

AHW Series: Vertical Wall Mount Installation – Models w/DX Cooling and Electric or Hydronic (Hot Water) Heating

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CONTACT INFORMATION

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SECTION 1: GENERAL

The following list includes important facts and information regarding this air handler.

1. Models with electric heat and no heat are rated for 208/240 VAC, 60 Hz, 1-Phase.
2. Models with hydronic heat are rated for 115 VAC, 60 Hz, 1-Phase.
3. Air handler is designed for both cooling only and heat pump applications.
4. Models are available in small, medium, or large cabinet size.
5. Air handler is designed for upflow applications only.
6. Air handler must not be operated without the access panel installed.
7. Air handler is listed by ETL for the United States and Canada.

INSTALLERS MUST READ ALL INSTRUCTIONS IN THIS MANUAL

THIS MANUAL MUST BE SAVED BY THE HOMEOWNER OR USER FOR FUTURE REFERENCE.



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

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.

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.



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.

SAFETY REQUIREMENTS

1. This air handler must be kept clear and free of combustible materials, gasoline and other flammable vapors and liquids.
2. Never store flammable materials of any kind near this air handler. Gasoline, solvents and other volatile liquids should be stored only in approved containers outside the home. These materials vaporize easily and are extremely dangerous.
3. Insulating materials may be combustible. The air handler must be kept free and clear of insulating materials. The air handler 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 air handler.
4. Follow the instructions exactly as shown in **Section 4: Startup and Shutdown Instructions** in this manual to properly start up or shut down this air handler.
5. If overheating occurs, turn the power off to the air handler and contact a qualified contractor, installer, or service agency.
6. Never store cleaning materials such as bleaches, detergents, powder cleaners, etc. near the air handler. These chemicals can cause corrosion of the air handler sheet metal and the electric heaters, the blower and the electrical controls.
7. Never use the area around the air handler as a storage area for items which could block or obstruct air-flow the space around the air handler. This flow of air is required for safe and proper operation. Never block or obstruct air openings used for ventilation and cooling of the air handler electrical components.
8. Refer to the air handler rating plate for requirements for safe operation.
9. Provide clearance for service access to the control box, electric heat elements or hydronic coil, and blower.
10. Failure to carefully read and follow all instructions in this manual can result in malfunction of the air handler, death, personal injury, and/or property damage.
11. If the air handler is installed in a residential garage, it must be installed so that the electric heaters are located no less than 18 inches above the floor and the air handler must be located or protected to avoid physical damage by vehicles.
12. These instructions cover 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 modular home and residential home construction practices. These instructions are to be followed and are the minimum requirement to perform service or repairs on this air handler.

⚠ 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: OWNERS INFORMATION AND SEASONAL INFORMATION

HOW THE AIR HANDLER WORKS

Heating Cycle - Electric Heat Models

When the thermostat calls for heat on the electric heat models, the heater contactor is energized, sending 208/240 VAC through to the electric heaters causing them to heat up. The indoor fan motor is then energized on the selected heating speed tap after an "ON" time delay which causes the circulating blower to draw air from the living space, passes it across the heater coils, and circulates the warmed air through the duct system to the living space. When the thermostat is satisfied, the electric heaters are de-energized and the blower is de-energized after an "OFF" time delay. The heating cycle has ended and the air handler is now in the stand-by mode awaiting the next call for heat.

Heating Cycle - Hydronic Heat Models

When the thermostat calls for heat on the hydronic heat models, a pump relay will be energized causing a flow of hot water through the hot water coil which heats the coil. The indoor fan motor is energized on the heating speed tap after an "ON" time delay which causes the circulating blower to draw air from the living space, passes it across the hot water coil, and circulates the warmed air through the duct system to the living space. When the thermostat is satisfied, the circulating pump is de-energized and the blower is de-energized after an "OFF" time delay. The heating cycle has ended and the air handler is now in the stand-by mode awaiting the next call for heat.

Cooling Cycle - Electric and Hydronic Heat Models

When the thermostat calls for cooling operation, 24 VAC is sent to the compressor contactor coil causing it to close which energizes the compressor and outdoor fan motor. The indoor fan motor is also energized on the selected cooling speed tap which causes the circulating blower to draw air from the living space, passes it across the cooling coil in the air handler, and circulates the cooled air through the duct system to the living space. When the thermostat is satisfied, the compressor contactor is de-energized which turns off the compressor and outdoor fan motor. The blower is de-energized after an "OFF" time delay. The cooling cycle has ended and the air handler is now in the stand-by mode awaiting the next call for cooling.

Heat Pump Heating Cycle - Electric and Hydronic Heat Models

When the thermostat calls for heat pump heating operation, 24 VAC is sent to the compressor contactor causing it to close which energizes the compressor and outdoor fan motor. If not already in the heating position from a previous heating cycle, the reversing valve in the outdoor unit switches position causing the flow of the refrigerant to reverse and heat the coil inside the air handler. The indoor fan motor is energized on the selected heat pump heating speed tap which causes the circulating blower to draw air from the living space, passes it across the coil in the air handler, and circulates the warmed air through the duct system to the living space. When the thermostat is satisfied, the compressor contactor is de-energized which turns off the compressor and outdoor fan motor. The blower is also de-energized after an "OFF" time delay. The heat pump heating cycle has ended and the air handler is now in the stand-by mode awaiting the next call for heat pump heating.

EXAMINATION OF THE AIR HANDLER

The homeowner should perform a visual examine the air handler every month for any defects or problems. The items to be inspected are:

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

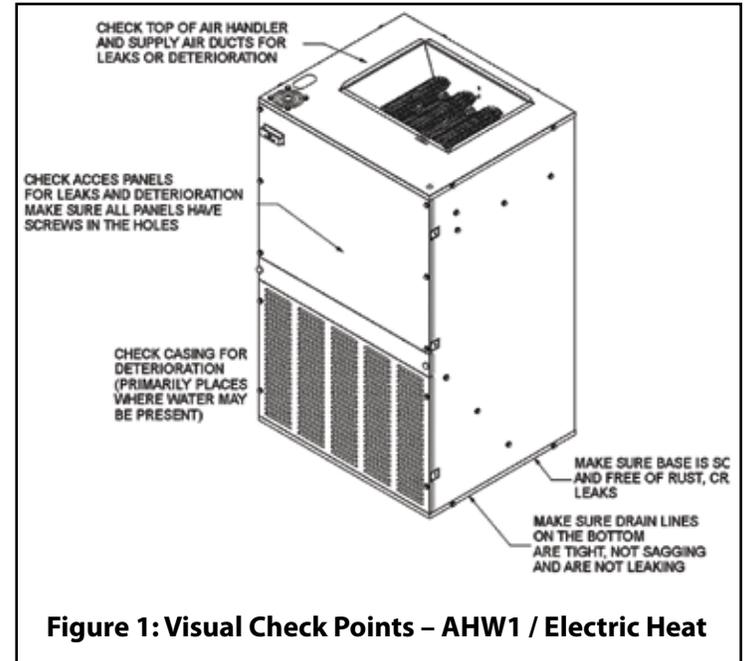


Figure 1: Visual Check Points - AHW1 / Electric Heat

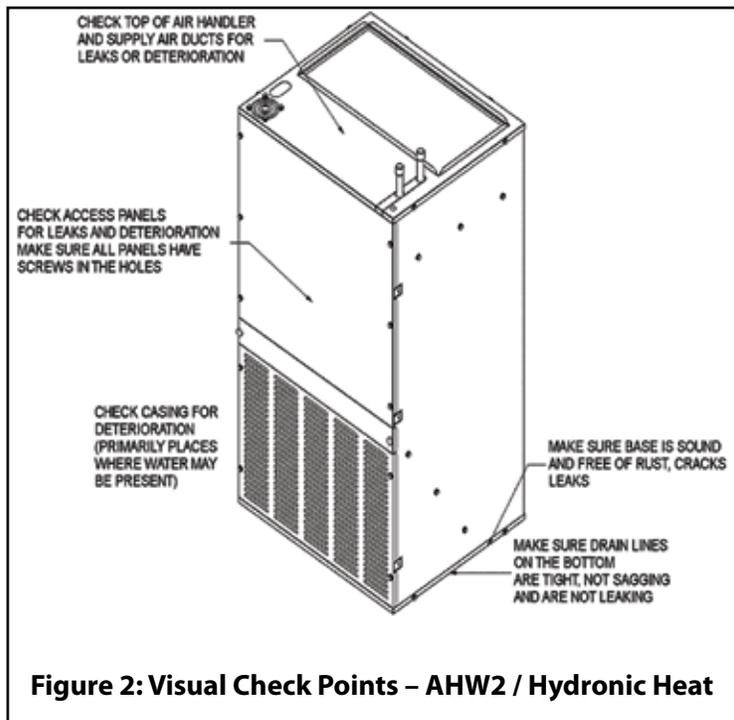


Figure 2: Visual Check Points – AHW2 / Hydronic Heat

THE SERVICE TECHNICIAN

If the air handler gives any indication of improper operation, the homeowner or user should call a qualified service technician. The service technician is qualified to perform the normal routine care of the air handler and can detect potential problems and make corrections before trouble develops. Preventative maintenance of this type will allow the air handler to operate with minimal concerns to the homeowner and will add years of comfort. The homeowner or user must not attempt to service or repair this air handler except for the cleaning and filter maintenance tasks presented in **“Section 5: Owner Maintenance”** of this **User Information Manual**.

WARRANTY AND RESPONSIBILITIES

It is the sole responsibility of the homeowner to make certain the air handler has been properly installed and adjusted to operate properly. The manufacturer warrants the air handler 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 adjustments, installing parts or components on the air handler that are not listed for use with this air handler, improper operating conditions, or repairs performed by the air handler user or homeowner.

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

1. Correcting faulty duct system in the home. This can be due to not enough 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 which has fallen into the air handler.
7. Replacement of fuses.
8. Insufficient air-flow problems caused by dirty air filters.

9. Air handler 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 air handler 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 air handler will operate unattended for a long period of time. Examples of a malfunction that can cause significant damage to the home would be:

1. The air handler blower motor fails and the heater elements cycle 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 resulting in significant damage to the structure.
2. The air handler 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 or above 75°F to ensure the air handler is operating properly. This will help prevent water pipes from freezing or appliances from failing.

THE AIR HANDLER FAILS TO OPERATE PROPERLY

If any abnormalities are observed while the air handler 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, especially ON/OFF switches used for servicing the air handler. These are often mistaken for light switches and are turned off.
3. Check any inline fuses that may have been installed on the air handler to determine if one has blown.
4. Make sure the air filters are clean, return grilles clean, are not obstructed, and supply air registers are open.

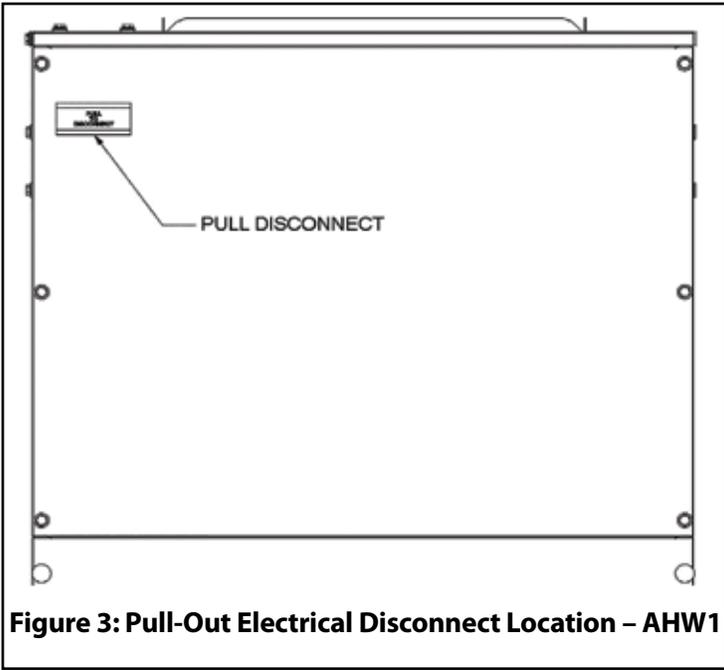


Figure 3: Pull-Out Electrical Disconnect Location – AHW1

! WARNING

Failure to follow the following instructions exactly may result in a fire causing property damage, personal injury, and/or loss of life.

Read the instructions below before trying to start the air handler.

- A. **BEFORE OPERATING:** Check around perimeter of the air handler to make sure there are no flammable materials in the area. If vapors of any kind are smelled, **DO NOT** turn on the power to the air handler until vapors have been ventilated and removed from the area of the air handler.
- 2. **CHECK THE AIR HANDLER:** Visually check the air handler for loose screws and/or panels that may be missing or have fallen off.
- 3. **CHECK DUCT CONNECTIONS:** Visually check the connections of the ducts to the air handler to make sure there are no gaps or holes and ducts are securely fastened to the air handler.

TURNING ON / STARTING THE AIR HANDLER

- 1. **STOP!** Read the safety information above before proceeding.
- 2. Set the thermostat mode to the "OFF" setting.
- 3. Turn the circuit breakers for the air handler in the main electrical panel to the "ON" position.
- 4. If it has been removed, insert the **Pull-Out Electrical Disconnect** located on the front panel of an electric heat air handler (See Figure 3).
- 5. Turn the service disconnect switch near the air handler (if one is present) to the "ON" position.
- 6. Set the thermostat to the desired mode and temperature.

Shutting Down / Turning Off the Air Handler

- 1. Set the thermostat mode to the "OFF" mode.
- 2. Turn the circuit breaker(s) for the air handler in the main electrical panel to the "OFF" position.
- 3. Remove the Pull-Out Electrical Disconnect located on the front panel of an electric heat air handler and place it in a safe location (See Figure 3).
- 4. Turn the service disconnect switch near the air handler (if one is present) to the "OFF" position.

! WARNING

AIR HANDLERS WITH ELECTRIC HEATERS

Should overheating occur, remove the **Pull-Out Electrical Disconnect** on the front of the air handler and turn circuit breaker(s) in the main electrical panel (circuit breaker box) to the OFF position. Call qualified service personnel to troubleshoot and repair the air handler. **DO NOT** allow the air handler to continue to cycle on the limit.

WHEN TO CALL FOR SERVICE ASSISTANCE

Very often time can be saved if the homeowner provides the service agency the information about the air handler ahead of time. This will enable the service agency to determine the specific components used and possibly identify the problem, allowing them to arrive with the correct parts to fix the problem. Write down the model number, serial number and be prepared to describe what the air handler is or is not doing and what has already been checked prior to calling the service agency.

SERVICE AGENCY INFORMATION

Fill in Below

MODEL NUMBER: _____

SERIAL NUMBER: _____

SERVICE COMPANY: _____

ADDRESS: _____

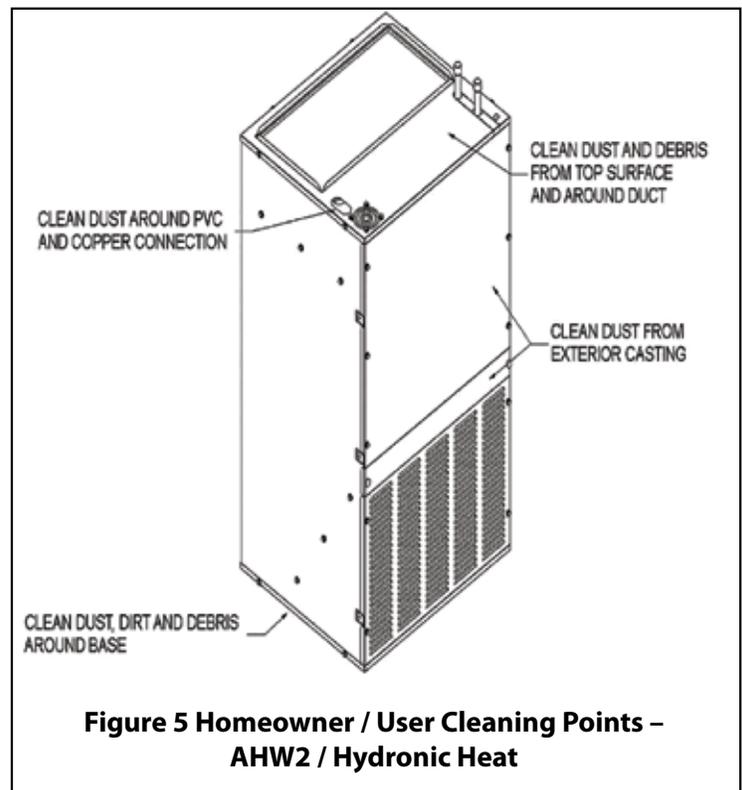
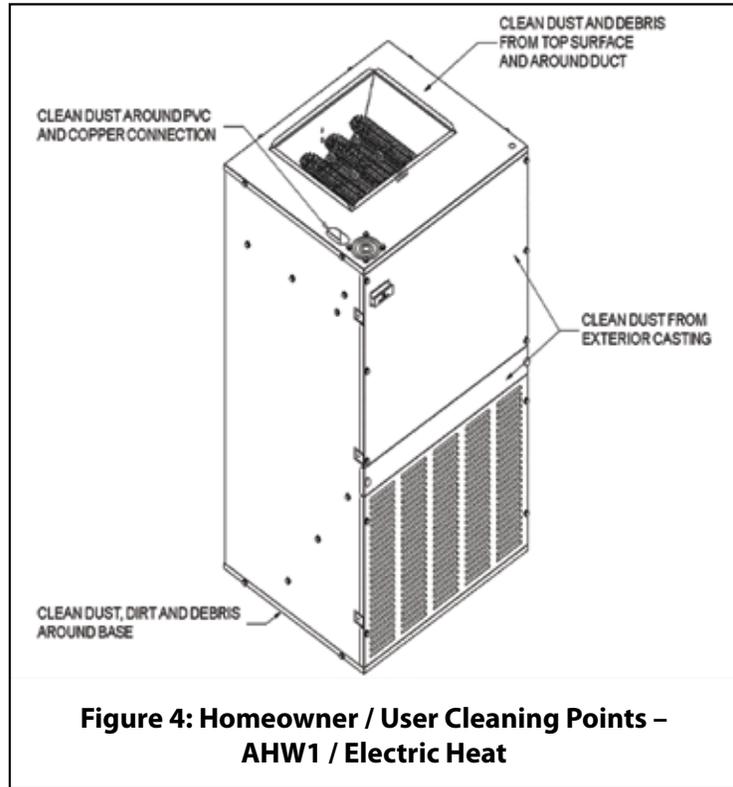
TELEPHONE (DAYTIME): _____

TELEPHONE (EMERGENCY) _____

NOTES: _____

SECTION 5: OWNER MAINTENANCE

All appliances need annual maintenance in order to operate properly. The annual service must be performed by qualified service personnel. The homeowner is expected to perform general cleaning of the exterior surfaces and replacement of the air filters. Air filters must be checked every month and replaced as needed. Air filters must be checked every month and replaced as needed. Figures 6 and 7 show the location of the air handler internal air filter.



Internal Air Filter Replacement

Follow these easy steps to replace the air filters.

1. Follow the procedure **“To Turn Off the Air Handler”** in **Section 4: Startup and Shutdown Instructions** in this manual.
2. Unscrew the white thumb screws that secure the filter cover panel to the air handler and remove the filter cover panel.
3. Slide the air filter up and out of the filter track. The air filter is a disposable filter. **DO NOT** attempt to clean the filter and reuse it.
4. Clean any access dirt or debris around the front area where the air filter is located.
5. Check the size of the air filter that was removed and make sure it is replaced with the same size filter.
6. Slide the new air filter into the filter track, place the filter cover panel into place, and tighten the thumb screws.
7. **NOTE:** Make sure the flow arrow on the air filter is pointing towards the coil.
8. Follow the **“Turn On / Start the Air Handler”** in **Section 4: Startup and Shutdown Instructions** in this manual.

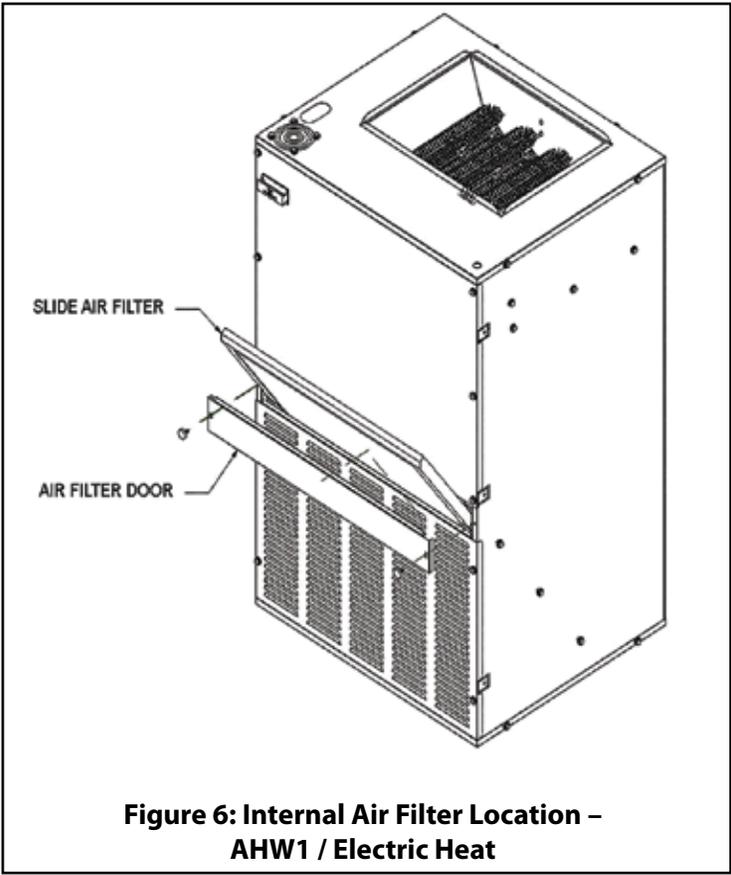


Figure 6: Internal Air Filter Location – AHW1 / Electric Heat

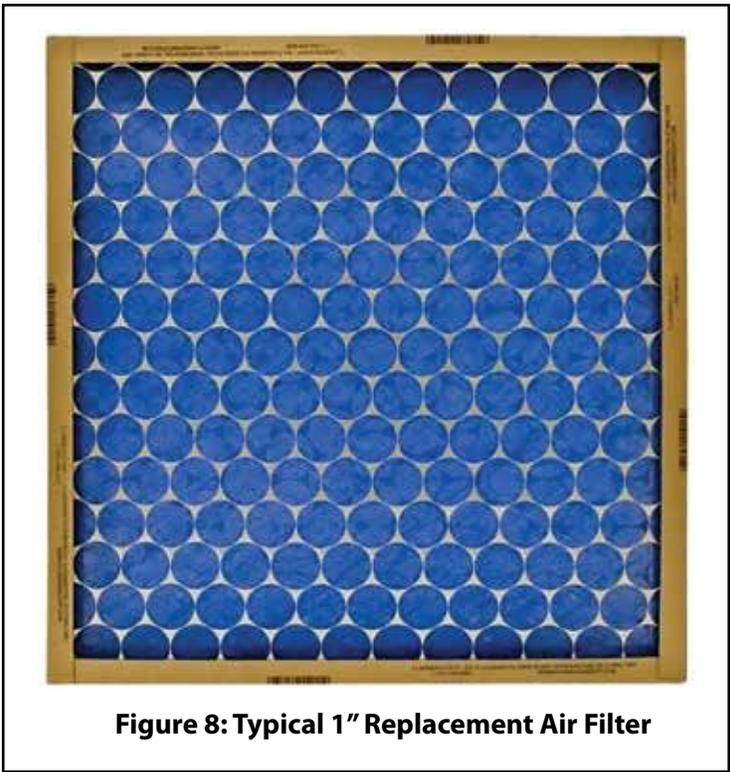


Figure 8: Typical 1" Replacement Air Filter

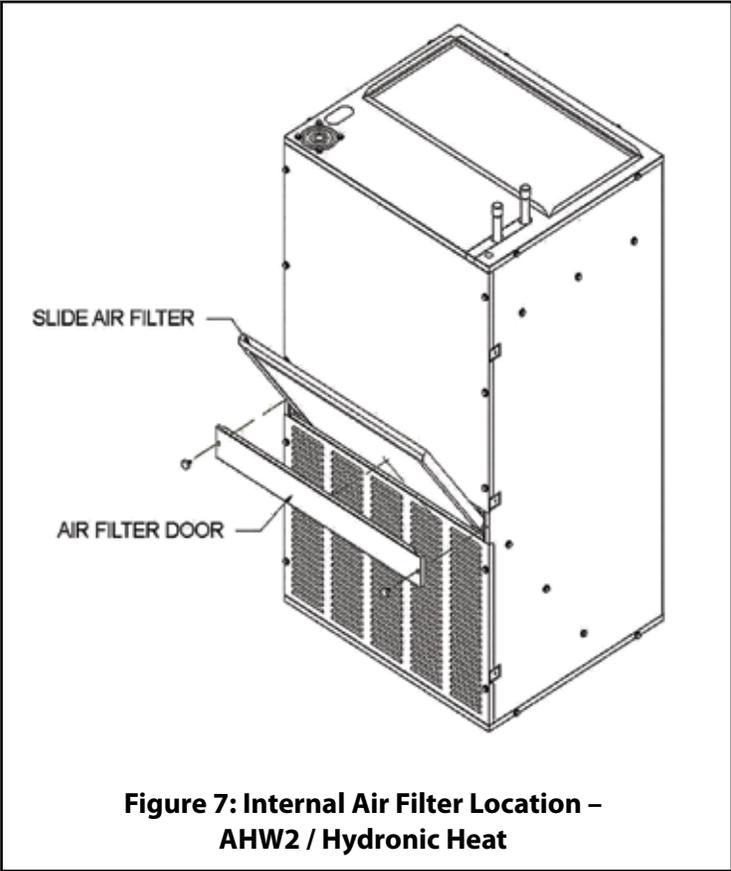


Figure 7: Internal Air Filter Location – AHW2 / Hydronic Heat

SERVICE AND MAINTENANCE MANUAL

SECTION 1: SAFETY

THE HOMEOWNERS AND AIR HANDLER USERS MUST STOP HERE!

This section has been designed to assist a **qualified service agency** in performing service and maintenance on this air handler. The homeowner and/or the air handler user **must never** attempt to perform any service or maintenance on the air handler, especially when it involves the removal or adjustment of any parts and/or components.

WARNING

The manufacturer and distributor will not be responsible for any repairs due to removal of parts or improper parts changes, improper maintenance, improper adjustments or improper modifications to this air handler that were performed by the homeowner or the air handler user.

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



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.

SAFETY REQUIREMENTS

1. Air handlers with electric heaters may have a dual electrical supply circuit. Check each electrical circuit with a meter to be sure the power has been disconnected before servicing.
2. Insulating materials may be combustible. The air handler must be kept free and clear of insulating materials.
3. Follow the instructions exactly as shown in **Section 4: Startup and Shutdown Instructions** in this manual to properly start up or shut down this air handler.
4. Make sure all moving parts have come to a complete stop before attempting to perform any work once the air handler access panels have been removed. Moving parts can cause serious injury if clothing or body parts get caught in the moving part.

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.

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 this air handler, disconnect all electrical power to the air handler by turning the circuit breaker(s) in the main electrical panel (breaker box) to the OFF position and removing the Pull-Out Electrical Disconnect on the front panel of electric heat and no heat models or moving the service disconnect switch for hydronic heat models to the OFF position.
- 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 proper air handler 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: AIR HANDLER MAINTENANCE

The interior sections of the air handler must be cleaned and adjusted by a qualified service contractor once a year or before the start of each heating or cooling 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 indoor coil for dust, debris or damage.
8. Check the indoor coil drain pan for proper drainage to prevent water backup into the air handler.
9. The air handler casing and all interior sheet metal panels or dividers.

Air Handler Cleaning Procedure

1. Follow the instructions exactly as shown in the **Startup and Shutdown Section in the Users Information Manual** section of this manual to properly shut down the air handler.
WARNING: Electrical power must be disconnected to the air handler before performing this procedure!
2. Remove the blower/control box access panel on the front of the air handler.
3. Unscrew the white thumb screws that secure the air filter cover panel to the air handler and remove the filter cover panel and filter.
4. Disconnect the blower motor wiring harness plug from the mating plug located under the right side of the control box.
5. Place a piece of cardboard (or equivalent) on top of the coil to prevent dirt or debris from falling onto the coil and to protect the coil while removing and reinstalling the blower assembly.
6. Remove the 2 screws that attach the blower assembly to the blower deck that are located under the control box on each side of the blower.
7. Remove only the 4 screws (2 on each side) nearest the front of the air handler that attach the filter channels to side of the cabinet. These are located on the outside of the air handler cabinet.
NOTE: Do not remove the 2 screws (1 screw on each side) nearest the rear of the air handler as this will make re-attaching the filter channels more difficult.
NOTE: If sides of air handler are not accessible in a wall mount installation, it will need to be detached from the wall and supply duct and then pulled out of the wall enough to remove the filter channel screws.
8. Remove the 2 screws that attach the top of the coil assembly to the sides of the air handler cabinet.
9. While supporting the coil, push the top of the filter rack channels inward to clear the air handler cabinet and allow the top of the coil to drop enough for the blower housing to clear the top of the coil assembly.
NOTE: Take care not to damage the refrigerant tubing when lowering the coil assembly.
10. Slide the blower assembly out of the air handler.
11. 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, the motor could run hotter

- than normal which could shorten the life of the motor.
12. 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(s) located on the wheel blade. Moving or removing a balance weight will cause the blower wheel to vibrate. If the blower wheel is vibrating, it must be replaced.
13. Check in the area above the blower where the heater elements or hydronic heating coil 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.
14. Use a vacuum cleaner and a small brush to remove any dirt and debris from the blower and indoor coil compartments.
15. Check the indoor coil condensate drain pan for any debris and ensure the drain pan is properly draining by pouring water into the drain pan.
16. Remove any excess water that may have spilled from checking the indoor coil condensate drain.
17. Check and clean any dust in the supply and return ducts with the brush and vacuum cleaner as far as can be reached. If the ducts look like they have an excessive amount of dust, dirt or debris, recommend to the homeowner or user to call a professional to properly clean the duct system.
18. Check and clean any dust, dirt, or debris from all controls and all surfaces in the control box. If dust or dirt is left on the components, they could operate at a much hotter temperature than normal causing premature component failure.
19. Slide the blower mount plate (See Figure 9) into the track under the blower deck until it stops and install the 2 screws that attach the blower assembly to the blower deck that were removed in Step 6.
20. Lift the top of the coil assembly and install the 2 screws that attach the top of the coil assembly to the air handler cabinet.
NOTE: Take care not to damage the refrigerant tubing when raising the coil assembly into place.
21. Lift the filter channels until they clear the front of the cabinet and push them outward until they are against the cabinet insulation. Install the 4 screws that attach them to the sides of the cabinet.
22. Re-attach the air handler to the wall and supply duct if applicable.
23. Connect the blower motor wiring harness plug into the mating plug located under the right side of the control box.
24. Remove the cardboard from above the coil.
25. Slide the air filter into the filter rack and install the filter cover panel.
NOTE: Make sure the filter flow arrows point toward the coil.
26. Install the blower/control box access panel.
27. Follow the instructions as shown in **Section 4: Startup and Shutdown Section in the Users Information Manual** section of this manual to properly start up the air handler.

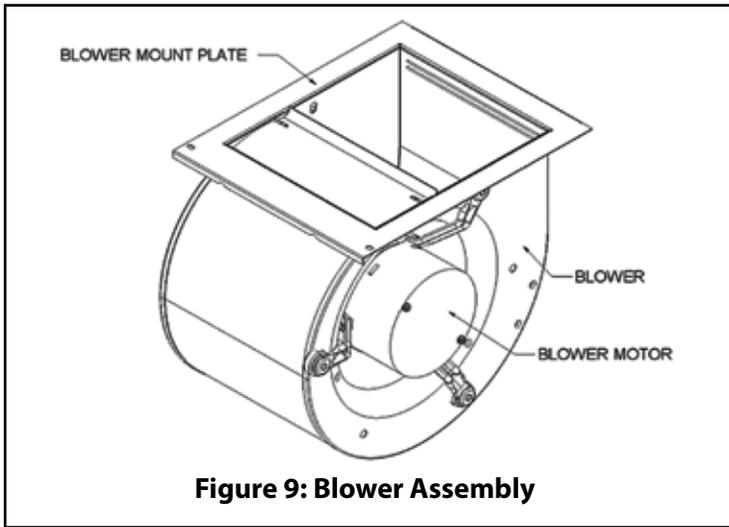


Figure 9: Blower Assembly

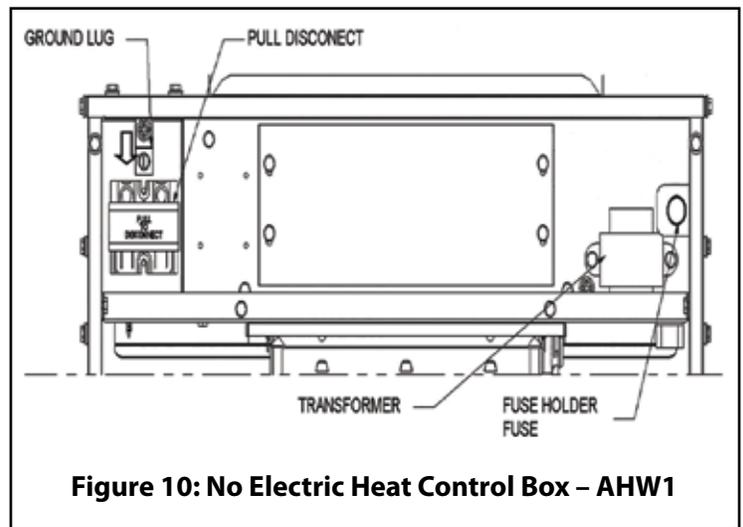


Figure 10: No Electric Heat Control Box – AHW1

SECTION 3: AIR HANDLER CONTROLS

ELECTRIC HEAT AND NO HEAT MODELS

This section discusses the air handler controls and how they operate. Refer to Figures 10 and 11 for component locations.

Limit Control(s) – Each electric heater element has an overtemperature limit control directly in front of it to sense overheating of the element. The limit electrical contacts open if the temperature rises above the set point of the limit control and interrupts the 24 VAC signal to the heater contactor coil which de-energizes the heater element. When the temperature of the element cools sufficiently for the limit control to reset, the heater elements are re-energized and the heater cycles until the cause for the overheating is corrected.

Heater Contactor(s) – The electric heater contactor turns the heater elements on and off. The contactor is controlled by the thermostat. On a call for heat by the thermostat, 24 VAC is applied to the 24 VAC coil of the contactor causing the electrical contacts of the contactor to close which energizes the heater elements.

Transformer – The transformer is used to reduce line voltage from 208 – 240 VAC to 24 VAC. The transformer provides the required 24 VAC for the system control circuit.

Pull-Out Electrical Disconnect – The non-fused pull-out electrical disconnect is designed to disconnect the supply voltage from the air handler internal electrical components when the pull handle is manually removed from the body. Field wiring and air handler wiring must be protected by field supplied circuit breakers or fuses (overcurrent protection) that are sized to protect the wire connected to and inside the air handler. Refer to the air handler data plate for the maximum overcurrent protection rating.

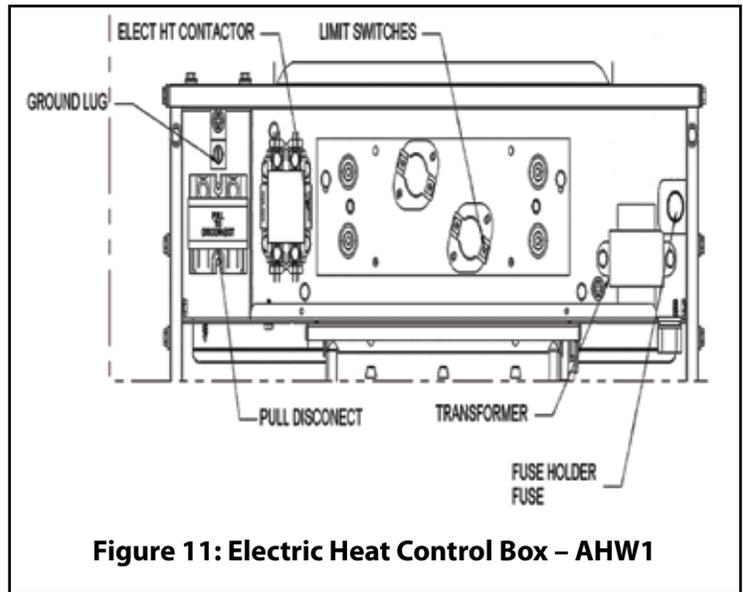


Figure 11: Electric Heat Control Box – AHW1

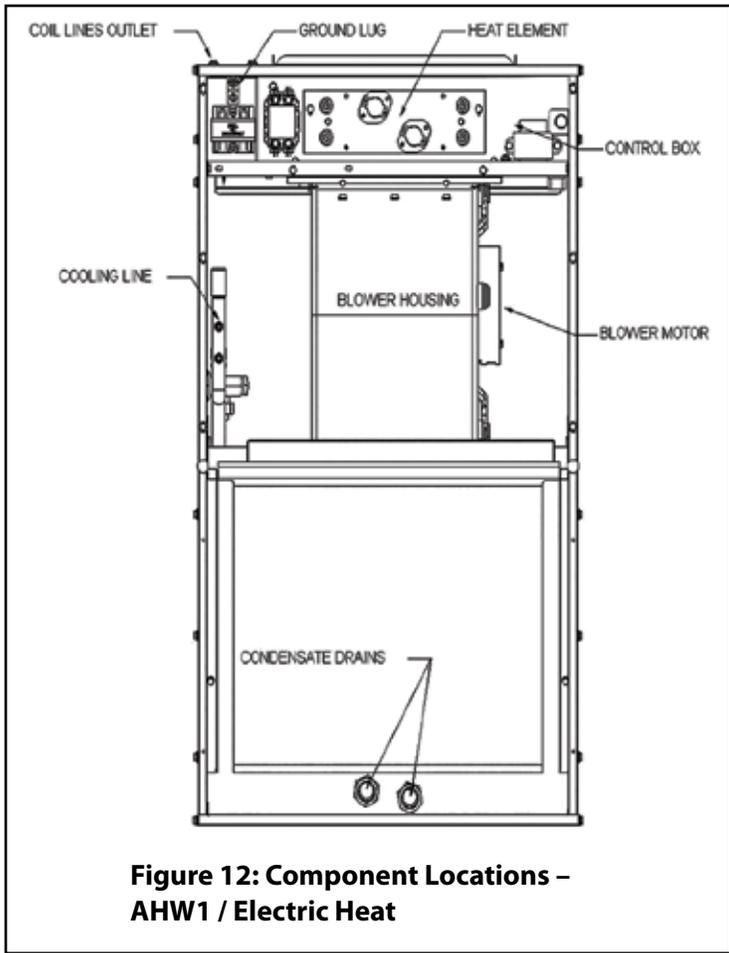


Figure 12: Component Locations – AHW1 / Electric Heat

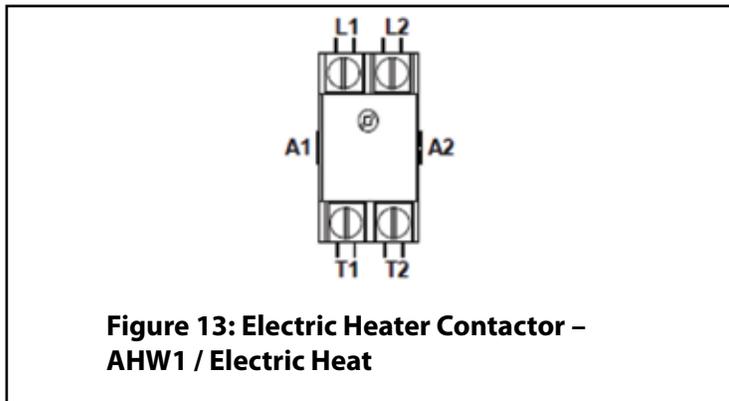


Figure 13: Electric Heater Contactor – AHW1 / Electric Heat

HYDRONIC HEAT MODELS

This section discusses the controls for hydronic heat models and explains how they operate. Refer to Figures 14 and 16 for component locations.

Transformer – The transformer is used to reduce the line voltage from 115 VAC to 24 VAC. The transformer provides the required 24 VAC for the system control circuit.

Hydronic Control Board (See Figure 16) – The hydronic control board is used on all hydronic models. This control board has on-board relays for blower motor control on models with constant torque motors and has an on-board pump relay that controls the pump function.

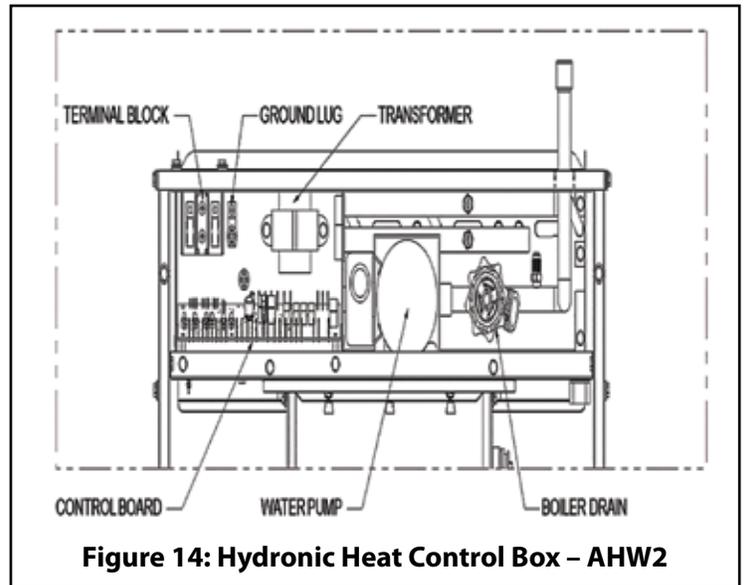


Figure 14: Hydronic Heat Control Box – AHW2

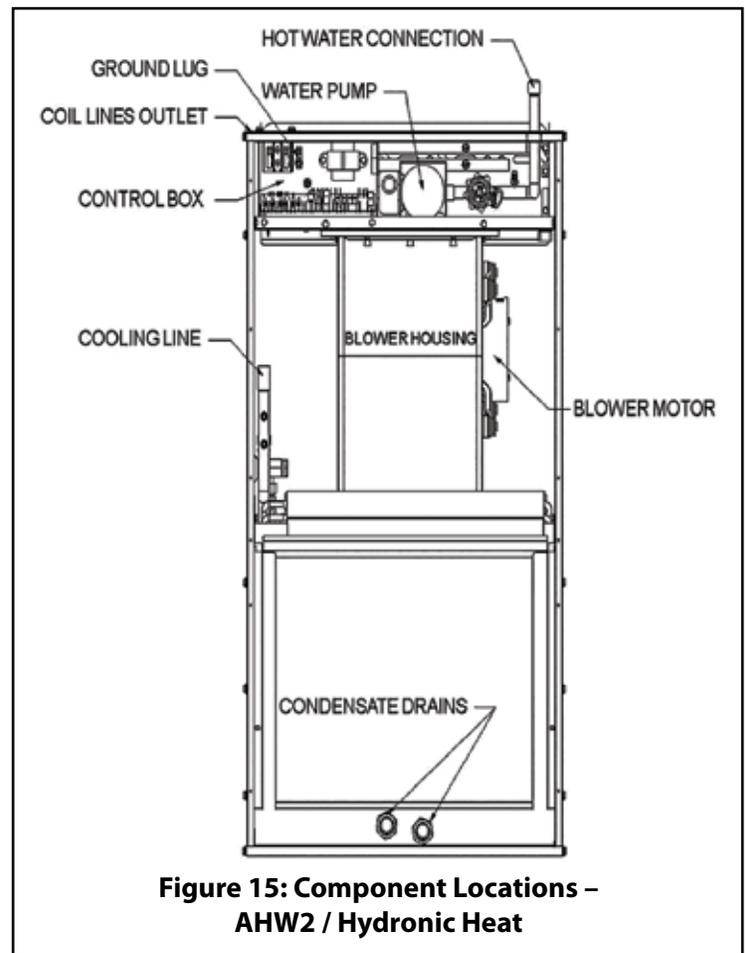


Figure 15: Component Locations – AHW2 / Hydronic Heat

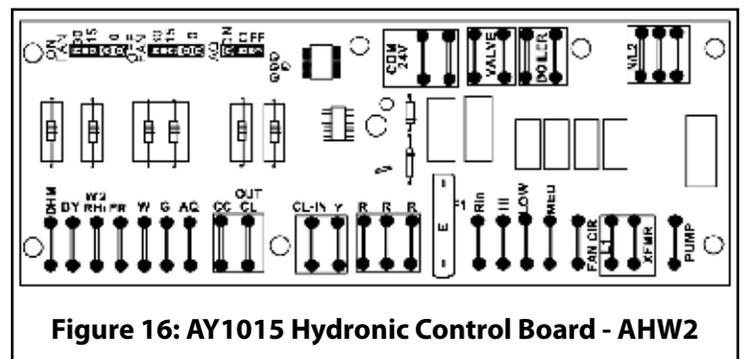


Figure 16: AY1015 Hydronic Control Board - AHW2

Hydronic Control Board Terminals and Descriptions

ICM AY1015 - Mortex Part No. 68AE0011 - The terminals and functions are explained below.

Line Voltage Terminals AY1015

L1 – Supply Voltage (115 VAC) to the control

L2 – Supply Neutral (115 Neutral) to the control

XFMR and L2 – 115 VAC supply to transformer

Pump and L2 – 115 VAC to the water pump

24 VAC Terminals AY1015:

Rin – 24 VAC supply from the transformer

24V COM – 24 VAC common from the transformer

R – Fused 24 VAC output connections

Y – Connect to the thermostat Y terminal

CC – connection between Y and CC AQ – 24 VAC from aquastat temperature switch G – 24 VAC from thermostat G terminal

CLin & Clout – connection between Y and CC AQ – 24 VAC from aquastat temperature switch G – 24 VAC from thermostat G terminal.

W – 24 VAC from thermostat W terminal

FR – 24 VAC from freeze protection switch

RH/W2 – 24 VAC from thermostat W2 terminal

BY – 24 VAC from the priority switch on tank less heater

DHM – 24 VAC from thermostat DHM terminal

VALVE – 24 VAC and 24V COM to zone valve

BOILER – switch, connect to "T" terminals on boiler aquastat

Hydronic Control Board Terminal Functions

HI & COM – 24 VAC cooling speed tap to blower motor (constant torque models only)

MED & COM - 24 VAC dehumidification speed tap to blower motor (constant torque models only)

LO & COM - 24 VAC heating speed tap to blower motor (constant torque models only)

FAN CIR & COM – 24 VAC continuous fan speed tap to blower motor (constant torque models only)

CLin and Clout – These terminals must be connected to transfer 24 VAC from the Y terminal to the CC terminal. When the compressor lockout switch is used, the switch is secured to the water coil. The two yellow wires are connected to the CLin and the Clout terminals. When the temperature of the water coil reaches 38°F, the switch opens which de-energizes the CC terminal on the control board. When the water temperature has risen above 42°F the compressor lockout switch will close. The control will send 24 VAC to the CC terminal on the control board.

NOTE: If the compressor lockout switch is not used, place a jumper wire between CLin and Clout to get 24 VAC from the Y terminal to the CC terminal. The indoor blower will not be energized in the cooling mode until the CC terminal has 24 VAC at the terminal.

AQ – The aquastat switch is placed on the hot water line exiting side of the air handler coil. The aquastat is connected to the R terminal and the AQ terminal on the control board. The AQ jumper pin shown in Figure 13 must be in the ON position to use this feature. When there is a call for heat (24 VAC on the W terminal) and the water line temperature reaches the aquastat switch setting, the switch will close sending 24 VAC to the AQ terminal turning on the blower motor. The blower motor will not energize until the aquastat switch is closed. When the call for heat has been satisfied, the indoor blower will be de-energized after the selected OFF delay.

VALVE – There are two terminals used to power a 24 VAC zone valve or solenoid valve. The terminal closest to the 24V COM terminals is a 24VAC common terminal to the valve. See Figure 13. The other terminal is the 24 VAC output to the valve. When there are 24 VAC to the W terminal the control board will send 24 VAC to the valve terminals. The VALVE terminals de-energize when the 24 VAC is removed from the W terminal.

BOILER - There are two terminals that are connected to a switch. The terminals do not output any voltage and are dry contacts. The BOILER switch is designed to be connected to the "T" terminals on a boiler aquastat to energize the boiler when the control board has a call for heat (24 VAC on W).

G – When 24 VAC is placed on the G terminal the control will energize the indoor blower by the FAN CIR terminal with NO delay. When the 24 VAC signal has been removed from the G terminal, the indoor blower will be de-energized with NO delay.

If there is a call for heat (24 VAC on the W terminal) while 24 VAC is present on the G terminal, the control will energize the pump, valve and boiler and the indoor fan motor will be de-energized. The indoor fan motor will be energized by the LOW terminal after the selected ON delay. When the call for heat has been satisfied, the control will de-energize the valve, pump and boiler and the indoor fan motor will switch to the FAN CIR speed terminal after the selected OFF delay.

If there is a call for cooling while there is 24 VAC on the G terminal, the control will switch the indoor blower speed to the HI terminal. When the call for cooling has been satisfied, the control will switch the indoor blower back to the FAN CIR speed.

W – When 24 VAC is present on the W terminal, the control will energize the pump, valve and boiler and the indoor fan will be energized by the LOW terminal after the selected ON delay. When the call for heat has been satisfied, the control will de-energize the valve, pump and boiler and the indoor fan motor will be de-energized after the selected OFF delay.

FR – The FR terminal energizes the control board freeze protection. The freeze protection switch is secured to the water coil. The two white wires are connected to the R terminal and to the FR terminal on the control board. When the temperature of the coil is below 38°F, the freeze protection switch closes and sends 24 VAC to the FR terminal. The control will energize the pump, valve and boiler. The control will not energize the indoor fan motor even when there is a call for heat with 24 VAC on the W terminal. When the water temperature has risen above 42°F, the freeze protection switch will open. The control will de-energize the pump, valve and boiler, if there is not a call for heat. If there is a call for heat at the time FR is de-energized, the pump, valve and boiler will remain ON and the control will energize the indoor fan motor with the LOW terminal after the selected ON delay.

RH/W2 – RH is only used for the reheat mode with a thermostat that has the reheat function.

BY – Bypass terminal is used when the heating and domestic hot water system are managed with the same tankless hot water system. The domestic water line has a normally open flow switch that is connected to the R and the BY terminals on the control board. When the domestic water flow switch detects the flow of water, the switch closes sending 24 VAC to the BY terminal. The control will de-energize the PUMP, VALVE, BOILER terminals and the indoor blower. When the domestic water flow

has stopped the domestic water flow switch will open and the PUMP, VALVE, and BOILER terminals will resume normal operation. The indoor blower will be energized after the selected ON delay. The indoor blower will be energized after the selected ON delay. The indoor blower will be energized after the selected ON delay.

Y – When there is a call for cooling (24 VAC is placed on the Y terminal), the control will energize the indoor blower with the HI terminal after the selected ON delay. When the call or cooling has been satisfied, the indoor blower will be de-energized after the selected OFF delay.

DHM – IMPORTANT NOTE: AHW2 air handlers are not set up for cooling mode dehumidification. Connecting a humidistat to the DHM terminal will cause the indoor blower to shut off in the cooling mode upon a call for dehumidification resulting in the indoor coil freezing up and outdoor unit compressor failure.

SECTION 4: SEQUENCE OF OPERATION

Continuous Blower – Electric Heat Models

The thermostat has a manual fan switch that can be moved to the “ON” position for continuous fan position. This setting causes the thermostat to complete the circuit between “R” and “G” thermostat terminals. This sends 24 VAC to the selected indoor blower motor speed tap for the continuous fan mode (RED motor speed tap wire). The indoor blower will operate continuously until the fan switch on the thermostat is switched from “ON” to the “AUTO” setting which will cause the constant torque blower motor to be de-energized after a 30 second OFF time delay that is programmed into the motor’s control module.

Continuous Blower – Hydronic Heat Models

The thermostat has a manual fan switch that can be moved to the “ON” position for continuous fan operation. This causes the thermostat to complete the circuit between “R” and “G” thermostat terminals sending 24 VAC to the “G” terminal on the hydronic control board. The hydronic control board will then energize the “FAN CIR” terminal which sends 24 VAC to the selected indoor blower motor speed tap for the continuous fan mode (BLUE motor speed tap wire). The indoor blower will operate continuously until the fan switch on the thermostat is switched from “ON” to the “AUTO” setting. When the thermostat is switched back to “AUTO”, the blower motor motor’s control module.

Intermittent Blower – Cooling - Electric Heat Models

The thermostat has a manual fan switch that can be moved to the “AUTO” position for intermittent fan operation. When the thermostat calls for cooling on models with constant torque motors, the circuit is completed between the “R”, “Y” and “G” terminals causing the motor to operate on the selected speed tap for the cooling mode (BLACK motor speed tap wire). When the thermostat is satisfied, the circuit between “R”, “Y” and “G” will open, the blower motor will shut down after a 30 second OFF delay which is programmed into the motor control module.

Intermittent Blower – Cooling - Hydronic Heat Models

The thermostat has a manual fan switch that can be moved to the “AUTO” position for intermittent fan operation. When the thermostat calls for cooling, the circuit is completed between the “R”, “Y” and “G” terminals sending 24 VAC to the hydronic control board through the “Y” and “G” terminals. The blower motor will

be energized on the selected cooling speed (BLACK motor speed tap wire) through the “HI” terminal on the control board after the selected ON time delay. When the thermostat is satisfied, the circuit between “R”, “Y” and “G” opens. The hydronic control board will de-energize the “HI” terminal on the control board after the selected OFF time delay on the hydronic control board and the blower motor will shut down. The blower is now in the stand-by mode awaiting the next cooling cycle.

Intermittent Blower - Heating - Electric Heat Models

When the thermostat is set to 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” terminal on the thermostat, through the white thermostat wire, the white pigtail wire on the air handler to the 24 VAC coil on the first heater contactor. This signal energizes the heater contactor, closing the contacts and sending 208 - 240 VAC to the heaters. The 24 VAC signal from the “W” thermostat terminal will also energize the motor’s selected heating speed tap (RED motor speed tap wire). When the call for heat has ended, the “W” thermostat terminal is de-energized which will de-energize the motor and open the heater contactor contacts. The air handler is now in the stand-by mode awaiting the next heating cycle.

Intermittent Blower - Heating - Hydronic Heat Models

When the thermostat is in the HEAT mode and the fan switch on the thermostat is set to AUTO, a call for heat closes the thermostat circuit between the “R” and “W” terminals. 24 VAC is sent from the “W” terminal on the thermostat through the white thermostat wire that is connected to the “W” terminal on the air handler hydronic control board. The hydronic control board then energizes the water pump relay on the control board which sends 115 VAC to the PUMP terminal. This will energize the water pump and start the circulation of hot water through the water coil. The hydronic control board energizes the motor on the selected heating speed (RED motor speed tap wire) through the LOW speed terminal on the control board after the selected ON time delay. When the call for heat has ended, the “W” terminal is de-energized which opens the control board pump relay contacts shutting down the pump. The blower motor will shut down after the selected OFF time delay. The air handler is now in the stand-by mode awaiting the next heating cycle.

SECTION 5: TROUBLESHOOTING

WARNING

For personal safety be sure to turn the electrical power "OFF" at the main entrance (Circuit Breaker Box) and at the control box circuit breakers before attempting any service or maintenance operations. Homeowners should never attempt to perform any maintenance which requires opening the air handler control box cover.

WARNING

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

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.

The following checks should be made before troubleshooting the air handler controls when the blower does not operate or there is a no-heat or no-cooling issue.

1. Check all circuit breakers in the air handler and at the building main electrical panel. Make sure they are turned to the "ON" position and have not tripped.
2. Check all fuses, especially any supply line fuses that were installed during installation, 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 air handler to make sure they are turned on, especially ON/OFF switches used for servicing the air handler. The service switch is often mistaken for a light switch and is turned off.
4. Check all wiring connections, especially those on the components, to ensure they are securely fastened.

ELECTRIC HEAT MODELS

If the air handler is equipped with electric heaters, check to make sure there is 208 - 240 VAC between the terminals on the load side of the circuit breakers in the control box . If 208-240 VAC is not present, check to see if the circuit breaker(s) in the air handler control box or in the building breaker box are tripped. If 208-240 VAC is present on the load side of the circuit breaker in the control box, check to make sure there is 24 VAC between to the RED thermostat pigtail or "R" low voltage terminal block terminal and ground. If 24 VAC is not present, but there is 208-240 VAC on the load side of the circuit breaker, check to see if the in-line fuse connected to the transformer secondary circuit is blown. If the fuse is not blown, check the wiring and connections from the transformer to the low voltage terminal block or RED low voltage pigtail.

Constant Torque Motor Check – Electric Heat Models

If the blower motor will not run in both the heating and cooling modes and there is 208-230 VAC on the load side of the circuit breaker in the control box, check the connections in the blower motor 6-pin plugs (BMMP and BMFP). If those connections are OK, proceed with the following checks. If the motor is not running, check for 208 - 240 VAC between the L and N motor terminals and for 24 VAC at either the RED or BLACK wires connecting to 2 of the motor terminals 1 - 5 when the thermostat is calling for blower operation. Refer to Figure 17 and Table 1 for terminal locations and definitions. If the 208 - 240 VAC is present between the L and N terminals and 24 VAC is measured between motor terminal C and one of the motor speed tap wires, but the motor is not operating, replace the motor. If 208 - 240 VAC is not present between the L and N motor terminals, check the 6wiring connections to the control board and circuit breaker. If 24 VAC is not present at any of the motor speed tap wires going to the motor terminal block terminals 1 – 5, check the connections to the control board and check to see if the in-line 3A fuse connected to the transformer secondary is blown.

ECM Control Board Check: Voltmeter will not read between pins 4, 5, 7, 11 and 1 or 3 because these signals are not full wave signals. To verify ECM control board is functioning properly in the heating mode check for 24 VAC between pins 1 and 2. To verify ECM board is functioning properly in the cooling mode check for 24 VAC between pins 1 and 6 also 1 and 15. If the ECM control board is OK, replace the motor or motor control module.

Heating Mode – Electric Heat Models - Constant Torque Motor

If 24 VAC is not present between the "W" terminal on the air handler's low voltage terminal block and ground when the thermostat is calling for heat, check the wiring and wiring connections from the thermostat "W" terminal to the "W" terminal on the air handler's low voltage terminal block. If 24 VAC is present on the "W" terminal on the low voltage terminal block, check for 24 VAC on the RED motor speed tap wire connected to the motor terminal block. If 24 VAC is not present on the RED motor speed tap wire, check the wiring and wiring connections between the low voltage terminal block and the blower motor terminal block. If the wiring and connections are OK, replace the motor.

Cooling Mode or Continuous Fan - Electric Heat Models - Constant Torque Motor

If 24 VAC is not present between the "G" and "C" terminals on the air handler's low voltage terminal block when there is a call for cooling or continuous fan operation, check for 24 VAC between the "R" and "C" terminals on the thermostat. If 24 VAC is not present at the thermostat "R" terminal, check the wiring from the "R" terminal on the air handler's low voltage terminal block to the thermostat. If there is 24VAC at the thermostat "R" terminal, but not at the "G" terminal on the thermostat when there is a call for cooling or continuous fan operation, replace the thermostat. If there is 24 VAC between the "G" and "C" terminals on the air handler's low voltage terminal block, check for 24 VAC on the BLACK motor speed tap wire connected to the motor terminal block. If 24 VAC is not present on the BLACK motor speed tap wire, check the wiring and wiring connections between the low voltage terminal block and the blower motor terminal block. If the wiring and connections are OK, replace the motor.

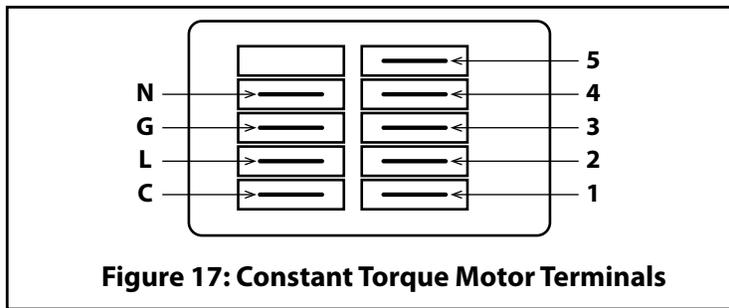


Figure 17: Constant Torque Motor Terminals

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 Descriptions - AHW1 / Electric Heat

Terminal	Connection
C	Speed Tap Common - 24 VAC Common
L	Supply Voltage - 115 VAC
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 2: Constant Torque Motor Terminal Descriptions - AHW2 / Hydronic Heat

MODEL	HP	Indoor Blower Codes	Voltage	FLA
AHW1	1/3	LM	208/240	0.77 / 0.74
AHW1	1/3	LG	208/240	1.66 / 1.58
AHW1	1/2	LI	208/240	2.52 / 2.40
AHW2	1/2	LK	115	1.91
AHW2	1/2	LL	115	2.70

Table 3: Blower Motor FLA

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.

Replacing the Blower Motor

- Follow the instructions exactly as shown in the **Startup and Shutdown Section in the Users Information Manual** section of this manual to properly shut down the air handler.
- WARNING: Electrical power must be disconnected to the air handler before performing this procedure!**
- Remove the blower/control box access panel on the front of the air handler.
- Unscrew the white thumb screws that secure the air filter cover panel to the air handler and remove the filter cover panel and filter.
- Disconnect the blower motor wiring harness plug from the mating plug located under the right side of the control box.
- Place a piece of cardboard (or equivalent) on top of the coil to prevent dirt or debris from falling onto the coil and to protect the coil while removing and reinstalling the blower assembly.
- Remove the 2 screws that attach the blower housing assembly to the blower deck that are located under the control box on each side of the blower.
- Remove only the 4 screws (2 on each side) nearest the front of the air handler that attach the filter channels to side of the cabinet. These are located on the outside of the air handler cabinet.
 - NOTE:** Do not remove the 2 screws (1 screw on each side) nearest the rear of the air handler as this will make re-attaching the filter channels more difficult.
 - NOTE:** If sides of air handler are not accessible in a wall mount installation, it will need to be detached from the wall and supply duct and then pulled out of the wall enough to remove the filter channel screws.
- Remove the 2 screws that attach the top of the coil assembly to the sides of the air handler cabinet.
- While supporting the coil, push the top of the filter rack channels inward to clear the air handler cabinet and allow the top of the coil to drop enough for the blower housing to clear the coil assembly.
 - NOTE:** Take care not to damage the refrigerant tubing when lowering the coil assembly.
- Slide the blower assembly out of the air handler.
- Loosen the set screw on the blower wheel hub that secures the wheel to the motor shaft. Make sure the wheel slides freely up and down the shaft. If it doesn't, push the wheel against the motor housing as far as it will go. Locate the burr on the shaft and file the shaft until the burr is removed.
- Remove the bolts that secure the motor to the blower housing and remove the blower motor.
- Slide the new blower motor shaft through the hub in the blower wheel until the mounts are setting on the blower housing.
- Turn the motor until the holes in the rubber motor mounts line up with the screw holes in the blower housing.
- Insert the screws into the screw holes and tighten all screws until the motor is securely fastened to the blower housing.
- Center the blower wheel in the housing and tighten the set screw to the flat side of the motor shaft.
 - NOTE:** Make sure the blower wheel setscrew is sitting on the flat side of the motor shaft.
- Slide the blower mount plate (See Figure 18) into the track under the blower deck until it stops and install the 2 screws that attach the blower assembly to the blower deck.

18. Lift the top of the coil assembly and install the 2 screws that attach the top of the coil assembly to the air handler cabinet.
NOTE: Take care not to damage the refrigerant tubing when raising the coil assembly into place.
19. Lift the filter channels until they clear the front of the cabinet and push them outward until they are against the cabinet insulation. Install the 4 screws that attach them to the sides of the cabinet.
20. Re-attach the air handler to the wall and supply duct if applicable.
21. Connect the blower motor wiring harness plug into the mating plug located under the right side of the control box.
22. Remove the cardboard from above the coil.
23. Slide the air filter into the filter rack and install the filter cover panel.
NOTE: Make sure the filter flow arrows point toward the coil.
24. Install the blower/control box access panel.
25. Follow the instructions as shown in **Section 4: Startup and Shutdown Section in the Users Information Manual** section of this manual to properly start up the air handler.

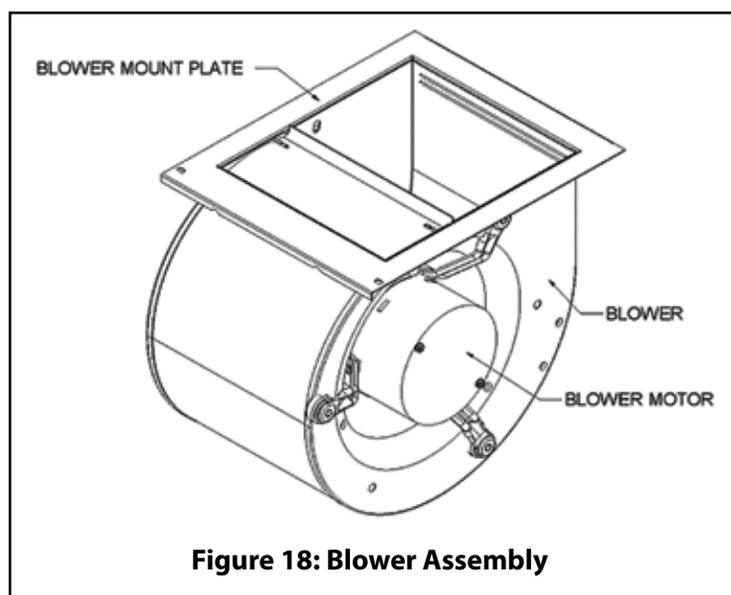


Figure 18: Blower Assembly

SECTION 6: BLOWER PERFORMANCE

Cabinet Size	Blower Housing	Motor HP	Blower Code	Motor Volts	Evap. CoilFHxFL	Motor Tap	CFM @ External Pressure In-WC (Watts/1000cfm)									
							0.10		0.20		0.30		0.40		0.50	
							CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts
22"Wx18 3/4"Dx36"H (Electric Heat)	10x7T	1/3	LM	240	18.194x17.75 (4R, .827x.625, 5/16")	5	957	{198}	899	{213}	842	{231}	781	{266}	722	{293}
							[185]	[192]	[195]	[208]	[212]	[293]				
						4	898	{176}	839	{196}	778	{226}	765	{236}	717	{259}
							[158]	[165]	[176]	[181]	[186]	[259]				
						3	779	{146}	734	{163}	680	{185}	618	{211}	545	{249}
[114]	[120]	[126]	[131]	[136]	[249]											
2	713	{129}	663	{150}	600	{173}	523	{208}	484	{235}						
	[92]	[100]	[104]	[109]	[114]	[235]										
1	585	{104}	545	{123}	460	{156}	385	{194}	308	{263}						
	[61]	[67]	[72]	[75]	[79]	[263]										
22"Wx18 3/4"Dx36"H (Electric Heat)	10x7T	1/3	LG	240	18.194x17.75 (4R, .827x.625, 5/16")	5	1248	{275}	1218	{286}	1213	{292}	1183	{300}	1129	{299}
							[343]	[348]	[354]	[355]	[338]	[299]				
						4	1079	{205}	1062	{210}	1045	{224}	1003	{238}	966	{260}
							[221]	[223]	[234]	[239]	[251]	[260]				
						3	1007	{176}	993	{187}	969	{196}	930	{215}	878	{237}
[177]	[186]	[190]	[200]	[208]	[237]											
2	878	{137}	851	{146}	811	{165}	757	{184}	706	{213}						
	[120]	[124]	[134]	[139]	[150]	[213]										
1	825	{125}	784	{140}	748	{157}	689	{178}	640	{206}						
	[103]	[110]	[117]	[123]	[132]	[206]										
22"Wx18 3/4"Dx36"H (Electric Heat)	10x8T	1/2	LI	240	21.50x17.75 (4R, .827x.625, 5/16")	5	1396	{300}	1340	{297}	1288	{297}	1288	{300}	1206	{298}
							[419]	[398]	[383]	[387]	[360]	[298]				
						4	1340	{276}	1307	{282}	1288	{288}	1254	{291}	1177	{294}
							[370]	[369]	[371]	[365]	[346]	[294]				
						3	1250	{246}	1219	{258}	1204	{261}	1181	{273}	1112	{291}
[307]	[315]	[314]	[322]	[323]	[291]											
2	1086	{195}	1065	{200}	1034	{212}	978	{235}	930	{260}						
	[212]	[213]	[219]	[230]	[242]	[260]										
1	1025	{176}	1002	{182}	974	{197}	909	{225}	846	{248}						
	[180]	[182]	[192]	[205]	[210]	[248]										
22"Wx18 3/4"Dx36"H (Hydronic Heat)	10x8T	1/2	LK	120	21.50x17.75 (4R, .827x.625, 5/16")	5	947	{267}	888	{292}	860	{310}	787	{351}	724	{387}
							[253]	[259]	[267]	[276]	[280]	[387]				
						4	911	{245}	859	{268}	802	{294}	732	{329}	656	{380}
							[223]	[230]	[236]	[241]	[249]	[380]				
						3	820	{210}	763	{236}	690	{274}	609	{314}	535	{368}
[172]	[180]	[189]	[191]	[197]	[368]											
2	733	{191}	661	{228}	588	{260}	564	{278}	502	{321}						
	[140]	[151]	[153]	[157]	[161]	[321]										
1	613	{148}	542	{177}	471	{217}	400	{262}	327	{334}						
	[91]	[96]	[102]	[105]	[109]	[334]										
22"Wx18 3/4"Dx36"H (Hydronic Heat)	12x8T	1/2	LL	120	21.50x17.75 (4R, .827x.625, 5/16")	5	1224	{303}	1169	{323}	1111	{345}	1050	{371}	985	{400}
							[371]	[377]	[383]	[390]	[395]	[400]				
						4	1154	{278}	1098	{294}	1036	{323}	973	{350}	903	{379}
							[321]	[323]	[334]	[340]	[342]	[379]				
						3	1081	{252}	1015	{276}	951	{298}	886	{326}	812	{361}
[272]	[280]	[283]	[289]	[293]	[361]											
2	1026	{232}	956	{248}	887	{274}	812	{308}	730	{350}						
	[238]	[237]	[243]	[250]	[255]	[350]										
1	950	{206}	876	{233}	801	{259}	717	{293}	627	{345}						
	[195]	[204]	[207]	[259]	[935]	[345]										

Table 4: Blower Performance Chart – Without Air Filters

Minimum CFM for Electric Heat: 3kW = 195 CFM; 5kW = 325 CFM; 6kW = 390 CFM; 8kW = 520 CFM; 10kW = 650 CFM

SECTION 7: FIELD INSTALLED ACCESSORIES

Part Number	Description
R72DB0001	Field Installed TXV (R-22) - 1.5-3.0 Ton
R72DB0002	Field Installed TXV (R-22) - 3.0-5.0 Ton
R72DB0003	Field Installed TXV (R-410) - 1.5-2.5 Ton
R72DB0004	Field Installed TXV (R-410) - 3.0-5.0 Ton
Hydronic Heat Models	
68AC0002	Field Installed Replacement Pump Timer for Hydronic Coil Purge
R78AA0006	4 GPM Water Pump
RPA-01	Remote Pump Assembly 4 GPM 1/2" Pipe
RPA-02	Remote Pump Assembly 4 GPM 3/4" Pipe
RPA-03	Remote Pump Assembly 7 GPM 3/4" Pipe
R86AHW006	2 Row Hot Water Coil Assembly
R86AHW007	3 Row Hot Water Coil Assembly
R86AHW005	4 Row Hot Water Coil Assembly
R74BB0001	Brass Boiler Drain
R86WM3902	Louvered Door / Frame Assembly - Hydronic Models
R86WM3902	Solid Door / Frame Assembly - Hydronic Models
R86WM3904	1/2-120 VAC - 10 x 8T Blower Assembly - Hydronic Models
R86WM3901	1/2-120 VAC - 12 x 8T Blower Assembly - Hydronic Models
Electric Heat Models	
R86WM3611	Louvered Door / Frame Assembly - Electric Models
R86WM3612	Solid Door / Frame Assembly - Electric Models
R86WM3607	1/3-208/240 VAC - 10 x 7T Blower Assembly - Electric Models
R86WM3608	1/2-208/240 VAC - 10 x 8T Blower Assembly - Electric Models
R86WM3602	3 kW Electric Heat Assembly
R86WM3603	5 kW Electric Heat Assembly
R86WM3604	6 kW Electric Heat Assembly
R86WM3605	8 kW Electric Heat Assembly
R86WM3606	10 kW Electric Heat Assembly

SECTION 8: REPLACEMENT PARTS

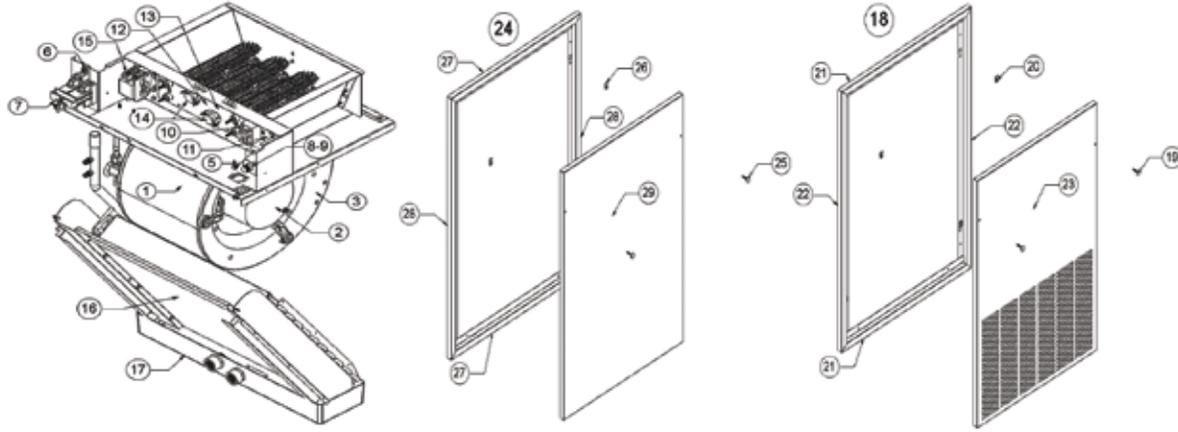


Figure 19: Replacement Parts Schematic – AHW1 / Electric Heat

AHW ELECTRIC HEAT MODELS			
Item Number	Quantity	Part Number	Description
LG / LM Blower Assembly			
1	1	R86WM3607	1/3-208/240-10 X 7T Blower Assembly (Complete Assembly)
2	1	R65BV0063	1/3 HP 208/240V Constant Torque Motor
3	1	R69AD0023	10 x 7T Blower Assembly w/ Wheel 1/2" Hub
4	1	R87WM3615	10 x 7T Blower Plate
LI Blower Assembly			
1	1	R86WM3608	1/2-208/240-10 X 8T Blower Assembly (Complete Assembly)
2	1	R65BV0062	1/2 HP 208/240V Constant Torque Motor
3	1	R69AD0027	10 x 8T Blower Assembly w/ Wheel 1/2" Hub
4	1	R87WM3618	10 x 8T Blower Plate
Control Box			
5	1	R68AA0003	208/240-24V Transformer
6	1	R66GF0022	Ground Lug
7	1	R68BDA030	Pull To Disconnect (Non-Fused)
8	1	R73MH0001	3 Amp Fuse
9	1	R73MHA001	Fuse Holder
10	1	R68AB0001	Fan Relay for Blower Motor
11	1	R68AC0009	Time Delay Relay for Blower Motor
3 kW Electric Heat			
12	1	R86WM3602	3 kW Heat Assembly
13	1	R67AB0023	3 kW Element
14	1	R68CA0002	130°F Limit Switch (Opens at 130°F - Closes at 100°F)
15	1	R68AB0019	Double Pole Electric Heat Contactor - 50 Amp Resistive
5 kW Electric Heat			
12	1	R86WM3603	5 kW Heat Assembly
13	1	R67AB0015	5 kW Element
14	1	R68CA0002	130°F Limit Switch (Opens at 130°F - Closes at 100°F)
15	1	R68AB0019	Double Pole Electric Heat Contactor - 50 Amp Resistive
6 kW Electric Heat			
12	1	R86WM3604	6 kW Heat Assembly
13	1	R67AB0022	6 kW Element
14	2	R68CA0002	130°F Limit Switch (Opens at 130°F - Closes at 100°F)
15	1	R68AB0019	Double Pole Electric Heat Contactor - 50 Amp Resistive
8 kW Electric Heat			
12	1	R86WM3605	8 kW Heat Assembly
13	1	R67AB0016	8 kW Element
14	2	R68CA0002	130°F Limit Switch (Opens at 130°F - Closes at 100°F)
15	1	R68AB0019	Double Pole Electric Heat Contactor - 50 Amp Resistive
10 kW Electric Heat			
12	1	R86WM3606	10 kW Heat Assembly
13	1	R67AB0017	10 kW Element
14	2	R68CA0002	130°F Limit Switch (Opens at 130°F - Closes at 100°F)
15	1	R68AB0019	Double Pole Electric Heat Contactor - 50 Amp Resistive
Slab Coil Assembly			
16	1	R86AHW001	4 Row (88 tube) 22 TH, 18.194" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.24 Sq.Ft
16	1	R86AHW002	4 Row (104 tube) 26 TH, 21.502" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.65 Sq.Ft
16	1	R86AHW003	5 Row (110 tube) 22 TH, 18.194" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.24 Sq.Ft
16	1	R86AHW004	5 Row (110 tube) 22 TH, 18.194" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.24 Sq.Ft
17	1	R71AA0042	21.00"W x 5.355" D - Plastic Drain Pan
Louvered Wall Panel/Door Assembly			
18	1	R86WM3611	Louvered Door/Frame Assembly
19	1	R66AB0002	1/4-20 Thumb Screw
20	2	R66AB0003	Clip For Thumb Screw
21	2	R87WM3620	Bottom, Top Frame
22	2	R87WM3621	Sides Frame
23	1	R87WM3622	Panel Door Louvered
Solid Wall Panel/Door Assembly			
24	1	R86WM3612	Solid Door/Frame Assembly
25	1	R66AB0002	1/4-20 Thumb Screw
26	2	R66AB0003	Clip For Thumb Screw
27	2	R87WM3620	Bottom, Top Frame
28	2	R87WM3621	Sides Frame
29	1	R87WM3623	Panel Door Solid

Table 6: Replacement Parts List – AHW1 / Electric Heat

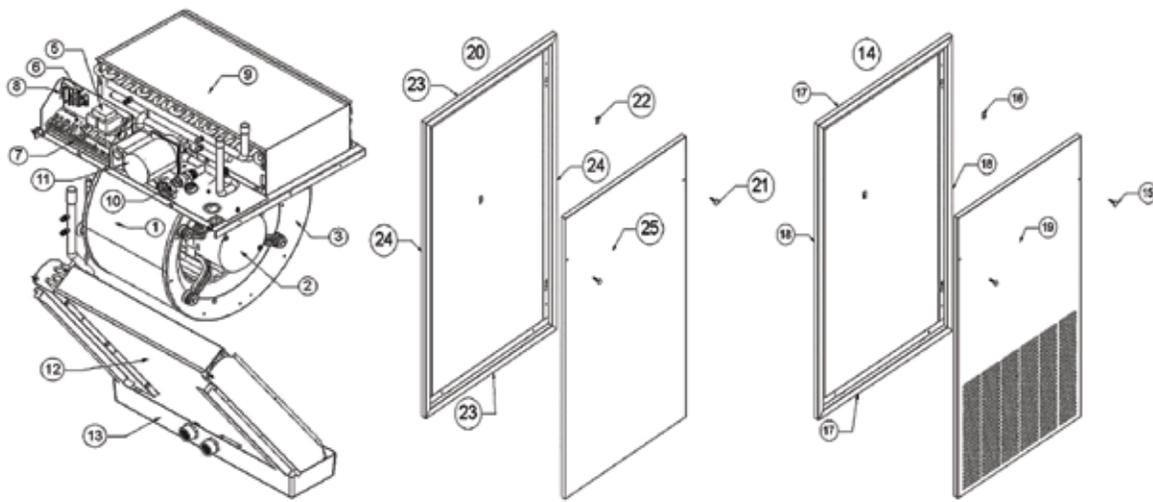


Figure 20: Replacement Parts Schematic – AHW2 / Hydronic Heat

AHW ELECTRIC HEAT MODELS			
Item Number	Quantity	Part Number	Description
LG Blower Assembly			
1	1	R86WM3904	1/2-115 VAC -10 X 8T Blower Assembly (Complete Assembly)
2	1	R65BV0022B	1/2 HP 115 VAC Constant Torque Motor
3	1	R69AD0027	10 x 8T Blower Assembly w/ Wheel 1/2" Hub
4	1	R87WM3618	10 x 8T Blower Plate
LL Blower Assembly			
1	1	R86WM3901	1/2-115 VAC -12 X 8T Blower Assembly (Complete Assembly)
2	1	R65BV0022B	1/2 HP 115 VAC Constant Torque Motor
3	1	R69AD0020	12 x 8T Blower Assembly w/ Wheel 1/2" Hub
4	1	R87WM3632	12 x 8T Blower Plate
Control box			
5	1	R68AA0002	115 VAC-24 VAC Transformer
6	1	R68DC0001	Ground Lug
7	1	R68AE0011	AT1015 Hydronic Control Board
8	1	R68DC0018	2 Pole Power Terminal Block
Hot Water Coils			
9	1	86AHW006	2 Row Hot Water Coil Assembly
9	1	86AHW007	3 Row Hot Water Coil Assembly
9	1	86AHW005	4 Row Hot Water Coil Assembly
10	1	R74BB0001	Brass Boiler Drain
11	1	R78AA0006	4 GPM Water Pump
DX Slab Coil Assembly			
12	1	R86AHW001	4 Row (88 tube) 22 TH, 18.194" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.24 Sq.Ft
12	1	R86AHW002	4 Row (104 tube) 26 TH, 21.502" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.65 Sq.Ft
12	1	R86AHW003	5 Row (110 tube) 22 TH, 18.194" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.24 Sq.Ft
12	1	R86AHW004	5 Row (110 tube) 22 TH, 18.194" FH x 17.75" FL, .827 x .625, 5/16 Rifled, Lanced, 15 FPI (DX), 2.24 Sq.Ft
13	1	R71AA0042	21.00"W x 5.355" D - Plastic Drain Pan
Louvered Wall Panel/Door Assembly			
14	1	R86WM3902	Louvered Door/Frame Assembly
15	1	R66AB0002	1/4-20 Thumb Screw
16	2	R66AB0003	Clip For Thumb Screw
17	2	R87WM3620	Bottom, Top Frame
18	2	R87WM3903	Sides Frame
19	1	R87WM3904	Panel Door Louver
Solid Wall Panel/Door Assembly			
20	1	R86WM3903	Solid Door/Frame Assembly
21	1	R66AB0002	1/4-20 Thumb Screw
22	2	R66AB0003	Clip For Thumb Screw
23	2	R87WM3620	Bottom, Top Frame
24	2	R87WM3903	Sides Frame
25	1	R87WM3905	Panel Door Solid

Table 7: Replacement Parts List – AHW2 / Hydronic Heat