USERS INFORMATION MANUAL

DOWNFLOW
SINGLE AND TWO STAGE
ELECTRIC FURNACE

For Installation In:

1. Manufactured (Mobile) Home **2. Recreational Vehicle**
3. Modular Homes & Buildings **4. Residential Homes**

MODELS: WE30 SERIES

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CONTACT INFORMATION

Contact us by mail: Manufactured and Distributed by Hamilton Home Products.
8260 Howe Industrial Parkway, Suite F (800) 879-0123
Canal Winchester, OH 43110

SECTION I: GENERAL

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

1. Furnace is rated at 240 volts AC at 60 Hertz
2. Furnace is the same cabinet size for all models
3. All furnaces are equipped with a blower for A/C or Heat Pump operation.
4. This furnace is designed for downflow and horizontal application.
5. This furnace must not be operated without furnace door installed.

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

BLOWER MOTOR SPEED TAP INFORMATION

The constant torque motor is designed with 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 circulates around 200 CFM and is energized by the "G" thermostat terminal. Tap 1 does not circulate enough air to support the heating or cooling operation. If used for cooling the evaporator coil will freeze up. If used for heating the limits will open very quickly.

⚠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 AND THIS MANUAL MUST BE SAVED FOR FUTURE REFERENCE

SECTION II: SAFETY


This is a safety alert symbol. When you see this symbol on labels or in manuals; be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER, WARNING,** or **CAUTION.**

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

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

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

⚠WARNING

Any adjustment, service or maintenance by the home owner 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 information on this appliance.

⚠ 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 appliance 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 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 exactly as shown in Start Up and Shutdown Section in this manual to properly Start Up or Shutdown this appliance.
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 furnace if any part has been under water. A flood damaged furnace is extremely dangerous. Attempts to use the furnace can result in a fire.

A qualified contractor, installer, or service agency must be contacted to inspect the furnace for any water damage and replace all components, control system parts, or electrical parts that have been damaged. If enough damage is present, the furnace 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 and the electric heaters, the blower and the electrical controls.
7. NEVER – Use the area around the furnace as a storage area for items which could block or obstruct the normal air flow to the furnace or the space around the furnace. The flow of air is required for safe and proper operation. Never block or obstruct air openings used for ventilation and cooling of the furnace electrical components.
8. Refer to the furnace rating plate for the furnace model number, for the operating specifications for safe operation.
9. Provide clearances for servicing ensuring service access is allowed for the control box, electric elements and the blower.
10. 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.
11. If the furnace is installed in a residential garage it must be installed so that the electric heaters are located not less than 18 inches above the floor and the furnace must be located or protected to avoid physical damage by vehicles.

⚠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 home owner **must never** try to perform service, repair or maintenance on this appliance.

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

Observe all precautions in the manuals and on the attached labels when working on this appliance

12. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances these instructions exceed certain local codes and ordinances, especially those who have not kept up with changing mobile home, modular home and HUD construction practices. These instructions are to be followed and are the minimum requirement to perform service or repairs on this appliance.

SECTION III: OWNERS INFORMATION AND SEASONAL INFORMATION

How the Furnace Works

This furnace may be installed in the downflow position. Figure 1 shows a typical model in the downflow position. The furnace is equipped with a motor time delay, transformer, circuit breakers, and a blower assembly. The transformer provides 24 VAC to the thermostat. When the thermostat calls for heat the relay(s) energize sending 240 VAC thru the limit switches to the electric heaters causing them to get hot. The indoor fan motor is then energized on the low speed tap and the circulating blower draws cool air from the living space(s), passes it across the heater coils and circulates the warmed air through the duct work to the living space(s). When the thermostat is satisfied the electric heaters are de-energized. The blower is also de-energized and the heating cycle has ended and the furnace is ready for the next call for heat to start the next cycle.

The furnace is equipped with the controls necessary for proper and safe operation. Circuit breakers and fuse location are shown in Figure 1.

Examination of the furnace

The home owner should perform a visual examine the furnace every month for any defects or problems. The items to be inspected are:

1. The physical support of the furnace is sound without sagging cracks, gaps, etc. around the base so as to provide a seal between the support and the base.
2. The furnace casing for any obvious signs of deterioration from rust or corrosion.
3. The return and supply duct connections are physically sound and are sealed to the furnace casing.
4. The furnace must be serviced by qualified personnel annually, preferably at the start of each heating season.

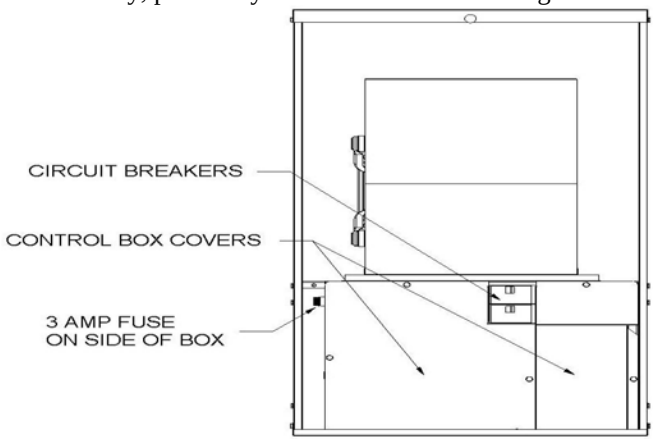

Figure 1: Circuit Breaker Locations

The Service Technician

The furnace's best friend is a qualified service technician. If the unit gives any indication of improper operation, call the service technician. The service technician is allowed to perform the normal routine care of your furnace. He can detect potential problems and make corrections before trouble develops. Preventative maintenance of this type will allow the furnace to operate with minimal concerns to the homeowner and will add 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 user or repairs performed by the user / owner.

Some specific examples of service calls which will be excluded from warranty reimbursement are:

1. Correcting faulty duct work in the home. This can be due to not enough ducts or ducts are too small to provide proper air flow through the furnace.
2. Correcting wiring problems in the electrical circuit to the furnace.
3. Resetting circuit breakers or on/off switches used for servicing.
4. Furnace problems caused by installation and operation of any air conditioning unit, heat pump, or other air quality devise which is not approved for use with this furnace.
5. Adjusting or calibrating the thermostat.
6. Problems caused by construction debris which has fallen into the furnace.
7. Replacement of fuses.
8. Problems caused by dirty air filters.
9. Problems caused by restrictions in the return or supply air flow causing low air flow.

The home owner should establish a firm understanding of these responsibilities with the installer or service company so there no misunderstanding at a later time.

While you are away
The furnace is equipped with safety shutoff devices which will shut off the electric heaters in case of a malfunction. For this reason it is never practical to assume the furnace will operate unattended for a long period of time.

If you are planning to be away from home for a long period of time have someone check on your home everyday, especially when the outside temperatures will be below 35°F to ensure the furnace is operating properly. This may prevent water pipes from freezing.

The Furnace Fails to Operate Properly
If any abnormalities are observed while the furnace is operating normally, 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 service circuit breaker box or check any on/off switches that may be used for service disconnect switches.
3. Check the 3 amp fuse on the inside of the control box to determine if it has blown. A replacement fuse can be purchased at where automotive fuses are sold.
4. Make sure the air filters are clean, return grilles are not obstructed, and supply air registers are open.

If the cause of the malfunction is not obvious do not attempt to service the furnace yourself. Call a qualified service agency/company to repair the furnace.

⚠WARNING

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 you give a service agency the information about the furnace ahead of time. This will enable the service agency to determine the specific components used and possibly indentify the problem, thus arriving with the parts to fix the problem.

SERVICE AGENCY INFORMATION
Fill in Below
COMPANY:_____
ADDRESS:_____
TELEPHONE (DAYTIME):_____
TELEPHONE (EMERGENCY)_____
NOTES: _____
_____
_____
_____
_____

SECTION IV: START UP AND SHUTDOWN INSTRUCTIONS

Read the instructions below before trying to start the furnace.

⚠WARNING

If you do not follow these instructions exactly, a fire may result causing property damage, personal injury, and/or loss of life.

A. BEFORE OPERATING; check around perimeter of the BEFORE OPERATING; check around perimeter of the furnace to make sure there are no flammable materials in the area. If you smell vapors of any kind, DO NOT turn on the power to the furnace until vapors have been ventilated and removed from the area of the furnace.
B. CHECK THE FURNACE; visually check the furnace for loose screws and/or panels that may be missing or have fallen off.
C. 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.

Turn On / Start the Appliance

1. STOP! Read the safety information above before proceeding.
2. Set the thermostat to the lowest setting.
3. Turn off all electrical power to the appliance at the main service disconnect box.
4. Remove the upper and lower furnace door.
5. Turn off the circuit breakers on the appliance control box.
6. Remove the control box door.
7. Visually check the control box for loose wire connections and faulty or loose components.
8. Visually check the blower compartment for obstructions or loose debris.
9. Replace the control box door.
10. Turn the circuit breakers to the on position.
11. Replace the upper and lower furnace door.
12. Turn the circuit breakers in the main service disconnect box to the on position.
13. Set the thermostat to the desired setting.

Shutting Down or Turning Off the Appliance

1. Set the thermostat to the lowest setting.
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.

SECTION V: OWNER 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 door and replacement of the air filters. Air filters must be checked every month and replaced as needed. Figures 2 and 3 indicate the location of the air filters if you have a louvered return air door.

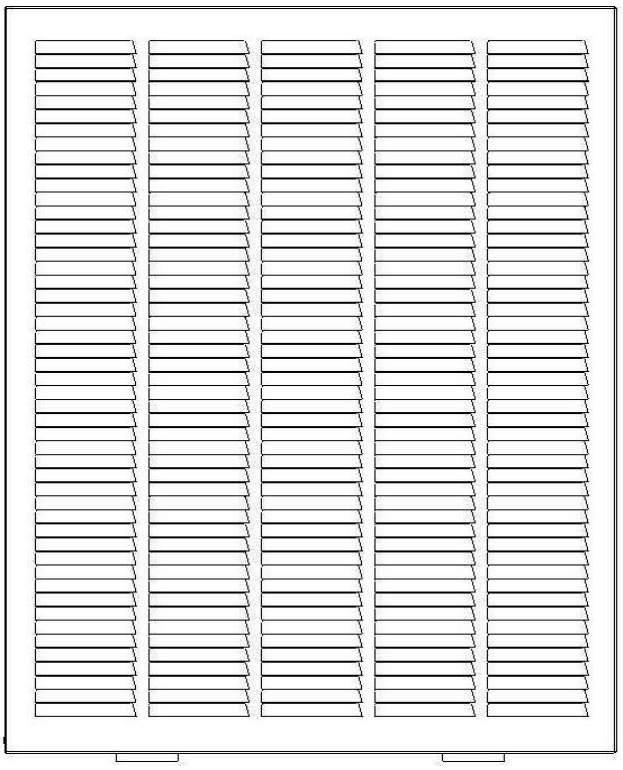

Figure 2: Return Air Louvered Door Air Filter Location

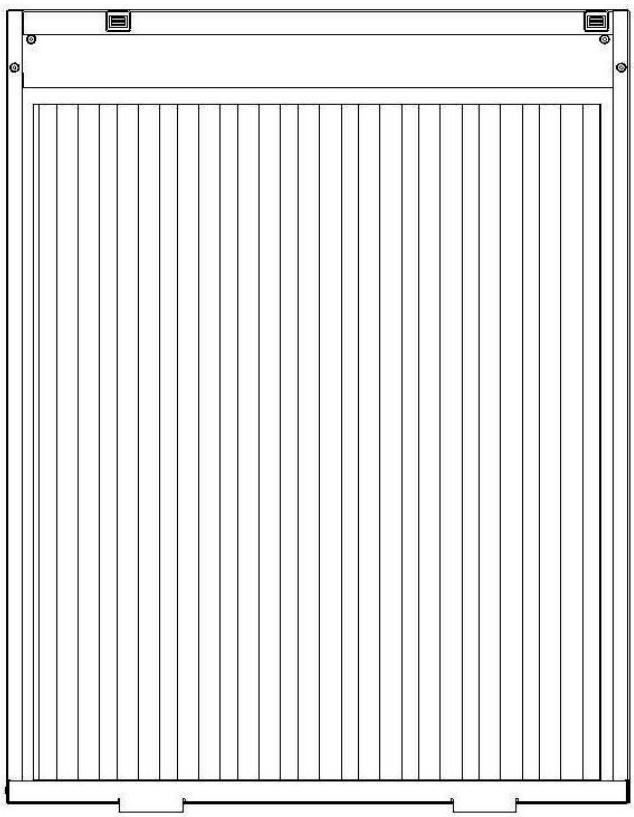

Figure 3: Return Air Louvered Door 20” x 20” x 1” Air Filters

Return Air Grille Air Filters

Follow these easy steps to replace the filters located in the return air grille:

1. Follow the procedure “**To Turn Off the Appliance”** in the Start Up and Shutdown Instructions section of these instructions.
2. Pull on the top of the return air louvered door (upper door) until the door strike is removed from the door latch.
3. Let the top of the door fall towards you then lift up slightly pulling towards you and set the door on the floor.
4. Turn the door upside down and pull the bottom frame out of the door to gain access to the air filters.
5. Remove the air filters. These filters are disposable filters. DO NOT attempt to clean the filters and reuse them.
6. Remove the new pleated air filters from the plastic wrap they come in.
7. Slide the air filters in place in the door so both air filters are installed as shown in Figure 3.
8. Replace the bottom door frame.
9. Lift the door up to the cooling cabinet and align the two tabs on the bottom of the door with the two slots on the center shelf. Refer to Figure 6.
10. Push the upper door forward and tighten with the thumb screw until the door is secured to the cabinet. Refer to Figure 6.
11. Follow the instructions to “**Turn On / Start the Appliance”** in the Start Up and Shutdown section of these instructions.

Coil Cabinet Top Air Filters

Follow these easy steps to replace the filters located in the top of the coil compartment:

1. Follow the procedure “**To Turn Off the Appliance”** in the Start Up and Shutdown Instructions section of these instructions.
2. Remove the thumb screw by turning it counter clockwise.
3. Let the top of the door fall towards you then lift up slightly pulling towards you, then set the door on the floor.
4. Remove the air filter at the top of the coil cabinet. The 20” x 24” x 1” filter is a disposable filter. DO NOT attempt to clean the filter and reuse it. Refer to Figure 4 for filter location.
5. Remove the new 20” x 24” x 1” pleated air filter from the plastic wrap they come in.
6. Slide the air filter into the filter rack at the top of the coil cabinet as shown in Figure 4.
7. Lift the door up to the cooling cabinet and align the two tabs on the bottom of the door with the two slots on the furnace top cover. Refer to Figure 6.
8. Push the upper door forward until aligned with the cabinet top flange. Insert the thumb screw onto the hole and secure by turning it clockwise. Refer to Figure 6.
9. Follow the “**Turn On / Start the Appliance”** in the Start Up and Shutdown Instructions section of these instructions.

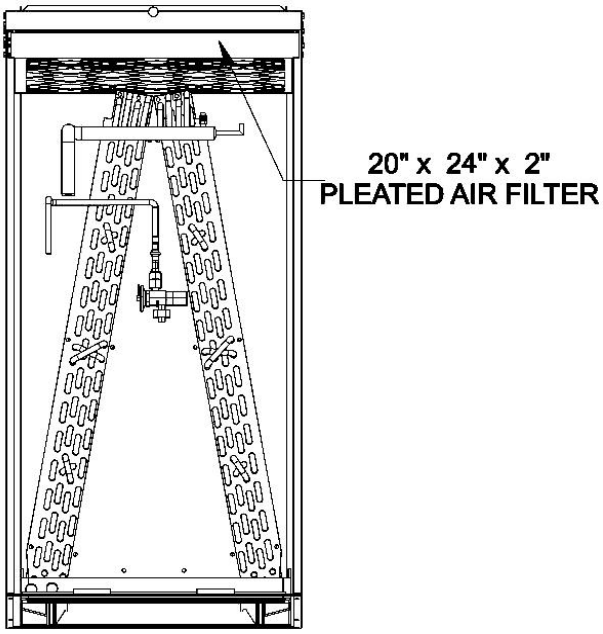

Figure 4: Coil Cabinet Top Return Pleated Air Filter Location.

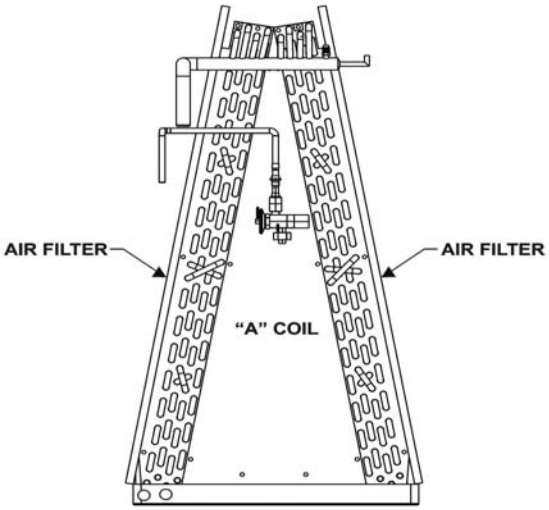

Figure 5: "A" Coil Hanging Air Filter Location.
NOTE: Coil Filters are used with the Frame and Grille assemblies only.

Position filters over the coil as shown in Figure 5. Homeowners must be instructed as to how to clean and reinstall filters washable or replaceable filters for good preventive maintenance. Care must be taken that the edges of the washable or replaceable filter are resting on the protruding edges of the metal plates at each end of the aluminum fins. This allows a ½" gap between the filter and the coil surface to prevent dirt from wicking from the filter to the coil. Make sure the flow arrows on the air filter are pointing towards the coil.

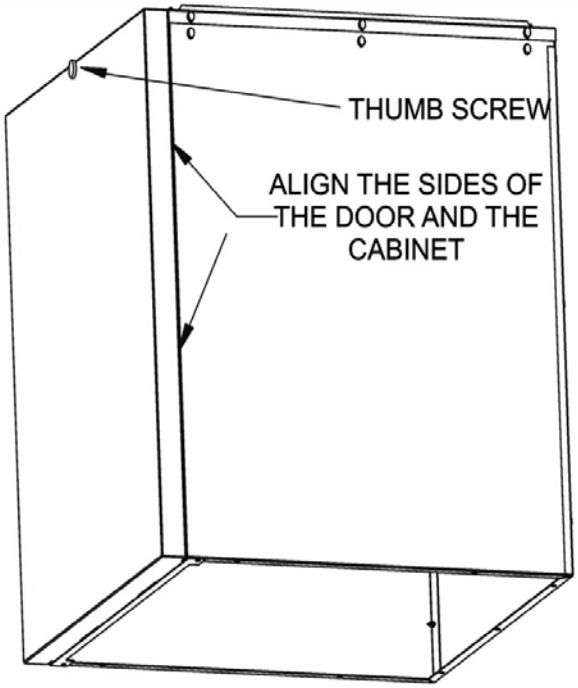

Figure 6: Replacing the Coil Cabinet Door.

SERVICE AND MAINTENANCE MANUAL

SECTION I: SAFETY

THE HOME OWNERS AND / OR APPLIANCE USERS MUST STOP HERE!

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

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

⚠WARNING

The manufacturer or distributer 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 you see this symbol on labels or in manuals; be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER, WARNING,** or **CAUTION.**

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

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

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

⚠WARNING

Improper 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

FIRE OR ELECTRICAL HAZARD

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

SAFETY REQUIREMENTS

1. This electric furnace 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 furnace in order 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 II: 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 dirt.
2. The electric heaters for wear, damage or corrosion.
3. The electrical components for excessive dust, dirt, wear, or deterioration.
4. The supply air duct system for excessive dust, dirt or debris
5. The return air duct system for excessive dust, dirt or debris
6. All electrical wiring for wear, insulation cracks and/or damage.
7. Check the air conditioning evaporator coil for dust, debris or damage.
8. Check the evaporator coil drain pan for proper drainage to prevent water backup into the furnace.
9. The furnace casing and all interior sheet metal panels or dividers.

Furnace Cleaning Procedure

1. Follow the instructions exactly as shown in Start Up and Shutdown Section in this manual to properly shutdown this appliance.
2. Remove the lower access door on the front of the furnace.
3. Remove the upper access door on the front of the evaporator coil compartment.
4. Remove all 6 screws on the control box cover and remove both covers. Refer to Figure 7.
5. Remove the two screws on the right side of the blower mounting plate and slide the blower out of the furnace. Refer to Figure 8.
6. Use a vacuum cleaner and a small brush to remove any dirt and debris from the blower compartment.
7. Check in the area below the blower compartment where the heater elements are located and remove any dust, dirt or debris from around the heater elements. Be careful not to damage the heater elements with the vacuum hose or the brush.

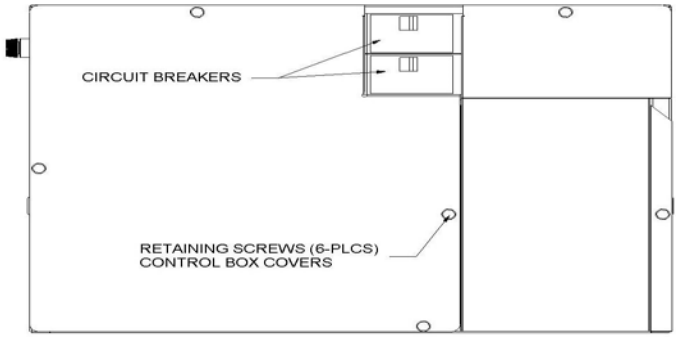

Figure 7: Control Box Cover

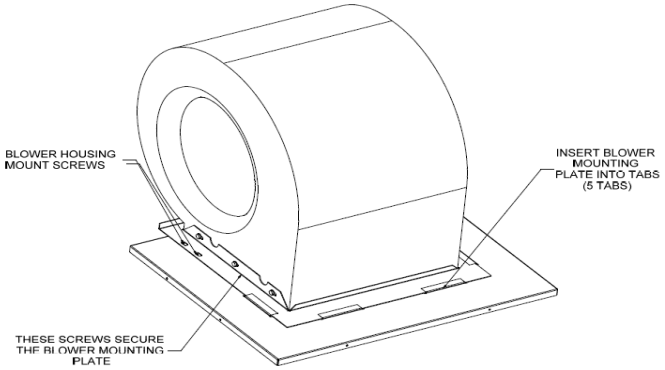

Figure 8: Blower Assembly and Mounting Screw Location

8. Check the blower wheel for dust and debris. Use the brush and the vacuum cleaner to remove any dust or debris from the wheel. Be careful not to move or accidentally remove the blower wheel balance weight located on the wheel blades. If the wheel weight is moved or removed, it will cause the blower wheel to vibrate. If the wheel is vibrating, you must replace it.
9. Check the blower motor for dust and debris. Be sure to clean the openings on the motor housing as these openings are used to cool the motor. If the dust, dirt or debris has not been removed from these openings it will cause the motor to run hotter than normal and will shorten the life of the motor.
10. Check and clean with the brush and vacuum cleaner any dust in the supply and return ducts as far as you can reach. If these ducts look like they have an excessive amount of dust, dirt or debris you should recommend to the home owner or user to call a professional to properly clean the duct system.
11. Check and clean any dust, dirt, or debris from all of the controls and all of the surfaces in the control box. If dust or dirt is left on the components they will operate at a much hotter temperature causing premature component failure.
12. Check the evaporator coil compartment for dirt, dust or debris and remove any that exists.
13. Check the evaporator condensate drain pan for any debris and ensure the pan is properly draining by pouring water into the drain to check it.
14. Remove any excess water that may have spilled from checking the evaporator condensate drain.

15. Reinstall the blower assembly and secure the assembly using the screws that were removed in step 5.
16. Reinstall the control box cover and secure it to the control box with the screws that were removed in step 4.
17. Reinstall the lower access door on the furnace.
18. Reinstall the upper access door on the front of the evaporator coil compartment.
19. Follow the instructions exactly as shown in start Up and Shutdown Section in this manual to properly start Up this appliance.

SECTION III: FURNACE CONTROLS

This section discusses the furnace controls and how they operate. Refer to Figure 9 for component locations.

1. **The Limit Controls** – Each electric heater element has a limit control directly in front of it to sense overheating of the element and opens if the temperature gets above the set point of the limit control.
2. **The Heater Contactors** – The electric heater contactors simply turn the heater elements on and off. The contactors are controlled by the thermostat. On a call for heat 24 VAC is sent to the contactor 24 VAC coil energizing the contactor. When the call for heat has been satisfied the 24 VAC is removed from the contactors 24 VAC coil de-energizing the contactors.
3. **Cooling Time Delay** – The cooling indoor fan on / off delay is factory programmed in the indoor fan motor software and is non-adjustable.
4. **Heating Time Delay** – The heating indoor fan on / off delay is factory programmed in the indoor fan motor software and is non-adjustable.
5. **Circuit breakers** – The circuit breakers are designed as over-current protection for the electric heaters only. The circuit breakers MUST NEVER be used for over-current protection for the transformer, 24 VAC circuit, or the blower motor.
6. **3 Amp Fuse** – This fuse is used for over-current protection of the 24 VAC circuit.
7. **Transformer** – The transformer is used to step down voltage from 240 VAC to 24 VAC. The transformer provides the required 24 VAC for the system control circuit.
8. **Thermostat "G" Circuit** – The thermostat "G" circuit is used for constant circulation only. When 24 VAC is placed on the thermostat "G" circuit the 24 vac is sent to the indoor fan motor where it will operate around 200 CFM. This is not enough air flow for heating or cooling operation.
9. **Thermostat "Y" Circuit** – The thermostat "Y" circuit is used for cooling or high speed indoor fan operation. When 24 VAC is placed on the thermostat "Y" circuit the 24 vac is sent to the indoor fan motor where it will operate around at high speed. The compressor contactor is also connected to this terminal.
10. **Thermostat "W" Circuit** – The thermostat "W" circuit is used for the heating indoor fan blower operation on the Med-low or Medium speed. When 24 VAC is placed on the thermostat "W" circuit the 24 vac is sent to the indoor fan motor where it will operate at the selected speed required for heating after the ON delay has been completed.

SECTION IV: SEQUENCE OF OPERATION

Continuous Blower

The thermostat has a manual fan switch that can be moved to the "**On"** position or it can be programmed for **continuous** fan operation. This setting causes the thermostat to complete the circuit between "R" and "G" terminals causing the blower motor to start the ON time delay. Once the time delay has completed the motor will start. When the thermostat "G" circuit has been de-energized the motor will start the OFF delay. The motor will turn off when the off delay has been completed.

The indoor blower will operate continuously until the fan switch on the thermostat has been switched from ON to AUTO. The AUTO position will allow the blower motor to operate only when there is a call for heat or cooling. The motor will remain in standby mode at all other times.

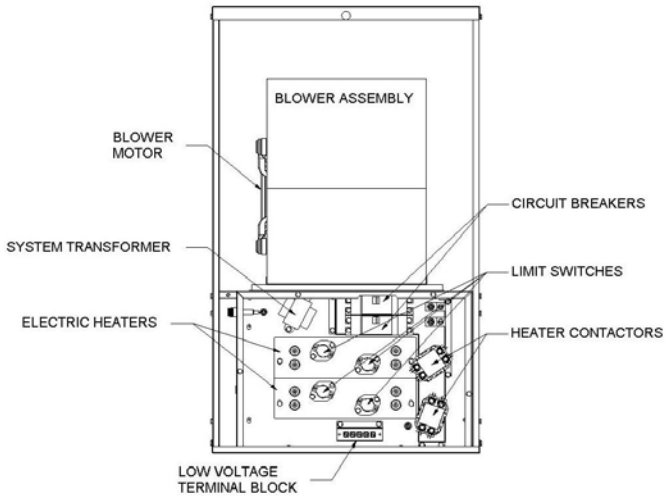

Figure 9: Component Locations

Intermittent Blower - Cooling

The thermostat has a manual fan switch that can be moved to the "**Auto"** position or it can be programmed for **auto** fan operation. When the thermostat calls for cooling, a circuit is completed between the "R" and "Y" Terminals. The indoor fan motor is energized from the "Y" terminal on the thermostat causing the indoor fan motor to start after the ON delay has expired. The motor will start on the selected speed tap that is connected to the "Y" terminal. When the call for cooling is complete the blower motor will start the off delay. Once the off delay has expired the motor will de-energize. The blower is now in the standby mode waiting for the next cooling cycle

The Heating Cycle

When the thermostat is in the HEAT mode and the fan switch on the thermostat is set to AUTO. The call for heat closes the thermostat circuit between the "R" and "W" terminals. 24 VAC is sent from the "W" thermostat terminal, through the

white thermostat wire to the W" terminal on the furnace terminal strip. This signal energizes the heater contactor(s) closing the contacts to the heaters. The blower heating speed wire is connected to the "W" terminal on the terminal block so the blower is energized at the after the ON delay has expired. The blower will continue to operate until the thermostat call for heat has been satisfied. When the call for heat has been satisfied the "W" terminal is de-energized and the heater contactor opens turning off the heater. The blower motor will continue to operate until the OFF delay has expired. The furnace is now in standby mode waiting for the next heating cycle.

The 12 kW, 15 kW and 20 kW models have a black wire that is connected to the "W" terminal on the terminal block. For two stage operation the black wire needs to be removed from the "W" terminal and connected to the W2 wire from the thermostat. Connect the wires using a wire nut. The other end of the black wire is connected to the 24 VAC coil on the second heater contactor. You must have a thermostat that has the second stage heating feature "W2". The second stage heat cycle is enabled when the room temperature typically falls more than 3 degrees below the thermostat set point. The thermostat energizes the second heater to aid in heating the room back to the thermostat set point. Once the room is within 1 degree of the thermostat set point the second stage heater is de-energized until the thermostat calls for second stage heat "W2" again.

⚠WARNING

For personal safety be sure to turn the electrical power "OFF" at the main circuit panel (Circuit Breaker Box) before attempting any service or maintenance operations. Home owners should never attempt to perform any maintenance which requires opening the furnace control box door.

SECTION V: TROUBLE SHOOTING

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

1. Check all of the circuit breakers. Make sure they are turned to the "ON" position and have not tripped.
2. Check all fuses, especially the 3 amp fuse on the top right side of the control box. If the fuse is blown, check the wiring with an OHM meter for a short to ground. If shorted, repair the short, and then 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, especially on any of the components, to ensure they are securely fastened.

If you have 240 VAC coming out of the control box circuit breakers and you have 24 VAC between the load side if the 3 amp fuse and ground, then continue on through the rest of the checks.

CONSTANT TORQUE Motor Check – Heating Mode

1. If the motor is not running, check for 240 VAC on the L1 and L2 terminals. Check 24 VAC at the motor terminals connected to the "W" and "C" terminal on the terminal block. If the 240 VAC and 24 VAC is present continue to the steps below. Refer to Figure 10 and Table 1 for terminal locations and definitions.

A. If 240 VAC is not present at the motor check for a broken wire between the circuit breaker and the motor.
B. If 240 VAC is present at the motor terminals continue to the next check.
C. If 24 VAC is not present at the motor check the fuse or transformer.
D. If 24 VAC is present at the terminal block "W" and "C" terminals then check the motor connections.
E. If the motor connections are ok then the motor is bad and needs to be replaced.

CONSTANT TORQUE Motor Check – Cooling Mode

1. If the motor is not running, check for 240 VAC on the L1 and L2 terminals. Check 24 VAC at the motor terminals on the "Y" and "C" terminals on the terminal block. If the 240 VAC and 24 VAC is present continue to the steps below. Refer to Figure 10 and Table 1 for terminal locations and definitions.

A. If 240 VAC is not present at the motor check for a broken wire between the circuit breaker and the motor.
B If 240 VAC is present at the motor terminals continue to the next check.
C. If 24 VAC is not present at the motor check the fuse or transformer.
D. If 24 VAC is present at the terminal block "Y" and "C" terminals then check the motor connections.
E. If the motor connections are ok then the motor is bad and needs to be replaced.

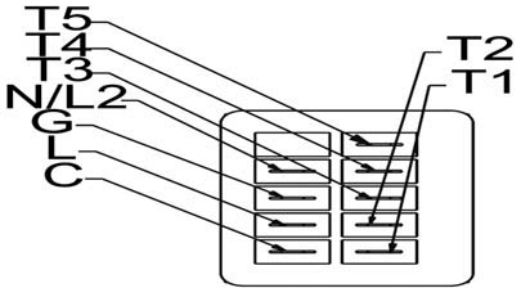

Figure 10: Constant Torque Motor Terminals

⚠WARNING

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

Terminal	Connection	Color	Wire Gauge
C	Motor Common - 24 VAC Common	Green	22
L	Supply Voltage to the Motor - 240 VAC L1	Black	18
G	Ground Connection	Green	18
N	Supply Voltage to the Motor - 240 VAC L2	White	18
1	Low Voltage Speed Tap - 24 VAC	Red	22
2	Med-Low Voltage Speed Tap - 24 VAC	Orange	22
3	Medium Voltage Speed Tap - 24 VAC	White	22
4	Med-High Voltage Speed Tap - 24 VAC	Blue	22
5	High Voltage Speed Tap - 24 VAC	Black	22

Table 1: Constant Torque Motor Terminal Connections

Heater Element Is Not On

Check for 240 VAC between each of the heater elements. If 240 VAC is present, check the current draw on each heater. If there is 200 – 250 VAC across the heaters but a heater is not drawing the proper current or is showing almost no current draw check the limit for that heater. If the limit is good but there still is no current flow then, check to see if the heater is defective.

The heater amps are as follows:

5 kW Heater = 20.8 amps

6 kW Heater = 25.0 amps

The heater design is as follows:

The 10 kW model has one heater with two 5 kW elements

The 12 kW model has one heater two 6 kW elements.

The 15 kW model has one heater with two 5 kW elements (top heater) and one heater with one 5 kW element (bottom heater).

The 20 kW model has one heater with two 5 kW elements (top heater) and one heater with two 5 kW elements (bottom heater).

If 240 VAC is not present at the heater element but there is 240 VAC present between the load terminal of the heater contactor check for a broken wire or bad connection.

If 240 VAC is not present at the heater element, the load terminal of the heater contactor but is present between the line terminals of the heater contactor; check for 24 VAC between the A1 and A2 terminals. If 24 VAC is present then, replace the heater contactor.

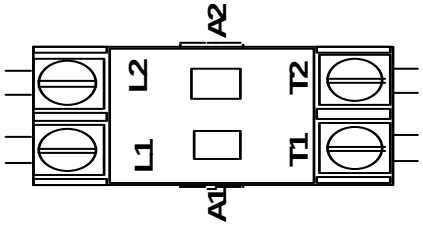

Figure 11: Heater Contactor Terminal Designations

Blower Motor FLA

1/2 HP Motor – 4.3

Replacing the Blower

1. Follow the instructions exactly as shown in Start Up and Shutdown Section in this manual to properly shutdown this appliance.
2. Remove furnace lower front door and switch furnace circuit breaker(s) to “OFF”.
3. Disconnect the plastic wire plug that has the wires that goes to the motor terminals from the control box.
4. Remove the two screws on the right side of the blower mounting plate.
5. Slide the blower out of the blower compartment and set on the floor.
6. Remove the wire connectors from the motor terminals.
7. Remove the blower motor from the mounting bracket by removing the screw that secure the blower motor to the bellyband.
8. Insert the new blower housing into the blower mounting bracket and secure to the bellyband with the screw. Make sure the arms are located in the proper place so the motor is not at an angle.
9. Connect the wires connectors to the motor terminals so the wires are connected to the same terminals on the new motor as they were on the previous motor.
10. Slide the blower assembly into the blower deck and insert the two screws on the mounting bracket.
11. Connect the male pin plug to the female pin plug on the control box.
12. Replace the control box door and switch the circuit breakers to ON.
13. Replace the front door.
14. Follow the instructions exactly as shown in Start Up and Shutdown Section in this manual to properly start up this appliance.
15. Set the thermostat to the desired temperature.

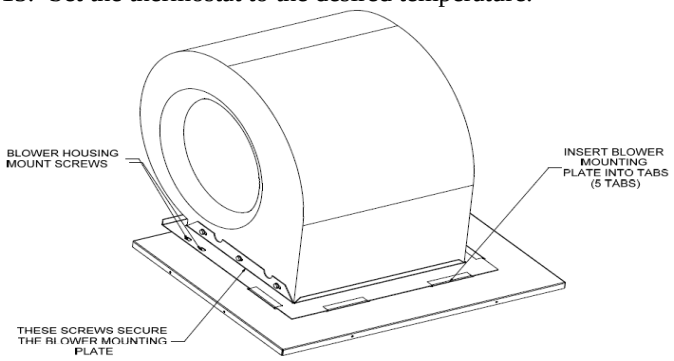

Figure 12: Blower Mounting Plate Screw Locations

⚠WARNING

To avoid personal injury take precautions not to come into contact with non-insulated electrical components.

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

SECTION VI: BLOWER PERFORMANCE

		EXTERNAL STATIC PRESSURE (ESP) INCHES WC DUCT									
	SPD TAP	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
CFM-NO-COIL	LO	984	922	851	799	740	604	578	497	423	365
	MED-LO	1149	1096	1051	995	933	870	795	891	658	604
	MEDIUM	1397	1344	1293	1250	1200	1148	1105	1048	982	699
	MED-HI	1630	1584	1533	1493	1443	1392	1352	1258	1136	702
	HI	1736	1712	1661	1612	1570	1515	1432	1321	1184	704
CFM with Coil 98-8G7W-OP with Cabinet 97-FLSB-27 OR 97-FLSF-27	LO	875	818	764	718	611	558	507	455	419	372
	MED-LO	1027	996	952	897	858	752	688	634	615	497
	MEDIUM	1241	1212	1176	1129	1090	1051	997	867	713	545
	MED-HI	1440	1411	1371	1328	1285	1232	1155	1062	734	593
	HI	1546	1506	1474	1415	1349	1270	1186	1079	702	603
CFM with Coil 98-8G7W-OP with Cabinet 97-FSOB-27	LO	845	811	753	682	611	563	522	467	407	364
	MED-LO	1032	990	949	897	838	800	730	677	607	477
	MEDIUM	1238	1191	1155	1107	1068	1033	991	809	660	492
	MED-HI	1419	1380	1340	1294	1217	1145	1068	839	665	486
	HI	1506	1445	1389	1313	1241	1166	1079	824	646	483
CFM with Coil 98-8W7W-OP with Cabinet 97-FLSB-27 or 97-FLSF-27	LO	884	817	771	722	616	568	536	472	417	380
	MED-LO	1040	984	955	893	864	756	698	656	630	494
	MEDIUM	1251	1216	1170	1134	1079	1045	1009	860	685	570
	MED-HI	1450	1410	1380	1335	1303	1221	1139	1056	737	580
	HI	1549	1506	1457	1410	1335	1246	1165	1056	741	648
CFM with Coil 98-8W7W-OP with Cabinet 97-FSOB-27	LO	878	811	771	714	625	558	536	478	417	377
	MED-LO	1035	981	943	891	852	797	702	652	609	474
	MEDIUM	1223	1190	1151	1111	1072	1018	940	842	647	523
	MED-HI	1422	1378	1325	1262	1159	1062	983	868	665	523
	HI	1478	1416	1338	1277	1174	1095	992	845	657	513
CFM with Coil 98-8W12W-OP with Cabinet 97-FLSB-39 or 97-FLSF-39	LO	897	842	796	733	619	566	522	470	408	361
	MED-LO	1054	1013	961	925	874	798	680	623	572	533
	MEDIUM	1281	1237	1202	1154	1111	1071	1012	902	723	613
	MED-HI	1478	1453	1414	1374	1333	1271	1191	1094	752	596
	HI	1581	1522	1477	1421	1350	1270	1180	1070	777	657
CFM with Coil 98-8W12W-OP with Cabinet 97-FSOB-39	LO	885	825	763	704	612	553	522	459	392	357
	MED-LO	1043	986	941	891	858	735	687	630	573	504
	MEDIUM	1240	1178	1139	1100	1076	1013	945	800	679	520
	MED-HI	1456	1404	1359	1322	1256	1190	1087	845	712	535
	HI	1550	1485	1426	1355	1294	1221	1104	874	735	534

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

		EXTERNAL STATIC PRESSURE (ESP) INCHES WC DUCT									
	SPD TAP	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
CFM with Coil	LO	884	824	774	692	595	560	507	460	391	360
98-8G12W-OP	MED-LO	1035	992	954	893	844	783	692	640	545	474
with Cabinet	MEDIUM	1250	1211	1170	1127	1083	1037	982	834	675	520
97-FLSB-39	MED-HI	1449	1415	1376	1345	1289	1218	1127	884	708	535
or 97-FLSF-39	HI	1547	1511	1462	1402	1326	1245	1159	976	724	531
CFM with Coil	LO	862	817	752	672	619	560	525	458	395	381
98-8G12W-OP	MED-LO	1013	967	925	887	824	744	692	636	563	435
with Cabinet	MEDIUM	1209	1173	1125	1098	1050	1000	865	748	578	484
97-FSOB-39	MED-HI	1415	1376	1321	1255	1175	1099	924	767	609	479
	HI	1478	1428	1362	1279	1195	1110	915	755	600	484
CFM with Coil	LO	899	837	784	724	609	570	519	455	388	360
98-8Z12W-OP	MED-LO	1040	1004	964	909	851	751	700	640	616	493
with Cabinet	MEDIUM	1258	1235	1185	1143	1099	1060	1000	848	704	533
97-FLSB-39	MED-HI	1484	1441	1393	1353	1316	1245	1137	1012	679	551
or 97-FLSF-39	HI	1570	1531	1488	1415	1344	1279	1170	1070	736	562
CFM with Coil	LO	851	813	759	708	618	555	523	458	394	362
98-8Z12W-OP	MED-LO	1021	982	934	884	837	740	684	636	573	452
with Cabinet	MEDIUM	1210	1170	1138	1092	1052	999	922	751	613	469
97-FSOB-39	MED-HI	1419	1385	1344	1279	1210	1083	1010	774	621	480
	HI	1503	1458	1393	1312	1230	1103	1019	785	629	486
CFM with Coil	LO	856	795	740	680	572	536	502	450	398	358
96-8W4W-OP	MED-LO	1002	965	920	866	819	712	650	619	630	502
with Cabinet	MEDIUM	1204	1163	1128	1093	1048	1007	952	785	667	581
97-FLSB-21	MED-HI	1383	1364	1332	1291	1248	1184	1099	837	696	528
or 97-FLSF-21	HI	1468	1458	1424	1368	1300	1219	1126	1019	700	536
CFM with Coil	LO	816	775	708	672	557	557	507	444	398	357
96-8W4W-OP	MED-LO	988	926	876	836	791	692	633	630	596	423
with Cabinet	MEDIUM	1163	1114	1087	1038	1002	959	895	680	653	477
97 FSOB-21	MED-HI	1355	1323	1281	1224	1147	1081	977	736	653	483
	HI	1433	1381	1314	1243	1166	1082	989	740	656	493

Table 3: Blower Performance -10 X 9 Morrison Wheel - 1/2 HP 5 SPD CONSTANT TORQUE Motor (With Air Filters)

SECTION VII: ACCESSORY AND REPLACEMENT PARTS LISTS

DESCRIPTION	PART NUMBER
DUCT CONNECTOR ASSRMBLY 2 - 4 IN MULTI USE	90-DCU-01
DUCT CONNECTOR ASSRMBLY 6 - 8 IN MULTI USE	90-DCU-02
DUCT CONNECTOR ASSRMBLY 8 - 12 IN MULTI USE	90-DCU-03
BMH TRANSITION SUB BASE	90-DCU-04
COMBUSTIBLE FLOOR BASR	90-DCU-05
FLOOR BASE	90-DCU-06
WR 1F951291 WINCHESTER BRAND THERMOSTAT	68AB0013
1/3 HP 3 TON ACCESSORY BLOWER	86MH0022
1/2 HP 4 TON ACCESSORY BLOWER	86MH0023
3/4 HP 5 TON ACCESSORY BLOWER	86MH0024
21" 1200 CFM BROKE DOWN COOLING COIL CABINET	97-FLSB-21
21" 1600 CFM BROKE DOWN COOLING COIL CABINET	97-FSOB-21
21" 1800 CFM BROKE DOWN COOLING COIL CABINET	97-FLOB-21
31" 1600 CFM BROKE DOWN COOLING COIL CABINET	97-FLSB-27
31" 1600 CFM BROKE DOWN COOLING COIL CABINET	97-FSOB-27
31" 1600 CFM BROKE DOWN COOLING COIL CABINET	97-FLOB-27
40" 1800 CFM BROKE DOWN COOLING COIL CABINET	97-FLSB-39
40" 1800 CFM BROKE DOWN COOLING COIL CABINET	97-FSOB-39
18" TALL RETURN AIR FILTER GRILLE	97-FG-18
24" TALL RETURN AIR FILTER GRILLE	97-FG-24
6 kW FIELD INSTALLED ELECTRIC HEATER KIT	BE30HK-06A
8 kW FIELD INSTALLED ELECTRIC HEATER KIT	BE30HK-08A
10 kW FIELD INSTALLED ELECTRIC HEATER KIT	BE30HK-10A
12 kW FIELD INSTALLED ELECTRIC HEATER KIT	BE30HK-12A
15 kW FIELD INSTALLED ELECTRIC HEATER KIT	BE30HK-15A
20 kW FIELD INSTALLED ELECTRIC HEATER KIT	BE30HK-20A

Table 4: Accessory Parts List

SECTION VIII: REPLACEMENT PARTS LISTS

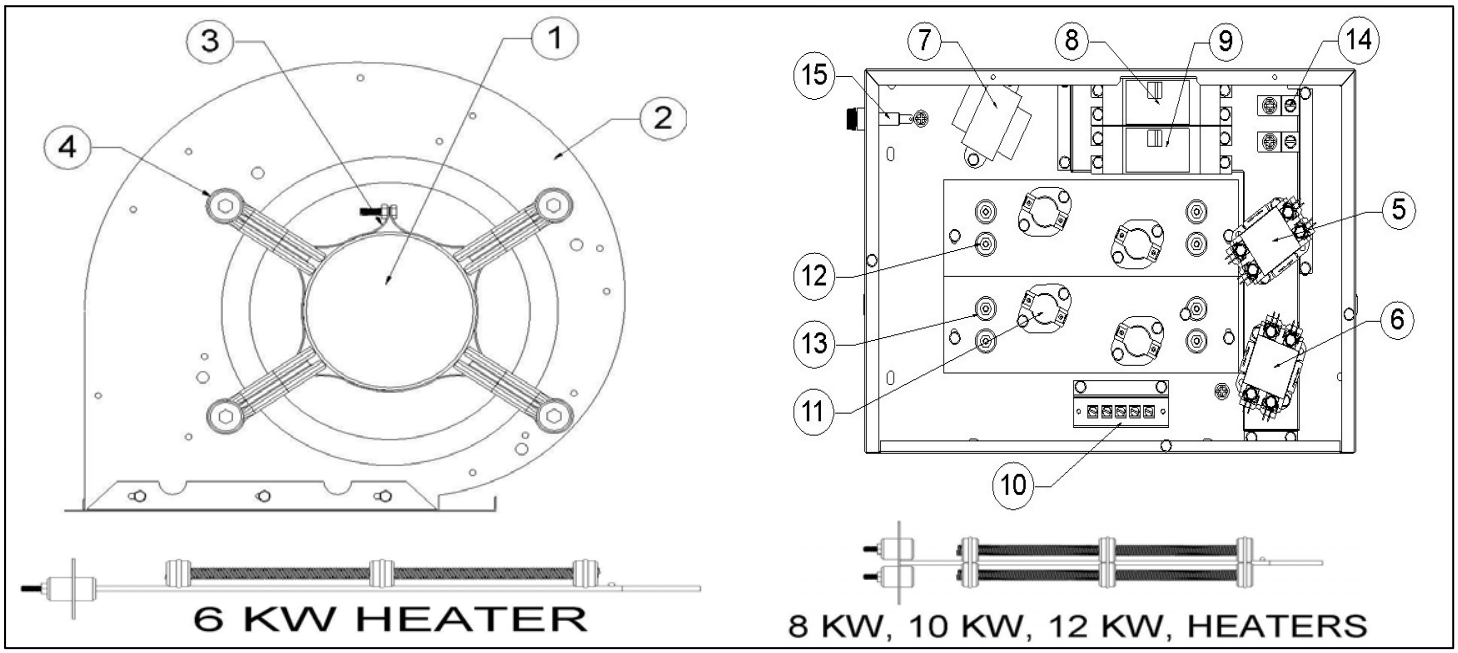

Figure 13: Replacement Parts Item Identification for Electric Heat Models with a 1/2 HP Constant Torque Blower Motor

		MODELS			
Item	Description	WE30B4D-10	WE30B4D-12	WE30B4D-15	WE30B4D-20
1	1/2 HP CT BLOWER MOTOR	R65BV0026	R65BV0026	R65BV0026	R65BV0026
2	BLOWER HOUSING & WHEEL	R69AD0018	R69AD0018	R69AD0018	R69AD0018
3	MOTOR MOUNT BAND	R66AB0065	R66AB0065	R66AB0065	R66AB0065
4	MTR MT ARM & GROMMET	R66AB0066	R66AB0066	R66AB0066	R66AB0066
5	HEATER CONTACTOR 1	R68AB0019P	R68AB0019P	R68AB0019P	R68AB0019P
6	HEATER CONTACTOR 2		R68AB0019P	R68AB0019P	R68AB0019P
7	TRANSFORMER	R68AA0003	R68AA0003	R68AA0003	R68AA0003
8	CIRCUIT BREAKER 1	R68BAD018	R68BAD015	R68BAD018	R68BAD018
9	CIRCUIT BREAKER 2		R68BAD014	R68BAD013	R68BAD017
10	LOW VOLTAGE TERMINAL BLOCK	68DC0013	68DC0013	68DC0013	68DC0013
11	LIMIT 155° F	R68CA0008	R68CA0008	R68CA0008	R68CA0008
12	ELECTRIC HEATER ELEMENT 1	R67AB0017	R67AB0018	R67AB0017	R67AB0017
13	ELECTRIC HEATER ELEMENT 2			R67AB0015	R67AB0017
14	GROUND LUG	R66GF0022	R66GF0022	R66GF0022	R66GF0022
15	FUSE HOLDER	R68MHA001	R68MHA001	R68MHA001	R68MHA001
15	3 AMP FUSE	R68MH0001	R68MH0001	R68MH0001	R68MH0001

Table 5: Replacement Parts for Electric Heat Models with a 1/2 HP Constant Torque Blower Motor

Subject to change without notice