

USERS INFORMATION MANUAL



DOWNFLOW & UPFLOW ONLY SINGLE & TWO-STAGE ELECTRIC HEAT FURNACE

For Installation In:

1. Manufactured (Mobile) Homes
2. Recreational Vehicles
3. Modular Homes & Buildings
4. Residential Homes

For installation only in HUD manufactured homes per Construction Safety 24 CFR Part 3280

MODELS: E30 SERIES

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CONTACT INFORMATION

Manufactured and Distributed by:

Mortex Products Inc
501 Terminal Rd
Fort Worth, TX 76106

www.mortx.com

SECTION 1: GENERAL

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

1. Furnace is rated for 208/240 VAC at 60 Hz.
2. All furnace have the same cabinet size.
3. All furnaces are designed for A/C or Heat Pump operation.
4. This furnace is designed for downflow applications only.
5. This furnace must not be operated with the control box cover and front access panel removed.
6. This furnace is listed by ETL for the United States and Canada.
7. This air handler is for use at elevations of 10,000 ft (3,048m) or less.
8. This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of this appliance by a person responsible for their safety. Children must not be allowed to play with this appliance.



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.

**USERS MUST READ ALL INSTRUCTIONS IN THIS MANUAL
THIS MANUAL MUST BE SAVED FOR FUTURE REFERENCE**



This is a safety alert symbol. When this symbol is seen on labels or in manuals, be alert to the potential for personal injury. Understand and pay particular attention to the signal words **DANGER**, **WARNING**, or **CAUTION**.

DANGER: Indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury**.

WARNING: Indicates a potentially hazardous situation, which if not avoided, **could result in death or serious injury**.

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

WARNING

Any adjustment, service or maintenance by the homeowner and/or user may create a condition where the operation of the product could cause personal injury or property damage.

Only qualified service personnel, a contractor, or an installer may refer to the service and maintenance section of this manual for assistance or for additional service or repair information on this air handler.

CAUTION

This product requires periodic routine maintenance and cleaning of the exterior surfaces by the homeowner or user to remove dust and debris. Any additional service must be performed by qualified personnel. This air handler must be serviced and maintained as specified in these instructions and/or to 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.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this air handler or any other appliance.

SAFETY REQUIREMENTS

1. This electric furnace must be kept clear and free of combustible materials, gasoline and other flammable vapors and liquids.
2. Insulating materials may be combustible. The furnace must be kept free and clear of insulating materials. The furnace area must be examined when installed in an insulated space or when insulation is added to be sure that the insulation material has been kept away from the furnace.
3. Follow the instructions in **Section 4: Furnace Startup and Shutdown** in this manual to properly start up or shut down this furnace.
4. If overheating occurs, turn off the power to the furnace and **contact a qualified contractor, installer, or service agency**.

DANGER

Do not use this air handler if any part has been under water. A flood damaged air handler is extremely dangerous. Attempts to use the air handler can result in a fire.

A qualified contractor, installer, or service agency must be contacted to inspect the air handler for any water damage and replace all components, control system parts, or electrical parts that have been damaged. If enough damage is present, the air handler may need to be replaced.

5. Never store flammable materials of any kind near your furnace. Gasoline, solvents and other volatile liquids should be stored only in approved containers outside the home. These materials vaporize easily and are extremely dangerous.
6. Never store cleaning materials such as bleaches, detergents, powder cleaners, etc. near the furnace. These chemicals can cause corrosion of the furnace sheet metal, electric heaters, blower, and electrical controls.
7. Never use the area around the furnace as a storage area for items which could block or obstruct the air circulation around the furnace. The flow of air is required for safe and proper operation.
8. Never block or obstruct air openings used for ventilation and cooling of the furnace electrical components.
9. Refer to the furnace rating plate for the furnace model number and specifications for safe operation.
10. Provide adequate clearances for servicing the control box, electric heating elements, and blower.
11. 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.
12. If the furnace is installed in a residential garage, it must be installed so that the electric heating elements are located not less than 18 inches above the floor. The furnace must be located or protected to avoid physical damage by vehicles.
13. These instructions cover the minimum requirements and conform to existing national standards and safety codes. In some cases, these instructions exceed certain local codes and ordinances, especially those who have not kept up with changing mobile home, modular home and HUD construction practices. These instructions are to be followed and are the minimum requirements for a safe installation and to preform service or repairs on this furnace.

WARNING

FIRE OR ELECTRICAL HAZARD

Servicing heating/cooling equipment can be hazardous due to electrical components.

Only trained and qualified personnel can service or repair heating/cooling equipment. The homeowner must never try to perform service, repair or maintenance on this air handler.

Untrained service personnel can perform only basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters **ONLY!**

Observe all precautions in the manuals and on the attached labels when working on this air handler.

SECTION 3: HOMEOWNER/USER INFORMATION

How The Air Handler Works – Heating Cycle

How the Furnace Works

This furnace must only be installed in the downflow orientation. The furnace is equipped with the controls necessary for proper and safe operation. Figure 1 shows the furnace in the downflow position and the location of the circuit breakers and low voltage fuse. The furnace is equipped with a blower assembly and transformer for no-heat models or a blower assembly, transformer, electric heat contactors, circuit breakers, and electric heating elements for electric heat models.

The transformer provides 24 VAC for the operation of the furnace controls and thermostat. When the thermostat calls for heat, 24 VAC is sent through the furnace low voltage terminal block (LVTB) and the over-temperature limits to the contactor coil which causes the contactor contacts to close. This sends 208/240 VAC to the electric heating elements which causing them to heat up. The furnace blower motor is then energized on the heating speed. The blower draws cool air from the living space, passes it across the heating elements, and circulates the warm air through the ductwork to the living space. When the thermostat is satisfied, the electric heating elements are de-energized and the blower motor is de-energized. The furnace is now in "standby" awaiting the next call for heat.

Visual Inspection of Furnace

The homeowner/user should visually inspect the furnace every month for any defects or problems. The items to be inspected are:

1. The physical support of the furnace with no sagging cracks, gaps, etc.
2. The furnace casing for any obvious signs of deterioration from rust or corrosion.
3. The supply duct connection is sealed to the furnace casing. The return connection (furnace base) is sealed to the floor base.
4. The furnace must be serviced by a qualified service technician annually, preferably at the start of each heating season.

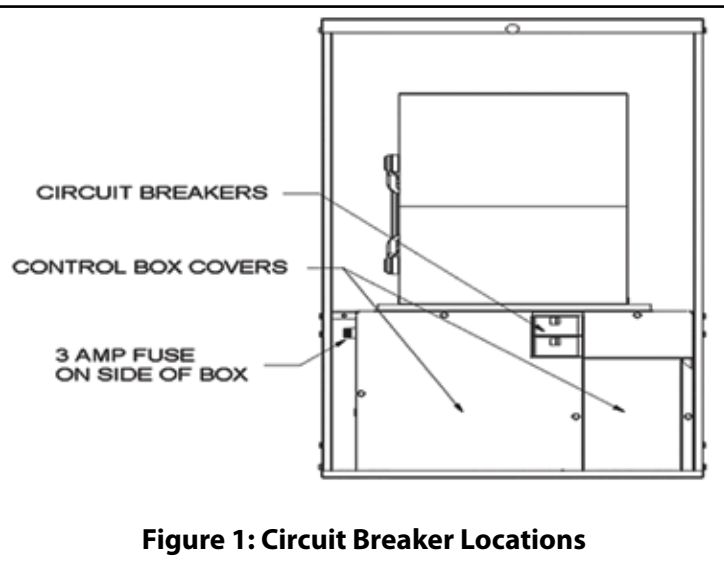


Figure 1: Circuit Breaker Locations

The Service Technician

If the furnace gives any indication of improper operation, a service technician should be called to inspect and repair the furnace. The service technician is allowed to perform the normal routine care of the furnace and can detect potential problems and then make corrections before trouble develops. Preventative maintenance of this type will allow the furnace to operate with minimal concerns to the homeowner/user and will provide years of comfort.

Warranty and Responsibilities

It is the sole responsibility of the homeowner to make certain the furnace has been properly installed and adjusted to operate properly.

The manufacturer warrants the furnace to be free from defects in material or workmanship for a stated time in the warranty agreement. The manufacturer will not be responsible for any repair costs to correct problems due to improper setup, improper installation, improper furnace adjustments, adding parts that are not listed for use with this furnace, improper operating procedures by the homeowner/user or repairs performed by the homeowner/ user.

Examples of service calls not covered by warranty:

1. Correcting faulty duct system in the home. This can be due to an insufficient number of ducts or ducts that are too small to provide proper air-flow through the air handler.
2. Correcting electrical wiring problems in the supply wiring to the air handler.
3. Resetting circuit breakers or ON/OFF switches used for servicing.
4. Problems caused by installation and operation of any outdoor unit or air quality devices which are not approved for use with this air handler.
5. Improper thermostat settings or calibrating the thermostat.
6. Problems caused by construction debris that has fallen into the furnace.
7. Replacement of fuses.
8. Insufficient air-flow problems caused by dirty air filters.
9. Furnace malfunction or component premature failure caused by restrictions in the return or supply ducts causing low air-flow.

The homeowner should establish a clear understanding of these responsibilities with the installer and /or service company so there will be no misunderstanding of what will be covered under warranty later.

While Homeowner or User is Away

The furnace is equipped with safety shutoff devices which are designed to prevent it from overheating in case of a malfunction. For this reason, it is never practical to assume the furnace will operate unattended for long periods of time. Examples of a malfunction that can cause significant damage to the home would be:

- 1. The furnace blower motor fails and the heating elements on the safety shutoff devices while the temperature inside the home continues to drop. Water pipes will freeze and could burst once their temperature falls below 32°F (0°C) resulting in significant damage to the structure.
- 2. The furnace blower motor or outdoor unit fails in the summer resulting in the temperature inside the home to rise above the setpoint. If the temperature of the home rises above the rated temperature of appliances, appliance failure can occur.
- 3. If the homeowner to be away from home for a long period of time, they should have someone check on the home every day, especially when the outside temperatures will be below 35°F (1.7°C) or above 75°F (23.9°C) to ensure the furnace is operating properly. This will help prevent water pipes from freezing or appliances from failing.

If the Furnace Fails to Operate Properly

If any abnormalities are observed while the furnace is operating, perform the following checks:

- 1. Check the setting on the thermostat to make sure the thermostat is set above the room temperature.
- 2. Check to see if the electrical power is turned on at the circuit breakers at the main electrical panel (circuit breaker box) or check any switches that may be used for service disconnect switches. These are often mistaken for light switches and are turned off.
- 3. Make sure the air filters are clean, return grilles clean, are not obstructed, and supply air registers are open.
- 4. If the cause of the malfunction is not obvious, the homeowner/ user must not attempt to service the furnace. **A qualified service company must be called to repair the furnace.**



Should overheating occur turn the circuit breakers on the control box and the main electrical service entrance (Circuit Breaker Box) to the off position. Call qualified service personnel to troubleshoot and repair the furnace. DO NOT allow the furnace to continue to cycle on the limit controls.

When to Call for Service Assistance

Very often time can be saved if the homeowner provides the service agency information about the furnace ahead of time. This will enable the service agency to determine the specific components used and possibly identify the problem and arrive with the correct parts to fix the problem. Write down the model number, serial number and be prepared to describe problem with the furnace and what has already been checked.

SERVICE AGENCY INFORMATION

Fill in Below
MODEL NUMBER: _____
SERIAL NUMBER: _____
SERVICE COMPANY: _____
ADDRESS: _____
TELEPHONE (DAYTIME): _____
TELEPHONE (EMERGENCY): _____
NOTES: _____

SECTION 4: STARTUP AND SHUTDOWN INSTRUCTIONS



If the Startup and Shutdown instructions are not followed exactly, a fire may result causing property damage, personal injury, and/or loss of life. Read the instructions below before trying to start up or shut down the furnace.

- 1. **BEFORE OPERATING:** Check around perimeter of the furnace to make sure there are no flammable materials in the area. If vapors of any kind are smelled, do not turn the electrical power to the furnace on until vapors have been ventilated and removed from the area of the furnace.
- 2. **CHECK THE FURNACE:** Visually check the furnace for loose screws and panels that may be missing or have fallen off.
- 3. **CHECK DUCT CONNECTIONS:** Visually check the connections of the ducts to the furnace to make sure there are no gaps or holes and ducts are securely fastened to the furnace. Check the furnace base for any gaps or deuteration that can cause leakage of the return air to the furnace.

Turning On / Starting Up the Furnace

- 1. STOP! Read the safety information above before proceeding.
- 2. Set the thermostat to the OFF setting.
- 3. Move the circuit breakers in the main electrical panel (home circuit breaker box) to the "OFF" position.
- 4. Remove furnace front access panel.
- 5. Move the circuit breakers located on the control box cover to the "ON" position.
- NOTE:** Homeowners or furnace users must not remove the furnace control box cover. Homeowners and furnace users should only reset the circuit breakers located on the front of the control box cover and in the main electrical panel (home circuit breaker box).
- 6. Install the furnace front access panel.
- 7. Move the circuit breakers in the main electrical panel (home circuit breaker box) to the "ON" position.
- 8. Set the thermostat to the desired mode and temperature setting.

Turning Off / Shutting Down the Furnace

1. Set the thermostat to the OFF setting.
2. Move the circuit breakers in the main electrical panel (home circuit breaker box) to the OFF position.

NOTE: Homeowners or furnace users must not remove the furnace control box cover. Homeowners and furnace users should only turn the circuit breakers located on the front of the furnace control box cover and in the main electrical panel (home circuit breaker box) to the OFF position.

3. Remove the furnace front access panel.
4. Turn the circuit breakers located on the control box cover to the OFF position.
5. Replace the furnace front access panel.

SECTION 5: HOMEOWNER/USER MAINTENANCE

All appliances need maintenance at the beginning of each heating season in order to operate properly. The annual service must be preformed by qualified service personnel. The homeowner is expected to perform general cleaning of the exterior surfaces, clean dust from the louvers in the return air grille and replacement of the air filters. Air filters must be checked every month and replaced as needed. Homeowners/users must be instructed as to how to replace air filters for good preventive maintenance. Figures 2 and 3 show the location of the air filters for applications with a coil cabinet return air grille. Figure 5 shows the location of the air filter applications with a coil cabinet top filter.

2. Turn off all electrical power to the appliance at the main service disconnect box.
3. Remove the lower furnace door.
4. Turn off the circuit breakers on the appliance control box.
5. Replace the lower furnace door.

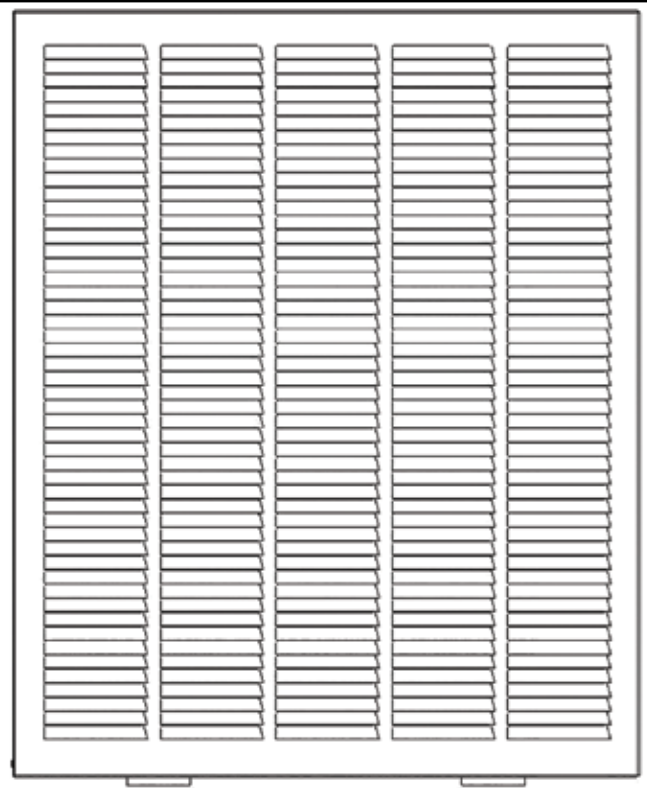
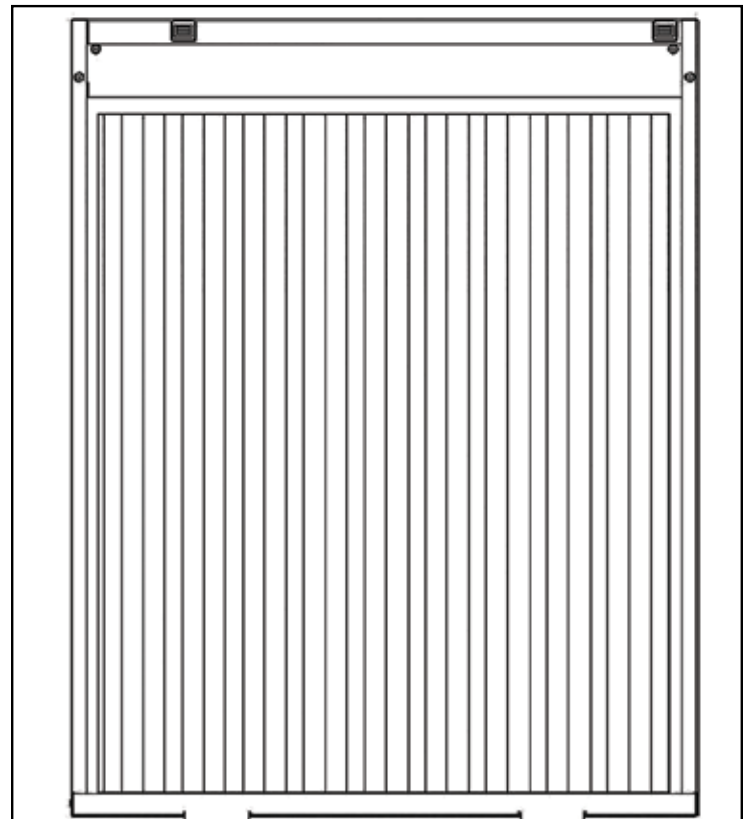


Figure 2: Return Air Louvered Grille



**Figure 3: Return Air Louvered Grille Air Filters
20" x 20" x 1" (508mm x 508mm x 25.4mm)
(2 Required)**

Replacement of Air Filters in Louvered Return Air Grille

Follow steps below to replace the filters in the louvered return air grille.

1. Follow the **"Turning Off / Shutting Down the Furnace" procedure in the Section 4: Furnace Startup and Shutdown Instructions** of this manual.
2. Remove the thumb screw at the top center of the louvered grille by turning it counter-clockwise (See Figure 4).
3. Pull the top of the grille outward and lift up on the grille until the bottom tabs are out of the slots in the furnace top cover.
4. Turn the grille upside down and pull the bottom frame out to gain access to the air filters.
5. Remove the two air filters.

NOTE: The filters are disposable. Do not attempt to clean the filters and reuse them.

6. Slide the two new 20" x 20" x 1" (508mm x 508mm x 25.4mm) air filters into the grille. Make sure the flow arrows on the filters are pointing away from the grille louvers.
7. Reinstall the bottom frame.
8. Insert the two tabs on the bottom of the grille into the two slots in the furnace top cover.
9. Push the top of the grille forward until it is aligned with the cabinet top flange and side flanges (See Figure 4). Reinstall the thumb screw to secure the grille to the coil cabinet.
10. Follow the **"Turning On / Starting Up the Furnace" procedure in the Section 4: Furnace Startup and Shutdown Instructions** of this manual.

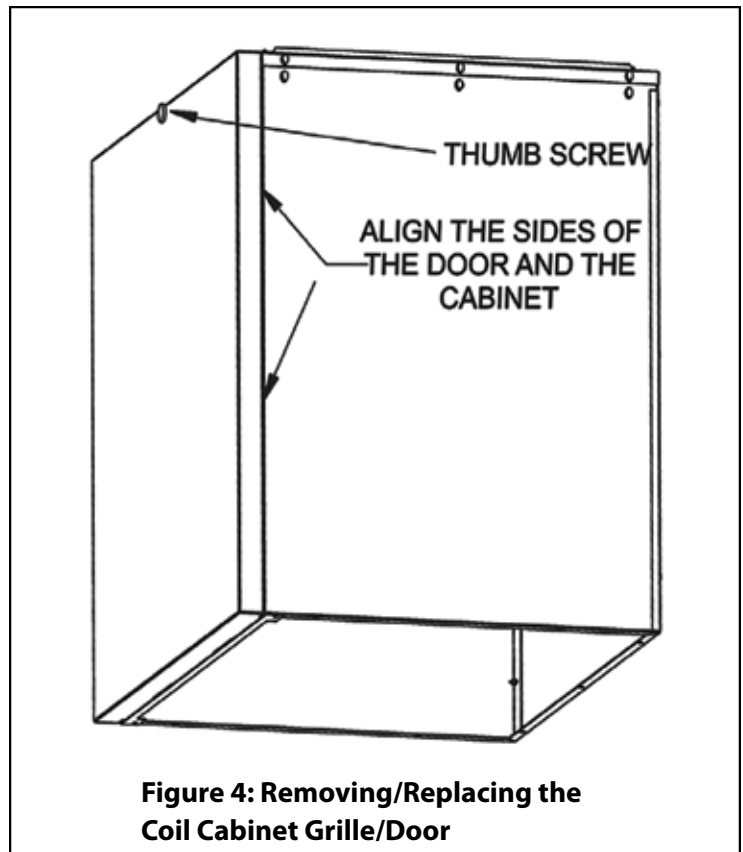


Figure 4: Removing/Replacing the Coil Cabinet Grille/Door

Replacement of Air Filter in Top of Coil Cabinet

Follow the steps below to replace the filter located in the top of the coil compartment.

1. Follow the **"Turning Off / Shutting Down the Furnace" procedure in the Section 4: Furnace Startup and Shutdown Instructions** of this manual.
2. Remove the thumb screw at the top center of the solid coil cabinet door by turning the screw counter-clockwise.
3. Pull the top of the door outward and lift up on the door until the bottom tabs are out of the slots in the furnace top cover.
4. Set the door on the floor.
5. Remove the air filter from the rack in the top of the coil cabinet (See Figure 5).

NOTE: The filter is disposable. Do not attempt to clean the filter and reuse it.

6. Slide the new 20" x 24" x 2" (508mm x 610mm x 50.8mm) pleated air filter into the filter rack. Make sure the flow arrows on the air filter are pointing toward the coil.
7. Insert the two tabs on the bottom of the coil cabinet door with the two slots on the furnace top cover.
8. Push the top of the coil cabinet door forward until it is aligned with the cabinet top flange and side flanges (See Figure 4). Reinstall the thumb screw to secure the door to the coil cabinet.
9. Follow the **"Turning On / Starting Up the Furnace" procedure in the Section 4: Furnace Startup and Shutdown Instructions** of this manual.

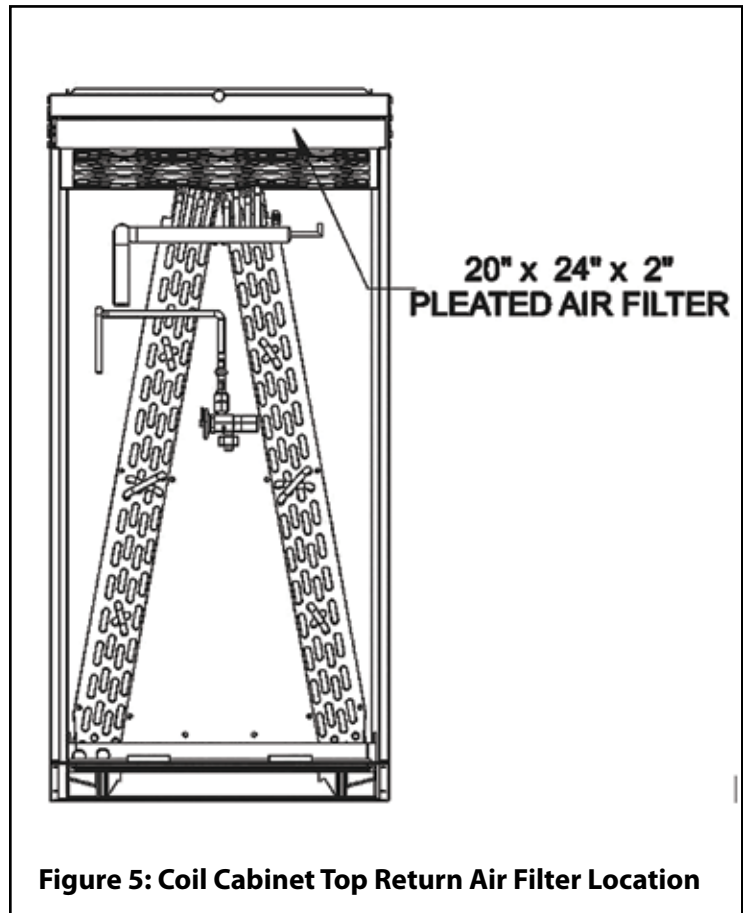


Figure 5: Coil Cabinet Top Return Air Filter Location

SERVICE AND MAINTENANCE MANUAL

SECTION 1: SAFETY

THE HOMEOWNERS AND / OR FURNACE USERS MUST STOP HERE! Continuing will void your warranty.

This section has been designed to assist a **qualified service agency** in performing service and maintenance on this furnace.

The homeowners and/or the furnace user must never attempt to perform any service or maintenance on the furnace especially when it involves the removal or adjustment of any parts and/or components.

WARNING

The manufacturer or distributor will not be responsible for any repairs due to improper parts changes, improper maintenance, improper furnace adjustments or improper modifications made by the homeowner and/or the appliance user.

The manufacturer will not be responsible if the homeowner and/or appliance user use this section of the instructions in an attempt to perform maintenance or repairs to the furnace. This practice is very dangerous and may result in a fire causing property damage, personal injury, loss of life and/or will void the appliance warranty.

The following safety rules must be followed when servicing this furnace.



This is a safety alert symbol. When this symbol is seen on labels or in manuals, be alert to the potential for personal injury. Understand and pay particular attention to the signal words **DANGER, WARNING, or CAUTION.**

DANGER: Indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury.**

WARNING: Indicates a potentially hazardous situation, which if not avoided, **could result in death or serious injury.**

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

WARNING

Improper adjustment, service or maintenance may create a condition where the operation of the product could cause personal injury or property damage. Refer to this manual for assistance or for additional information consult the Technical Support Group.

CAUTION

This product must be serviced and maintained as specified in these instructions and/or to any applicable local, state, and national codes including, but not limited to building, electrical, and mechanical codes.

WARNING

ELECTRICAL SHOCK, FIRE HAZARD

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

SAFETY REQUIREMENTS

1. This electric furnace may have a dual electrical supply circuit. Make sure you check each electrical circuit with a meter to be sure the power has been disconnected.
2. Insulating materials may be combustible. The furnace must be kept free and clear of insulating materials.
3. Follow the instructions exactly as shown in Start Up and Shutdown Section in this manual to properly Start Up or Shutdown this appliance.
4. Make sure all moving parts have come to a complete stop before attempting to perform any work once the furnace door has been removed. Moving parts can cause serious injury if clothing or body parts get caught in the moving part.

WARNING

ELECTRICAL SHOCK, FIRE HAZARD

Failure to follow the safety warnings exactly or improper servicing could result in dangerous operation, serious injury, property damage, and/or death.

- Before servicing, disconnect all electrical power to the furnace. Make sure you disconnect both power supplies if the furnace has a dual power supply circuit. Dual circuits may be used on the 12 kW, 15kW and 20kW furnaces.
- When servicing controls, label all wires prior to disconnecting to aid in proper reconnection of wires.
- Verify proper operation after servicing by turning the thermostat above the room temperature for a brief period of time to ensure future furnace operation.

WARNING

FIRE HAZARD

NEVER PLACE A JUMPER BETWEEN "R" & "W"

Placing jumper wire between the RED and WHITE thermostat wires at the air handler to override the thermostat and energize the heater elements is an extremely dangerous practice that can result in damage to the thermostat, dangerous operation, serious injury, property damage and/or death.

SECTION 2: FURNACE MAINTENANCE

The interior sections of the furnace must be cleaned and adjusted by a qualified service contractor once a year or before the start of each heating season. The following items must be checked:

1. The blower wheel and motor for excessive dust/lint/ debris buildup.
2. The electric heaters for dust/lint/debris buildup, wear, damage, and corrosion.
3. The electrical components for excessive dust/lint/debris buildup, wear, and deterioration.
4. The supply air duct system for excessive dust/lint/debris buildup and deterioration.
5. The return air duct system for excessive dust/lint/debris buildup and deterioration.
6. All electrical wiring for secure connections, wear, insulation deterioration, and damage.
7. Indoor coil for dust/lint/debris buildup or damage.
8. Indoor coil drain pan for dust/lint/debris buildup, mold, and proper drainage.
9. Furnace casing and all interior sheet metal panels or dividers.

Furnace Cleaning Procedure

1. Follow the instructions in Section 4: Furnace Startup and Shutdown Instructions found in the Users Information Manual to properly shut down the furnace.
2. Remove the access panel on the front of the furnace.
3. Remove the access panel on the front of the indoor coil compartment.
4. Remove the screws on the control box covers and remove both covers (See Figure 6).
5. Remove the two screws on the right side and the screw on the left side of the blower mounting plate and slide the blower out of the furnace (See Figure 7).
6. Use a vacuum cleaner and small soft bristle brush to remove any dust, lint, and debris from the blower compartment.
7. Inspect the area below the blower compartment where the electric heating elements are located and remove any dust, lint, and debris from around the heating elements. Be careful not to damage the heating element.

NOTE: Use the soft bristle brush along with the vacuum to clean the area so dirt or debris gets drawn into the vacuum hose and does not fall into the supply duct.

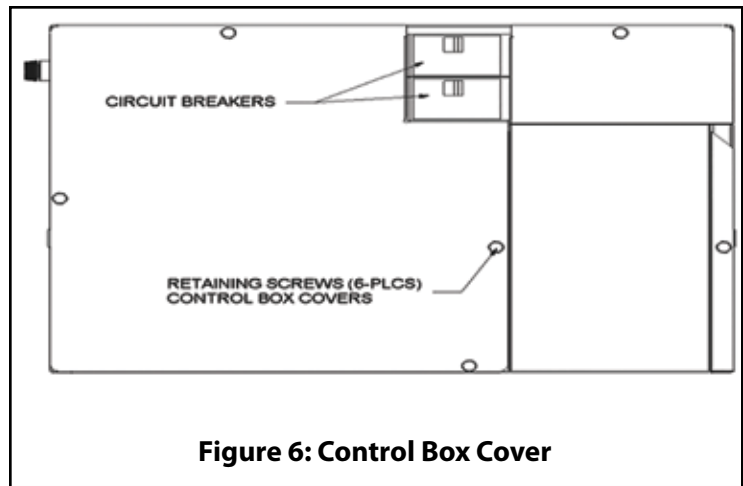


Figure 6: Control Box Cover

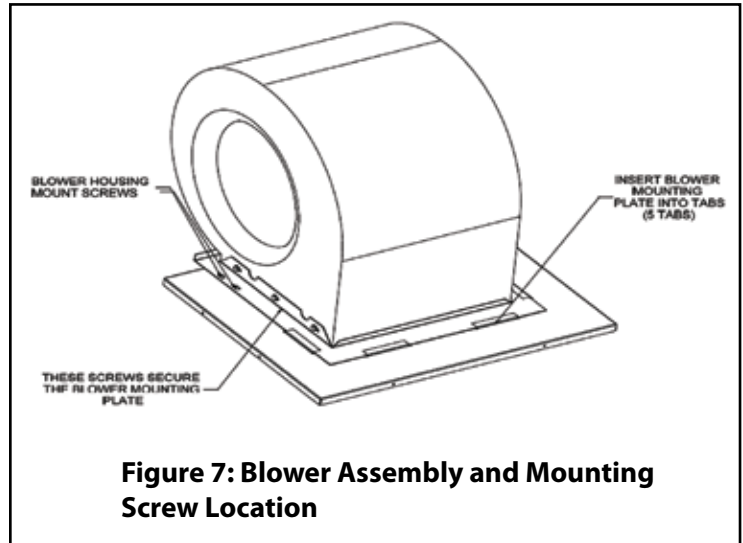


Figure 7: Blower Assembly and Mounting Screw Location

8. Check the blower wheel for dust, lint, and debris buildup. Use the brush and the vacuum cleaner to remove any dust, lint, and debris from the blower wheel. Be careful not to move or remove any of the balance weights located on the blower wheel blades. If the blower wheel weight is moved or removed, the blower wheel will vibrate. If the blower wheel is vibrating, it must be replaced.
9. Remove any dust, lint, and debris buildup from the blower motor. Clean the openings on the motor housing. If these openings are blocked, the motor may overheat and trip on its internal protector and could fail prematurely.
10. Remove any dust, lint, and debris buildup in the supply and return ducts as far as possible with the brush and vacuum cleaner. Excessive amount of dust, lint, or debris in the ductwork should be cleaned by a professional duct cleaning service.
11. Remove any dust, lint, and debris from the furnace controls and all surfaces in the control box to prevent overheating and premature failure of the controls and premature failure.
12. Remove any dust, lint, and debris buildup from indoor coil, coil compartment, and condensate drain pan.
13. After cleaning the drain pan, verify the drain pan is draining properly by pouring water into the drain pan.
14. Remove any excess water that may have spilled from verifying the condensate drain pan is draining properly.
15. Reinstall the blower assembly and secure the blower mount plate to the fan deck using the screws that were removed in step 5.
16. Reinstall the control box covers and secure them to the control box with the screws that were removed in step 4.
17. Reinstall the furnace and indoor coil compartment access panels.
18. Follow the instructions in Section 4: Furnace Startup and Shutdown Instructions found in the Users Information Manual to properly place the furnace back into service.

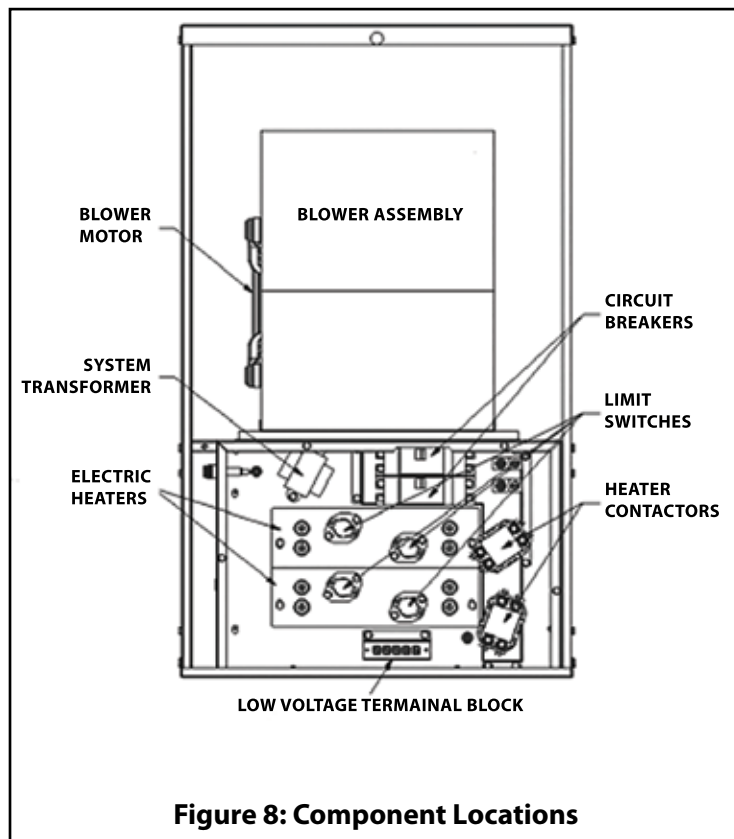
SECTION 3: FURNACE CONTROLS

This section explains how the furnace control operate. Refer to Figure 8 for component locations.

1. **Limit Control(s)** – Each electric heating element has a limit switch directly in front of it to sense the heating element temperature to prevent overheating. The limit switch opens if the temperature rises above the set point and interrupts the 24 VAC signal to the heater contactor coil which disconnects electrical power to the heating element.
2. **Heater Contactor(s)** –The contactors are controlled by the thermostat. Upon a call for heat, 24 VAC is sent from the thermostat “W” terminal to the contactor coil(s) causing the contactor contacts to close which sends 208/240 VAC to the electric heating elements. When the call for heat has been satisfied, the contactor contacts open removing the 208/240 VAC from the heating elements.
3. **Circuit Breaker(s)** – The circuit breakers are designed as short circuit protection for the electric heating elements and can also be used to disconnect the electrical power to the furnace.

NOTE: The circuit breaker(s) are not intended to protect the wiring from the main control panel (home circuit breaker box) to the furnace, so the appropriate size breaker(s) or fuse(s) must be selected (See furnace rating plate) and installed in the main electrical panel to protect the electrical supply wiring and furnace.

4. **Transformer** – The transformer is used to reduce the 208/240 VAC line voltage to 24 VAC which is used by the system control circuit.
5. **3 Amp Low Voltage Fuse** – This fuse is used for over-current protection of the 24 VAC circuit and transformer.



SECTION 4: SEQUENCE OF OPERATION

Continuous Blower

When the thermostat fan switch is in the “ON” position (continuous indoor fan operation), the circuit between the “R” and “G” terminals in the thermostat is completed causing 24 VAC to be sent through the GREEN wire to the “G” terminal on the furnace low voltage terminal block (LVTB). This energizes the furnace blower motor and air will be circulated through the ductwork into the conditioned space. The indoor fan motor will operate continuously until the thermostat fan switch is switched to the “AUTO” position.

Intermittent Blower

When the thermostat fan switch is set in the “AUTO” position (intermittent indoor fan operation), the indoor blower motor is only energized when there is a call for cooling or heating operation. Different motor speed taps are typically use for cooling and heating operating. The indoor fan motor will operate until the call for cooling or heating is satisfied.

Heating Cycle

When the thermostat is set in the “HEAT” mode and the fan switch on the thermostat is set in the “AUTO” position, a call for heat completes the circuit between the “R” and “W” terminals in the thermostat and 24 VAC is sent from the “W” thermostat terminal through the WHITE thermostat wire to the “W” terminal on the low voltage terminal block (LVTB).

24 VAC is sent from the LVTB “W” terminal through the limit controls to the heater contactor coils which closes the contactor contacts and energizes the heating elements with line voltage. The blower motor heating speed lead is connected to the “W” terminal on the LVTB so the blower is energized on the selected heating speed tap.

The blower will continue to operate until the call for heat has been satisfied. The electric heater contactor coil is de-energized which opens the contactor contacts and de-energizes the heating elements. The 24 VAC signal is also removed from the blower motor heating speed tap which de-energizes the blower motor. The furnace is now in standby mode awaiting the next heating cycle.

The 12 kW, 15 kW and 20 kW models have a BLACK wire that can be disconnected from the spade terminal on the back of the LVTB “W” terminal and connected to the wire from the thermostat “W2” terminal (2nd stage heat) for two-stage heating operation. A thermostat that has the second stage (W2) heating feature must be used. The 2nd stage heat cycle is enabled when the room temperature falls approximately 3° below the thermostat set point. Once the room temperature is within approximately 1° of the thermostat set point, the 2nd stage of heat is de-energized until the thermostat calls for the 2nd stage heat again.

⚠ WARNING

For personal safety be sure to turn the electrical power OFF to the furnace at the main electrical panel (circuit breaker box) before performing service or maintenance on the furnace. Homeowners/users should never attempt to perform any servicing or maintenance which requires opening the furnace control box covers.

Cooling Cycle

When the thermostat is set in the "COOL" mode and the fan switch on the thermostat is set in the "AUTO" position, a call for heat completes the circuit between the "R" and "Y" terminals in the thermostat and 24 VAC is sent from the "Y" thermostat terminal through the YELLOW thermostat wire to the "Y" terminal on the low voltage terminal block (LVTB). The blower motor cooling speed lead is connected to the "Y" terminal on the LVTB so the blower is energized on the selected cooling speed tap.

The blower will continue to operate until the call for cooling has been satisfied. The 24 VAC signal is removed from the blower motor cooling speed tap which de-energizes the blower motor. The furnace is now in standby mode awaiting the next cooling cycle.

SECTION 5: TROUBLESHOOTING

The following checks should be made before troubleshooting the furnace controls for a no-heat issue.

1. Check all of the circuit breakers in the main electrical panel and on the furnace control box cover to make sure they are in the "ON" position and have not tripped.
2. Check the 3-amp low voltage fuse on the left side of the control box. If the fuse is blown, check the wiring with an ohmmeter for a short to ground. If shorted, repair the short and replace the fuse.
3. Check any electrical switches that are external to the furnace to make sure they are turned on.
4. Check all wiring connections make sure they are securely fastened.

If the furnace still will not operate, check the following.

1. Check to see if the voltage is above 200 volts for a 208 VAC power supply and above 220 volts for a 240 VAC power supply. If there is no voltage or the voltage is low, check the circuit breakers in the main electrical panel or the electrical supply wiring to the furnace.
2. If the blower is operating, but there is no heat, check the heater contactors to be sure they are closing or check the limit controls to make sure they are not open.
3. If the motor is not running, check for 208 - 240 VAC on the L1 and L2 contactor terminals. Check for 24 VAC at the motor speed tap terminals connected between the low voltage terminal block (LVTB) "G" and "C" terminals for continuous fan operation, between the LVTB "W" and "C" terminals for heating operation, or between the LVTB "Y" and "C" terminals for cooling operation.
4. If 240 VAC is present on the L1 and L2 contactor terminals and 24 VAC is present on the motor speed tap terminals and the motor is still not operating, replace the motor.
5. Refer to Figure 9 and Table 1 for the motor terminal connections.

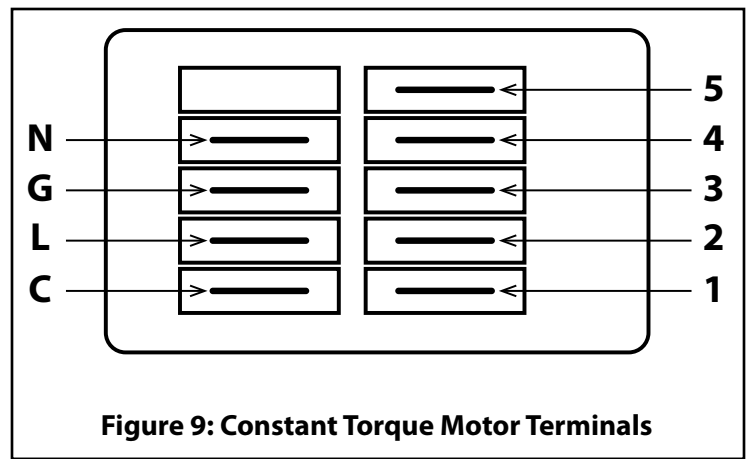


Figure 9: Constant Torque Motor Terminals

Blower Motor FLA

1/3 HP Motor – 2.8

1/2 HP Motor – 4.3

3/4 HP Motor – 6.8

WARNING

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

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

Table 1: Constant Torque Motor Terminal Connections

Heating Element Not Heating

Check for 208 - 240 VAC between terminals T1 and T2 of the heater contactor(s). If 208 - 240 VAC is present, check the resistance across the heating element terminals. If the heating element resistance is infinity (open circuit) for any heating element, replace the defective heating element.

The heater design is as follows:

- The 5kW and 6kW models have one 5 kW or 6kW heating element.
- The 8kW and 10 kW models have a heater assembly with two 4kW or 5 kW heating elements.
- The 12kW model has a heater assembly with two 6kW heating elements.
- The 15 kW model has one heater assembly with two 5 kW heating elements and one heater assembly with one 5 kW heating element.
- The 20 kW model has two heater assemblies, each with two 5 kW heating elements.

The correct heating element amp draw is approximately as follows:

4 kW Heating Element = 16.7 amps

5 kW Heating Element = 20.8 amps

6 kW Heating Element = 25.0 amps

If the heating element current draw is below the amps shown above or at 0.0, replace the heating element.

If 208 - 240 VAC is not present between the T1 and T2 terminals (load) of a heater contactor, but there is 208-240 VAC present between terminals L1 and L2 (line) of that heater contactor, check for an open limit control and replace the open limit control if it has failed open.

If 208-240 VAC is not present between the T1 and T2 terminals (load) of a heater contactor, but 208-240 VAC is present between the terminals L1 and L2 (line) of the heater contactor(s) and there is 24 VAC across the coil of that contactor, replace the heater contactor.

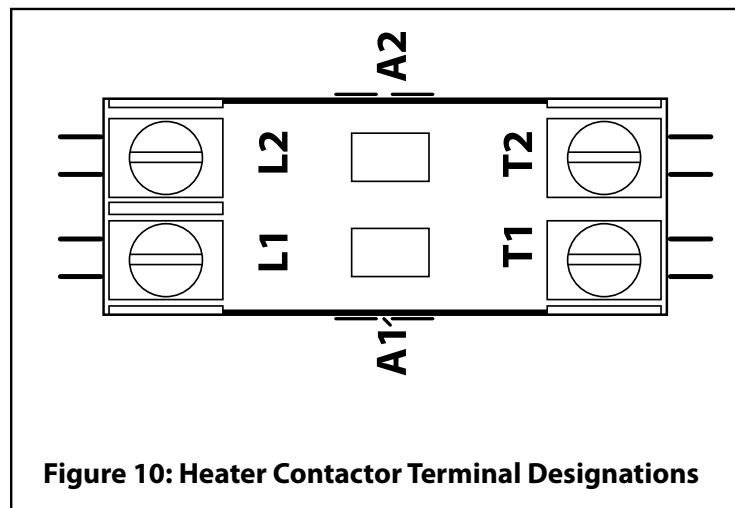


Figure 10: Heater Contactor Terminal Designations

Replacing the Blower Motor

1. Follow the instructions as shown in **Section 4: Startup and Shutdown Instructions in the Users Information Manual** to properly shut down this furnace.
2. Remove furnace front access panel and switch the furnace circuit breaker(s) to the "OFF" position.
3. Disconnect the blower motor 9 pin plastic plug from the top left corner of the control box (furnace in downflow orientation).
4. Remove the two screws on the right side and the screw from the left side of the blower mounting plate. See Figure 11 for screw locations.
5. Slide the blower out of the blower compartment and set it on the floor.
6. Loosen the set screw on the blower wheel hub that secures the wheel to the blower motor shaft. Make sure the wheel spins freely with no obstructions. File off any burrs on the motor shaft before trying to remove the wheel.
7. Remove the 3 screws that secure the motor mounting bracket legs to the blower housing and remove the motor/bracket assembly from the blower housing.
8. Disconnect the wires from the motor terminal block after labeling which terminal each wire was connected to for use when connecting the wires to the new motor.
9. Remove the blower motor from the motor mounting bracket by removing the 1/4" screw that secure the blower motor to the bellyband.

10. Insert the new motor and original mounting legs into the motor mounting bracket and secure to the bellyband and mounting legs are to the motor with the 1/4" screw and nut. Make sure the belly band and mounting legs are positioned in the same place as they were on the original motor so the motor is not at an angle and the wire terminals are located in the proper position.
11. Insert the 3 screws that secure the motor mounting bracket legs to the blower housing. Tighten the screws until the mount bracket arms are securely fastened to the blower housing.
12. Position the blower wheel in the housing until the wheel is centered between the orifices on each side of the housing. Center the setscrew on the center of the shaft flat and tighten the setscrew securely to hold the wheel in place.
13. Reconnect the wires to the motor terminal block terminals. If the wires were not labeled in step 8, refer to the wiring diagram for the correct connections.
14. Plug the motor speed tap connector to the motor terminal.
15. Slide the blower assembly onto the blower deck and attach the blower assembly to the blower mounting plate with the screws that were removed in step 4.
16. Connect the 9-pin plastic plug to the 9-pin plastic plug on the top left corner of the control box (furnace in downflow orientation).
17. Turn the furnace circuit breakers to the "ON" position.
18. Install the furnace front access panel.
19. Follow the instructions in **Section 4: Furnace Startup and Shutdown Instructions found in the Users Information Manual** to properly place the furnace back into service.
20. Turn the thermostat fan switch to the "ON" position and check for proper blower operation. Make sure the blower does not make any noises or vibrate during operation.
21. When the blower check is complete, set the thermostat to the desired mode and temperature.

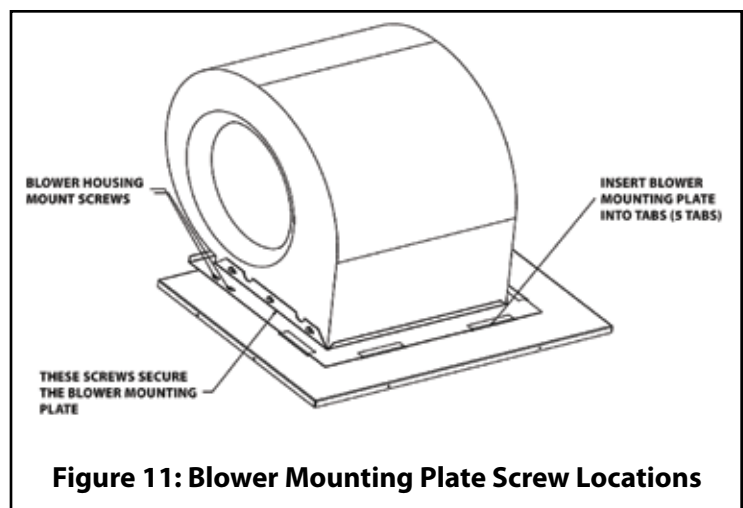


Figure 11: Blower Mounting Plate Screw Locations

WARNING

To avoid personal injury, take precautions to not touch non-insulated electrical components.

Avoid wearing loose clothing or any items that can become caught in moving parts, such as the blower wheel. This can cause serious personal injury.

SECTION 6: BLOWER PERFORMANCE

Blower Motor Speed Tap Information

The constant torque motor has 5 speed taps. The speed taps are designed to be used as shown below:

Tap 5 is used for HIGH-SPEED Cooling operation.

Tap 4 is used for MED-HIGH SPEED Cooling or Heating operation.

Tap 3 is used for MEDIUM SPEED Cooling or Heating operation.

Tap 2 is used for MED-LOW SPEED Heating operation.

Tap 1 is used for LOW-SPEED Constant Circulation operation ONLY. This speed tap is energized by the "G" thermostat terminal and delivers approximately 200 CFM which is insufficient to support cooling or heating operation and will result in the indoor coil freezing and tripping of the heating limits.

EXTERNAL STATIC PRESSURE (ESP)																					
		IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa
	SPD TAP	0.10	0.02	0.20	0.05	0.30	0.07	0.40	0.10	0.50	0.12	0.60	0.15	0.70	0.17	0.80	0.20	0.90	0.22	1.00	0.25
CFM-NO-COIL OPEN TOP, SOLID DOOR	LO	935	441	763	360	680	321	560	264	498	235	437	206	347	164						
	MED-LO	968	457	881	416	810	382	756	357	680	321	566	267	531	251	446	210	382	180		
	MEDIUM	1074	507	1022	482	953	450	904	427	842	397	789	372	663	313	623	294	565	267	475	224
	MED-HI	1192	563	1131	534	1079	509	1042	492	971	458	914	431	862	407	748	353	697	329	519	245
	HIGH	1429	674	1372	648	1327	626	1285	606	1227	579	1176	555	1128	532	1072	506	941	444	602	284
CFM-NO-COIL SOLID TOP LOUVERED DOOR	LO	813	384	742	350	655	309	596	281	490	231	436	206	349	165						
	MED-LO	913	431	864	408	806	380	742	350	673	318	593	280	521	246	438	207	379	179		
	MEDIUM	1050	496	990	467	939	443	885	418	843	398	813	384	726	343	642	303	568	268	471	222
	MED-HI	1150	543	1096	517	1082	511	1002	473	958	452	913	431	857	404	806	380	737	348	533	252
	HIGH	1360	642	1314	620	1267	598	1227	579	1182	558	1134	535	1096	517	1002	473	885	418	564	266
CFM-WITH COIL 98-8Z7W-OP WITH CABINET 97-FLSB-27 OR 97-FLSF-27	LO	745	352	689	325	595	281	513	242	453	214	393	185	323	152						
	MED-LO	859	405	800	378	745	352	641	303	581	274	527	249	458	216	401	189	384	181		
	MEDIUM	978	462	926	437	872	412	832	393	721	340	655	309	600	283	563	266	514	243	420	198
	MED-HI	1066	503	1023	483	965	455	923	436	875	413	793	374	709	335	655	309	596	281	439	207
	HIGH	1276	602	1237	584	1197	565	1150	543	1117	527	1061	501	977	461	798	377	668	315	500	236
CFM WITH COIL 98-8Z7W-OP WITH CABINET 97-FSOB-27	LO	721	340	655	309	556	262	490	231	462	218	382	180	321	151						
	MED-LO	832	393	775	366	717	338	623	294	556	262	528	249	470	222	404	191	352	166		
	MEDIUM	939	443	898	424	845	399	793	374	701	331	633	299	623	294	559	264	502	237	413	195
	MED-HI	1037	489	994	469	956	451	901	425	832	393	752	355	697	329	655	309	554	261	453	214
	HIGH	1231	581	1178	556	1146	541	1101	520	1058	499	1003	473	832	393	741	350	615	290	466	220
CFM WITH COIL 98-8G7W-OP WITH CABINET 97-FLSB-27 OR 97-FLSF-27	LO	764	361	689	325	586	277	507	239	460	217	399	188	332	157						
	MED-LO	855	404	807	381	733	346	632	298	571	269	521	246	478	226	416	196	367	173		
	MEDIUM	990	467	923	436	878	414	825	389	741	350	672	317	628	296	574	271	520	245	440	208
	MED-HI	1085	512	1031	487	988	466	929	438	878	414	789	372	725	342	663	313	603	285	474	224
	HIGH	1291	609	1247	589	1202	567	1160	547	1117	527	1073	506	1020	481	821	387	665	314	524	247
CFM WITH COIL 98-8G7W-OP WITH CABINET 97-FSOB-27	LO	721	340	655	309	566	267	507	239	451	213	374	177	315	149						
	MED-LO	828	391	756	357	705	333	623	294	561	265	529	250	462	218	404	191	359	169		
	MEDIUM	948	447	898	424	845	399	778	367	705	333	641	303	595	281	553	261	502	237	406	192
	MED-HI	1048	495	1003	473	965	455	907	428	851	402	771	364	701	331	637	301	562	265	431	203
	HIGH	1252	591	1227	579	1166	550	1139	538	1090	514	1026	484	871	411	709	335	618	292	466	220
CFM WITH COIL 98-8G4W-OP WITH CABINET 97-FLSB-27 OR 97-FLSF-21	LO	731	345	634	299	577	272	473	223	368	174	394	186	290	137						
	MED-LO	827	390	754	356	703	332	629	297	530	250	570	269	457	216	383	181	312	147		
	MEDIUM	937	442	870	411	812	383	769	363	698	329	620	293	590	278	540	255	474	224	403	190
	MED-HI	1030	486	967	456	919	434	877	414	816	385	784	370	673	318	615	290	591	279	472	223
	HIGH	1230	580	1194	564	1136	536	1086	513	1046	494	998	471	947	447	784	370	634	299	500	236
CFM WITH COIL 96-8G4W-OP WITH CABINET 97-FSOB-21	LO	731	345	678	320	587	277	503	237	458	216	398	188	333	157						
	MED-LO	848	400	792	374	739	349	630	297	562	265	527	249	483	228	419	198	387	183		
	MEDIUM	956	451	913	431	868	410	820	387	719	339	657	310	597	282	572	270	524	247	447	211
	MED-HI	1051	496	1012	478	962	454	923	436	875	413	766	362	711	336	661	312	603	285	458	216
	HIGH	1251	590	1216	574	1169	552	1132	534	1093	516	1053	497	986	465	770	363	643	303	510	241

Table 2: Blower Performance -10 X 9 Blower - 1/3 HP 5 Speed Constant Torque Motor (With Air Filters)

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

EXTERNAL STATIC PRESSURE (ESP)																					
		IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa
	SPD TAP	0.10	0.02	0.20	0.05	0.30	0.07	0.40	0.10	0.50	0.12	0.60	0.15	0.70	0.17	0.80	0.20	0.90	0.22	1.00	0.25
CFM-NO-COIL	LO	984	464	922	435	851	402	799	377	740	349	604	285	578	273	497	235	423	200	365	172
	MED-LO	1149	542	1096	517	1051	496	955	451	933	440	870	411	795	375	891	421	658	311	604	285
	MEDIUM	1397	659	1344	634	1293	610	1250	590	1200	566	1148	542	1105	522	1048	495	982	463	699	330
	MED-HI	1630	769	1584	748	1533	723	1493	705	1443	681	1392	657	1352	638	1258	594	1136	536	702	331
	HIGH	1736	819	1712	808	1661	784	1612	761	1570	741	1515	715	1432	676	1321	623	1184	559	704	332
CFM-WITH COIL 98-8Z7W-OP WITH CABINET 97-FLSB-27 OR 97-FLSF-27	LO	875	413	818	386	764	361	718	339	611	288	558	263	507	239	455	215	419	198	372	176
	MED-LO	1027	485	996	470	952	449	897	423	858	405	752	355	688	325	634	299	615	290	497	235
	MEDIUM	1241	586	1212	572	1176	555	1129	533	1090	514	1051	496	997	471	867	409	713	336	545	257
	MED-HI	1440	680	1411	666	1371	647	1328	627	1285	606	1232	581	1155	545	1062	501	734	346	593	280
	HIGH	1546	730	1506	711	1474	696	1415	668	1349	637	1270	599	1186	560	1079	509	702	331	603	285
CFM-WITH COIL 98-8G7W-OP WITH CABINET 97-FSOB-27	LO	845	399	811	383	753	355	682	322	611	288	563	266	522	246	467	220	407	192	364	172
	MED-LO	1032	487	990	467	949	448	897	423	838	395	800	378	730	345	677	320	607	286	477	225
	MEDIUM	1238	584	1191	562	1155	545	1107	522	1068	504	1033	488	991	468	809	382	660	311	492	232
	MED-HI	1419	670	1380	651	1340	632	1294	611	1217	574	1145	540	1068	504	839	396	665	314	486	229
	HIGH	1506	711	1445	682	1389	656	1313	620	1241	586	1166	550	1079	509	824	389	646	305	483	228
CFM WITH COIL 98-8W7W-OP WITH CABINET 97-FLSB-27 OR 97-FLSF-27	LO	884	417	817	386	771	364	722	341	616	291	568	268	536	253	472	223	417	197	380	179
	MED-LO	1040	491	984	464	955	451	893	421	864	408	756	357	698	329	656	310	630	297	494	233
	MEDIUM	1251	590	1216	574	1170	552	1134	535	1079	509	1045	493	1009	476	860	406	685	323	570	269
	MED-HI	1450	684	1410	665	1380	651	1335	630	1303	615	1221	576	1139	538	1056	498	737	348	580	274
	HIGH	1549	731	1506	711	1457	688	1410	665	1335	630	1246	588	1165	550	1056	498	741	350	648	306
CFM WITH COIL 98-8W7W-OP WITH CABINET 97-FSOB-27	LO	878	414	811	383	771	364	714	337	625	295	558	263	536	253	478	226	417	197	377	178
	MED-LO	1035	488	981	463	943	445	891	421	852	402	797	376	702	331	652	308	609	287	474	224
	MEDIUM	1223	577	1090	514	1151	543	1111	524	1072	506	1018	480	940	444	842	397	647	305	523	247
	MED-HI	1422	671	1378	650	1325	625	1262	596	1159	547	1062	501	983	464	868	410	665	314	523	247
	HIGH	1478	698	1416	668	1338	631	1277	603	1174	554	1095	517	992	468	845	399	657	310	513	242
CFM WITH COIL 98-8W12W-OP WITH CABINET 97-FLSB-39 OR 97-FLSF-39	LO	897	423	842	397	796	376	733	346	619	292	566	267	522	246	470	222	408	193	361	170
	MED-LO	1054	497	1013	478	961	454	925	437	874	412	798	377	680	321	623	294	572	270	533	252
	MEDIUM	1281	605	1237	584	1202	567	1154	545	1111	524	1071	505	1012	478	902	426	723	341	613	289
	MED-HI	1478	698	1453	686	1414	667	1374	648	1333	629	1271	600	1191	562	1094	516	752	355	596	281
	HIGH	1581	746	1522	718	1477	697	1421	671	1350	637	1270	599	1180	557	1070	505	777	367	657	310
CFM WITH COIL 98-8W12W-OP WITH CABINET 97-FSOB-39	LO	885	418	825	389	763	360	704	332	612	289	553	261	522	246	459	217	392	185	357	168
	MED-LO	1043	492	986	465	941	444	891	421	858	405	735	347	687	324	630	297	573	270	504	238
	MEDIUM	1240	585	1178	556	1139	538	1100	519	1076	508	1013	478	945	446	800	378	679	320	520	245
	MED-HI	1456	687	1404	663	1359	641	1322	624	1256	593	1190	562	1087	513	845	399	712	336	535	252
	HIGH	1550	732	1485	701	1426	673	1355	639	1294	611	1221	576	1104	521	874	412	735	347	534	252

Table 3: Blower Performance -10 X 9 Blower - 1/2 HP 5 Speed Constant Torque Motor (With Air Filters)

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

	SPD TAP	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa
		0.10	0.02	0.20	0.05	0.30	0.07	0.40	0.10	0.50	0.12	0.60	0.15	0.70	0.17	0.80	0.20	0.90	0.22	1.00	0.25
CFM WITH COIL 98-8G12W-OP WITH CABINET 97-FLSB-39 OR 97-FLSF-39	LO	884	417	824	389	774	365	692	327	595	281	560	264	507	239	460	217	391	185	360	170
	MED-LO	1035	488	992	468	954	450	893	421	844	398	783	370	692	327	640	302	545	257	474	224
	MEDIUM	1250	590	1211	572	1170	552	1127	532	1083	511	1037	489	982	463	834	394	675	319	520	245
	MED-HI	1449	684	1415	668	1376	649	1345	635	1289	608	1218	575	1127	532	884	417	708	334	535	252
	HIGH	1547	730	1511	713	1462	690	1402	662	1326	626	1245	588	1159	547	976	461	724	342	531	251
CFM WITH COIL 98-8G12W-OP WITH CABINET 97-FSOB-39	LO	862	407	817	386	752	355	672	317	619	292	560	264	525	248	458	216	395	186	381	180
	MED-LO	1013	478	967	456	925	437	887	419	824	389	744	351	692	327	636	300	563	266	435	205
	MEDIUM	1209	571	1173	554	1125	531	1098	518	1050	496	1000	472	865	408	748	353	578	273	484	228
	MED-HI	1415	668	1376	649	1321	623	1255	592	1175	555	1099	519	924	436	767	362	609	287	479	226
	HIGH	1478	698	1428	674	1362	643	1279	604	1195	564	1110	524	915	432	755	356	600	283	484	228
CFM-WITH COIL 98-8Z12W-OP WITH CABINET 97-FLSB-39 OR 97-FLSF-39	LO	899	424	837	395	784	370	724	342	609	287	570	269	519	245	455	215	388	183	360	170
	MED-LO	1040	491	1004	474	964	455	909	429	851	402	751	354	700	330	640	302	616	291	493	233
	MEDIUM	1258	594	1235	583	1185	559	1143	539	1099	519	1060	500	1000	472	848	400	704	332	533	252
	MED-HI	1484	700	1441	680	1393	657	1353	639	1316	621	1245	588	1137	537	1012	478	679	320	551	260
	HIGH	1570	741	1531	723	1488	702	1415	668	1344	634	1279	604	1170	552	1070	505	736	347	562	265
CFM WITH COIL 98-8Z12W-OP WITH CABINET 97-FSOB-39	LO	851	402	813	384	759	358	708	334	618	292	555	262	523	247	458	216	394	186	362	171
	MED-LO	1021	482	982	463	934	441	884	417	837	395	740	349	684	323	636	300	573	270	452	213
	MEDIUM	1210	571	1170	552	1138	537	1092	515	1052	496	999	471	922	435	751	354	613	289	469	221
	MED-HI	1419	670	1385	654	1344	634	1279	604	1210	571	1083	511	1010	477	774	365	621	293	480	227
	HIGH	1503	709	1458	688	1393	657	1312	619	1230	580	1103	521	1019	481	785	370	629	297	486	229
CFM WITH COIL 98-8W4W-OP WITH CABINET 97-FLSB-21 OR 97-FLSF-21	LO	856	404	795	375	740	349	680	321	572	270	536	253	502	237	450	212	398	188	358	169
	MED-LO	1002	473	965	455	920	434	866	409	819	387	712	336	650	307	619	292	630	297	502	237
	MEDIUM	1204	568	1163	549	1128	532	1093	516	1048	495	1007	475	952	449	785	370	667	315	581	274
	MED-HI	1383	653	1364	644	1332	629	1291	609	1248	589	1184	559	1099	519	837	395	696	328	528	249
	HIGH	1468	693	1458	688	1424	672	1368	646	1300	614	1219	575	1126	531	1019	481	700	330	536	253
CFM WITH COIL 98-8W4W-OP WITH CABINET 97-FSOB-21	LO	816	385	775	366	708	334	672	317	557	263	557	263	507	239	444	210	398	188	357	168
	MED-LO	998	471	926	437	876	413	836	395	791	373	692	327	633	299	630	297	596	281	423	200
	MEDIUM	1163	549	1114	526	1087	513	1038	490	1002	473	959	453	895	422	680	321	653	308	477	225
	MED-HI	1355	639	1323	624	1281	605	1224	578	1147	541	1081	510	977	461	736	347	653	308	483	228
	HIGH	1433	676	1381	652	1314	620	1243	587	1166	550	1082	511	989	467	740	349	656	310	493	233

**Table 4: Blower Performance -10 X 9 Blower - 1/2 HP 5 Speed Constant Torque Motor (Continued)
(With Air Filters)**

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

EXTERNAL STATIC PRESSURE (ESP)																					
	SPD TAP	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa	IN W.C.	kPa
		0.10	0.02	0.20	0.05	0.30	0.07	0.40	0.10	0.50	0.12	0.60	0.15	0.70	0.17	0.80	0.20	0.90	0.22	1.00	0.25
CFM NO COIL	LO	1225	578	1174	554	1121	529	1077	508	1036	489	976	461	924	436	877	414	740	349	629	297
	MED-LO	1429	674	1386	654	1345	635	1308	617	1245	588	1220	576	1158	547	1115	526	1070	505	608	287
	MEDIUM	1569	740	1529	722	1476	697	1438	679	1403	662	1368	646	1313	620	1260	595	1109	523	707	334
	MED-HI	1785	842	1740	821	1711	808	1664	785	1619	764	1592	751	1488	702	1359	641	1137	537	967	456
	HIGH	2129	1005	2057	971	2017	952	1959	925	1838	867	1733	818	1603	757	1432	676	1225	578	1183	558
CFM WITH COIL 98-8W 7W-OP WITH CABINET 97-FS B-27 OR 97-FLS F-27	LO	1104	521	1059	500	1012	478	975	460	930	439	876	413	780	368	719	339	662	312	581	274
	MED-LO	1292	610	1244	587	1214	573	1184	559	1136	536	1098	518	1053	497	981	463	773	365	584	276
	MEDIUM	1400	661	1365	644	1334	630	1301	614	1263	596	1219	575	1168	551	1070	505	780	368	592	279
	MED-HI	1596	753	1569	740	1521	718	1468	693	1392	657	1301	614	1204	568	1087	513	811	383	604	285
	HIGH	1743	823	1659	783	1615	762	1505	710	1425	673	1341	633	1236	583	1106	522	809	382	582	275
CFM WITH COIL 98-8W 7W -OP WITH CABINET 97-FSOB-27	LO	1067	504	1017	480	978	462	942	445	889	420	805	380	758	358	703	332	661	312	518	244
	MED-LO	1268	598	1229	580	1199	566	1158	547	1109	523	1075	507	1012	478	826	390	675	319	536	253
	MEDIUM	1374	648	1343	634	1311	619	1278	603	1224	578	1163	549	1053	497	812	383	708	334	524	247
	MED-HI	1549	731	1481	699	1409	665	1338	631	1258	594	1189	561	1087	513	848	400	669	316	481	227
	HIGH	1611	760	1579	745	1460	689	1383	653	1297	612	1199	566	1115	526	889	420	708	334	578	273
CFM WITH COIL 98-8W 12W-OP WITH CABINET 97-FLSB-39 OR 97-FLS F-39	LO	1104	521	1085	512	1025	484	979	462	936	442	882	416	786	371	719	339	682	322	580	274
	MED-LO	1309	618	1266	597	1232	581	1197	565	1156	546	1119	528	1074	507	1010	477	790	373	606	286
	MEDIUM	1429	674	1390	656	1350	637	1323	624	1281	605	1234	582	1203	568	1124	530	801	378	629	297
	MED-HI	1607	758	1573	742	1539	726	1497	707	1430	675	1332	629	1256	593	1152	544	815	385	637	301
	HIGH	1751	826	1663	785	1607	758	1533	723	1455	687	1372	648	1270	599	1160	547	811	383	619	292
CFM WITH COIL 98-8W 12W -OP WITH CABINET 97-FSOB-39	LO	1104	521	1059	500	1023	483	974	460	935	441	902	426	841	397	723	341	676	319	563	266
	MED-LO	1285	606	1246	588	1211	572	1175	555	1126	531	1104	521	1065	503	874	412	711	336	561	265
	MEDIUM	1404	663	1350	637	1327	626	1294	611	1251	590	1211	572	1145	540	1005	474	718	339	535	252
	MED-HI	1601	756	1538	726	1468	693	1400	661	1327	626	1241	586	1148	542	888	419	719	339	541	255
	HIGH	1725	814	1613	761	1530	722	1442	681	1360	642	1283	606	1190	562	1088	513	739	349	576	272
CFM WITH COIL 98-8G 12W-OP WITH CABINET 97-FLSB-39 OR 97-FLSF-39	LO	1111	524	1072	506	1019	481	976	461	931	439	877	414	781	369	712	336	680	321	548	259
	MED-LO	1289	608	1255	592	1226	579	1185	559	1143	539	1105	522	1066	503	938	443	732	345	556	262
	MEDIUM	1415	668	1367	645	1345	635	1308	617	1270	599	1226	579	1170	552	1072	506	751	354	573	270
	MED-HI	1594	752	1571	741	1519	717	1449	684	1380	651	1294	611	1205	569	1043	492	736	347	551	260
	HIGH	1716	810	1643	775	1563	738	1511	713	1411	666	1317	622	1228	580	1088	513	748	353	596	281
CFM WITH COIL 98-8G 12W-O P WITH CABINET 97-FSOB-39	LO	1084	512	1038	490	996	470	952	449	899	424	813	384	748	353	705	333	823	388	494	233
	MED-LO	1262	596	1227	579	1187	560	1150	543	1112	525	1067	504	1014	479	775	366	621	293	488	230
	MEDIUM	1373	648	1341	633	1314	620	1265	597	1207	570	1134	535	1032	487	807	381	638	301	489	231
	MED-HI	1513	714	1455	687	1373	648	1309	618	1247	589	1150	543	1067	504	793	374	672	317	509	240
	HIGH	1557	735	1484	700	1417	669	1337	631	1271	600	1172	553	1055	498	835	394	885	418	533	252
CFM WITH COIL 98-8Z 12W-OP WITH CABINET 97-FLSB-39 OR 97-FLS F-39	LO	1106	522	1072	506	1026	484	969	457	938	443	878	414	774	365	721	340	676	319	532	251
	MED-LO	1299	613	1266	597	1222	577	1186	560	1139	538	1100	519	1057	499	938	443	752	355	539	254
	MEDIUM	1416	668	1377	650	1341	633	1309	618	1271	600	1241	586	1181	557	1067	504	740	349	539	254
	MED-HI	1603	757	1588	749	1540	727	1476	697	1390	656	1336	631	1232	581	1095	517	748	353	545	257
	HIGH	1741	822	1667	787	1607	758	1532	723	1435	677	1350	637	1253	591	1148	542	1165	550	558	263
CFM WITH COIL 98-8Z 12W-OP WITH CABINET 97-FSOB-39	LO	1088	513	1019	481	1007	475	967	456	924	436	870	411	824	389	716	338	621	293	507	239
	MED-LO	1270	599	1240	585	1200	566	1143	539	1110	524	1077	508	990	467	747	353	612	289	496	234
	MEDIUM	1371	647	1340	632	1303	615	1265	597	1210	571	1138	537	1019	481	796	376	627	296	506	239
	MED-HI	1555	734	1487	702	1424	672	1331	628	1270	599	1148	542	1037	489	792	374	675	319	494	233
	HIGH	1613	761	1543	728	1445	682	1385	654	1279	604	1200	566	1083	511	924	436	700	330	507	239

Table 5: Blower Performance -10 X 9 Blower - 3/4 HP 5 Speed Constant Torque Motor (With Air filters)

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

SECTION 7: ACCESSORIES

DOWNFLOW E30 MANUFACTURED / MODULAR HOUSING ELECTRIC FURNACE ACCESSORIES				
COOLING COIL CABINETS				
PART NUMBER	TOP	TYPE DOOR	MAX CFM	MAX SIZE COILS
97-FLSB-21	Solid	Louvered	1200	96-()()4...Note 1
97-FSOB-21	Open	Solid	1600	96-()()4...Note 1
97-FLOB-21	Open	Louvered	1800	96-()()4...Note 1
97-FLSB-27	Solid	Louvered	1600	98-()()7...Note 1
97-FSOB-27	Open	Solid	1600	98-()()7...Note 1
97-FLOB-27	Open	Louvered	1800	98-()()7...Note 1
97-FLSB-39	Solid	Louvered	1800	98-()()13... Note 1
97-FSOB-39	Open	Solid	1800	98-()()13... Note 1
97-FG-18	N/A	Frame & Grille	1200	96-()()4...Note 1 & 2
97-FG-24	N/A	Frame & Grille	1600	98-()()7...Note 1 & 3
90-DCU0-01	1" to 4" Duct Connector, Floor to Duct			
90-DCU0-02	6" to 8" Duct Connector, Floor to Duct			
90-DCU0-03	9" to 12" Duct Connector, Floor to Duct			
90-DCU0-04	E30 Transition Sub Base to Old Style Electric Furnaces			
95-1741-UES	Universal Electro-Static Coil Filter			
R87MH0012	Solid Door for the 97-F***-21 Cabinet			
R87MH0026	Louvered Door for the 97-F***-21 Cabinet			
R87MH0014	Solid Door for the 97-F***-27 Cabinet			
R87MH0027	Louvered Door for the 97-F***-27 Cabinet			
R87MH0016	Solid Door for the 97-F***-39 Cabinet			
R87MH0028	Louvered Door for the 97-F***-39 Cabinet			
UPFLOW E30 MANUFACTURED / MODULAR HOUSING ELECTRIC FURNACE ACCESSORIES				
97-FSCB-28	Up Flow 28" Tall Coil Cabinet			
97-FSCB-36	Up Flow 36" Tall Coil Cabinet			
97-FFSB-20	Up Flow Filter Cabinet and Stand 20"			
97-FFSB-24	Up Flow Filter Cabinet and Stand 24"			
E30 MANUFACTURED / MODULAR HOUSING ELECTRIC FURNACE ACCESSORIES				
R87MH0010	White Furnace Door			
R68BAE003	Feeder from Single Circuit to Dual Breaker Furnace			
Note 1: Maximum height of coil, see coil spec sheet. All 9(6,7,8)-Series coils will fit in the 39 cabinet. Alcove modification will be required with most coil cabinets				
Note 2: 97-FG-18 used in conjunction with the E30 Electric Furnace. Will fit in the existing alcove opening when replacing a Coleman electric furnace with 96-Series Coils..				
Note 3: 97-FG-24 used in conjunction with the E30 Electric Furnace. Will fit in the existing alcove opening when replacing a Nordyne electric furnace. (98-8W7 Max Height)				

Table 6: Accessories

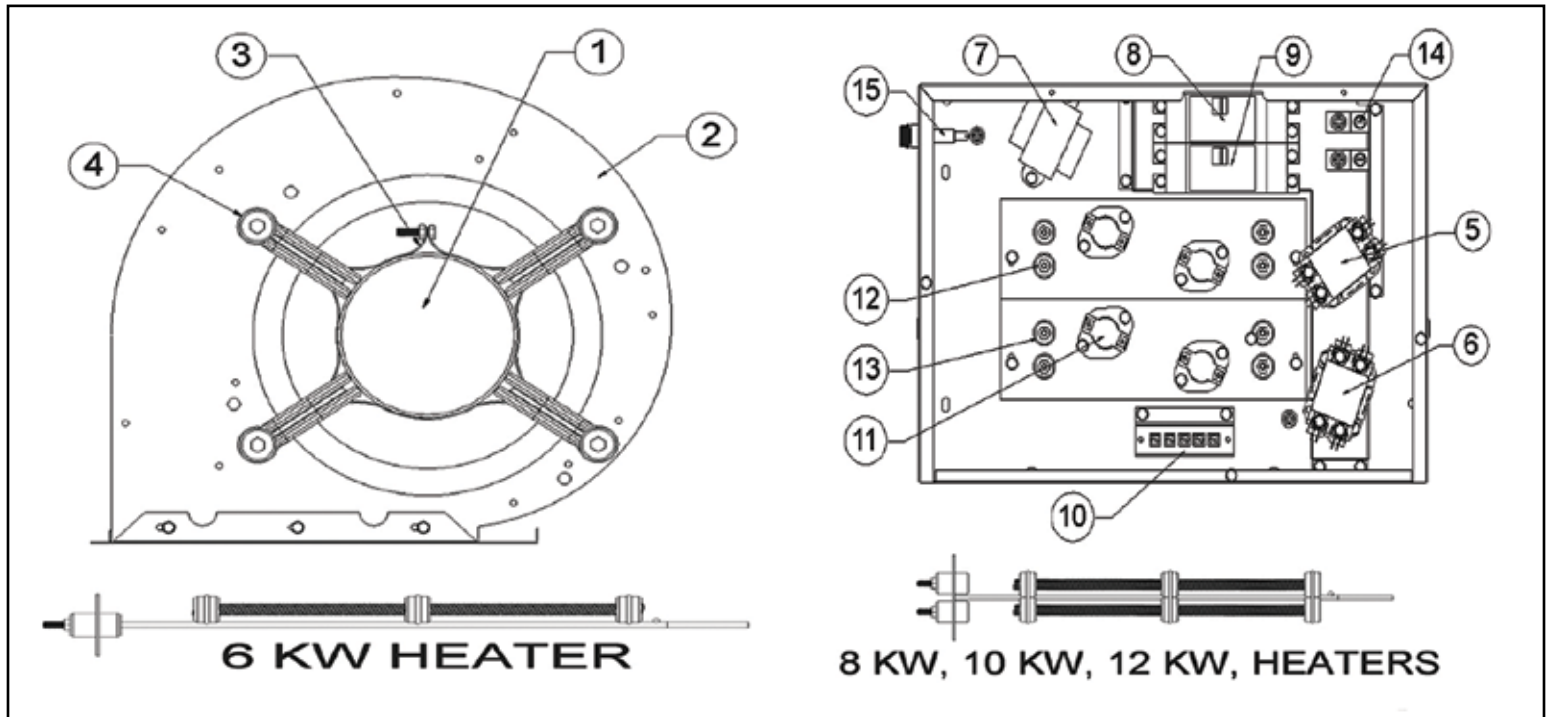


Figure 12: Replacement Parts Item Identification for Electric Heat Models with a 1/3 HP Constant Torque Blower Motor

Item	Description	E30B3D006AAD	E30B3D008AAD	E30B3D010AAD	E30B3D012ABD	E30B3D015ABD	E30B3D020ABD
1	1/3 HP CT BLOWER MOTOR	R65BV0025R	R65BV0025R	R65BV0025R	R65BV0025R	R65BV0025R	R65BV0025R
2	BLOWER HOUSING & WHEEL	R69AD0018	R69AD0018	R69AD0018	R69AD0018	R69AD0018	R69AD0018
3	MOTOR MOUNT BAND	R66AB0065	R66AB0065	R66AB0065	R66AB0065	R66AB0065	R66AB0065
4	MOTOR MT ARM & GROMMET	R66AB0066	R66AB0066	R66AB0066	R66AB0066	R66AB0066	R66AB0066
5	HEATER CONTACTOR 1	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P
6	HEATER CONTACTOR 2				R68AB0019P	R68AB0019P	R68AB0019P
7	TRANSFORMER	R68AA0003	R68AA0003	R68AA0003	R68AA0003	R68AA0003	R68AA0003
8	CIRCUIT BREAKER 1	R68BAD014	R68BAD017	R68BAD018	R68BAD015	R68BAD018	R68BAD018
9	CIRCUIT BREAKER 2				R68BAD013	R68BAD013	R68BAD017
10	LOW VOLTAGE TERMINAL BLOCK	R68DC0013	R68DC0013	R68DC0013	R68DC0013	R68DC0013	R68DC0013
11	LIMIT 155° F	R68CA0008	R68CA0008	R68CA0008	R68CA0008	R68CA0008	R68CA0008
12	ELECTRIC HEATER ELEMENT 1	R67AB0022	R67AB0016	R67AB0017	R67AB0018	R67AB0017	R67AB0017
13	ELECTRIC HEATER ELEMENT 2					R67AB0015	R67AB0017
14	GROUND LUG	R66GF0022	R66GF0022	R66GF0022	R66GF0022	R66GF0022	R66GF0022
15	3 AMP FUSE AND FUSE HOLDER	R86MHA001	R86MHA001	R86MHA001	R86MHA001	R86MHA001	R86MHA001

Table 7: Replacement Parts for Electric Heat Models with a 1/3 HP Constant Torque Blower Motor

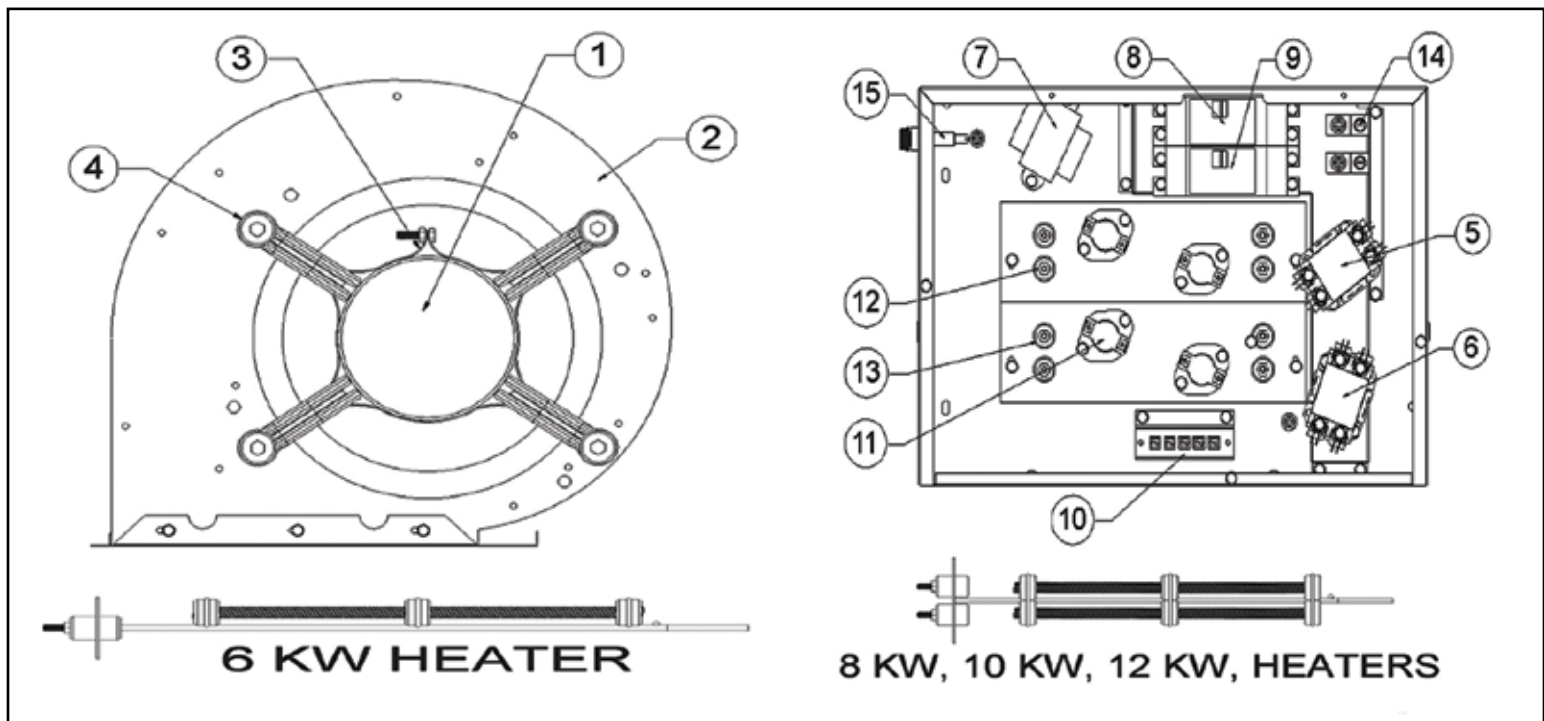


Figure 13: Replacement Parts Item Identification for Electric Heat Models with a 1/2 HP Constant Torque Blower Motor

Item	Description	E30B4D06AAD	E30B4D08AAD	E30B4D010AAD	E30B4D012ABD	E30B4D015ABD	E30B4D020ABD
1	1/2 HP C.T. BLOWER MOTOR	R65BV0026R	R65BV0026R	R65BV0026R	R65BV0026R	R65BV0026R	R65BV0026R
2	BLOWER HOUSING AND WHEEL	R69AD0018	R69AD0018	R69AD0018	R69AD0018	R69AD0018	R69AD0018
3	MOTOR MOUNT BAND	R66AB0065	R66AB0065	R66AB0065	R66AB0065	R66AB0065	R66AB0065
4	MOTOR MOUNT ARM & GROMMET	R66AB0066	R66AB0066	R66AB0066	R66AB0066	R66AB0066	R66AB0066
5	HEATER CONTACTOR STAGE 1	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P
6	HEATER CONTACTOR STAGE 2				R68AB0019P	R68AB0019P	R68AB0019P
7	TRANSFORMER	R68AA0003	R68AA0003	R68AA0003	R68AA0003	R68AA0003	R68AA0003
8	CIRCUIT BREAKER STAGE 1	R68BAD014	R68BAD017	R68BAD018	R68BAD015	R68BAD018	R68BAD018
9	CIRCUIT BREAKER STAGE 2				R68BAD013	R68BAD013	R68BAD017
10	LOW VOLTAGE TERMINAL BLOCK	R68DC0013	R68DC0013	R68DC0013	R68DC0013	R68DC0013	R68DC0013
11	LIMIT SWITCH 155°F	R68CA0008	R68CA0008	R68CA0008	R68CA0008	R68CA0008	R68CA0008
12	ELECTRIC HEATER ELEMENT STAGE 1	R67AB0022	R67AB0016	R67AB0017	R69AB0018	R67AB0017	R67AB0017
13	ELECTRIC HEATER ELEMENT STAGE 2					R67AB0015	R67AB0017
14	GROUND LUG	R66GF0022	R66GF0022	R66GF0022	R66GF0022	R66GF0022	R66GF0022
15	3 AMP FUSE AND FUSE HOLDER	R86MHA001	R86MHA001	R86MHA001	R86MHA001	R86MHA001	R86MHA001

Table 8: Replacement Parts for Electric Heat Models with a 1/2 HP Constant Torque Blower Motor

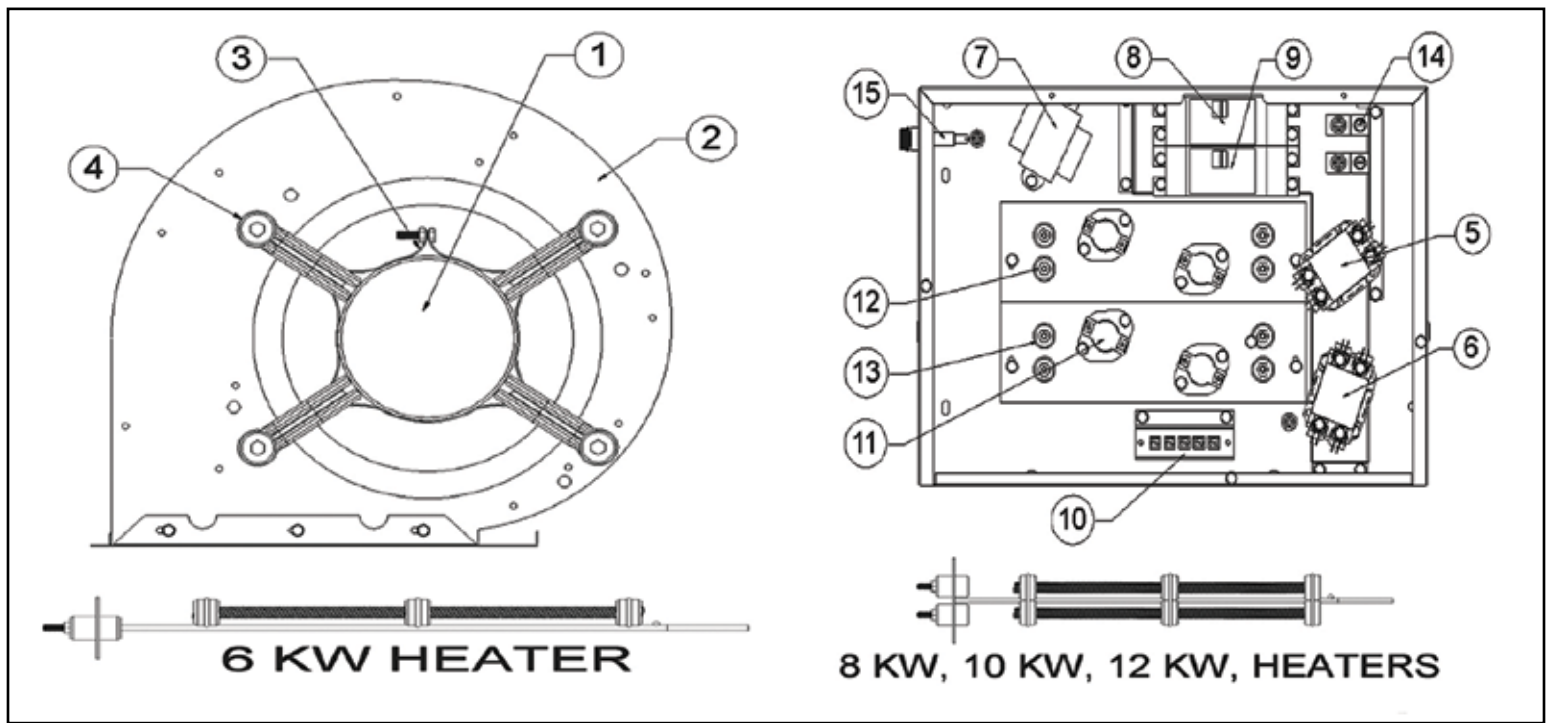


Figure 14: Replacement Parts Item Identification for Electric Heat Models with a 3/4 HP Constant Torque Blower Motor

Item	Description	E30B5D06AAD	E30B5D08AAD	E30B5D010AAD	E30B5D012ABD	E30B5D015ABD	E30B5D020ABD
1	3/4 HP C.T. BLOWER MOTOR	R65BV0027R	R65BV0027R	R65BV0027R	R65BV0027R	R65BV0027R	R65BV0027R
2	BLOWER HOUSING AND WHEEL	R69AD0018	R69AD0018	R69AD0018	R69AD0018	R69AD0018	R69AD0018
3	MOTOR MOUNT BAND	R6AB0065	R6AB0065	R6AB0065	R6AB0065	R6AB0065	R6AB0065
4	MOTOR MOUNT ARM & GROMMET	R66AB0066	R66AB0066	R66AB0066	R66AB0066	R66AB0066	R66AB0066
5	HEATER CONTACTOR STAGE 1	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P
6	HEATER CONTACTOR STAGE 2				R68AB0019P	R68AB0019P	R68AB0019P
7	TRANSFORMER	R68AA0003	R68AA0003	R68AA0003	R68AA0003	R68AA0003	R68AA0003
8	CIRCUIT BREAKER STAGE 1	R68BAD014	R68BAD017	R68BAD018	R68BAD015	R68BAD018	R68BAD018
9	CIRCUIT BREAKER STAGE 2				R68BAD013	R68BAD013	R68BAD017
10	LOW VOLTAGE TERMINAL BLOCK	R68DC0013	R68DC0013	R68DC0013	R68DC0013	R68DC0013	R68DC0013
11	LIMIT SWITCH 155°F	R68CA0008	R68CA0008	R68CA0008	R68CA0008	R68CA0008	R68CA0008
12	ELECTRIC HEATER ELEMENT STAGE 1	R67AB0022	R67AB0016	R67AB0017	R69AB0018	R67AB0017	R67AB0017
13	ELECTRIC HEATER ELEMENT STAGE 2					R67AB0015	R67AB0017
14	GROUND LUG	R66GF0022	R66GF0022	R66GF0022	R66GF0022	R66GF0022	R66GF0022
15	3 AMP FUSE AND FUSE HOLDER	R86MHA001	R86MHA001	R86MHA001	R86MHA001	R86MHA001	R86MHA001

Table 9: Replacement Parts for Electric Heat Models with a 3/4 HP Constant Torque Blower Motor