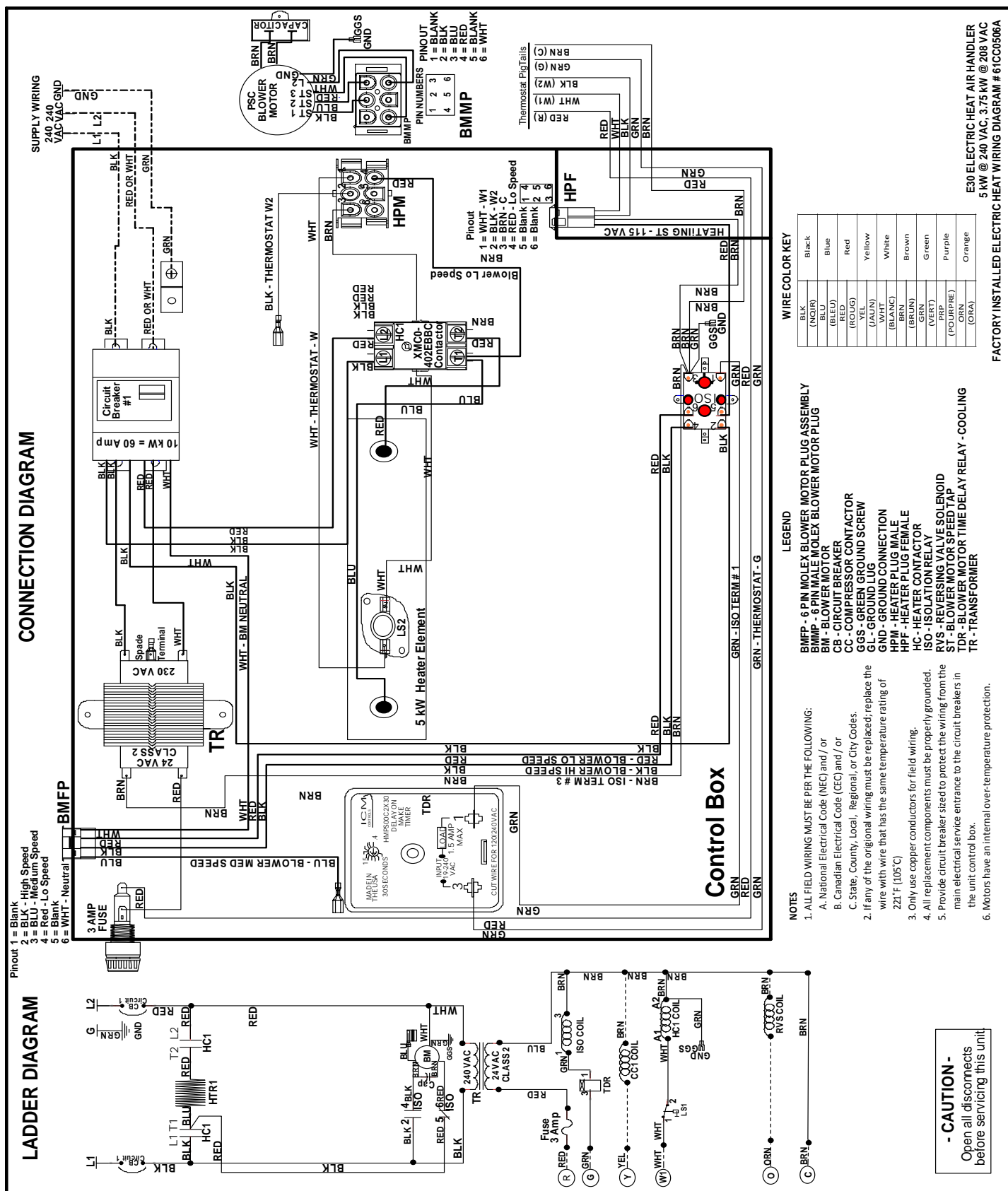


Figure 35: 5kW Factory Installed Electric Heat Wiring Diagram with a PSC Blower Motor.

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.

E30 ELECTRIC HEAT AIR HANDLER
5 kW @ 240 VAC, 3.75 kW @ 208 VAC
FACTORY INSTALLED WIRING DIAGRAM # 61CC0506A

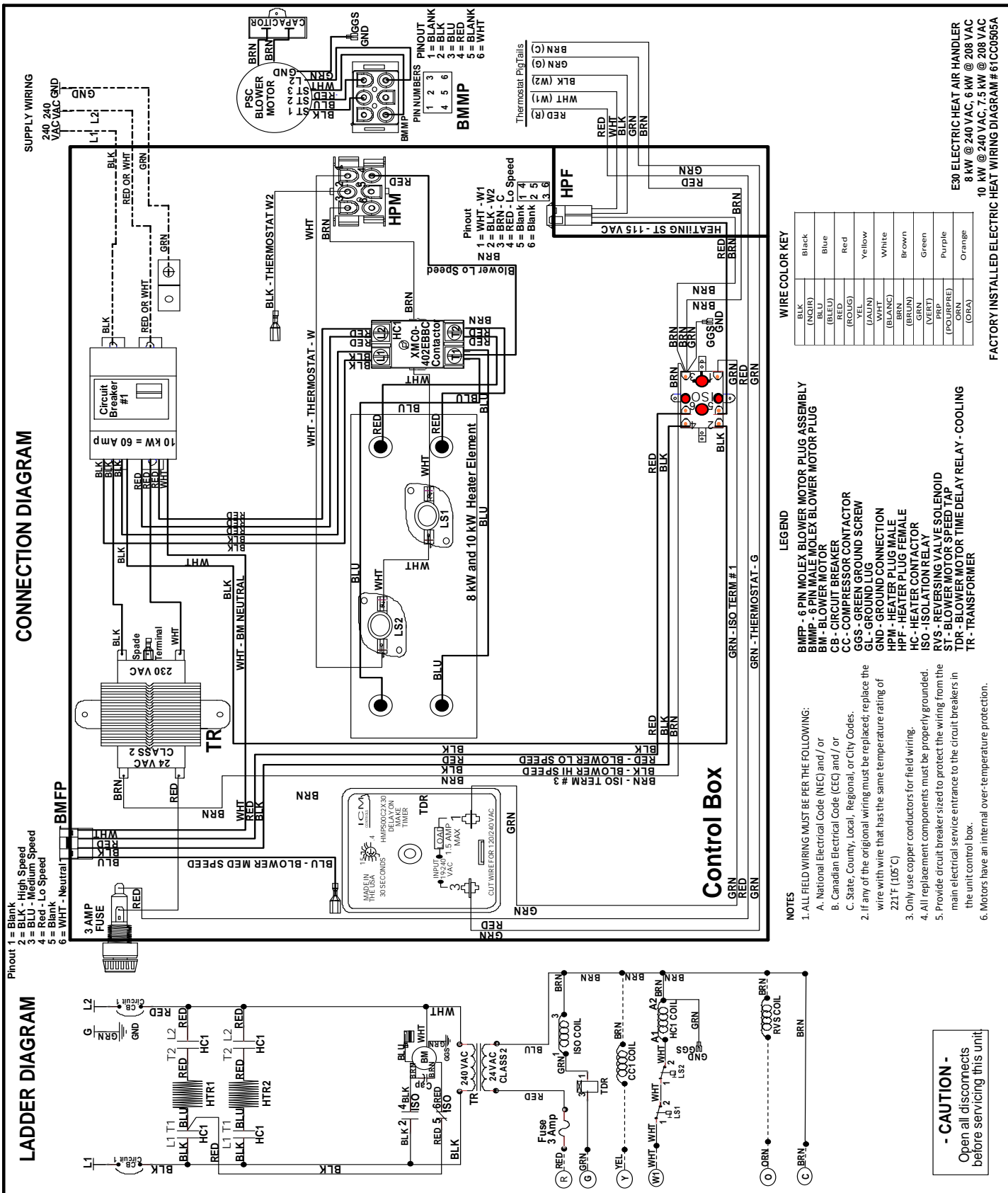


Figure 36: 8kW, 10kW Factory Installed Electric Heat Wiring Diagram with a PSC Blower Motor.

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

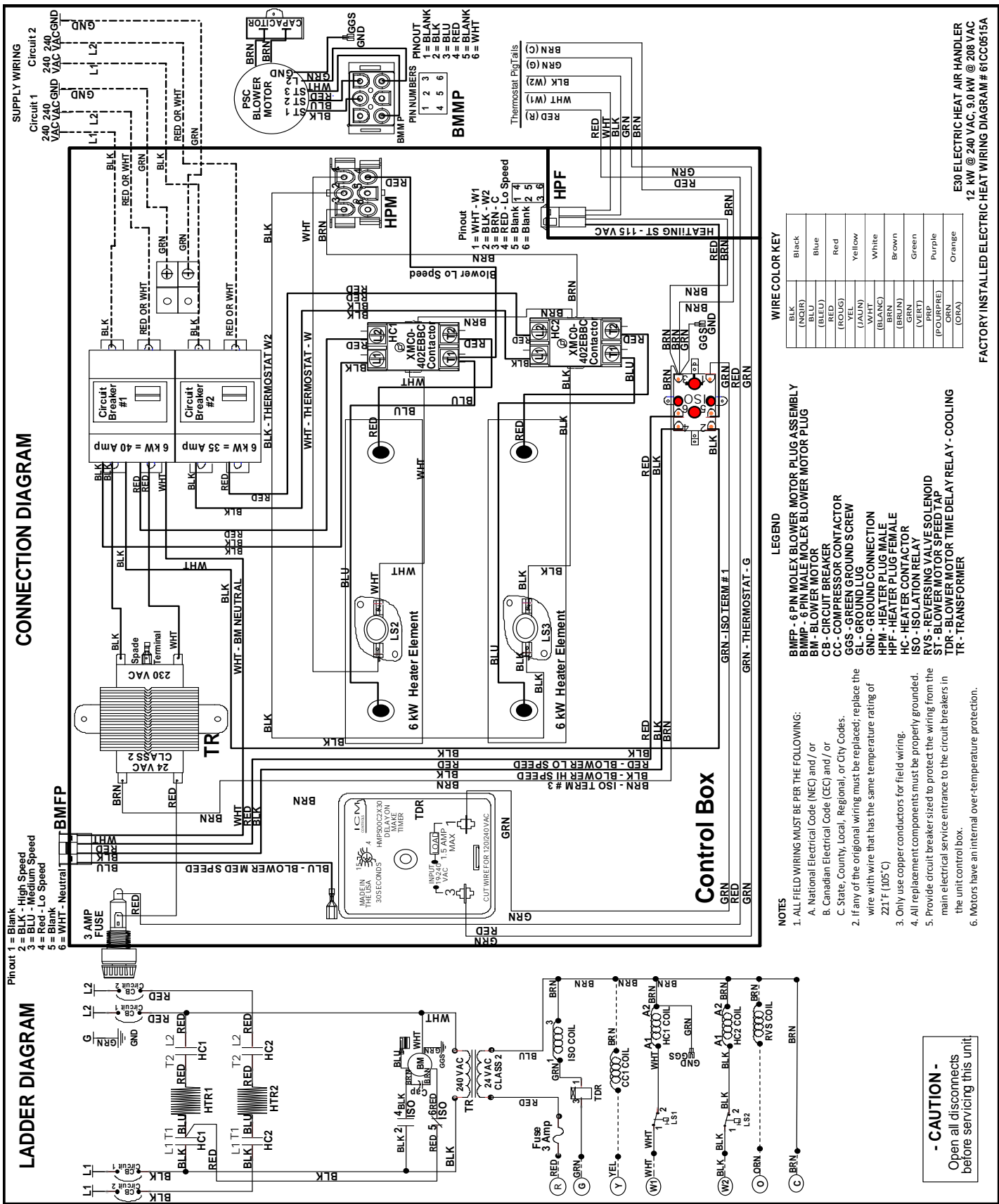


Figure 37: 12kW Factory Installed Two Stage Electric Heat Wiring Diagram with a PSC Blower Motor.

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

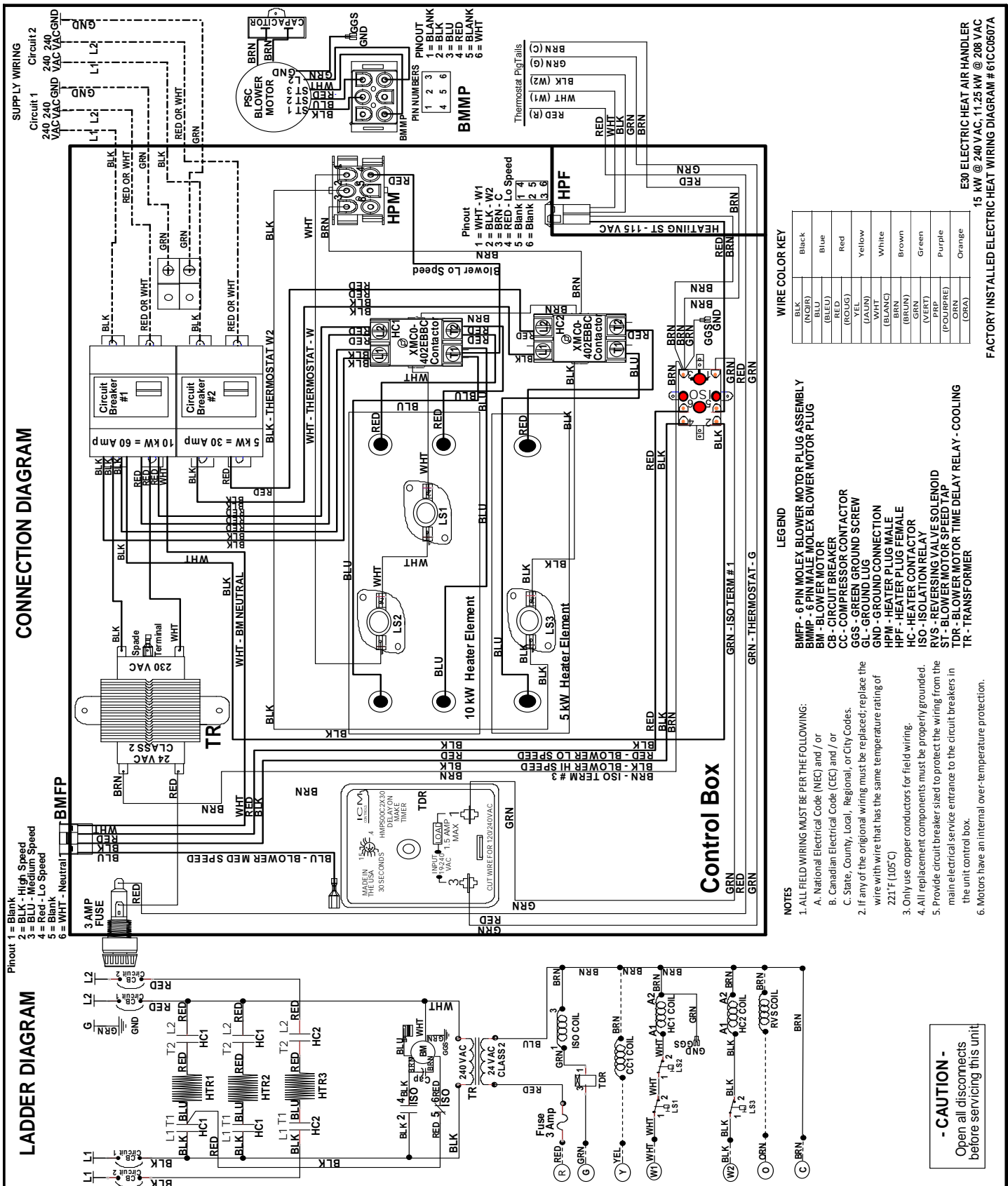


Figure 38: 15kW Factory Installed Two Stage Electric Heat Wiring Diagram with a PSC Blower Motor.

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

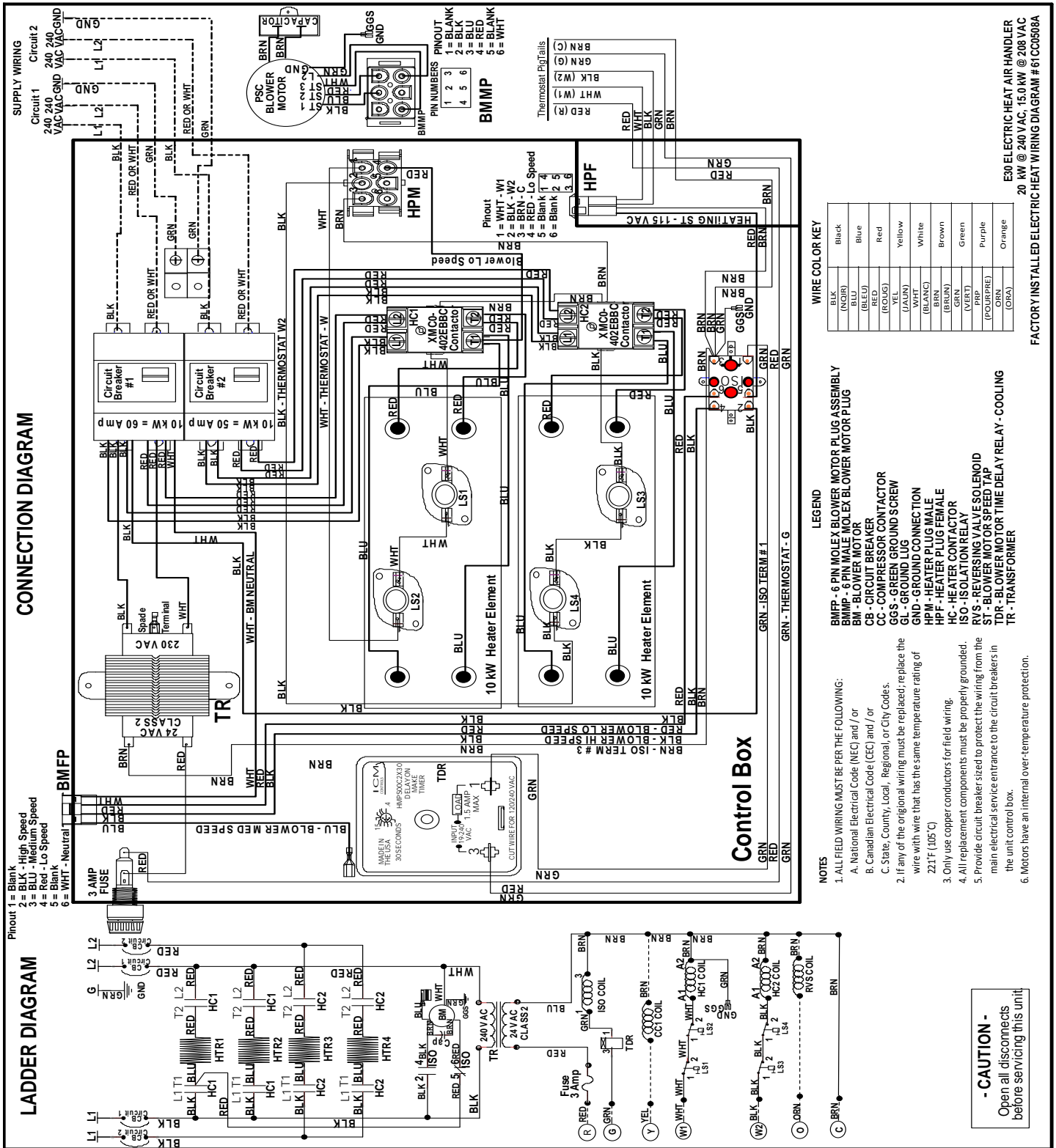


Figure 39: 20kW Factory Installed Two Stage Electric Heat Wiring Diagram with a PSC Blower Motor.

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

Subject to change without notice
 Copyright by Mortex Products Inc. 2016.

61MH0030A
 Supersedes: 61MH0030