B5BV Series

INSTALLATION INSTRUCTIONS

Electric Furnace

For HUD approved installations in manufactured homes and modular homes

IMPORTANT

ATTENTION INSTALLERS:

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the furnace or failure to follow safety warnings could result in serious injury, death, or property damage.

Please read all instructions carefully before starting the installation. These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation / service personnel for this type of equipment. If a problem occurs, check the instructions and follow recommendations given. If these suggestions don't eliminate your problem, call your servicing contractor. Return this manual to the customer's package for future reference.

DO NOT DESTROY. PLEASE READ CAREFULLY & KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

TABLE OF CONTENTS

IMPORTANT SAFETY INFORMATION

NOTE TO INSTALLER: Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual.

Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to electric furnace.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.**
- **Verify proper operation after servicing.**

GENERAL INFORMATION

Requirements & Codes

⚠ WARNING:

This unit must be installed in accordance with instructions outlined in this manual during the installation, service, and operation of this unit. Unqualified individuals should not attempt to interpret these instructions or install this equipment. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

- The installer must comply with all local codes and regulations which govern the installation of this type of equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. Consult local building codes for special installation requirements.
- This equipment contains nitrogen gas. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.
- Electrical power wiring must be made in accordance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70). For Canadian installations, the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).
- Installation of equipment may require brazing operations. Installer must comply with safety codes and wear appropriate safety equipment (safety glasses, work gloves, fire extinguisher, etc.) when performing brazing operations.
- Install this unit only in a location and position as specified on page 4. This unit is designed only for Indoor installations and should be located with consideration of minimizing the length of the supply and return ducts. Refer to the rating plate or Table 3 (page 15) for proper airflow data.
- Follow all precautions in the literature, on tags, and on labels provided with the equipment. Read and thoroughly understand the instructions provided with the equipment prior to performing the installation and operational checkout of the equipment.

About the Electric furnace

This appliance has been tested and certified by AHRI for capacity and efficiency and will provide many years of safe and dependable comfort, providing it is properly installed and maintained. Abuse, improper use, and/or improper maintenance can shorten the life of the appliance and create unsafe hazards. Please read all instructions before installing the unit.

The B5BV Series electric furnace is approved for use in HUD code manufactured homes (HUD Manufactured Home Construction and Safety Standard (Title 24, Part 3280) and other modular home applications.

B5BV Series electric furnaces are supplied with factory installed electric heat. Only approved heat-pump/air conditioning coils may be installed in the field. Unless otherwise noted in the instructions, only factory authorized kits or accessories may be used when modifying this product.

Mounting Applications

Vertical only electric furnaces are factory ready for upflow applications. These units may be applied in downflow or horizontal left and right discharge applications when applied with the appropriate field kit.

Through-the-floor installations require a 1/4” thick noncombustible resilient gasket to be used whenever the supply or return air ducts pass through the floor. The gasket should be positioned between the duct, unit, and floor.

Before You Install this Appliance

√ This equipment is securely packaged at the time of shipment and upon arrival should be carefully inspected for damage prior to installing the equipment at the job site. Claims for damage (apparent or concealed) should be filed immediately with the carrier.

√ The heating load of the area must be calculated and a system of the proper capacity selected. It is recommended that the area to be heated be completely insulated and vapor sealed.

√ Check the electrical supply and verify the power supply is adequate for unit operation. The system must be wired and provided with circuit protection in accordance with local building codes. If there is any question concerning the power supply, contact the local power company.

√ Verify the static pressure drop of the coil, filter, and duct work do not exceed the air delivery specs of the electric furnace.

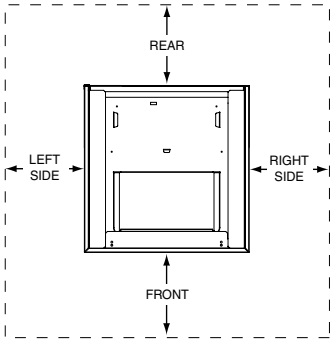
Locating the Electric furnace

- Survey the job site to determine the best location for mounting the unit. Consideration should be given to availability of electric power, service access, and noise.
- The dimensions of the room or alcove must be able to accommodate the overall size of the unit and the installation clearances listed in Figure 1. Physical dimensions for this electric furnace are also shown in Figure 9 (page 13).
- The electric furnace should be installed before routing the refrigerant tubing.
- This unit should be located with consideration of minimizing the length of the supply and return ducts. Refer to the rating plate or Table 3 (page 15) for proper circulating airflow data.

Minimum Clearances

- This appliance must be installed in accordance with clearances listed in Figure 1. The electric furnace must be installed with ample clearance for easy access to the air filter, blower assembly, heater assembly, controls, and vent connections.
- Sufficient clearance for unobstructed airflow through a louvered door must be maintained in order to achieve rated performance.
- All electric heater kits less than 20 kw are approved for use in electric furnace installations with zero-clearance to combustibles at any blower speed. For horizontal and upflow configuration, B5 electric furnaces equipped with 20 kw electric heater kits are approved for installation with zero clearance to combustibles at any blower speed.

INSTALLATION CLEARANCES



Left Side..... 0 Inches Right Side ..... 0 Inches

Back..... 0 Inches Front..... †See Notes

†NOTES:

Closet or Alcove Installations:

- Allow 24 in. minimum clearance from front of unit to nearest wall or partition for servicing. Recommended clearance is 36 in.
- A return air grill should be installed in the door or a partially louvered door across the opening for proper air circulation. Provide at least 235 in^2 free opening for return air for B-cabinet models and 300 in^2 for C-cabinet models. A fully louvered closet door is strongly recommended for both installation types

Figure 1. Minimum Unit Clearances

CIRCULATING AIR SUPPLY

⚠ WARNING:

All return ducts must be secured to the electric furnace using appropriate methods. All return ducts must be adequately sealed. When return air is provided through the bottom of the unit, the joint between the electric furnace and the return air plenum must be air tight.

Return air and circulating air ducts must not be connected to any other heat producing device such as a fireplace insert, stove, etc. This may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.

- Plenums and air ducts should be installed in accordance with the standards of the National Fire Protection Association Standard for Installation of Air Conditioning Systems (NFPA 90A), Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems (NFPA 90B), and all applicable local codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, ME 02269 or visit www.NFPA.org online.
- Design the duct work according to methods described by the Air Conditioning Contractors of America (ACCA). Air ducts must be aluminum, tin plate, galvanized sheet steel, or other approved materials for outlet or return air ducts. Snap-Lock or Pittsburgh-Lock seams are preferred. All other types of seams must be made tight to prevent leakage.
- This unit is designed only for use with a return and supply duct. The ducts should be appropriately sized to the capacity of the electric furnace to ensure its proper airflow rating. Refer to the rating plate or Table 3 (page 15) for proper circulating airflow data.
- Use transition fittings if the supply and/or return air openings of the unit do not match the duct openings. These transitions should be dimensioned in accordance with standard practice as specified in the ASHRAE recommendations for duct transitions.
- Flexible connectors should be used between the unit and the ductwork to prevent transmission of vibration from the unit to the structure. Heat resistant material must be used for the flexible connector at the supply air end of the unit.
- It is good practice to seal all connections and joints with industrial grade sealing tape or liquid sealant. Requirements for sealing ducts vary from region to region. Consult with local codes for requirements specific to your area.

Return Air Connections

For each application in the USA, the home manufacturer shall comply with all of the following conditions to have acceptable return air systems for closet installed forced air heating appliances:

- Regardless of the location, the return air opening into the closet shall not be less than specified in the appliance's listing.
- Means shall be provided to prevent inadvertent closure by a flat object placed over the return air opening when it is located in the floor of the closet (versus the vertical front or side wall).
- The cross-sectional area of the return duct system leading into the closet shall not be less than 390 in^2.
- The total free area of openings in the floor or ceiling registers serving the return air duct system must be at least 352 in^2. At least one register should be located where it is not likely to be covered by carpeting, boxes and other objects.
- Materials located in the return duct system must have a flame spread classification of 200 or less. This includes a closet door if the furnace is in a closet.
- Test the negative pressure in the closet with the air-circulating fan operating at high speed and the closet closed. The negative pressure is to be no more negative than minus 0.05 inch water column.
- For floor return systems, the manufactured home manufacturer shall affix a prominent marking on or near the appliance where it can be easily read when the closet door is open. The marking shall read:

⚠ CAUTION:

HAZARD OF ASPHYXIATION: Do not cover or restrict return air opening.

- The return air opening can be located in a closet door or a sidewall. If the return air opening is directly adjacent to the side (or front) of the electric furnace, 6" minimum clearance must be provided between the side of the electric furnace and the return air opening. If no part of the return air opening is directly adjacent to the unit no clearance is required.
- In applications where the supply ducts carry heated air to areas outside the space where the furnace is installed, the return air must be delivered to the furnace by duct(s) secured to the furnace casing, running full size and without interruption.

Supply Air Connections

- The supply duct system must be designed so that the external static pressure of the furnace does not exceed the listed static pressure shown on the furnace rating plate. The supply air must be delivered to the heated space by duct(s) secured to the furnace casing, running full length and without interruption.

Unconditioned Spaces
All duct work passing through unconditioned space must be properly insulated to minimize duct losses and prevent condensation. Use insulation with an outer vapor barrier. Refer to local codes for insulation material requirements.

Acoustical Duct Work
- Certain installations may require the use of acoustical lining inside the supply duct work. Acoustical insulation must be in accordance with the current revision of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) application standard for duct liners. Duct lining must be UL classified batts or blankets with a fire hazard classification of FHC-25/50 or less.
- Fiber duct work may be used in place of internal duct liners if the fiber duct work is in accordance with the current revision of the SMACNA construction standard on fibrous glass ducts. Fibrous duct work and internal acoustical lining must be NFPA Class 1 air ducts when tested per UL Standard 181 for Class 1 ducts.
- Damping ducts, flexible vibration isolators, or pleated media-style filters on the return air inlet of the electric furnace may be used to reduce the transmission of equipment noise eminating from the electric furnace. These treatments can produce a quieter installation, particularly in the heated space. However, they can increase the pressure drop in the duct system. Care must be taken to maintain the proper maximum pressure rise across the electric furnace, temperature rise and flow rate. This may mean increasing the duct size and/or reducing the blower speed. These treatments must be constructed and installed in accordance with NFPA and SMACNA construction standards. Consult with local codes for special requirements. For best sound performance, be sure to install all the needed gaskets and grommets around penetrations into the electric furnace, such as for electrical wiring.

Air Filters
B5BV series electric furnaces are not supplied with an air filter when shipped from the factory. The installer must provide a high velocity filter that is appropriately sized to the return air duct opening or filter rack located in the bottom of the unit. Accessing the filter does not require tools and can be removed from the front of the unit by removing the filter door. See Unit Maintenance (page 12) for filter sizes and installation information.

⚠ WARNING:

Never operate the electric furnace without a filter or with doors removed. Dust and lint can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire.

Ventilaire III or IV Air Quality Package (Accessory)
The B5BV electric furnace has a cutout on each side of the cabinet for ventialtion air. The Ventilaire air quality packages introduce outdoor air into the living space during furnace blower operation. The VentilAire IV also serves to exhaust moist and/or hot air from the attic space. These packages meet the ventilation requirements as outlined in H.U.D. Standard Part 3280.103 (b) (2). See Figure 2 for typical installation.

⚠ CAUTION:

MAINTAIN 2 1/2" MINIMUM CLEARANCE BETWEEN FLUE PIPE AND FLEX DUCT. FAILURE TO COMPLY WITH THIS RESTRICTION COULD CAUSE EQUIPMENT DAMAGE. VENTILAIRE III ILLUSTRATED OTHER LISTED VARIATIONS AVAILABLE. CHECK WITH MANUFACTURER.

Use adaptor (part number 914427) with Ventilaire III or IV to supply the proper amount of ventilation air. The VentilAire connections must be made for the system to conform to H.U.D. rules. Do not leave disconnected after servicing or adding A/C to the system. Complete installation instructions are supplied with each air quality package.

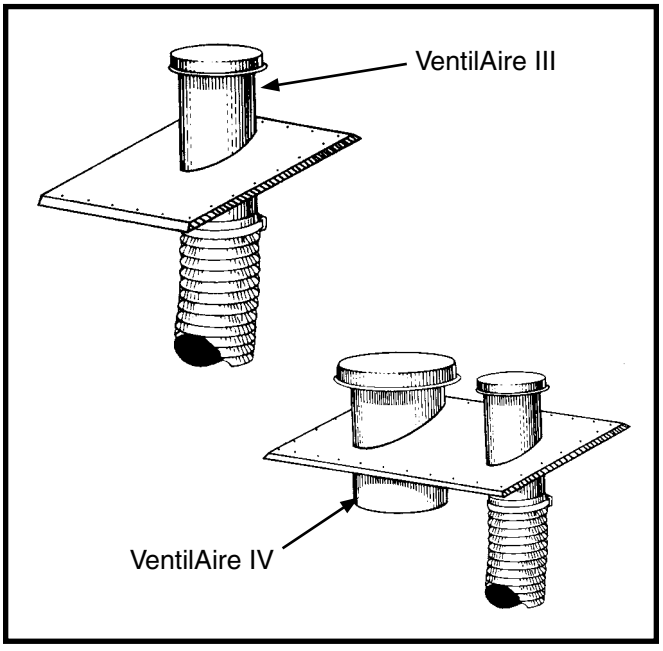


Figure 2. VentilAire III & IV

ELECTRIC FURNACE INSTALLATION

These Installation procedures are suggested for typical electric furnace installations. Since all installations are different from each other, the sequence of these steps may differ from the actual installation. **Only qualified HVAC technicians should install this furnace**.

The B5BV series electric furnace is shipped ready for vertical upflow installation and is approved for attic, basement, alcove/closet or crawlspace installation with zero clearance to combustibles. See Figure 1 (page 4) for required installation clearances. **This appliance is only for indoor use.**

- Remove the shipping crate and User's Manual from the equipment.
- The unit must be leveled at installation and attached to a properly installed duct system.
- The surface that the electric furnace is mounted on must provide sound physical support of the unit.
- The electric furnace must be installed so that all electrical components are protected from water.
- If a louvered door is installed across the front of this unit, the appliance must be mounted flush or behind front edge of finished wall.

Upflow Installations

All electric furnaces are factory shipped, ready for upflow installation. All return air must enter from the bottom of the unit when installed in the upflow configuration. A typical upflow unit is shown in Figure 3.

Position the electric furnace on top of the return air duct and secure together with sheet metal screws. The screws must penetrate the sheet metal cabinet and duct. Tape or seal all seams if required by local code.

To attach the supply air duct to the electric furnace, bend the perforated flanges (Figure 5, page 8) upward 90° with a pair of wide duct pliers. Position the duct on top of the electric furnace and secure together with sheet metal screws. Make sure the screws penetrate the sheet metal casing and flanges. Tape or seal all seams if required by local code.

NOTE: If an upflow pedestal mounting stand is fabricated in the field, the stand must be constructed strong enough to support the unit with all accessories installed (approximately 130 lbs. for B-cabinet models and 200 lbs. for C-cabinet models). The construction of the pedestal stand must also allow for at least 235 in^2 free opening (300 in^2 for C-cabinet models) in the application. Field fabricated upflow pedestal mounting stands must be constructed of noncombustible materials. Position the electric furnace on top of the mounting stand and secure together with sheet metal screws. The screws must penetrate the sheet metal cabinet and duct. Tape or seal all seams if required by local code.

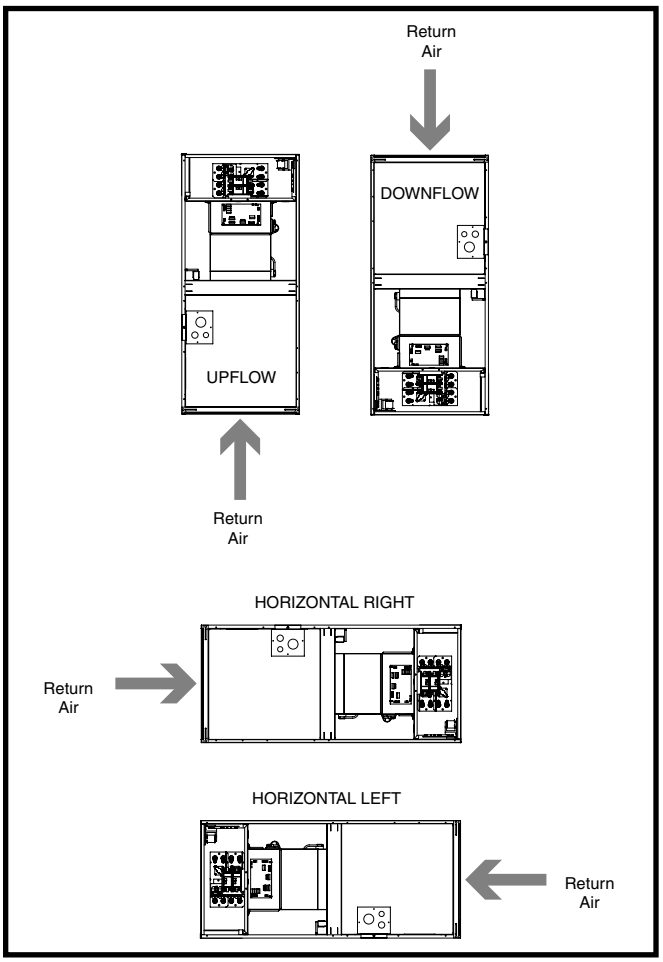


Figure 3. Installation Configurations

Downflow Installations

B5BV electric furnaces can be converted to downflow operation by flipping an upflow unit 180°. A typical installation of the unit in a downflow application is shown in Figure 3.

NOTE: Downflow installations require the use of a plenum connector (or its equivalent) if the supply air ducts pass through the floor of the structure. This factory supplied accessory must be installed in the floor cavity and attached to the supply air duct before the downflow unit is installed. Available plenum connectors for all B5BV electric furnaces are listed in Table 1. All return air in downflow applications must enter through the top of the unit.

Description	Cabinet Size	
	B	C
Downflow Plenum Connector, 6.25"	913840	914969
Downflow Plenum Connector, 8.25"	913841	914970
Downflow Plenum Connector, 10.25"	913842	914971
Upflow Pedestal Mounting Stand	913872	913873
Downflow Coil Adaptor	919321	919322 *919323

* Use when installing B width coil in C width cabinet

Table 1. Optional Accessory Kits

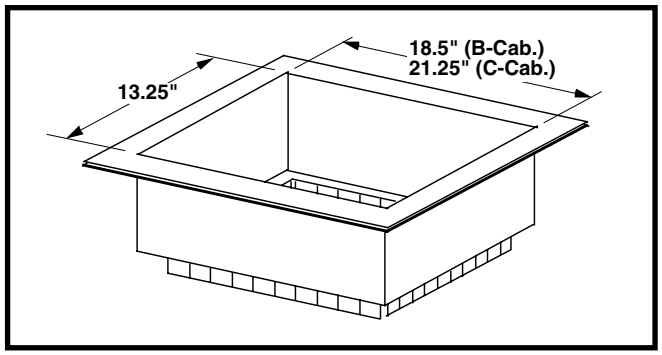


Figure 4. Plenum Adapter

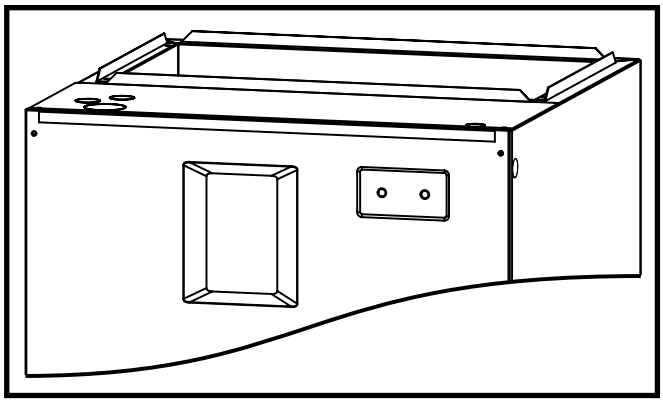


Figure 5. Perforated Flanges

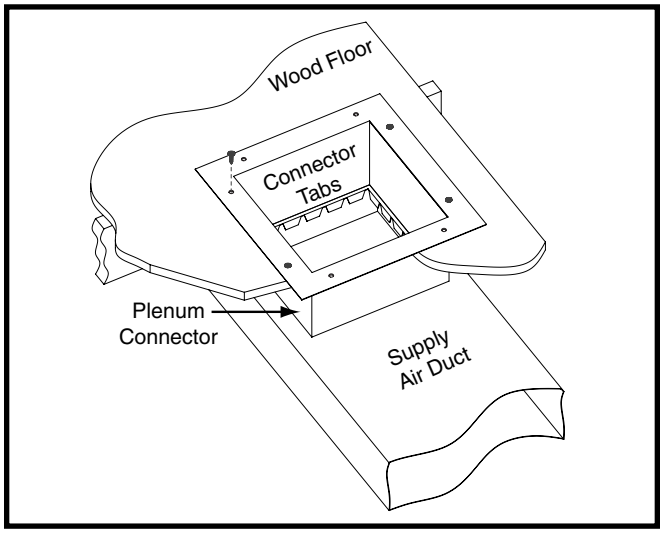


Figure 6. Duct Connector Installed

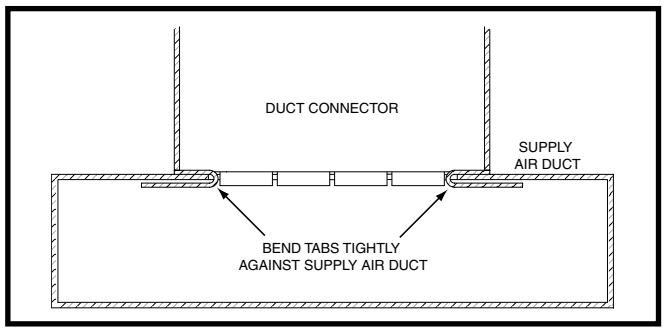


Figure 7. Duct Connector Tabs

Position the electric furnace on top of the plenum connector and secure together with sheet metal screws. The screws must penetrate the sheet metal cabinet and plenum connector. Tape or seal all seams if required by local code.

Plenum Connector Installation

The plenum connector is designed for use with trunk ducts having a minimum width of 12". If sufficient space is not available to adequately bend and secure duct tabs it may be necessary to attach the connector to the duct using sheet-metal fasteners and seal with an approved foil tape. The connector may be field constructed but must meet requirements as listed in the unit installation instructions.

1. Measure and mark the outline of the cut-out on the floor. See Figure 4 for cutout dimensions.

   IMPORTANT!: Cut-outs in the floor and ductwork must be carefully located to avoid misalignment of the furnace and supply / return air ducts.

2. Cut out the floor opening.

   NOTE: To allow some clearance for installing the plenum connector, cut the opening 1/16" larger than the actual cutout drawn.

3. Center the plenum connector in the floor opening with bottom tabs resting on top of the supply air duct.
4. Mark the cut-out area on the supply air duct by tracing around the connector tabs of the plenum connector.
5. Remove the plenum connector and cut out the marked area of the supply air duct.

   NOTE: To allow some clearance for installing the plenum connector, cut the opening 1/4" larger the actual cutout drawn.

6. Install the duct connector back in the floor opening with the bottom tabs extending into the supply air duct. See Figure 6.
7. Secure the plenum connector to the wood floor with appropriate size screws.
8. Bend the connector tabs on the bottom of the plenum connector upwards and as tight as possible against the supply air duct. See Figure 7.
9. Seal all connections with industrial grade sealing tape or liquid sealant. **Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.**

Horizontal Installations

The B5BV series electric furnace can be installed horizontally in an attic, basement, crawl space or alcove. A typical horizontal unit is shown in Figure 3. It can also be suspended from a ceiling in a basement or utility room in either a right to left airflow or left to right airflow as shown in Figure 8 (page 9). A horizontal accessory kit is required for horizontal applications. Instructions for installing the kit are included in the kit.

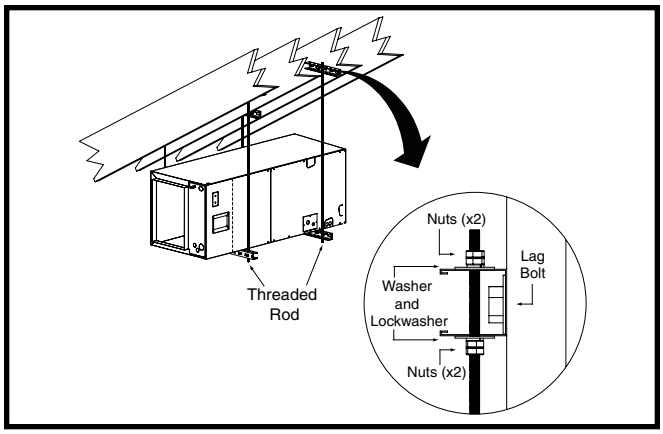


Figure 8. Unit Horizontally Suspended

The unit may also be installed in a horizontal application with the unit suspended from the ceiling. If suspending the electric furnace from the ceiling, assemble a support frame using slotted iron channel and full threaded rod. Fasten the frame together with nuts, washers, and lockwashers. Secure the support frame to the rafters with lag bolts. The electric furnace can also be suspended using steel straps around each end of the unit. The straps should be attached to the electric furnace with sheet metal screws and to the rafters with bolts.

To attach the supply air duct to the electric furnace, bend the perforated flanges (Figure 5, page 8) upward 90° with a pair of wide duct pliers. Position the duct against the electric furnace, align the openings, and secure together with sheet metal screws. Make sure the screws penetrate the sheet metal casing and flange. Tape or seal all seams if required by local code.

To attach the return air duct to the electric furnace, position the duct against the electric furnace, align the openings, and secure together with sheet metal screws. Make sure the screws penetrate the sheet metal casing and electric furnace. Tape or seal all seams if required by local code.

A/C or H/P Coil Installation

Approved air conditioning and heat pump system components are listed on the unit nameplate. To install the indoor coil:

1. Remove door cover plate, door and coil close-off plate (with insulation). Discard door cover plate.
2. Upflow Applications: Slide the coil into the track located in the bottom of the unit.
   Downflow Applications: The downflow adaptor must be used (see Table 1). Install the downflow adaptor and coil as directed in the instructions supplied with the kit.
3. Reinstall the door and coil close-off plate (with insulation). **NOTE:** In downflow applications the door is rotated 180° so that the refrigerant and condensate lines remain on the left side.
4. Install the refrigerant and condensate lines as directed in the instructions supplied with the outdoor unit. **NOTE:** The drain pan MUST be drained with field supplied tubing and looped to form a trap. Both drain tubes must have a minimum diameter of 3/4" and be trapped separately. **IMPORTANT:** Failure to install a trap may result in condensation overflowing the drain pan, resulting in substantial water damage to surrounding area.

ELECTRICAL CONNECTIONS

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to the electric furnace.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly**.
- **Verify proper operation after servicing.**

Electrical power wiring must be made in accordance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70). For Canadian installations, the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

Pre-Electrical Checklist

√ Verify the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.

√ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. See the unit wiring label or Table 4 (page 15) for proper high and low voltage wiring.

√ Verify factory wiring is in accordance with the unit wiring diagrams (Figures 11-14, pages 16-19). Verify no connections came loose during shipping or installation.

Line Voltage

- **An electrical disconnect must be located within sight of and readily accessible to the unit**. This switch shall be capable of electrically de-energizing the outdoor unit control voltage. See unit data label for proper incoming field wiring. Any other wiring methods must be acceptable to authority having jurisdiction.
- It is recommended that the line voltage to the unit be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit.
- The installer should become familiar with the wiring diagram/schematic before making any electrical connections to the unit. See the unit wiring label or Figures 11-14 (pages 16-19).

- Use only copper wire for the line voltage power supply to this unit. Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit. Aluminum supply wire may be used if a heater kit is installed.
- Provide power supply for the unit in accordance with the unit wiring diagram, and the unit rating plate. Use UL listed conduit and conduit connectors for connecting the supply wires to the unit and for proper grounding. Field supplied bushings for the power supply cables must be added to support and protect the power supply cables.
- If replacing any of the original wires supplied with the unit, the replacement wire must be copper wire consisting of the same gauge and temperature rating.
- Circuit breakers installed in the B5BV series electric furnace are for short-circuit protection of the internal wiring and to serve as a unit disconnect. They do not provide over-current protection of the supply wiring. Overcurrent protection must be provided at the branch circuit distribution panel and sized as shown on the unit rating label and according to applicable local codes. See the unit rating plate and Table 4 (page 15) for maximum circuit ampacity and maximum overcurrent protection limits.
- All 208/230 Volt units are shipped from the factory wired for 240 volt operation. For 208V operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V.

Single Circuit Adaptor Kit

If a single circuit adaptor kit is used, it may need to be re-configured for some applications. Remove the single circuit adaptor kit cover and verify that the lugs are configured correctly for the application. If the lugs are not configured for the application, refer to the instructions included with the kit and modify the configuration.

Install the single circuit adaptor kit (if used) in the line side ("on" end) of the circuit breakers. Tighten the lugs securely (45 in-lbs recommended). Connect the supply wiring to the circuit breakers, single circuit adaptor kit, or terminal block. Tighten the lugs securely.

Dual Supply Circuits

When using dual supply circuits verify that the supply sized for circuit "A" is connected to the circuit breaker that is connected to the top element assembly. Replace metal circuit breaker line cover. Refer to Figure 15 (page 20) for thermostat wiring examples.

Control Board

The control board in the electric furnace controls the timing sequence of the elements. The board is equipped with a 3 second blower ON delay and a 15 second blower OFF delay in heating and a 40 second blower OFF delay in cooling.

Twinning

Electric furnaces are not supplied with a built in twinning capability. To connect two electric furnaces to a common single stage AC condensing unit or heat pump, a twinning kit is available for field installation. **Please follow the instructions supplied with the kit.**

NOTE: Variable speed electric furnaces cannot be twinned.

Thermostat Connections

- Thermostat connections shall be in accordance with the instructions supplied with the thermostat and the indoor equipment. The low voltage wires must be properly connected to the units low voltage terminal block.
- A single stage thermostat is used with this equipment and must operate in conjunction with any installed accessories. Typical AC and electric furnace hookups are shown in Figure 15 (page 20).

⚠ CAUTION:

Isolation must be maintained from the external Class 2 output of any transformer in a cooling circuit. Use a thermostat with isolating contacts to prevent inter-connection of Class 2 outputs.

- Where local codes require that the thermostat wiring must be routed through a conduit or raceway, splices can be made inside the unit; however, all wiring must be NEC Class 1 and must be separated from incoming power leads.
- The thermostat should be mounted about 5 feet above the floor on an inside wall. DO NOT install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting and installation information.
- Install the grommet, which is packed with the unit, in the hole for low-voltage wires. Connect the low-voltage wiring to the thermostat and the outdoor unit and the appropriate screw terminal located on the control board. **NOTE:** When the low voltage wires are positioned in this grommet, the grommet will prevent chafing and/or shorting of the low voltage leads.

Grounding

⚠ WARNING:

The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. Do not use gas piping as an electrical ground!

This unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code (ANSI/NFPA 70) or the CSA C22.1 Electrical Code. Use the grounding lug provided in the control box for grounding the unit.

STARTUP & ADJUSTMENTS

Before You Start the Unit

Prior to start-up, complete the following inspections:

√ Verify the unit is level and properly located with adequate clearances for servicing the unit. See Figure 1 (page 4) for clearance requirements.

√ Check condensate drain line(s) for proper drainage (if applicable). See step 4 on page 9.

√ Verify the surrounding area and top of the unit is free from obstructions and debris.

√ Check all duct connections. Make sure the duct work is adequately sealed to prevent air leakage.

√ Check all coil connections for leaks (if applicable).

√ Verify that the line voltage power leads are securely connected and the unit is properly grounded. Make sure all doors are installed before restoring power to the unit

√ Verify the thermostat is wired correctly. Make sure all low voltage wires are securely connected to the correct leads of the low voltage terminal strip.

√ Verify the power supply branch circuit overcurrent protection is sized properly.

√ Verify filter is properly and securely installed.

Air Circulation Check

Running the Blower Continuously

Set the thermostat's system mode to **OFF** and the thermostat's fan mode to **ON**. The blower motor should run continuously. Check for air delivery at the register(s). Make sure that there are no obstructions at the registers or in the ducts.

NOTE: If blower is turning opposite of arrow direction, shut off main power to the unit and switch any two field wires at the disconnect. **DO NOT** alter unit wiring.

System Cooling

1. Set the thermostat's system mode to **COOL** and fan mode to **AUTO**. Lower the thermostat's temperature mode below room temperature and observe that the blower energizes. Check the air being discharged at the register is cooler than room temperature. Verify unit refrigerant pressures are in order. Blower should be turning in direction indicated by arrow.

   NOTE: DO NOT alter unit wiring. Listen for any unusual noises. Locate the source and correct as needed.

2. Allow the unit to run for several minutes and then set the thermostat's temperature above room temperature. Verify the blower cycles off with the thermostat.

System Heating

1. Set the thermostat's system mode to **HEAT** and the fan mode to **AUTO**. Increase the thermostat's temperature above room temperature and observe that the blower energizes. Check the air being discharged at the register is warmer than room temperature.
2. Allow the unit to run for several minutes and then set the thermostat's temperature below room temperature. Verify the blower cycles off with the thermostat.

Turning the Blower Off

Set thermostat's fan mode to **AUTO**, the blower will shut down immediately.

Blower Configurations

Determining Nominal System Capacity

To select the appropriate airflow for the electric furnace, the nominal system capacity must be known. The nominal system capacity is always the nominal capacity of the outdoor unit. However, in some situations the nominal system capacity may not be the same as the capacity rating of the electric furnace. Always refer to the capacity rating of the outdoor unit to determine the nominal system capacity.

Proper Blower Speed for Multi-Speed Units

The blower speed is preset at the factory for operation at the same speed for heating and cooling. Use the jumping terminal on the blower motor and connect it to the desired speed with both the red and black wires connected to the jumping terminal.

NOTES:

- The control board is programmed with a 40 second off delay in the cooling mode for optimum system performance and efficiency.
- When using a 20 kw electric heat kit in a downflow installation, the blower must be set for high speed for both heating and cooling.

For optimum system performance and comfort, it may be necessary to change the factory set speed. Refer to Table 3 (page 15) for airflow data. To change the blower speed:

1. Disconnect all electrical power to the unit and remove the upper door.
2. Remove the black and red wires from the blower motor jumping terminal. Discard the blower motor jumping terminal.
3. Connect the heating speed wire (red) and the cooling speed wire (black) to the desired blower speed marked on the terminal block of the blower motor.

To change motor speed for standard 4-speed motors:

- Terminal 2 = High speed
- Terminal 3 = Medium High speed
- Terminal 4 = Medium Low speed
- Terminal 5 = Low speed

C Cabinet units are equipped with 5 selectable blower speeds. To change motor speed for standard 5-speed motors:

- Terminal 1 = High speed
- Terminal 2 = Medium Low speed
- Terminal 3 = Medium speed
- Terminal 4 = Medium High speed
- Terminal 5 = High speed

4. Replace the upper door and secure it to the unit.
5. Restore power to the unit.

UNIT MAINTENANCE

Proper maintenance is most important to achieve the best performance from a electric furnace. Some of the components and their locations are shown in Figure 10 (page 14). If any component of the electric furnace must be replaced, use only factory authorized replacement parts specified in the Replacement Parts List provided online.

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to electric furnace.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly**.
- **Verify proper operation after servicing.**

- These maintenance instructions are primarily intended to assist qualified technicians experienced in the proper maintenance and operation of this appliance.
- Always reinstall the doors on the electric furnace after servicing or cleaning/changing the filters. Do not operate the electric furnace without all doors and covers in place.
- Verify that the thermostat is properly installed and is not being affected by drafts or heat from lamps or other appliances.
- To achieve the best performance and minimize equipment failure, it is recommended that a yearly maintenance checkup be performed. At a minimum, this check should include the following items:

Air Filter(s) - B5BV series electric furnaces are not supplied with a single air filter when shipped from the factory. It is recommended that the filter be cleaned or replaced monthly. Newly built or recently renovated homes may require more frequent changing until the construction dust has minimized. Filter sizes shown in Table 2 are available at most local retailers.

⚠ WARNING:

Never operate the electric furnace without a filter in place. Dust and lint in the return air can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire.

Filters designed to remove smaller particles such as pollen, may require additional maintenance.

CABINET SIZE	FILTER SIZE
A	12 x 20 x 1
B	18 x 20 x 1
C	20 x 20 x 1

Table 2. Filter Sizes

Blower Compartment - Dirt and lint can create excessive loads on the motor resulting in higher than normal operating temperatures and shortened service life. It is recommended that the blower compartment be cleaned of dirt or lint that may have accumulated in the compartment or on the blower and motor as part of the annual inspection.

Blower Fan Wheel - Inspect the blower wheel blades for accumulations of dirt and clean if necessary. Inspect mounting nut for tightness when done.

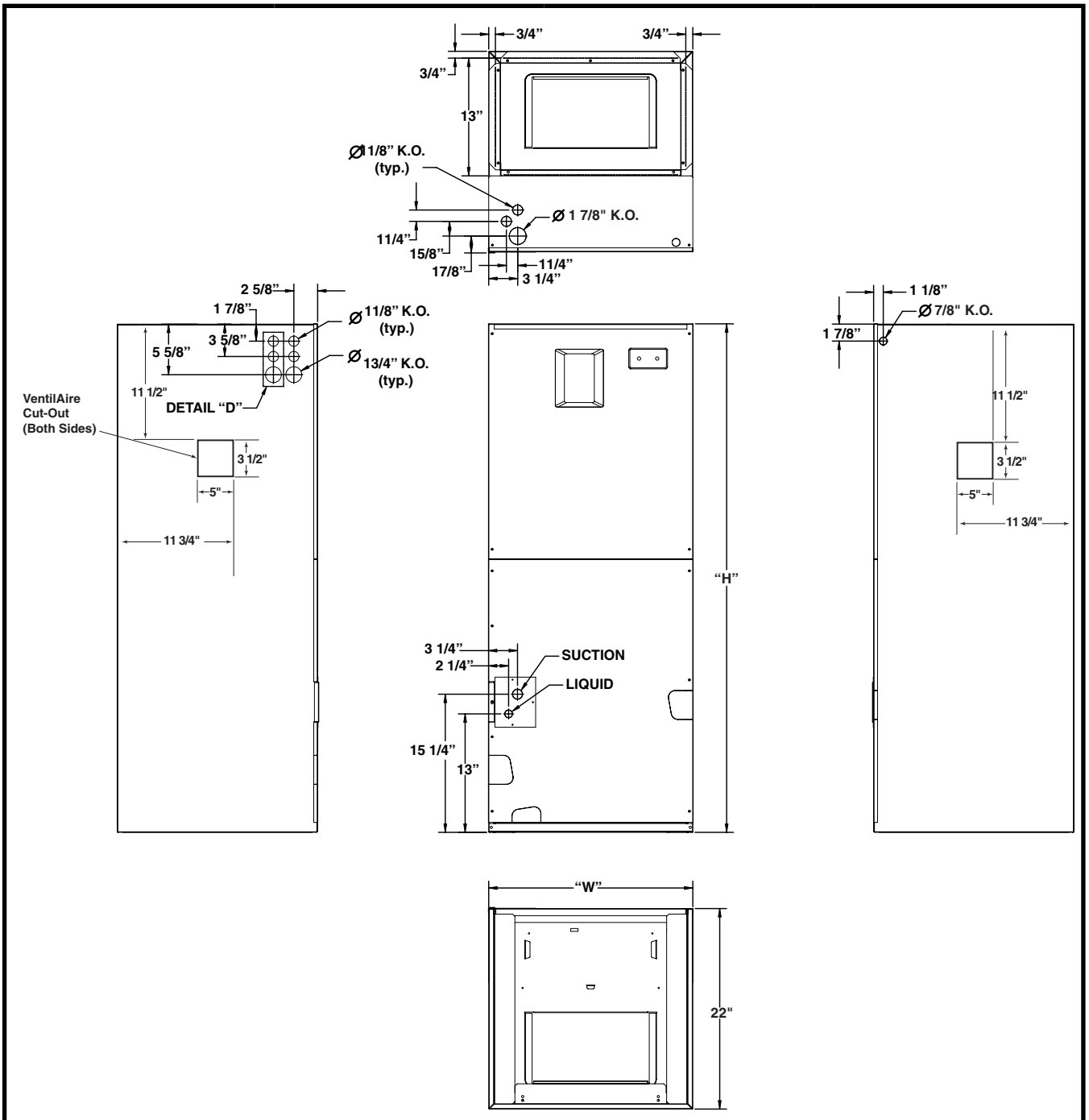
Blower Motor & Assembly - Inspect the blower assembly and motor mounting brackets for tightness and corrosion. Correct deficiencies if necessary. The blower motor contains sealed bearings and under normal operating conditions, no maintenance is necessary for the life of the equipment.

TROUBLESHOOTING

If the electric furnace fails to operate, check the following:

- Is the electric turned on?
- Is the thermostat operating properly?
- Are the blower compartment door(s) in place?
- Is the electric furnace disconnect closed?
- Has the circuit breaker tripped or the control board fuse burned open?
- Are any manual reset switches open?
- Is the filter dirty or plugged?

FIGURES & TABLES



Cabinet Size	W	A	H
Tall B	19 3/4	18 1/4	49 3/8
C	22 1/2	21	56

Figure 9. B5BV Series Electric Furnace Physical Dimensions

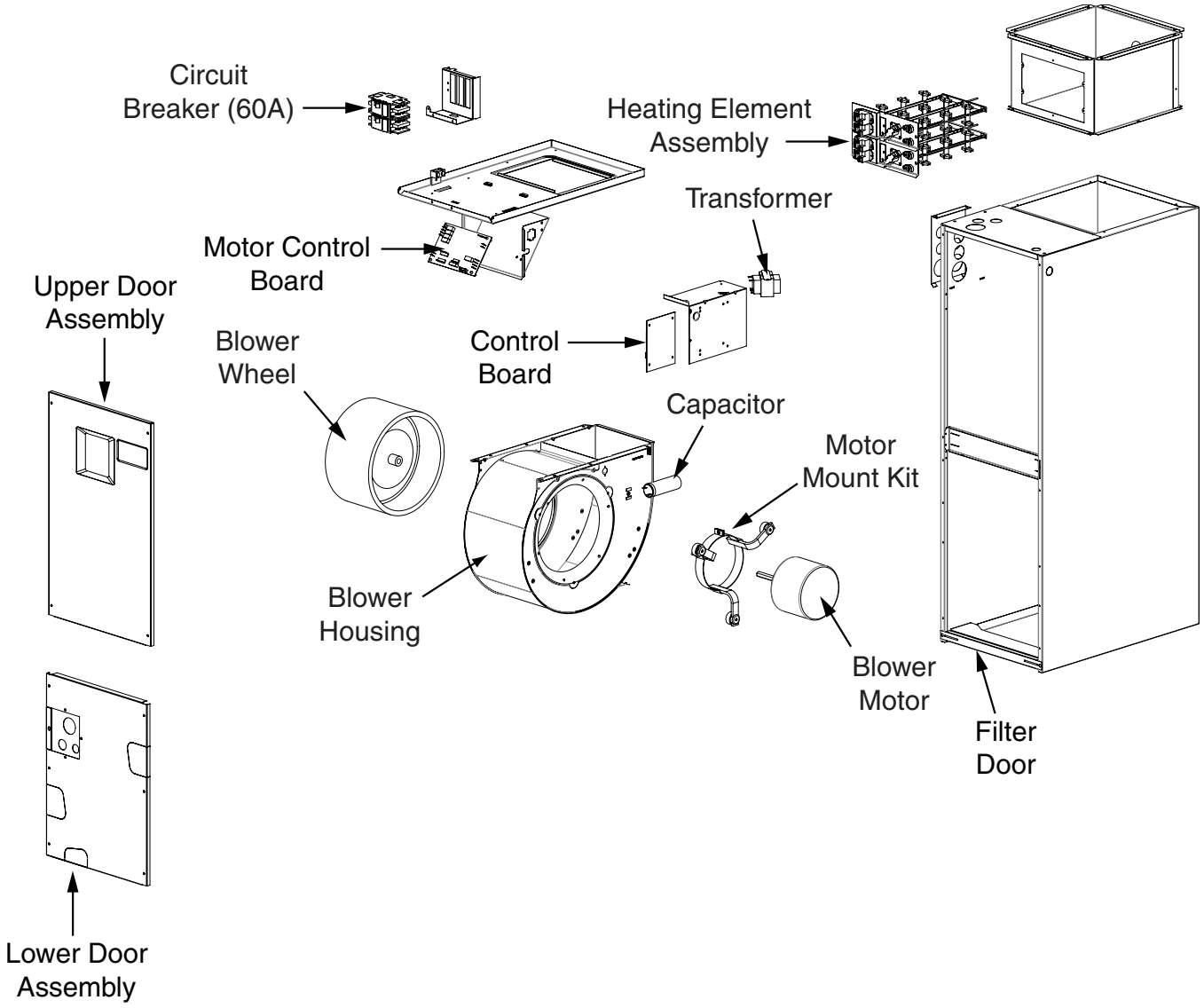


Figure 10. B5BV Series Electric Furnace Components

AIRFLOW DATA

Model B5BV-	Nominal Blower Size	Nominal Motor Size	Number of Speeds	Ext. Static Pressure (in W.C.)	Low	Medium Low	Medium High	High
000 K-B-10	10 x 8	1/3 hp	4-sp	0.1	800	1090	1265	1405
000 K-B-15	10 x 8	1/3 hp	4-sp	0.2	780	1080	1255	1395
				0.3	760	1060	1240	1375
				0.4	740	1095	1215	1350
				0.5	715	1020	1190	1310

Model B5BV-	Nominal Blower Size	Nominal Motor Size	Number of Speeds	Ext. Static Pressure (in W.C.)	Low	Medium Low	Medium	Medium High	High
000 K-C-10	11 x 10	3/4 hp	5-sp	0.1	1348	1517	1799	1956	2146
000 K-C-20	11 x 10	3/4 hp	5-sp	0.2	1272	1455	1753	1910	2099
				0.3	1198	1390	1702	1862	2050
				0.4	1126	1325	1650	1311	2000
				0.5	1056	1258	1596	1756	1948
				0.6	933	1189	1539	1699	1894
				0.7	922	1120	1431	1639	1839
				0.8	858	1048	1420	1576	1783

NOTES:

1) Airflow is shown in cfm, +/- 5%.
2) All airflows are measured without filter and with dry coil. For filter velocity of 300 ft./min. subtract .08" external static pressure. For wet coil, subtract .1" external static pressure.
3) See unit nameplate or installation instructions for maximum recommended external static pressure.

Table 3. Airflow Data for B5BV Series Electric Furnace

ELECTRICAL INFORMATION

Model B5BV-	Supply Circuit	Voltage	Total Amps	MCA	Maximum Over-current Rating	Copper Wire Size		
						60°C	75°C	90°C
000K-B-10	Single	240V	42.9	53.6	60.0	6.0	6.0	8.0
000K-C-10	Single		46.0	57.5	60.0	4.0	6.0	6.0
000K-B-15	Single		62.9	78.6	80.0	3.0	4.0	4.0
	A		42.9	53.6	60.0	6.0	6.0	8.0
	B		20.0	25.0	30.0	10.0	10.0	10.0
000K-C-20	Single		86.0	107.5	125.0	1.0	2.0	3.0
	A		46.0	57.5	60.0	4.0	6.0	6.0
	B		40.0	50.0	60.0	6.0	8.0	8.0
000K-B-10	Single	208V	37.5	46.9	50.0	6.0	8.0	8.0
000K-C-10	Single		40.6	50.8	60.0	6.0	6.0	8.0
000K-B-15	Single		54.8	68.5	70.0	4.0	4.0	6.0
	A		37.5	46.9	50.0	6.0	8.0	8.0
	B		17.3	21.6	25.0	10.0	10.0	10.0
000K-C-20	Single		75.2	94.0	100.0	2.0	3.0	4.0
	A		40.6	50.8	60.0	6.0	6.0	8.0
	B		34.6	43.3	50.0	6.0	8.0	8.0

Table 4. B5BV Electrical Data

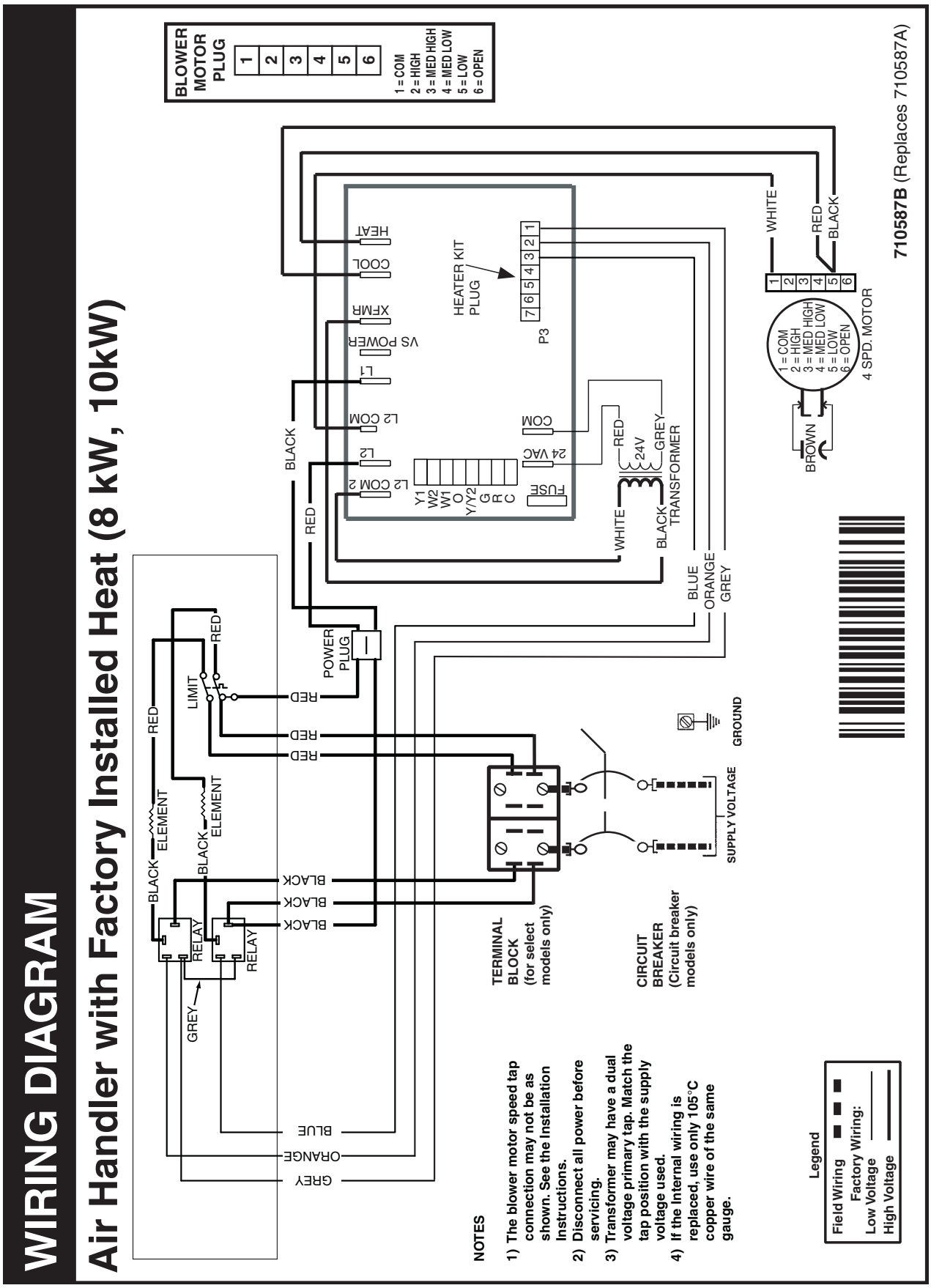


Figure 11. Wiring Diagram for B5BV Series Electric furnace Equipped With PSC Motor & 8 or 10 kw Heater Kit

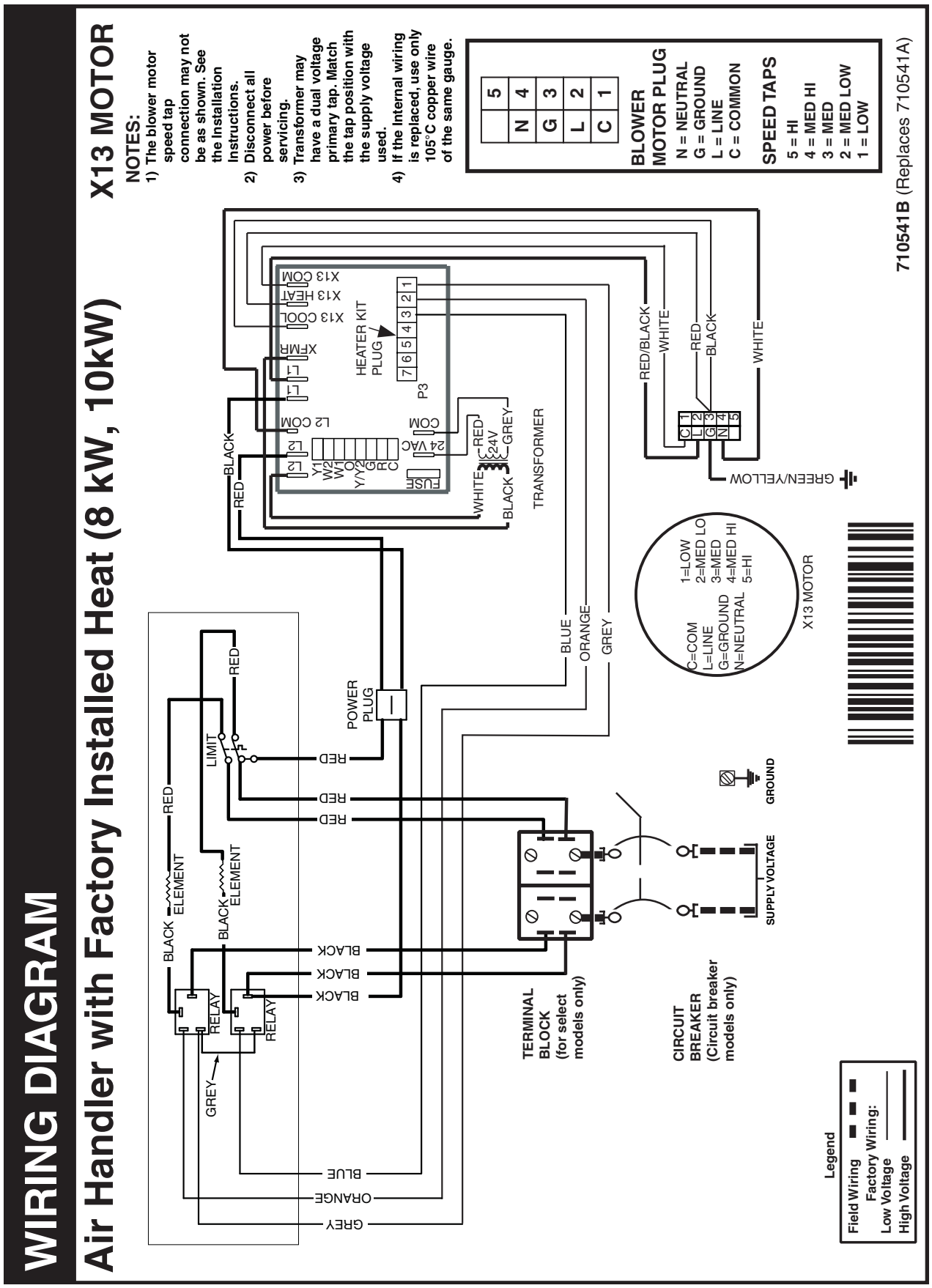


Figure 12. Wiring Diagram for B5BV Series Electric furnace Equipped With X13 Motor & 8 or 10 kw Heater Kit

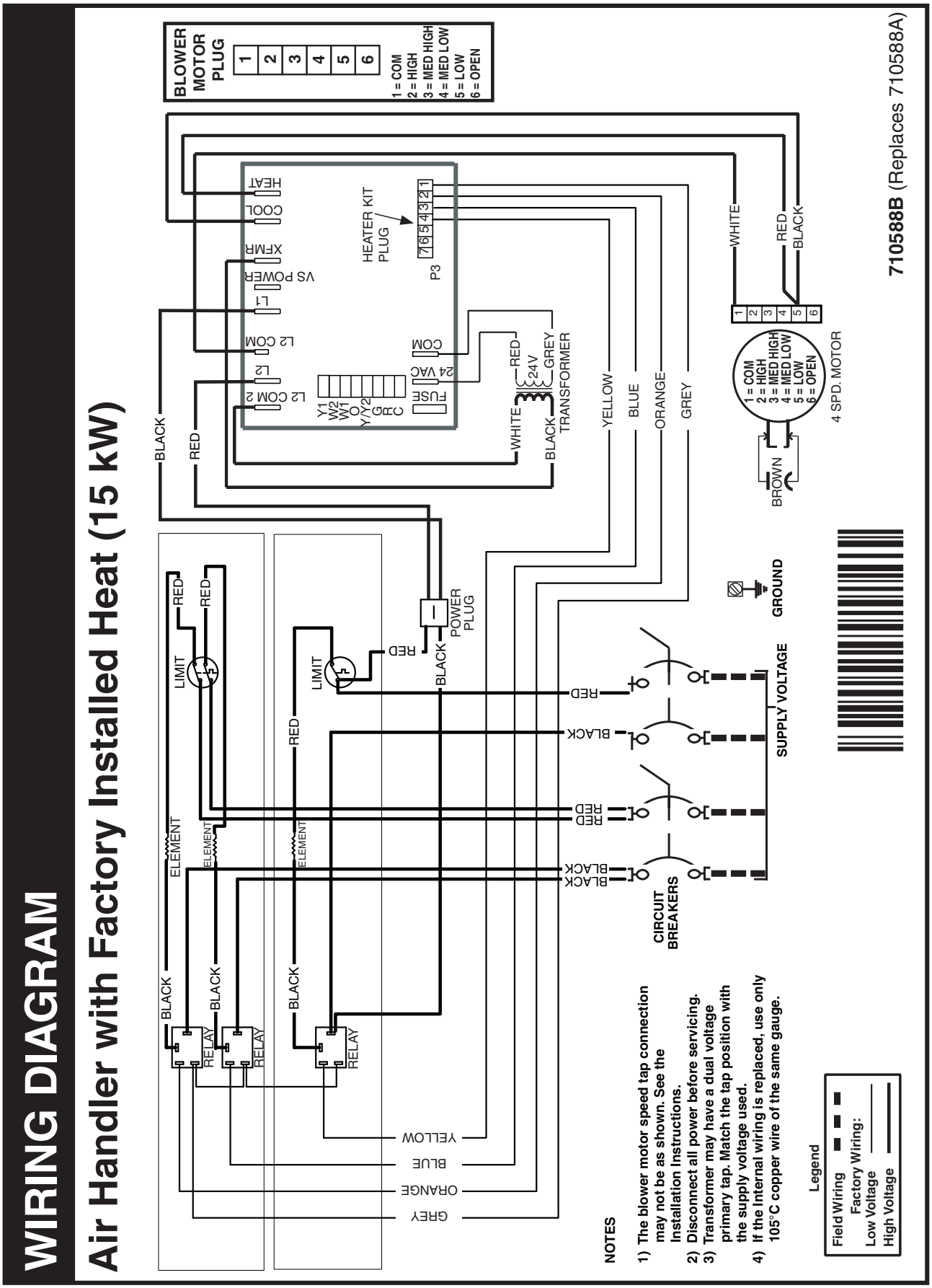


Figure 13. Wiring Diagram for B5BV Series Electric furnace Equipped With 15 kw Heater Kit

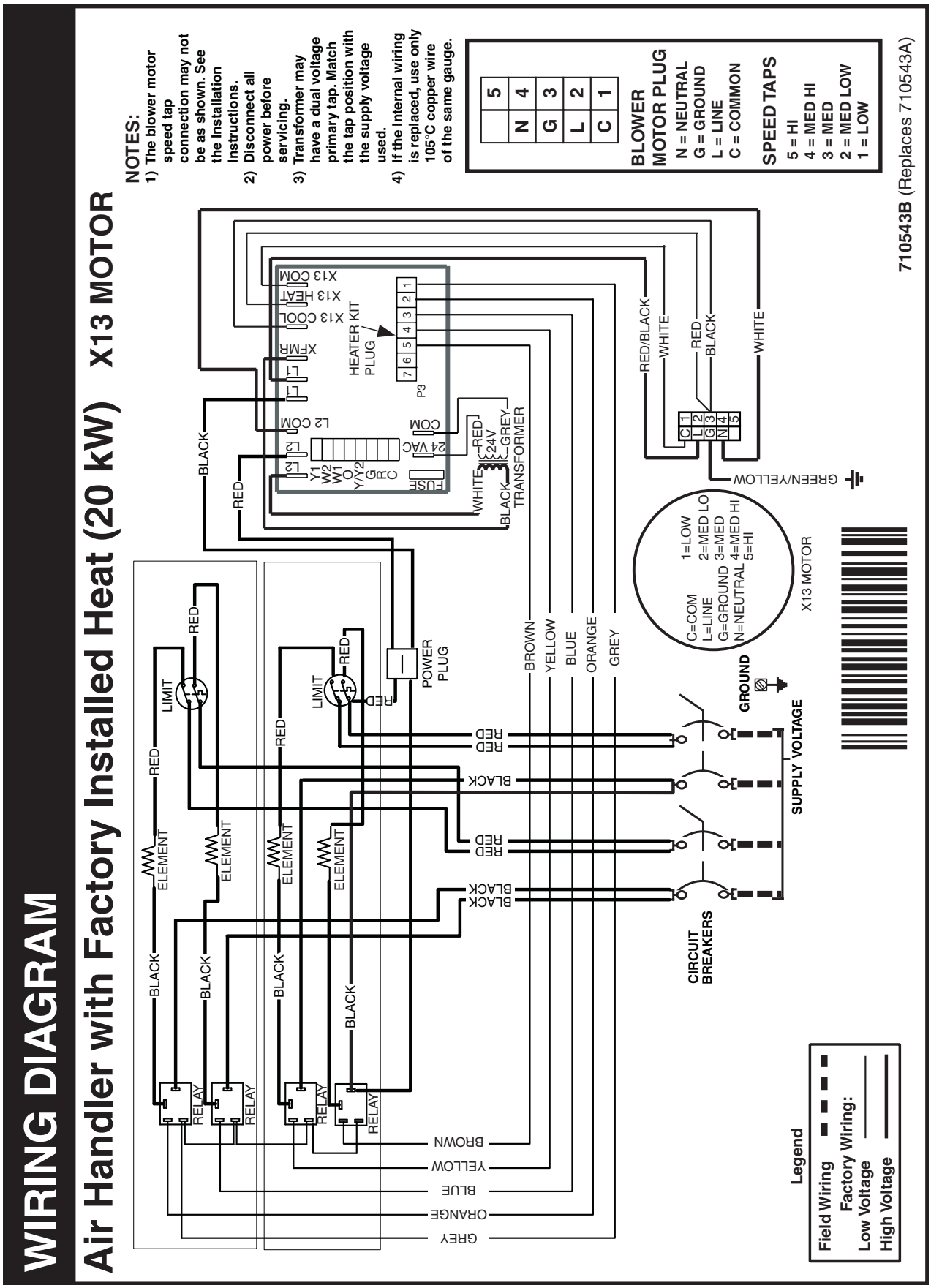


Figure 14. Wiring Diagram for B5BV Series Electric furnace Equipped With X13 Motor & 20 kw Heater Kit

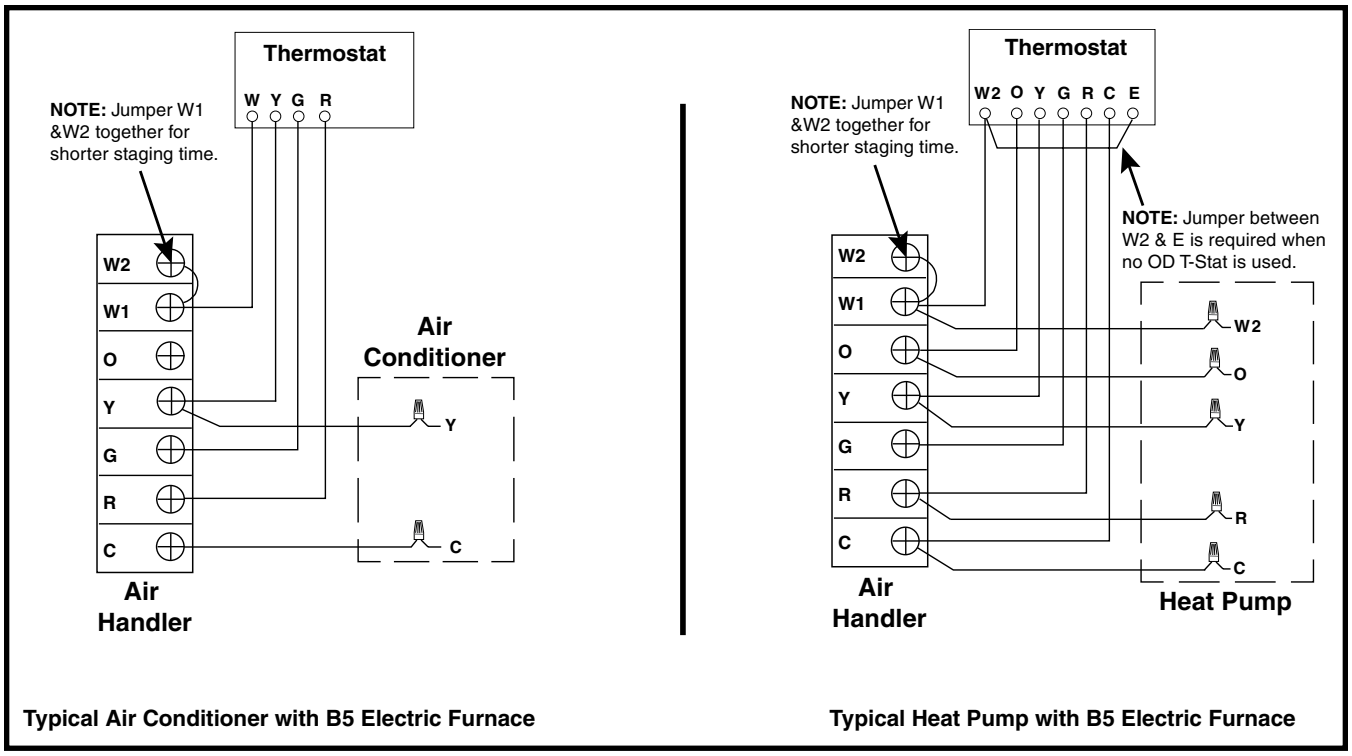


Figure 15. Typical Thermostat Connections

INSTALLATION / PERFORMANCE CHECK LIST

INSTALLER NAME:		
CITY:	STATE:	
INSTALLATION ADDRESS:		
CITY:	STATE:	
UNIT MODEL #		
UNIT SERIAL #		
Minimum clearances per page 4?	YES	NO
Is the unit properly installed and leveled?	YES	NO
Does condensate drain properly in both drain tubes?	YES	NO
Has the owner's information been reviewed with the home-owner?	YES	NO
Has the literature package been left near the appliance?	YES	NO

⚠ WARNING:

PROPOSITION 65 WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

ELECTRICAL SYSTEM:		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Supply Voltage: _____(V)		
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct?	YES	NO

VENTING SYSTEM:		
Is there adequate fresh air supply for ventilation?	YES	NO
Vent free from restrictions?	YES	NO
Filter properly installed?	YES	NO
Filter clean?	YES	NO
Flue connections tight?	YES	NO
Is there proper draft?	YES	NO
Return Air Temp: _____(° F)		
Supply Air Temp: _____(° F)		
Temperature Rise: _____(° F)		

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