INSTALLATION MANUAL

HORIZONTAL SINGLE AND TWO STAGE PACKAGE ELECTRIC FURNACE WITH:

- **FACTORY INSTALLED OR FIELD INSTALLED ELECTRIC HEAT**
- **OPTIONAL FIELD INSTALLED COOLING**

MODELS: E40 SERIES WEATHERIZED AIR HANDLER

LIST OF SECTIONS

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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.

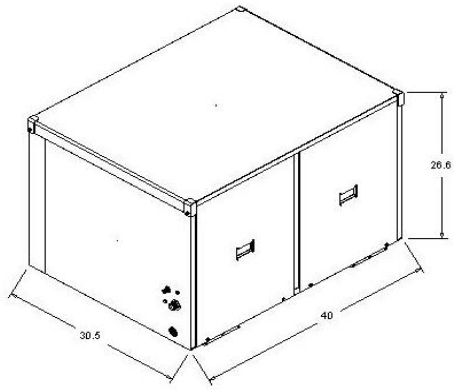

Figure 1: Air Handler Dimensions

SAVE THIS MANUAL FOR FUTURE REFERENCE

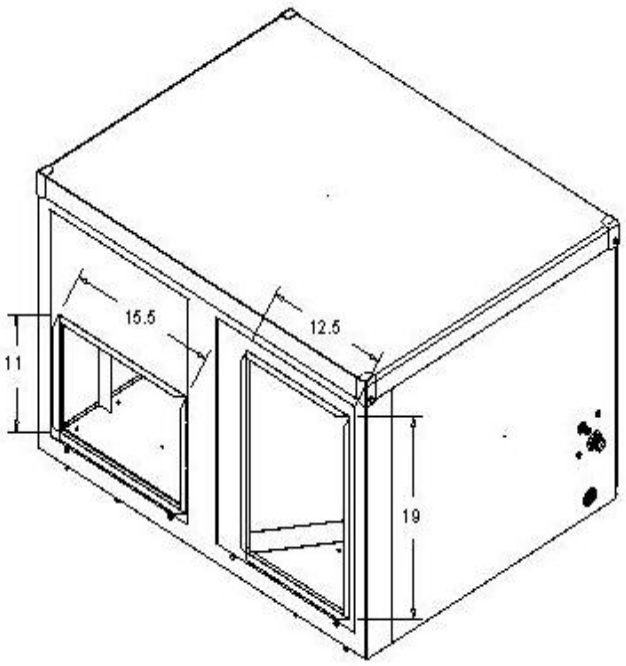

Figure 2: Air Handler Dimensions

Models	ALL	ALL	ALL	ALL
Input, kW	3	5	6	8
Air Temperature Rise, Range - F	20-80	20-80	20-80	20-80
Designed Max Outlet Air Temp-F	160	160	160	160
Max. External SP (Duct), In. W.C.	0.3			
Thermostat Circuit	24 VAC, 60 Hz, 40VA			

Models	ALL	ALL	ALL	ALL
Input, kW	10	12	15	20
Air Temperature Rise, Range - F	30-80	30-80	35-80	40-80
Designed Max Outlet Air Temp-F	160	160	160	160
Max. External SP (Duct), In. W.C.	0.3			
Thermostat Circuit	24 VAC, 60 Hz, 40VA			

Table 1: Electric Air Handler Model Specifications

Available Blower Motors

1. Standard Blower Motor - 5 SPD C.T. MOTOR
2. Optional Blower Motor – 3 SPD PSC MOTOR

Code (With / kW Heat) Unit Data Tag								Coil to build							
E40A2A06** 25															
E	40	A	2	A	06	*	*	CS-PZ7H-4X-8 (AHRI Listing CS-PZ7+TDR)							
1	2,3	4	5	6	7,8	9	10	1,2,-	4,5,6	7	8	9	10	11	12
Style	Product Description	Type Blower / Voltage	Blower Description	Configurations	Heating Input	Configurations	Revision Letter	Coil Model	Coil Code if applicable	Metering Device	SWT / QC	Pan			
E = Furnace A = Air Handler	40 = Ground Mount Horizontal Weatherized	A = PSC 208 / 230 (3 Spd.) B = C.T 208 / 230 C = High performance PSC 208 / 230 (4 Spd.) D = ECM 208/230	1 = 1/3 HP 9 x 7T 2 = 1/2 HP 10 x 7T 3 = 1/2 HP 10 x 10T 4 = 3/4 HP 10 x 10T 5 = 3/4 HP 12 x 10T	A= 12" Supply & 12" Return B= 12" Supply & 14" Return C= 14" Supply & 14" Return D= 14" Supply & 16" Return, Etc	00 = 0 kW 03 = 3 kW 05 = 5 kW 06 = 6 kW 08 = 8 kW 10 = 10 kW 12 = 12 kW 15 = 15 kW 20 = 20 kW	A through 9 All open for future use	A= All Outdoor Units will be Double Wall construction, either Powder Coated Top and a Combination Galvanized and / or Precoat Paint using Valspar Product Code PMA6116	Summit or Mortex Coil Model Number CS-	PN7 = 1-Row PZ7 = 2-Row PY7 = 3 Row PH7 = 4 Row	D = 1.5 to 2.5 Ton R-410A TXV Y = 2.5 to 4.0 Ton R-410A TXV Z = 3.5 to 5.0 R-410A TXV or Piston #, Etc 5= .065 piston	0=Sweat Connect 4=Male Quick Connect 1 & 2 Row Coils use a 3/4" Suction Line 3 & 4 Row Coils use a 7/8" Suction Line QC Coils Contain 8 oz of R-410A	P= Plastic Pan X= Metal Pan			
	41 = Roof Mount Horizontal Weatherized			1= 12" Supply & Return set for the Roof Adapter											
E	40	A	2	A	06	A	A	CS-	PZ7	5	Q	X			
E40 Information								Coil Information							
E40A2A06** 25															
E	40	A	2	A	6	*	*	2=ROW		# 65 Piston (5)			Future		

Table 2: Air Handler Model Nomenclature

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

E40Ax00 Models – 245 lbs	E40Bx00 Models – 247 lbs
E40Ax03 Models – 246 lbs	E40Bx03 Models – 248 lbs
E40Ax05 Models – 246 lbs	E40Bx05 Models – 248 lbs
E40Ax06 Models – 246 lbs	E40Bx06 Models – 248 lbs
E40Ax08 Models – 247 lbs	E40Bx08 Models – 249 lbs
E40Ax10 Models – 247 lbs	E40Bx10 Models – 249 lbs
E40Ax12 Models – 247 lbs	E40Bx12 Models – 249 lbs
E40Ax15 Models – 248 lbs	E40Bx15 Models – 250 lbs
E40Ax20 Models – 248 lbs	E40Bx20 Models – 250 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 Air Handler dimensions. The Air Handler 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. Only trained and qualified personnel can interpret the instructions in this manual. Untrained service personnel and /or the home owner or user of the equipment (renter) 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.
12. The air handler heating and cooling size should be determined by conducting heat loss and heat gain calculations on the structure that are performed by a qualified service agency. The heat loss and heat gain calculations should be based on acceptable heat loss and heat gain calculation methods in ACCA, Manual J or other approved methods may be used.
13. Check the rating plate and power supply to be sure that the electrical characteristics match. The 208/230 VAC models use nominal 208 or 230 VAC, 1 Phase, 60-Hertz power supply. DO NOT CONNECT THIS APPLIANCE TO A 50 HZ POWER SUPPLY OR A VOLTAGE ABOVE 250 VOLTS.
14. Ground connections MUST BE securely fastened to the control box and ground wires MUST BE secured to the ground lugs control box with terminals.

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. Check the blower and the motor, heater, relays, wiring or other components that may have loosened during shipping.

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 IlI: RETURN AIR AND CLEARANCE REQUIREMENTS

LOCATION

Access for servicing is an important factor in the location of any furnace. Provide a minimum of 30 inches in front of the furnace for access to the control box, heating elements, and blower. This access may be provided by locating the furnace so that the front of the air handler is not less than 30 inches from a wall, porch, skirting, trees, plants or garden.

Ground Mount Applications

It is recommended that the air handler be located at the back of the building opposite the front entrance. Be sure the most advantageous location for the air handler has been selected.

Rooftop Mount Applications

Rooftop installations should be located in the center of the building when possible. Follow the guide below for proper mounting of the air handler for ground or rooftop mound applications:

1. For ground mount applications select a solid level location; preferably on a concrete or plastic pad designed to handle the weight.
2. Select a location that will require the minimum amount of supply duct to connect to the existing duct system and the minimum amount of return duct to connect to the return grille or return filter grille. Be sure the location allows for a minimum amount of elbows and use 45 degree elbows whenever possible to keep the air flow reductions to a minimum.
3. Consideration should be given to choosing a location that provides easy access for routing the line voltage electrical wiring to the air handler.
4. Consideration should be given to choosing a location that provides easy access for routing the low voltage thermostat wiring to the air handler.
5. Sound Transmission should be taken into consideration in choosing a location where the air handler is away from bedroom windows or rooms where the sound maybe objectionable.
6. For Rooftop Mount Applications - consideration should be given to access a drain to drain the evaporator condensate. NEVER use the sewer vent that penetrates the roof to drain condensate.
7. Whenever possible the air handler should be located where it is shaded from the sun especially at peak hours when the heat from the sun is at its warmest and the heat load on the structure is at its highest.
8. NEVER install the air handler in a confined space.

Recommended Return Filter Sizes

800 CFM = 20 x 20 x 1 Filter / Pleated Filter =16 x 20 x 1
1000 CFM = 20 x 24 x 1 Filter / Pleated Filter = 20 x 20 x 1
1200 CFM = 24 x 24 x 1 Filter / Pleated Filter = 20 x 24 x 1
1400 CFM = 24 x 30 x 1 Filter / Pleated Filter = 24 x 24 x 1
1600 CFM = 30 x 30 x 1 Filter / Pleated Filter = 24 x 24 x 1
1800 CFM = 30 x 30 x 1 Filter / Pleated Filter = 24 x 30 x 1
2000 CFM = 30 x 40 x 1 Filter / Pleated Filter = 24 x 30 x 1

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 3 for clearance to combustibles information.

MODEL	TOP (in)	BACK (in)	SIDES (in)	FRONT	DUCT (in)
Electric	0	0	0	30	0

Table 3: Clearances to Combustibles

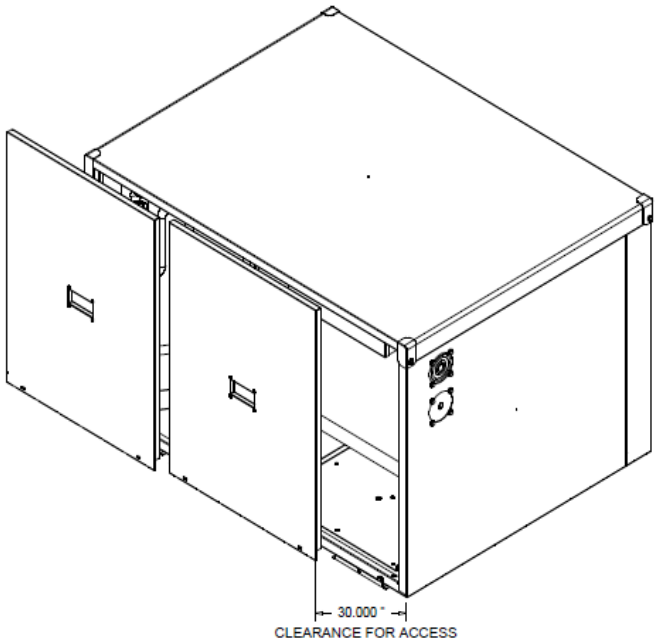

Figure 3: Clearance – Access for Service

RETURN AIR REQUIREMENTS

The furnace is designed to operate at a 0.01 inch WC static pressure on the return air duct. In order to assure proper air flow through the furnace the duct system must be designed so that the external static pressure from the furnace, thru the duct system must not exceed 0.01 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 return air system you are going to use.

To connect the return air duct system to the furnace make sure the return duct you are going to use is the same size as the opening on the air handler.

Place the air handler on a pad and slide the air handler towards the duct until the duct is over the outside of the flanges on the air handler for the return air duct.

Secure the duct with screws and seal with a calking, and/or non-tape sealant such as mastic or an aerosol sealant to prevent leaks in the ducts and to prevent leaks where the duct connects to the air handler.

Make sure the return air duct is securely fastened to the return duct system and sealed to prevent leaks. If return duct is

connected to a grille or filter grille be sure the duct is securely fastened to the wall and the grille is securely fastened to the duct and sealed to prevent leaks. Be sure to insulate and weatherize the duct to prevent cold air and moisture leakage into the duct during the winter months and to prevent sweating during the summer months when the air conditioner is operating.

SECTION IV: SUPPLY AIR INSTALLATION

The furnace is designed to operate at a 0.30 inch WC static pressure on the supply air duct. In order to assure proper air flow through the furnace the duct 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 return air system you are going to use.

To connect the return air duct system to the furnace make sure the return duct you are going to use is the same size as the opening on the air handler.

Place the air handler on a pad and slide the air handler towards the duct until the duct is over the outside of the flanges on the air handler for the supply air duct.

Secure the duct with screws and seal with a calking, and/or non-tape sealant such as mastic or an aerosol sealant to prevent leaks in the ducts and to prevent leaks where the duct connects to the air handler.

Make sure the supply air duct is securely fastened to the supply duct system and sealed to prevent leaks. Be sure to insulate and weatherize the duct to prevent cold air and moisture leakage into the duct during the winter months and to prevent sweating during the summer months when the air conditioner is operating.

SECTION V: FURNACE INSTALLATION

Pad Installation

Use 2" x 6" wood to make a frame that is a minimum of 44" wide and 35" deep. Use concrete to fill in the wooden frame and use a trowel to make the top of the cement smooth. Allow 24 hours for the concrete to set before placing the air handler on the pad. Place the air handler on the pad with the air handler duct openings facing the skirting. Make sure the air handler duct openings are facing the supply and return ducts.

Prior to installing the furnace make sure there is access for the refrigerant tubing, the electrical wiring, the thermostat wiring and the condenser control wiring.

1. Remove the top shipping cover and corner posts.
2. Remove the air handler from the wooden skid.
3. Remove the supply and return cover plate from the back of the air handler.
4. Place the air handler on the pad and slide the air handler in place.
5. Connect the supply and return ducts as instructed above.

Rooftop Installation

A gable needs to be designed to place the air handler on before placing the air handler on the rooftop. The gable must be designed so the air handler is level after being placed on the gable. Place the air handler on the gable and secure it to the gable with screws. Make sure the air handler duct openings are facing the supply and return ducts.

Prior to installing the air handler, make sure there is access for the refrigerant tubing, the electrical wiring, the thermostat wiring and the condenser control wiring.

1. Remove the top shipping cover and corner posts.
2. Remove the air handler from the wooden skid.
3. Remove the supply and return cover plate from the back of the air handler.
4. Place the air handler on the pad and slide the air handler in place.
5. Connect the supply and return ducts as instructed above.

DX Refrigerant Piping:

Air Handlers with DX type evaporator coils require liquid and suction piping sized in accordance with condensing unit manufacturer's instructions. The evaporator coils have sweat copper connections. Refrigerant lines should be soldered with silver solder or high temperature brazing alloy. Suction line must be insulated to avoid condensate from forming and dropping off. Armaflex (or equivalent) with 3/8" (1 cm) minimum wall thickness is recommended. In severe conditions such as hot or high humidity areas require 1/2" (1.3 cm) minimum wall thickness may be required.

Horizontal suction lines should slope 1 inch for every 20 feet toward condensing unit. Manufacturer recommends that dry nitrogen be flowed through refrigerant lines during soldering operation.

CONDENSATE DRAIN PIPING:

The air handler coil drain pan has two ¾" NPT female primary and two secondary connections (left or right hand). Piping from each fitting used is to have 1-1/2 minimum trap and each run in such a manner as to provide enough slope downward for adequate drainage to a visible area. PVC drain pipe must not rise above the drain fitting on the air handler at any point in the routing of the pipe from the air handler to the drain.

Do not pipe these two fittings together into a common drain. Cap unused connection.

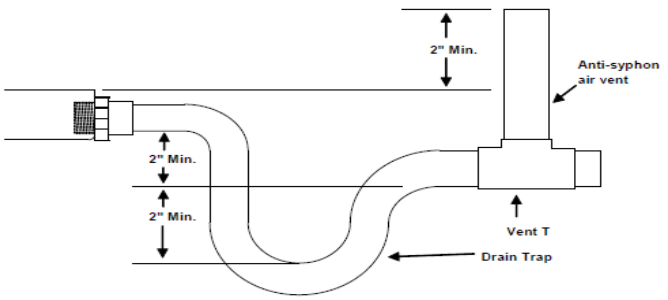

Figure 4: Typical Condensate Traps

SECTION VI: 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 4, 5, 6 and 7 for wire size, fuse/circuit breaker size, and ground wire sizes. The electrical power supply wire size **MUST BE** checked to ensure the wire is the proper size to handle the current draw from the electric heaters you are installing.

Failure to use the proper size wire can lead to a ELECTRICAL FIRE caused by overloading the wire. Contact your local power company or electrical contractor for corrections.

Install a service disconnect switch. The 230 Volt supply line to the unit must include a disconnect switch at or in sight of the unit that may be fused or non-fused. This disconnect switch is in addition to the main disconnect or main entrance to the home or building.

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 – No Electric Heat

1. Remove the main control box cover.
2. Install the cable connectors on the 7/8" dia holes on the right side of the control box.
3. Strip ½" 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 terminal block 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 terminal block and tighten the set screw to clamp down on the wire.
7. Insert the green wire into the ground lug and tighten the set screw.
8. Check for possible loose connections. Make sure all electrical connections are tight.

Single Circuit Line Wiring Connections with Electric Heat

1. Follow the instructions that came with the Field Installed Electric Heater Kit to properly install the electric heaters.
2. Install the cable connectors on the 7/8" dia holes on the right side of the electric heater control box.
9. Strip ½" of the insulation on the end of each wire.
10. Insert the wires through the holes in the casing and through the cable connectors.
11. Insert the black wire into the L1 screw terminal on the circuit breaker and tighten the set screw to clamp down on the wire. The 15 kW and 20 kW models use a jumper bar assembly to connect the circuit breakers. Insert the wire into the L1 screw terminal on the jumper bar assembly.
12. Insert the white or red wire into the L2 screw terminal on the circuit breaker and tighten the set screw to clamp down on the wire. The 15 kW and 20 kW models use a jumper bar assembly to connect the circuit breakers. Insert the wire into the L2 screw terminal on the jumper bar assembly.
    Note: The 100 amp 4 Pole Jumper Bar Assembly part number is 68BAE001.
13. Insert the green wire into the ground lug and tighten the set screw.
14. Check for possible loose connections. Make sure all electrical connections are tight.

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

15. The jumper bar assembly cannot be used on duel circuit models.
16. Insert the black wire from the second power supply into the L1 screw terminal on the second circuit breaker and tighten the set screw to clamp down on the wire.
17. Insert the white or red wire from the second power supply into the L2 screw terminal on the second circuit breaker and tighten the set screw to clamp down on the wire.
18. Insert both green wire from the second power supply into the second ground lug and tighten the set screw.
19. Tighten the screws on the cable connectors until the power supply wires are securely fastened to the connector.
20. Check for possible loose connections. Make sure all electrical connections are tight.

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 main circuit breaker panel. General wire and breaker sizes are shown in Tables 4, 5, 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 local codes for additional requirements concerning supply circuit wiring. Electrical data can be found in Tables 4, 5, 6, 7, and 8.

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

The 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.

Indoor Blower Type	X-13 (CTM)	PSC	X-13 (CTM)	PSC
Indoor Blower Amps	2.72	4.40	2.72	7.70
Circuit Load - FLA - 208/230 VAC	2.92	4.60	2.92	7.90
Min. Wire Size (90°C)	#14	#14	#14	#14
Minimum Wire Size (75°C)	#14	#14	#14	#14
Minimum Wire Size (60°C)	#14	#14	#14	#14
Ground Wire Size	*	*	*	*
Max Fuse/Circuit Breaker Amps	15	15	15	15

Table 4: Wiring Requirements – No Heat Models - 18-60 kBTU Cooling - Single Branch Circuit

+ 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 4.

3 kW Heater Amps - 208/230 VAC	10.98/12.5					10.98/12.5					10.98/12.5							10.98/12.5						
5 kW Heater Amps - 208/230 VAC	18.3/20.83					18.3/20.83					18.3/20.83							18.3/20.83						
6 kW Heater Amps - 208/230 VAC	21.9/25					21.9/25					21.9/25							21.9/25						
8 kW Heater Amps - 208/230 VAC	29.2/33.3					29.2/33.3					29.2/33.3							29.2/33.3						
10 kW Heater Amps - 208/230 VAC	36.6/41.67					36.6/41.67					36.6/41.67							36.6/41.67						
12 kW Heater Amps - 208/230 VAC	43.9/50					43.9/50					43.9/50							43.9/50						
15 kW Heater Amps - 208/230 VAC	54.18/62.5					54.18/62.5					54.18/62.5							54.18/62.5						
Indoor Blower Type	9 x 7T - X-13 (CTM)					9 x 7T - PSC					10 x 7T - X-13 (CTM)							10 x 7T - PSC						
Indoor Blower Amps	0.98					1.21					1.31							2.31						
Heater - kW	3	5	6	8	10	3	5	6	8	10	3	5	6	8	10	12	15	3	5	6	8	10	12	15
Circuit Load - FLA - 230 VAC	13.48	21.60	25.72	34.05	42.38	13.71	22.88	27.00	35.33	43.66	13.81	22.54	26.66	34.99	43.32	51.31	64.16	14.81	23.88	28.00	36.33	44.66	52.31	65.50
Min. Wire Size (90°C)	#12	#10	#10	#8	#6	#12	#10	#10	#8	#6	#12	#10	#8	#8	#6	#6	#4	#12	#10	#8	#8	#6	#6	#3
Minimum Wire Size (75°C)	#12	#10	#10	#8	#6	#12	#10	#10	#8	#6	#12	#10	#8	#8	#6	#6	#4	#12	#10	#8	#8	#6	#4	#3
Minimum Wire Size (60°C)	#12	#10	#10	#8	#4	#12	#10	#10	#6	#4	#12	#10	#8	#6	#4	#4	#3	#12	#10	#8	#6	#4	#4	#2
Ground Wire Size	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Max Fuse Amps	20	30	30	40	60	20	30	35	45	60	20	30	35	45	60	70	80	20	30	35	50	60	70	90

Table 5: Wiring Requirements – Electric Heat Models - 18-36 kBTU Cooling - Single Branch Circuit

15kW Two Stage models may have a dual or single power supply. - Single power supply may require 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 5.

3 kW Heater Amps - 208/230 VAC	10.98/12.5								10.98/12.5								10.98/12.5								10.98/12.5							
5 kW Heater Amps - 208/230 VAC	18.3/20.83								18.3/20.83								18.3/20.83								18.3/20.83							
6 kW Heater Amps - 208/230 VAC	21.9/25								21.9/25								21.9/25								21.9/25							
8 kW Heater Amps - 208/230 VAC	29.2/33.3								29.2/33.3								29.2/33.3								29.2/33.3							
10 kW Heater Amps - 208/230 VAC	36.6/41.67								36.6/41.67								36.6/41.67								36.6/41.67							
12 kW Heater Amps - 208/230 VAC	43.9/50								43.9/50								43.9/50								43.9/50							
15 kW Heater Amps - 208/230 VAC	54.18/62.5								54.18/62.5								54.18/62.5								54.18/62.5							
20 kW Heater Amps - 208/230 VAC	72.2/83.4								72.2/83.4								72.2/83.4								72.2/83.4							
Indoor Blower Type	10 x 10T - X-13 (CTM)								10 x 10T - PSC								12 x 10T - X-13 (CTM)								12 x 10T - PSC							
Indoor Blower Amps	1.50								2.64								2.41								3.98							
Heater - kW	3	5	6	8	10	12	15	20	3	5	6	8	10	12	15	20	3	5	6	8	10	12	15	20	3	5	6	8	10	12	15	20
Circuit Load - FLA - 230 VAC	14.0	22.3	26.5	34.8	43.2	51.5	64.0	84.8	15.1	23.5	27.6	36.0	44.3	52.6	65.1	86.0	14.9	14.9	27.4	35.7	44.1	52.4	64.9	85.7	16.5	24.8	29.0	37.3	45.6	54.0	66.5	87.3
Min. Wire Size (90°C)	#12	#10	#8	#8	#6	#6	#3	#2	#12	#10	#8	#8	#6	#6	#3	#2	#12	#10	#8	#8	#6	#6	#3	#2	#10	#8	#8	#8	#6	#6	#3	#2
Minimum Wire Size (75°C)	#12	#10	#8	#8	#6	#6	#3	#1	#12	#10	#8	#8	#6	#4	#3	#1	#12	#10	#8	#8	#6	#4	#3	#1	#10	#8	#8	#8	#6	#4	#3	#1
Minimum Wire Size (60°C)	#12	#10	#8	#6	#4	#4	#2	N/A	#12	#10	#8	#6	#4	#4	#2	N/A	#12	#10	#8	#6	#4	#4	#2	N/A	#10	#8	#8	#6	#4	#4	#2	N/A
Ground Wire Size	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Max Fuse Amps	20	30	35	45	60	60	80	125	20	30	35	45	60	70	90	125	20	30	35	45	60	70	90	125	30	35	40	50	60	70	90	125

Table 6: Wiring Requirements – Electric Heat Models - 37-60 kBTU Cooling - Single Branch Circuit

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

12 kW Heater Amps - 208/230 VAC	43.9/50				43.9/50				43.9/50						43.9/50						43.9/50						43.9/50					
15 kW Heater Amps - 208/230 VAC	54.18/62.5				54.18/62.5				54.18/62.5						54.18/62.5						54.18/62.5						54.18/62.5					
20 kW Heater Amps - 208/230 VAC	N/A				N/A				72.2/83.4						72.2/83.4						72.2/83.4						72.2/83.4					
Indoor Blower Type	10 x 7 T-(CTM)				10 x 7T - PSC				10 x 10 T - X-13 (CTM)						10 x 10 T - PSC						12 x 10 T - X-13 (CTM)						12 x 10 T - PSC					
Indoor Blower Amps	0.98				1.66				1.50						2.64						2.41						3.98					
Total Heater kW	12		15		12		15		12		15		20		12		15		20		12		15		20		12		15		20	
Circuit Heater kW	6	6	10	5	6	6	10	5	6	6	10	5	10	10	6	6	10	5	10	10	6	6	10	5	10	10	6	6	10	5	10	10
Circuit	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Circuit Load - FLA	26.0	25.0	42.6	20.8	26.7	25.0	43.3	20.8	26.5	25.0	43.2	20.8	43.2	41.7	27.6	25.0	44.3	20.8	44.3	41.7	27.4	25.0	44.1	20.8	44.1	41.7	29.0	25.0	45.6	20.8	45.6	41.7
Min. Wire Size (90°C)	#8	#8	#6	#10	#8	#8	#6	#10	#8	#8	#6	#10	#6	#6	#8	#8	#6	#10	#6	#6	#8	#8	#6	#10	#6	#6	#8	#8	#6	#10	#6	#6
Minimum Wire Size (75°C)	#8	#8	#6	#10	#8	#8	#6	#10	#8	#8	#6	#10	#6	#6	#8	#8	#6	#10	#6	#6	#8	#8	#6	#10	#6	#6	#8	#8	#6	#10	#6	#6
Minimum Wire Size (60°C)	#8	#8	#4	#10	#8	#8	#4	#10	#8	#8	#4	#10	#4	#4	#8	#8	#4	#10	#4	#4	#8	#8	#4	#10	#4	#4	#8	#8	#4	#10	#4	#4
Ground Wire Size	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Max Fuse Amps	35	35	60	30	35	35	60	30	35	35	60	30	60	60	35	35	60	30	60	60	35	35	60	30	60	60	40	35	60	30	60	60

Table 7: Wiring Requirements – Electric Heat Models – 18-60 kBTU Cooling – Dual Branch Circuit

15kW, and 20kW Two Stage models may have a dual or single power supply. - Single power supply may require 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										
		3 kW	5 kW	6 kW	8 kW	10 kW	12 kW		15 kW		20 kW	
	BRANCH CIRCUIT	1	1	1	1	1	1	2	1	2	1	2
240 VAC, 60 HZ, 1 PH	BTU	10,236	17,033	20,472	27,297	34,067	20,472	20,472	34,067	17,033	34,067	34,067
	kW	3	4.99	6.00	8.00	10	6.00	6.00	10	4.99	10	10
230 VAC, 60 HZ, 1 PH	BTU	9,539	15,876	19,080	25,441	33,686	19,080	19,080	33,686	15,876	33,686	33,686
	kW	2.79	4.65	5.592	7.456	9.78	5.592	5.592	9.78	4.65	9.78	9.78
220 VAC, 60 HZ, 1 PH	BTU	8,872	14,736	17,717	23,622	30,222	17,717	17,717	30,222	14,736	30,222	30,222
	kW	2.6	4.3186	5.1924	6.9232	8.8572	5.1924	5.1924	8.8572	4.3186	8.8572	8.8572
Heating Element Capacity	BTU	10	17,033	20,472	27,297	34,067	40,946		51,149		68,232	
	kW	4.99	4.99	6.00	8.00	9.9984	12,000		14.9904		19.9968	

Table 8: Electric Heater Electrical Data

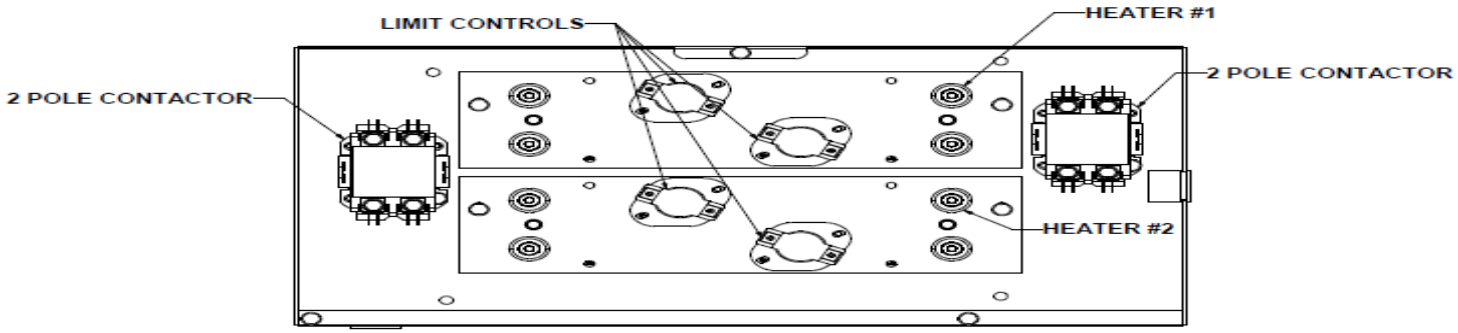

Figure 5: Electric Heater Control Box Component Locations

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

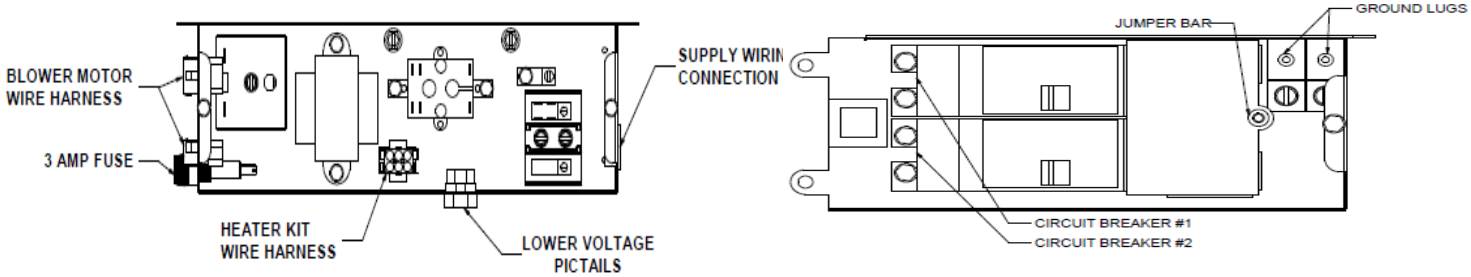

Figure 6: Main Control Box Connections, Circuit Breaker Box Connections and 24 VAC Fuse Location

⚠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 cover. Refer to Figure 7.

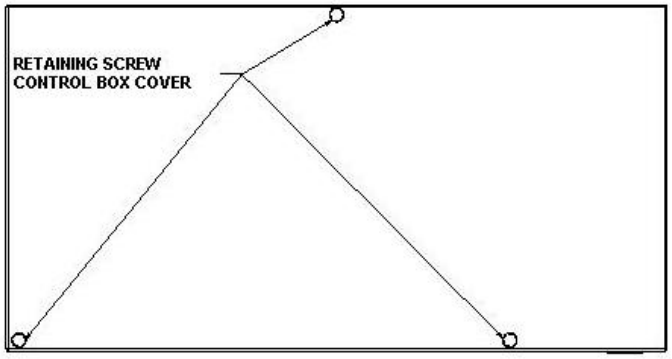

Figure 7: Electric Heater Control Box Cover

⚠WARNING

Be sure to turn the electrical power "OFF" at the main entrance (Home Circuit Breaker Box) and at the control box circuit breakers before servicing the Control Box. Refer to Figure 8.

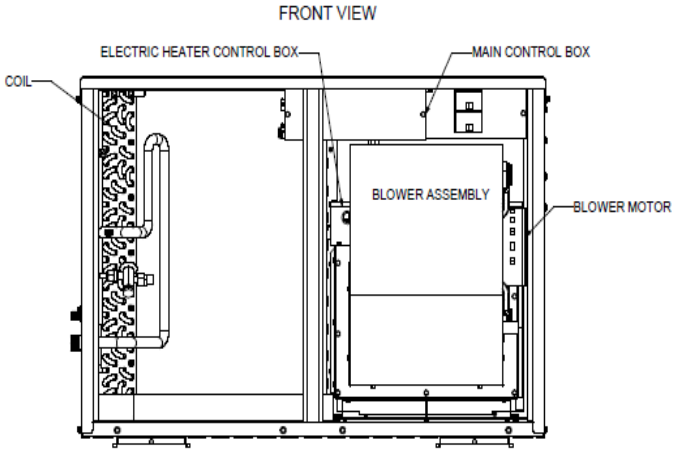

Figure 8: Electric Heater Control Box Circuit Breaker Location

SECTION VII: FIELD INSTALLED ELECTRIC HEATER KITS: This instruction covers the physical installation of the following electric heat kits on the E40 series models. Refer to Tables 4-8 for electrical specifications.

Heat Kit Model	Circuit Breaker	DP Heat Contactor	Limits	Element kW	Heat Kit Model	Circuit Breaker	DP Heat Contactor	Limits	Element kW
9 x 7T PSC Blower Assembly					9 x 7T Constant Torque Blower Assembly				
E40BPAHK03A	1(20 amp)	1	1	3	E40BXAHK03A	1(20 amp)	1	1	3
E40BPAHK05A	1(35 amp)	1	1	5	E40BXAHK05A	1(35 amp)	1	1	5
E40BPAHK06A	1(40 amp)	1	1	6	E40BXAHK06A	1(40 amp)	1	1	6
E40BPAHK08A	1(50 amp)	1	2	8	E40BXAHK08A	1(50 amp)	1	2	8
E40BPAHK10A	1(60 amp)	1	2	10	E40BXAHK10A	1(60 amp)	1	2	10
Heat Kit Model	**Circuit Breaker**	**DP Heat Contactor**	**Limits**	**Element kW**	**Heat Kit Model**	**Circuit Breaker**	**DP Heat Contactor**	**Limits**	**Element kW**
10 x 7T PSC Blower Assembly					10 x 7T Constant Torque Blower Assembly				
E40BPBHK03A	1(20 amp)	1	1	3	E40BXBHK03A	1(20 amp)	1	1	3
E40BPBHK05A	1(35 amp)	1	1	5	E40BXBHK05A	1(35 amp)	1	1	5
E40BPBHK06A	1(40 amp)	1	1	6	E40BXBHK06A	1(40 amp)	1	1	6
E40BPBHK08A	1(50 amp)	1	2	8	E40BXBHK08A	1(50 amp)	1	2	8
E40BPBHK10A	1(60 amp)	1	2	10	E40BXBHK10A	1(60 amp)	1	2	10
E40BPBHK12A	1(35 amp) & 1 (35 amp)	1	2	12	E40BXBHK12A	1(35 amp) & 1 (35 amp)	1	2	12
E40BPBHK15A	1(40 amp) & 1(60 amp)	2	3	15	E40BXBHK15A	1(40 amp) & 1(60 amp)	2	3	15
Heat Kit Model	**Circuit Breaker**	**DP Heat Contactor**	**Limits**	**Element kW**	**Heat Kit Model**	**Circuit Breaker**	**DP Heat Contactor**	**Limits**	**Element kW**
10 x 10T AND 12 x 10T PSC Blower Assemblys					10 x 10T AND 12 x 10T Constant Torque Blower Assemblys				
E40BPCHK03A	1(20 amp)	1	1	3	E40BXCHK03A	1(20 amp)	1	1	3
E40BPCHK05A	1(35 amp)	1	1	5	E40BXCHK05A	1(35 amp)	1	1	5
E40BPCHK06A	1(40 amp)	1	1	6	E40BXCHK06A	1(40 amp)	1	1	6
E40BPCHK08A	1(50 amp)	1	2	8	E40BXCHK08A	1(50 amp)	1	2	8
E40BPCHK10A	1(60 amp)	1	2	10	E40BXCHK10A	1(60 amp)	1	2	10
E40BPCHK12A	1(35 amp) & 1(35 amp)	2	3	12	E40BXCHK12A	1(40 amp) & 1(35 amp)	2	3	12
E40BPCHK15A	1(40 amp) & 1(60 amp)	2	3	15	E40BXCHK15A	1(40 amp) & 1(60 amp)	2	3	15
E40BPCHK20A	2(60 amp)	2	4	20	E40BXCHK20A	2(60 amp)	2	4	20

Table 9: Field Installed Electric Heater Kit Accessory

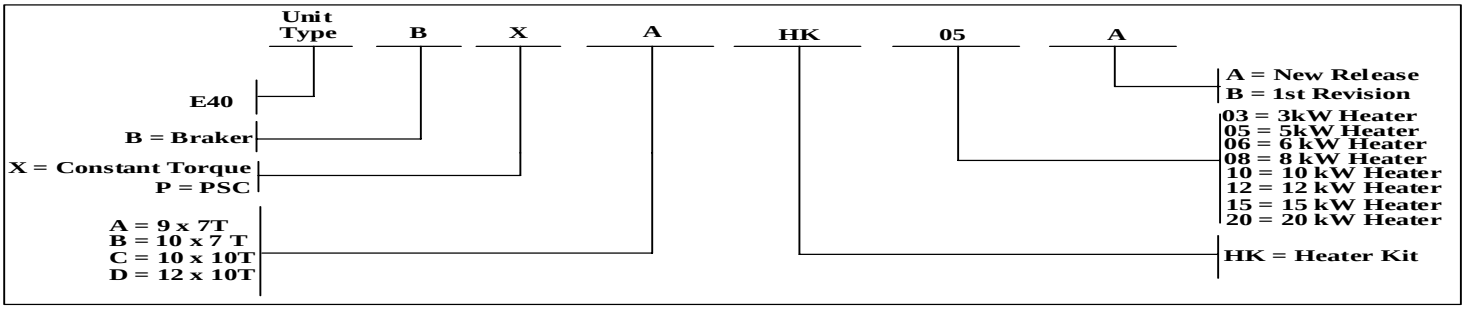

Table 10: Field Installed Electric Heater Kit Nomenclature

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 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 9 pin male plug to the 9 pin female plug on the main control box.
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 4-7 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.

LOW VOLTAGE CONNECTIONS

If a air handler was previously installed, nothing will need to change on the low voltage wiring providing the air handler does not have any accessories or options that the previous air handler did not have. Additional accessories like adding cooling or installing a heat pump can change the low voltage wiring. I some cases new low voltage wires will need to be installed especially if this is a new installation.
Refer to SECTION IX for thermostat and low voltage wiring connections.

SECTION VIII: THERMOSTAT WIRING AND CONNECTIONS

Thermostat Wiring

Thermostat wires connect through side of furnace and should be no smaller than 22 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 - 28 Feet	22	3.0 amps
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 main control box that protects the 24 VAC circuit. Replace this fuse only with the equivalent 3 Amp fuse.
Thermostat wires can enter through the right side of the air handler and connect with wire nuts to the thermostat pigtails located on the right side of the air handler outside the main control box.
When bringing wiring through the right side of the air handler, water tight cable connectors must be installed on the knockout plate that is secured to the casing to hold wiring in place and to relieve any strain on the wiring.
These connectors will also serve as a seal between the inside of the air handler and the outside of the casing. 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 air handler to the condenser. The thermostat wire colors and the typical heating/cooling connections are listed in Tables 12 and 13.
A seven-conductor cable from the thermostat to the air handler is recommended for a typical heat pump installation with a five-conductor cable from the furnace to the condenser.
The thermostat wire colors and the typical heat pump heating/cooling connections are listed in Tables 12 and 13.

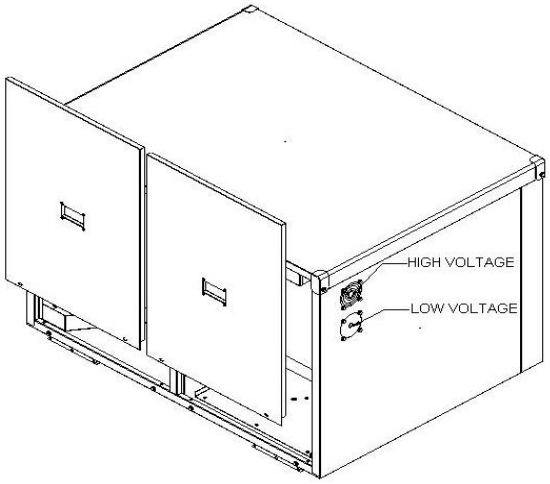

Figure 9: In-coming Power, Low Voltage (Thermostat) Wiring and Blower plug Locations

Thermostat Installation
If a analogue thermostat is being used that has a heat anticipator set the heat anticipator at 0.4 Amps. This setting should be checked at the time of installation.
The thermostat may be a digital “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 air handler. Locating height of thermostat is important. Thermostat should be located preferably in a hall way upstream from the air handler return airflow, not within three 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 handler 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 12 and 13. 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 12 and 13 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 10 and 11.

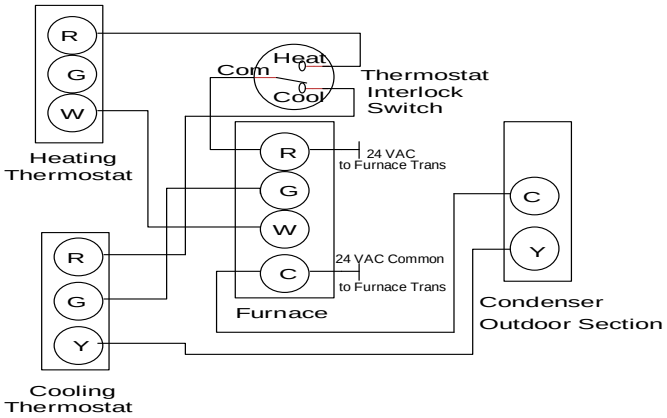

Figure 10: Separate Thermostats; Separate Furnace and Cooling Unit

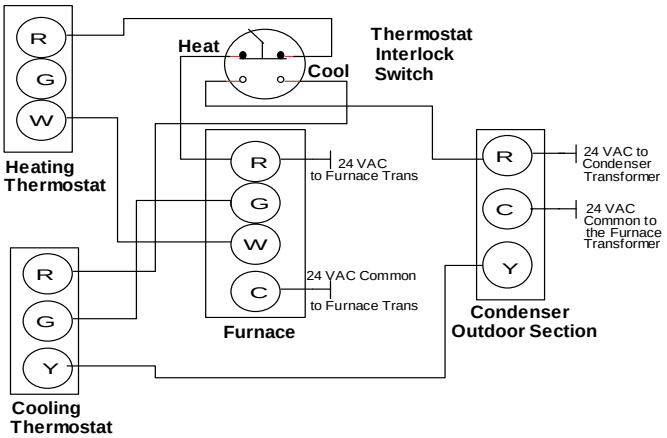

Figure 11: Separate Thermostats; Separate Transformers, Separate Furnace and Cooling Unit

⚠ 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.

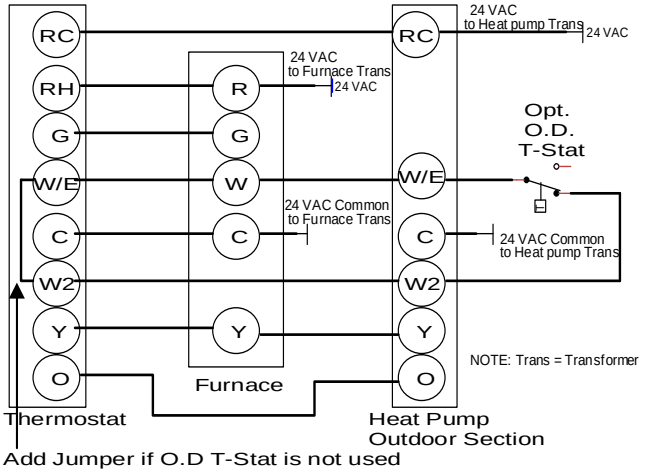

Figure 12: Same Thermostat; Separate Furnace and Heat Pump Unit with separate transformers

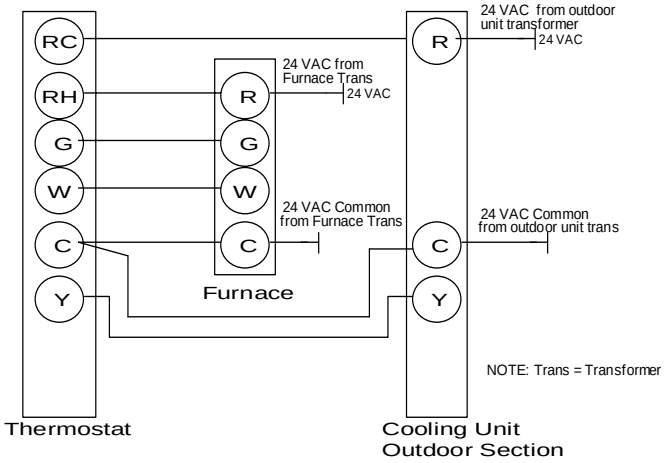

Figure 13: Same Thermostat; Separate Furnace and Cooling Unit with separate transformers

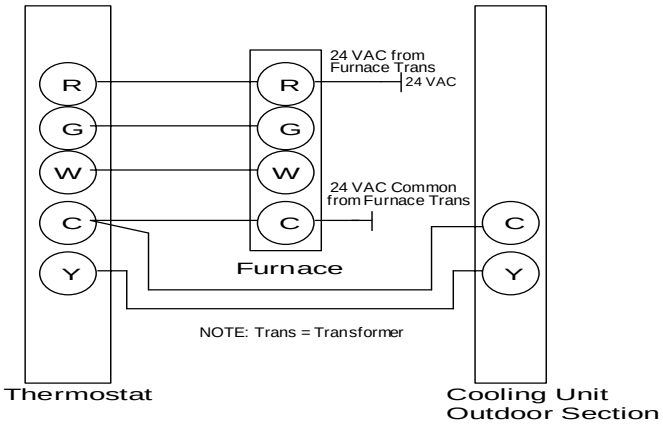

Figure 14: Same Thermostat; Separate Furnace and Cooling Unit same transformer

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 access door.
2. Remove the main control box cover.
3. Install a strain relief in the 3/8" hole on the right side of the furnace casing to protect and secure the thermostat wire cable to the casing of the air handler.
4. Strip ½" of the insulation on the end of each wire.
5. Connect the Red (24 VAC) supply thermostat wire to the Red low voltage pigtail wire and secure with a wire nut.
6. Connect the White (First stage heating) thermostat wire to the White low voltage pigtail wire and secure with a wire nut.
7. Connect the Green (Indoor fan) thermostat wire to the Green low voltage pigtail wire and secure with a wire nut.
8. 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.
9. 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.
10. On 15 kW and 20 kW models connect the Black (2nd stage heating) thermostat wire to the black low voltage pigtail wire and secure with a wire nut.
11. 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 air handler connect the black and the white air handler pigtail wires and the white thermostat wire together; then, secure all three wires with a wire nut.

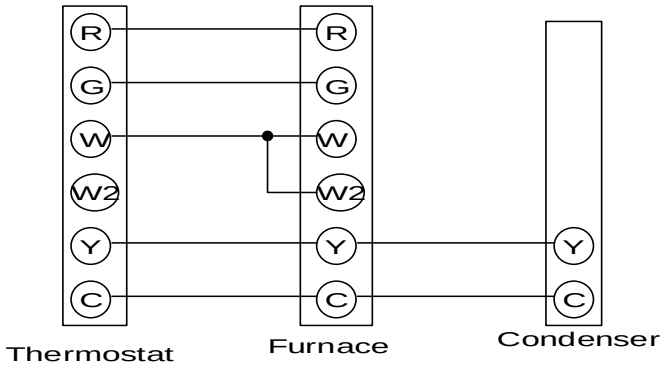

Figure 15: Typical Connections for a Single Stage Heating/Cooling Digital Thermostat with Two Stage Furnace

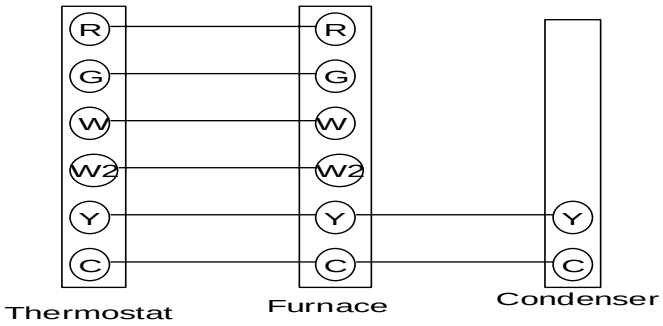

Figure 16: Typical Two Stage Heating/Cooling Digital Thermostat Connections

Typical Heat Pump - Heating/Cooling Thermostat Wiring Connections

1. Remove the access panel.
2. Remove the main control box cover.
3. Install a strain relief in the 3/8" dia hole on the right side of the furnace casing to protect and secure the thermostat wire cable.
4. Strip ½" of the insulation on the end of each wire.
5. Insert the wire cable from the thermostat through the casing and place the thermostat wire cable next to the low voltage pigtails.
6. Tighten the strain relief to secure the thermostat cable and prevent wire strain.
7. 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.
8. 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.
9. 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.
10. Connect the Red wire from the "Y" terminal on the outdoor unit. Fasten the three wires together securely with a wire nut.
11. 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.
12. 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.
13. Connect the Black (2nd stage heating) thermostat wire to the black low voltage pigtail wire and secure with a wire nut.
14. 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 17.

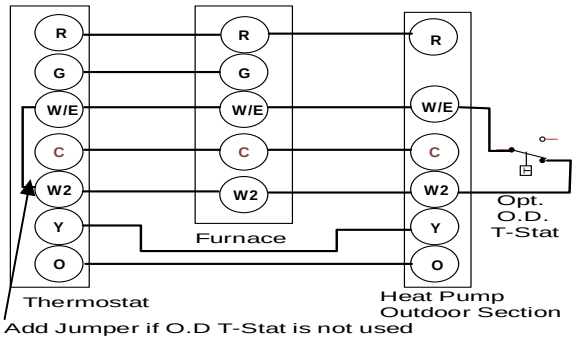

Figure 17: Typical Heat Pump / Heating / Cooling Connections

SECTION IX: 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 C.T. Blower Speed

This furnace uses the new C.T. 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 C.T. 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: Constant Torque (C.T.) 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 the wiring diagrams for the 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.

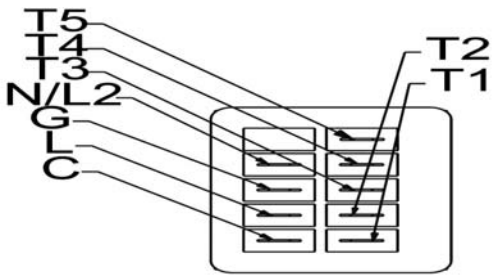

Table 15: Constant Torque (C.T.) Motor Terminals

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.

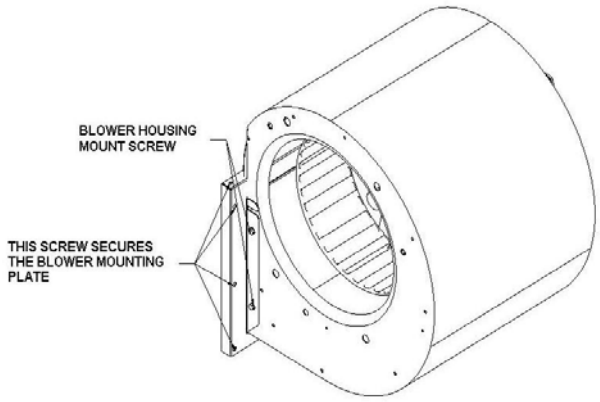

Figure 18: Blower Assembly and Blower Deck

SECTION X: FINAL SYSTEM CHECKOUT

1. Check to be sure the air handler is properly located and level.
2. The ductwork is properly sized, insulated, weather proofed and correctly spaced from combustible materials.
3. Air is free to flow to and from the coil.
4. All wiring is correct, tight and installed according to the wiring diagrams and complies to all codes.
5. The air handler is electric circuit is safely and properly grounded and is in accordance with all codes.
6. Condensate drain is properly connected and directed away from the air handler and the structure. Be sure the condensate drain system is installed in accordance with all state and local codes for condensate disposal.
7. Blower and heating deck are properly secured and the blower wheel turns freely.
8. Check the indoor blower motor speed tap to be sure the blower motor is set to the correct speed tap for the application.
9. Refer to appropriate wiring diagram and recheck all wiring connections. Ensure that all wiring connections are tight.
10. Check blower motor connectors for proper connection.
11. If the control box cover is removed; reinstall control box cover.
12. Switch circuit breaker(s) to “ON” position.
13. Switch the furnace circuit breakers in the main service (House Circuit Breaker) panel to the ON position.
14. Set the blower selector switch to the ON position and check all of the duct connections for air leaks. Seal any leaks found.
15. Check the air handler for unusual noise or vibration.
16. Check the supply voltage to the air handler. If the voltage is not within 10% of rated voltage shut the air handler off and contact the electrical utility.
17. Set the blower selector switch to the AUTO position.
18. Set the thermostat above the room temperature to check for proper operation of the electric heaters.
19. Check the supply air temperature after about 6 minutes of operation to make sure the supply air temperature is between 110°F and 140°F at a 70°F to 80°F room temperature.
20. Check the heater amps to make sure each heater is operating.
21. Switch the thermostat to cooling and check the operation of the cooling unit and check the indoor fan operation as it changes from low speed in heating to high speed in cooling. The blower motor has a OFF DELAY in cooling of 20 seconds.
22. Set the thermostat to the desired temperature.

Thermostat Heat Anticipator

Some analogue 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.

The heat anticipator should be set to the following settings.

For 3kW, 5kW, 8kW, 10kW, 12kW, 15kW and 20 kW Models set at 0.4

SECTION XI: WIRING DIAGRAMS

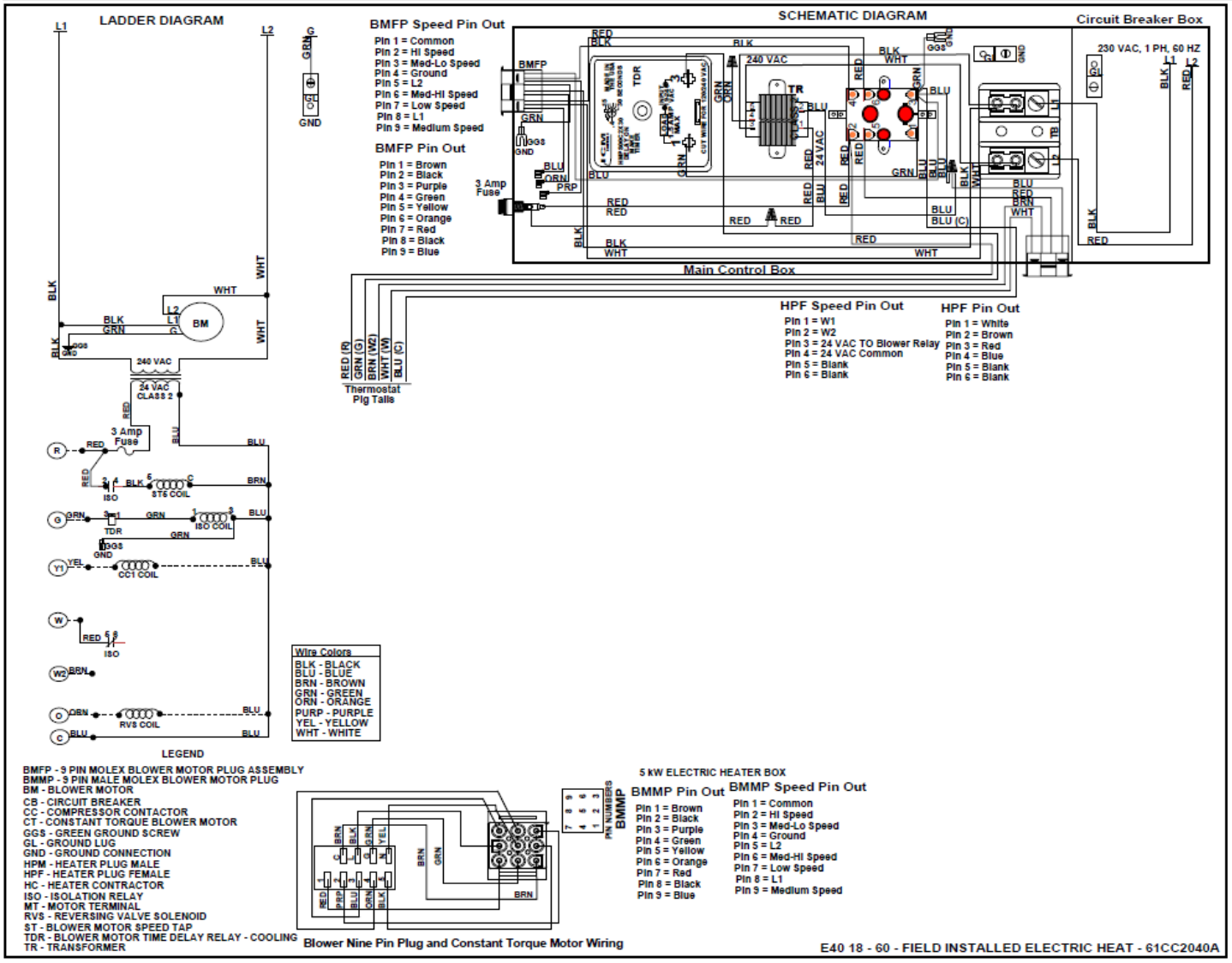

Figure 19: No Heat Wiring Diagram with a C.T. blower motor.

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.

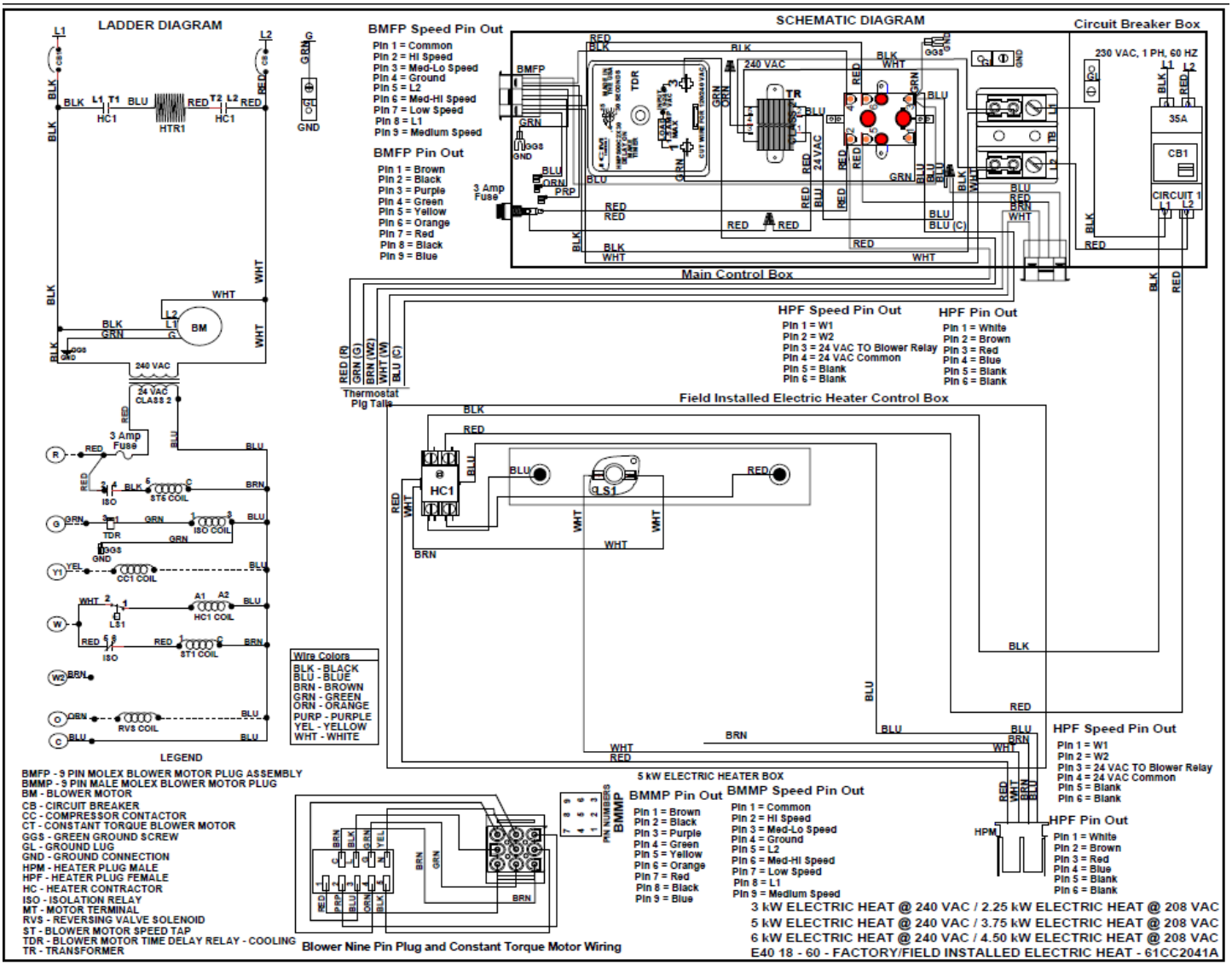

Figure 20: 3kW/5kW/6kW Factory or Field Installed Electric Heat Wiring Diagram with a C.T. blower motor.

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.

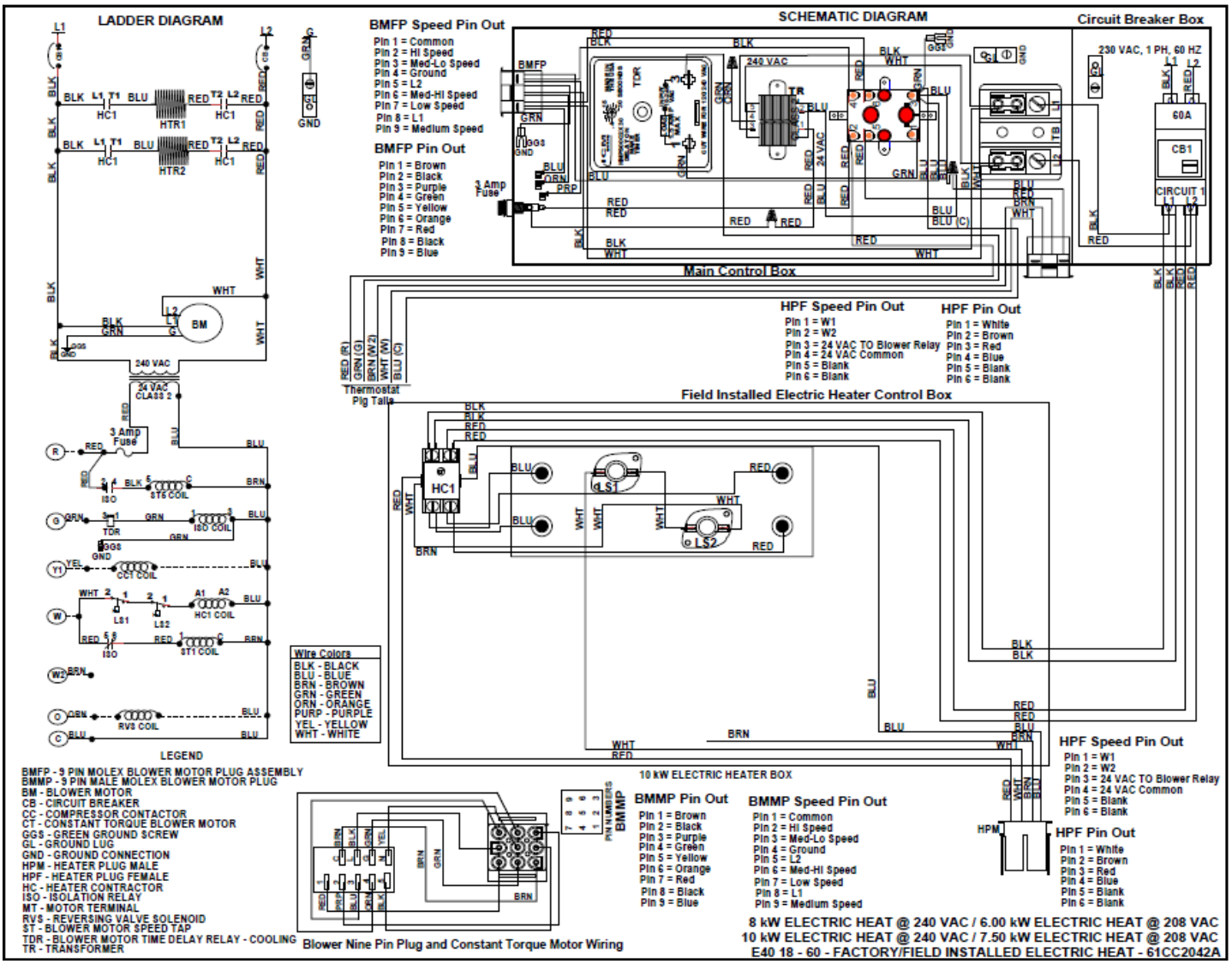

Figure 21: 8 kW / 10 kW Factory or Field Installed Electric Heat Wiring Diagram with a C.T. Blower Motor.

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.

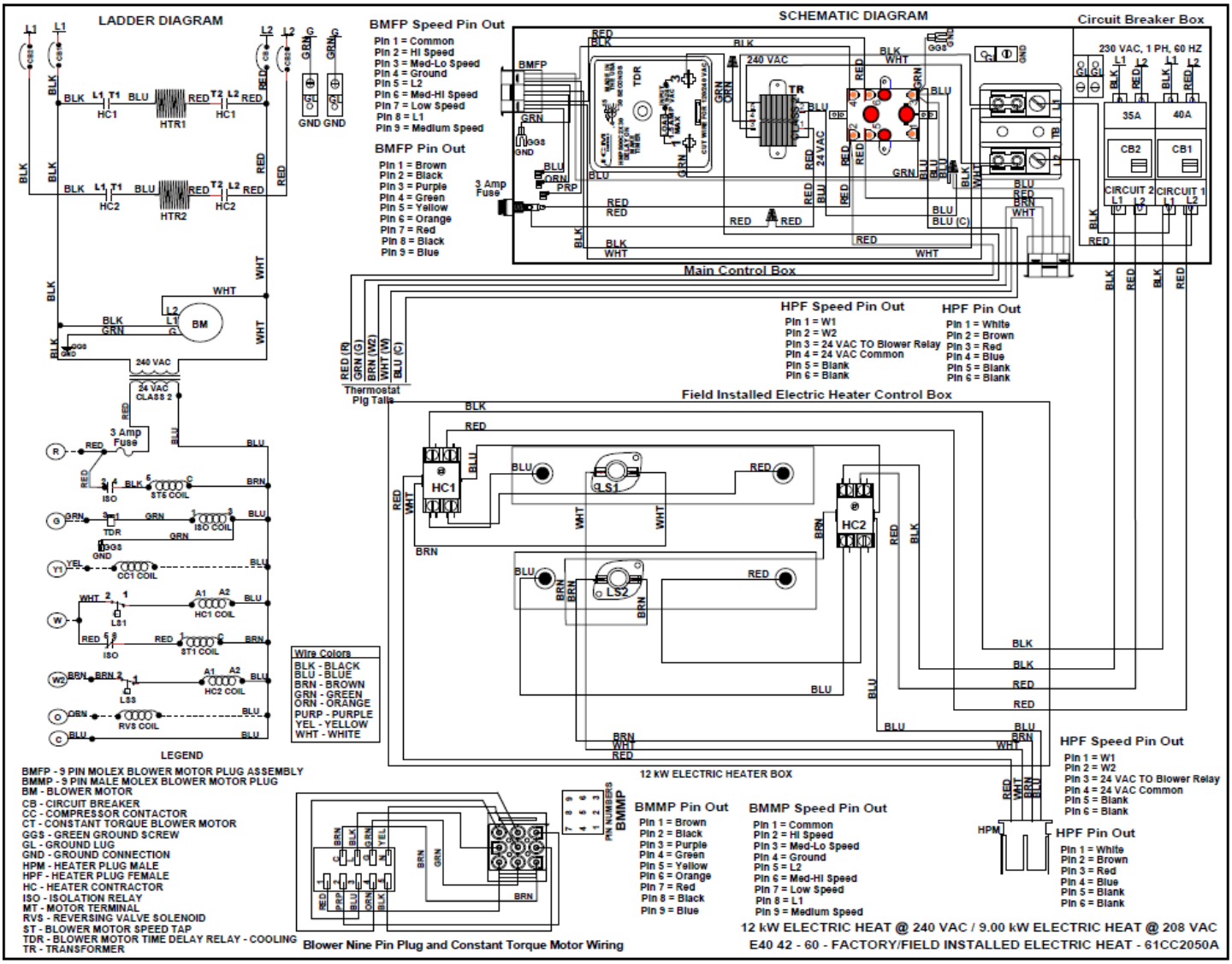

Figure 22: 12 kW Factory or Field Installed Electric Heat Wiring Diagram with a C.T. Blower Motor.

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.

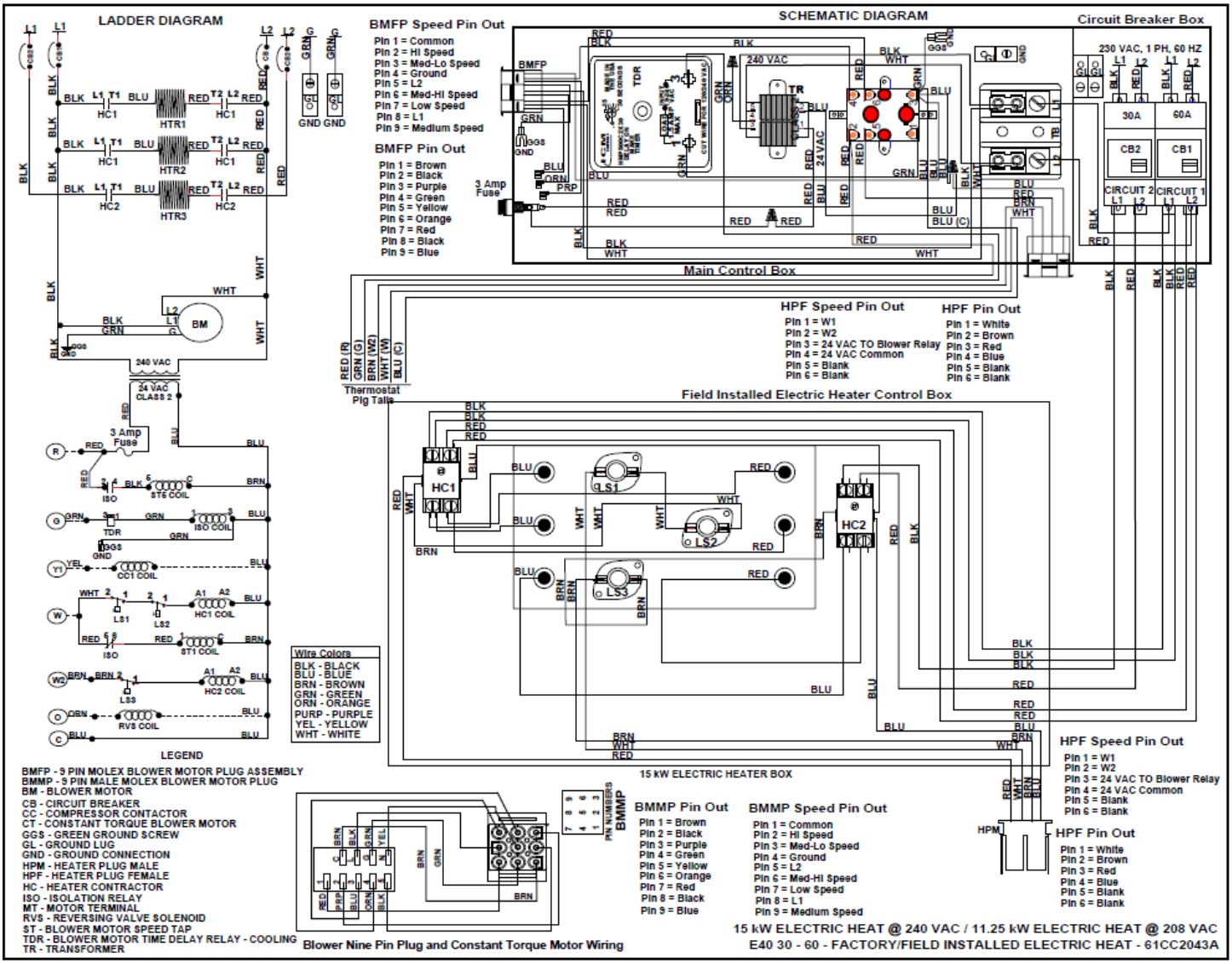

Figure 23: 15 kW Factory or Field Installed Single Stage or Two Stage Electric Heat Wiring Diagram with a C.T. Blower Motor.

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.

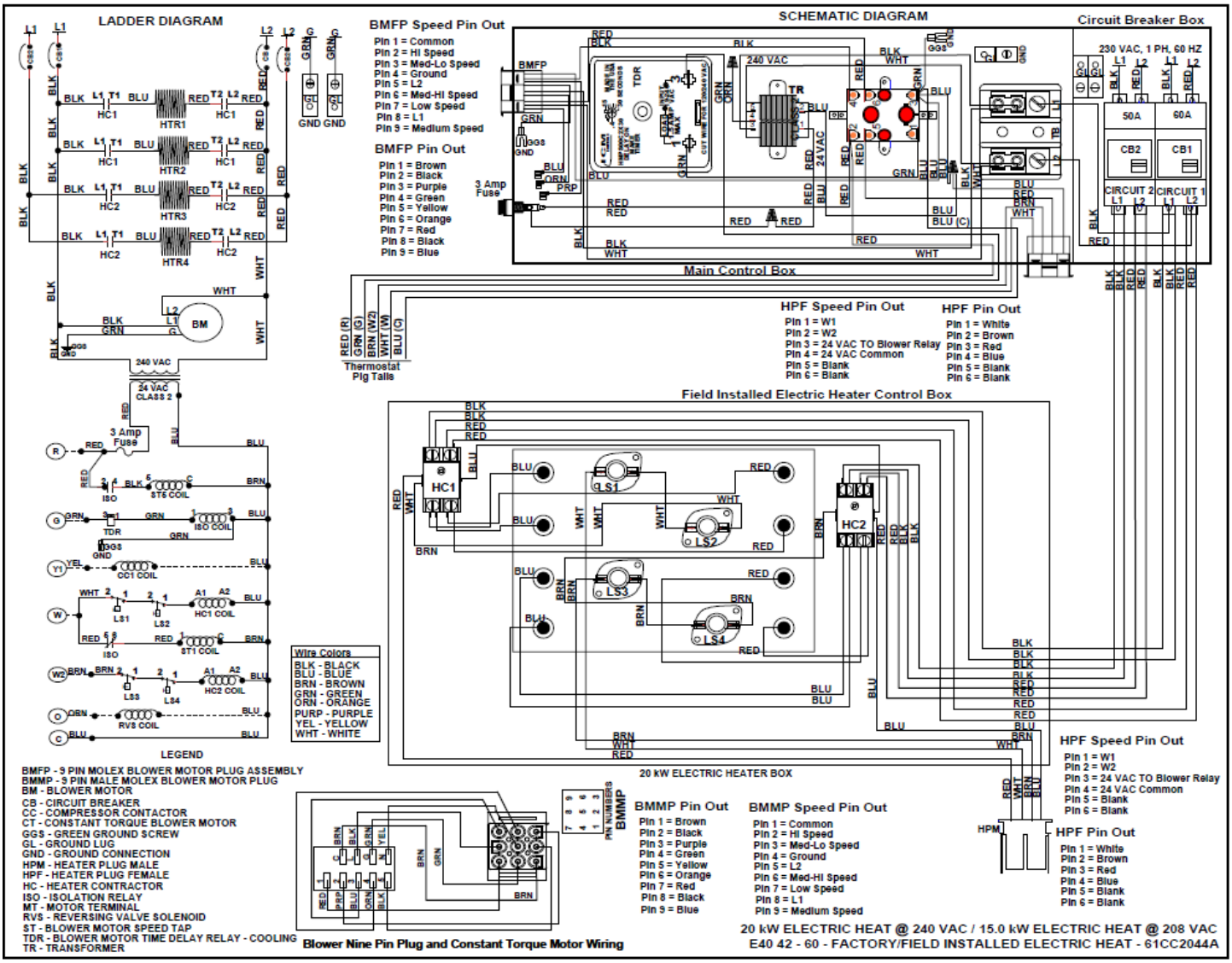

Figure 24: 20 kW Factory or Field Installed Single Stage or Two Stage Electric Heat Wiring Diagram with a C.T. Blower Motor.

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

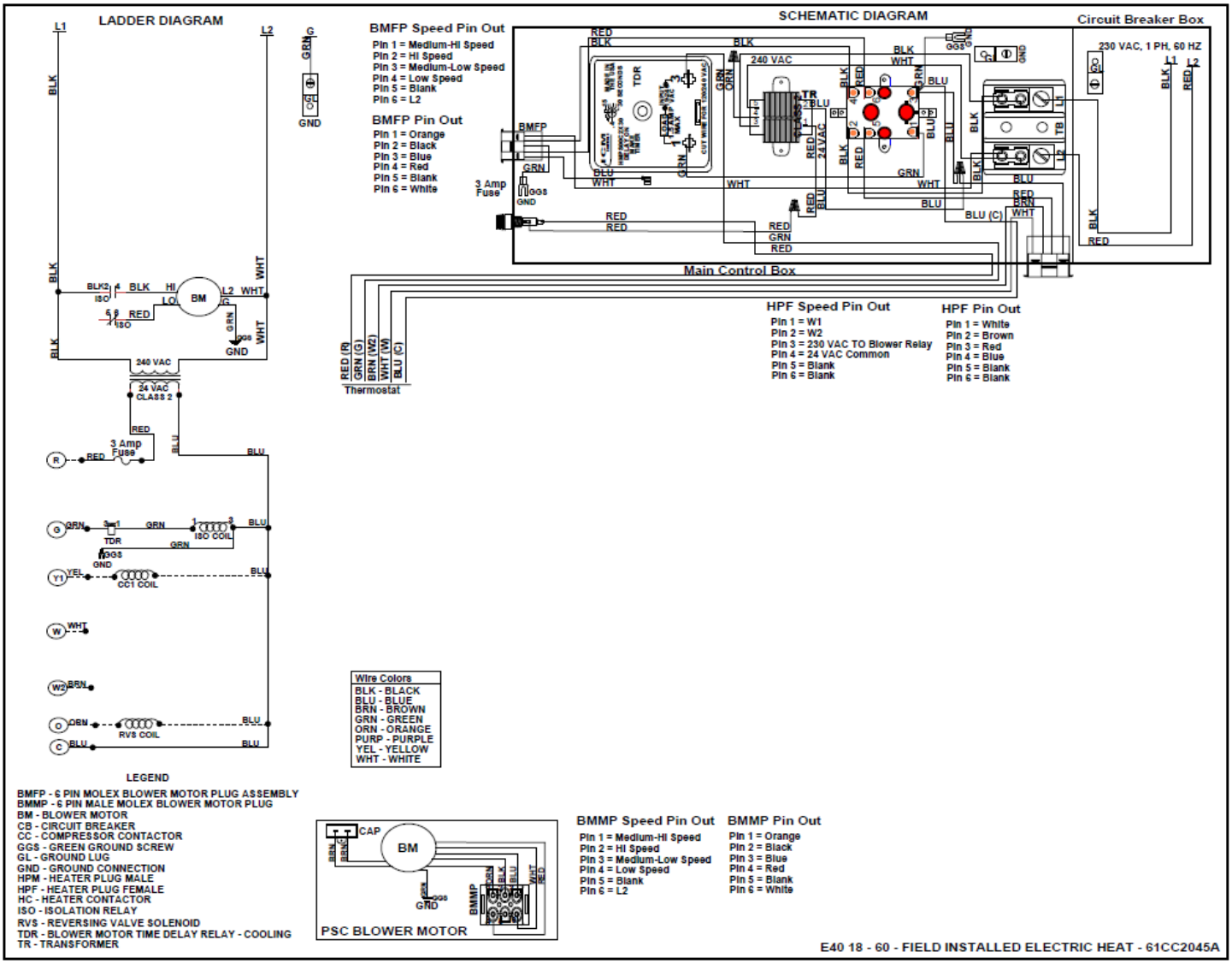

Figure 25: No Heat Wiring Diagram with a PSC Blower Motor.

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

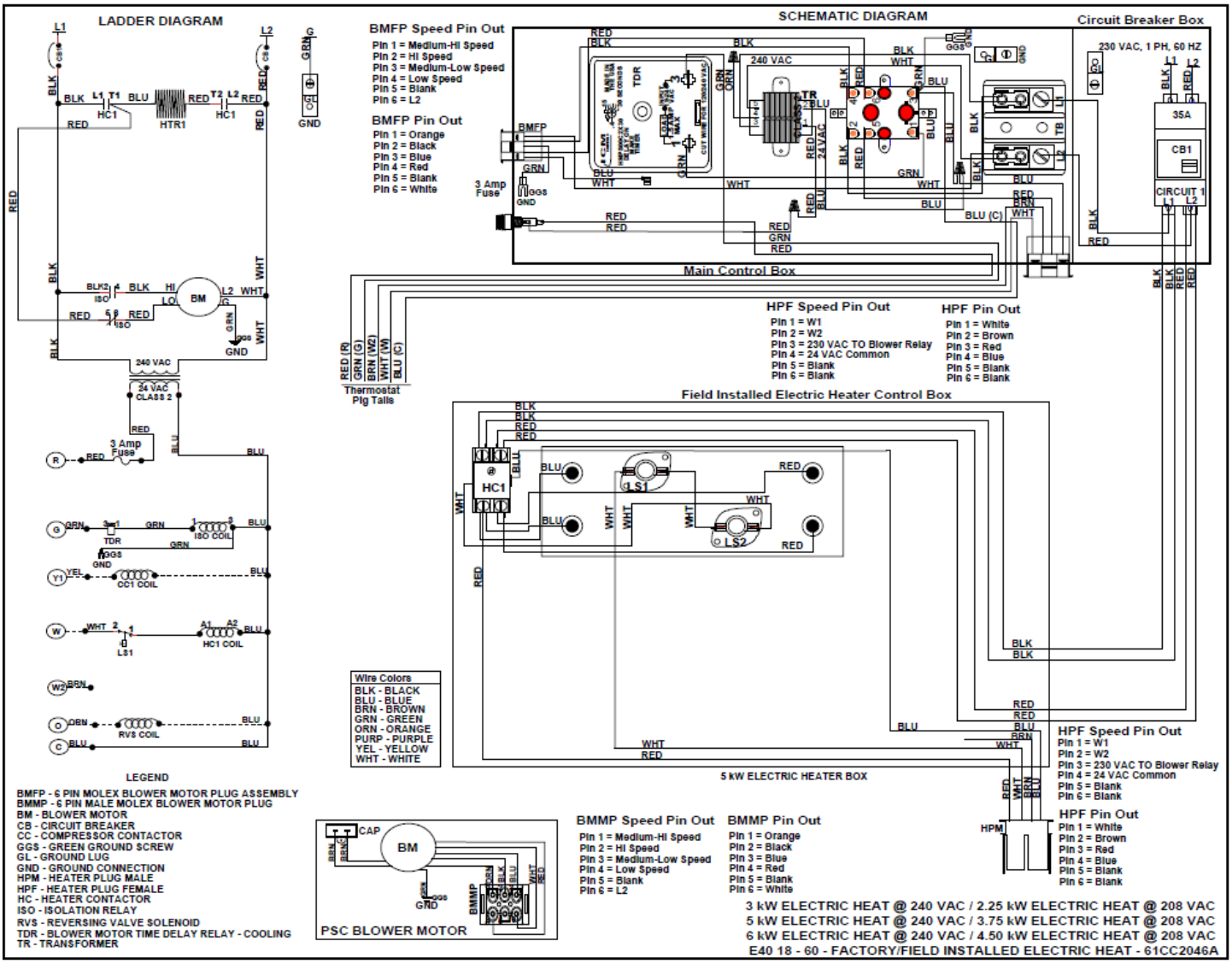

Figure 26: 3kW/5kW/6kW Factory or Field Installed Electric Heat Wiring Diagram with a PSC Blower Motor.

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.

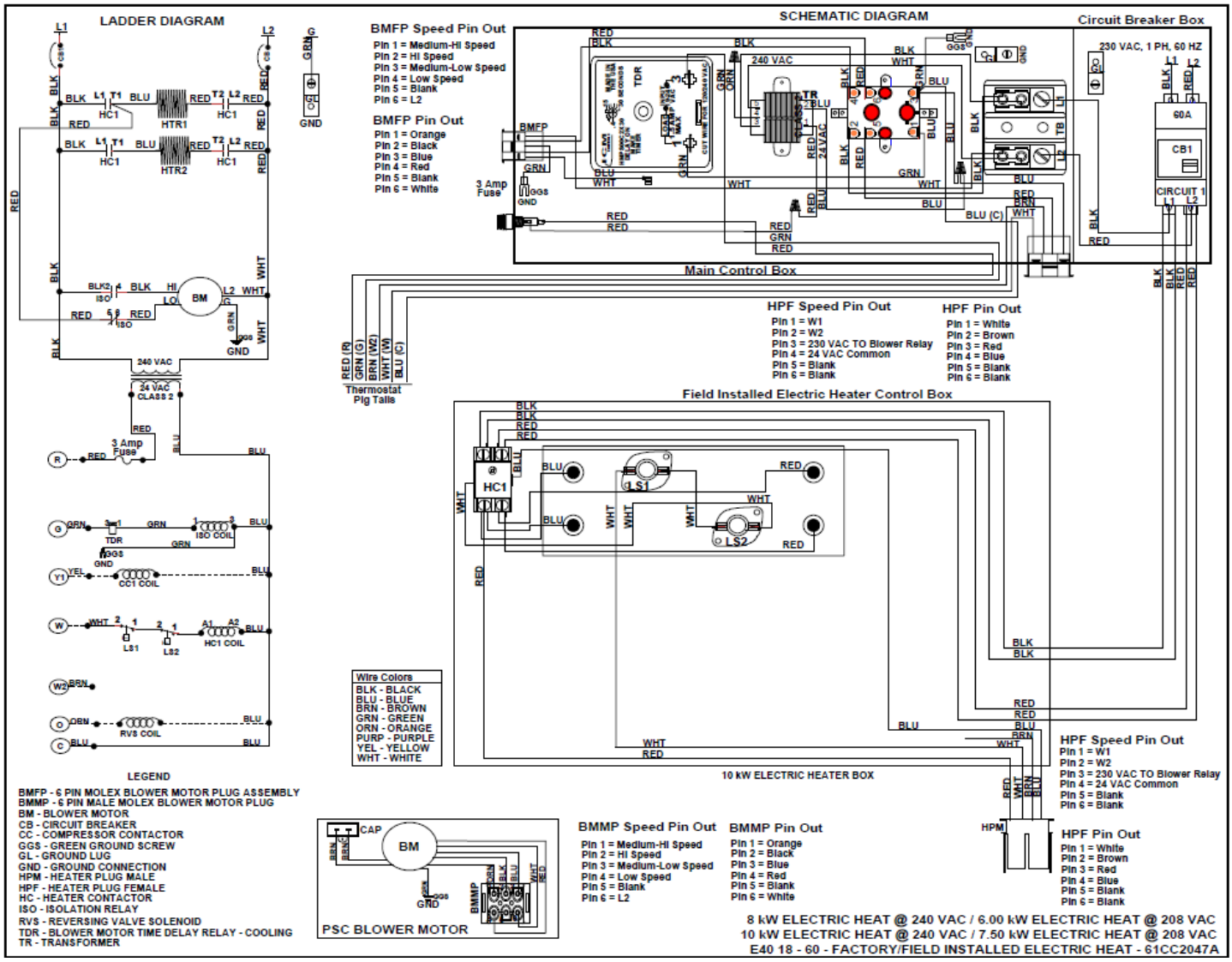

Figure 27: 8kW, 10kW Factory or Field Installed Electric Heat Wiring Diagram with a PSC Blower Motor.

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

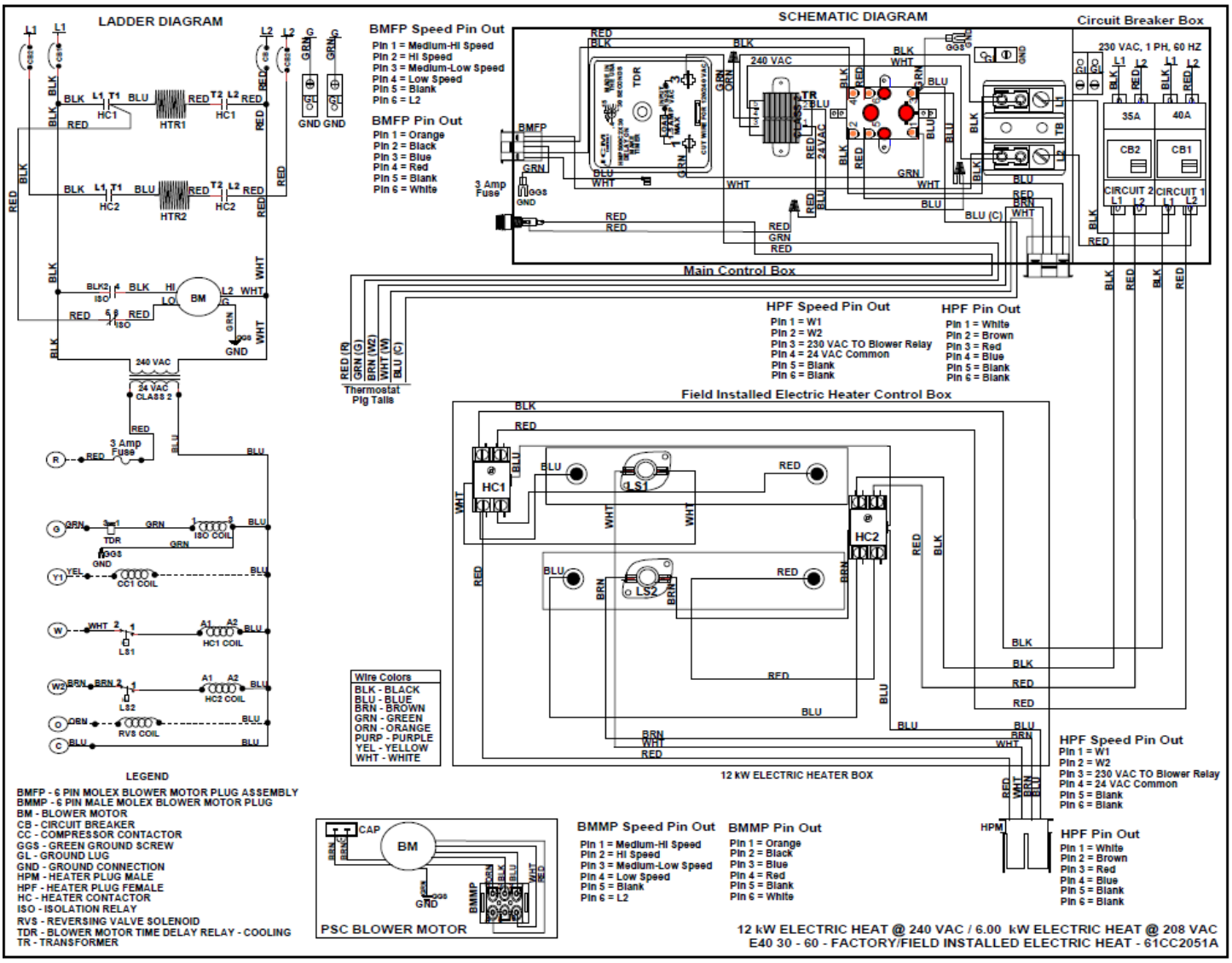

Figure 28: 12 kW Factory or Field Installed Electric Heat Wiring Diagram with a PSC Blower Motor

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

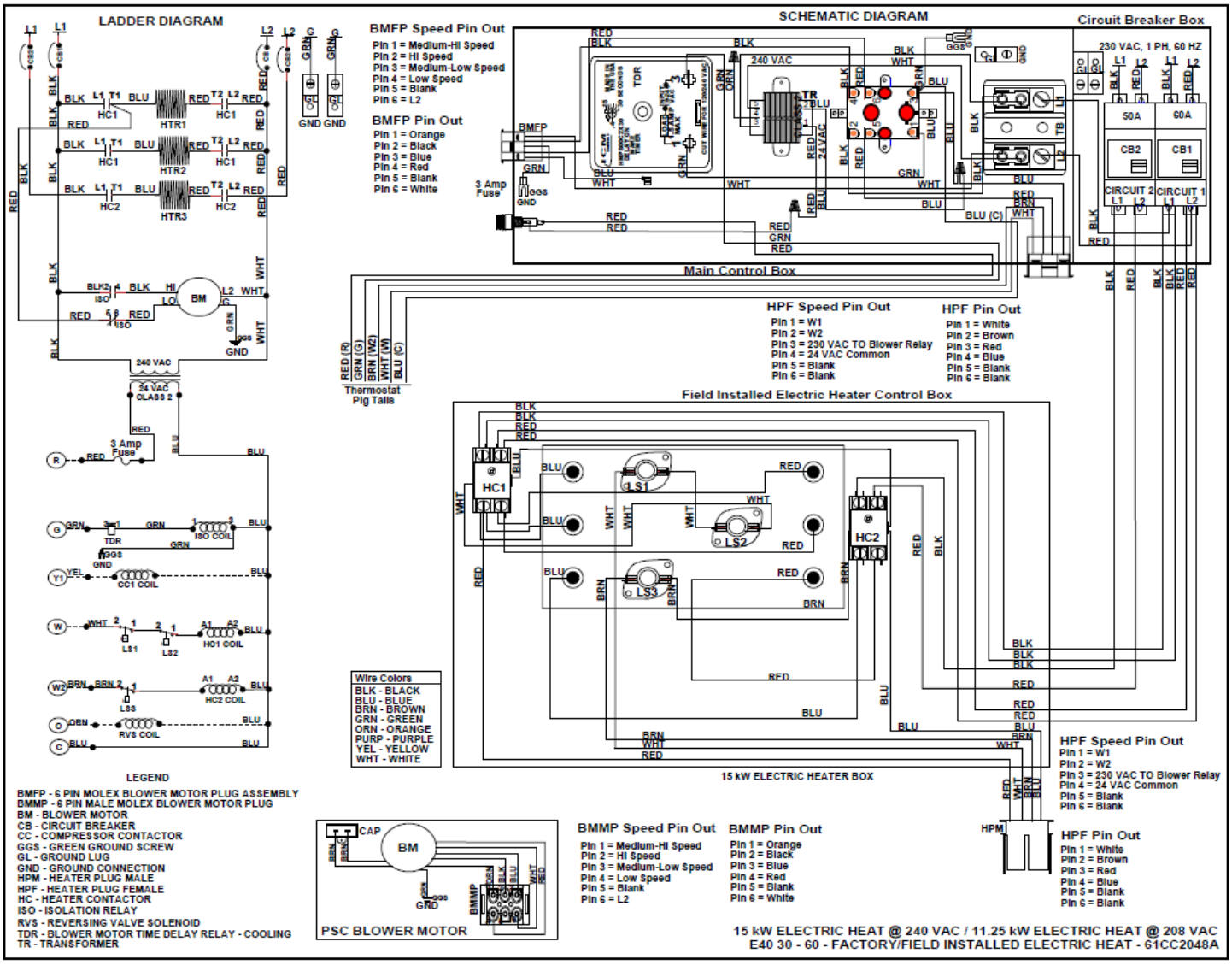

Figure 29: 15 kW Factory or Field Installed Single Stage or Two Stage Electric Heat Wiring Diagram with a PSC Blower Motor

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

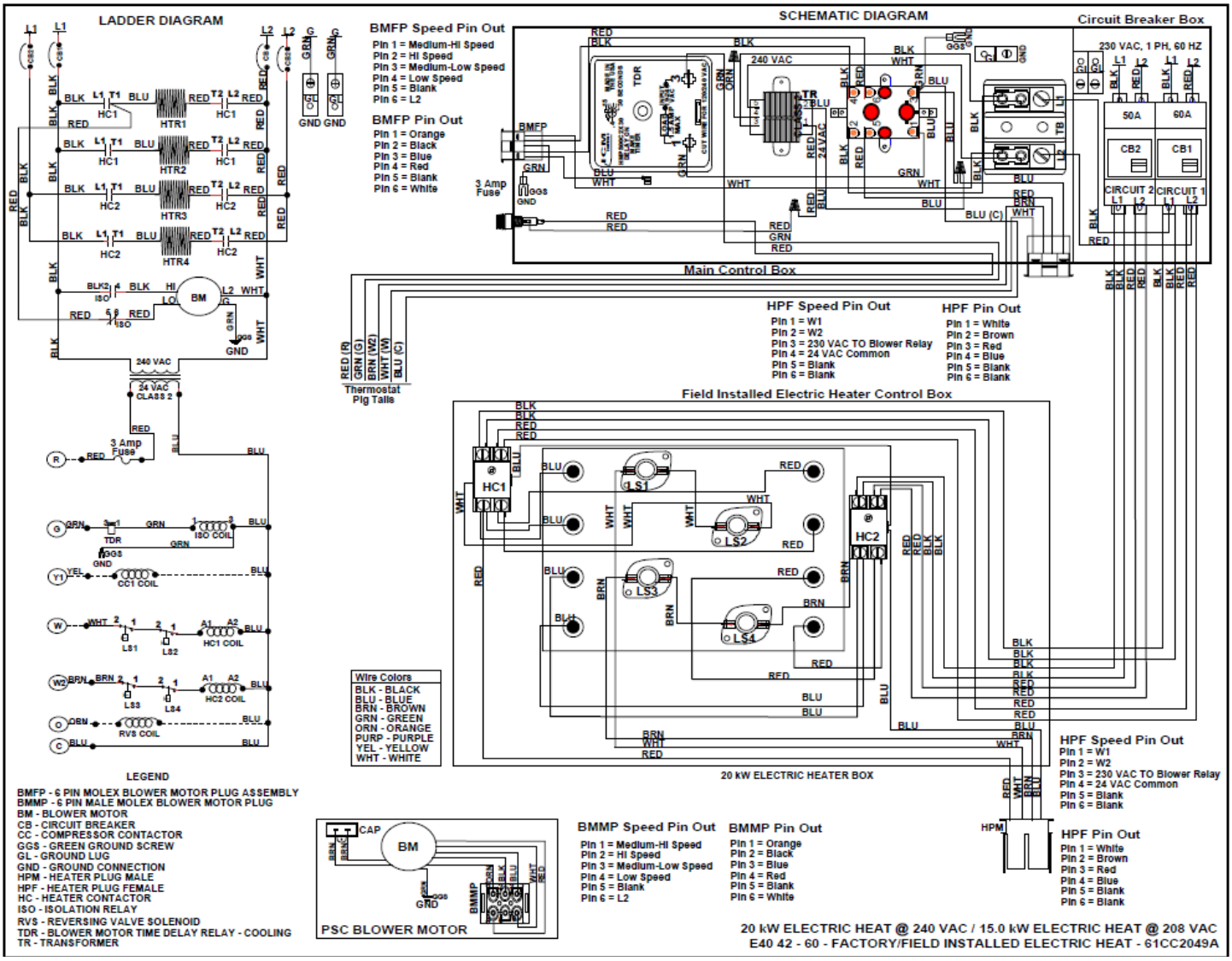

Figure 30: 20 kW Factory or Field Installed Single Stage or Two Stage Electric Heat Wiring Diagram with a PSC Blower Motor

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