

HEAT CONTROLLER, INC.

**Installation, Operation and
Maintenance Manual**

**AHB13XX-0A Series
Hydronic
Air Handling Units**

HEAT CONTROLLER, INC.

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THE QUALITY LEADER IN CONDITIONING AIR

A. Introduction

Heat Controller Air Handlers come in a variety of models and sizes for upflow or horizontal use and when combined with cooling coils, are ready for air conditioning and heat pump applications.

These instructions are primarily to assist qualified individuals trained and experienced in the proper installation of this type of equipment. Refer to authorities having jurisdiction for additional guidance.

B. Rules for Safe Installation and Operation

1. Read these rules and the instructions carefully. Failure to follow the rules and the instructions could cause a malfunction of the unit, and a possible safety hazard. Keep these instructions nearby the unit for future reference.

2. This unit has been designed and manufactured to comply with National Codes; however, it is the installer's responsibility to install this unit to comply with prevailing codes and regulations. Heat Controller, Inc assumes no responsibility for units installed in violation of any code or regulation.

3. Before servicing, **ALWAYS SHUT OFF ELECTRICITY TO THE UNIT.** This will prevent any electrical shocks.

4. Ground the unit to prevent electric shock. All electrical wiring should be in accordance with the National Electrical Code.

5. Duct work must be installed in accordance with the standards of the National Fire Protection Association (NFPA) for the installation of Air Conditioning, Warm Air Heating and Ventilating Systems (NFPA 90A and 90B). The air distribution duct system should be sized for 0.2 inches of static pressure. See National Environmental Systems Contractors Association Manual K for duct sizing recommendations. Ductwork in non-conditioned spaces must be insulated to prevent formation of condensate and for maximum operating efficiency.

6. The safety testing agency label appearing on the unit covers the unit and factory installed coil(s) only. It does not cover any other equipment.

7. Exterior surface of cabinet may sweat when unit is installed in non-conditioned space such as attic or garage. Installer must provide protection such as full size auxiliary drain pan on all units installed in non-conditioned space such as attic or garage type installations to prevent damage from condensation. It is recommended that units installed in non conditioned space be insulated on the outside with 1" thick fiberglass with the vapor barrier on the outside.

8. While designed to operate quietly when properly installed, several steps should be taken to insure this. Use of isolation pads when mounting unit, flexible duct collars for discharge, and use of acoustical duct liners are all good installation practices that promote quiet operation.

9. Cabinet insulation is rated for R=4.2 (standard). Some jurisdictions require R=6.0 on installations in non-conditioned space. Add insulation 1" thick to exterior of air handler to comply in these jurisdictions, putting the vapor barrier on the outside.

!!!WARNING!!!

HOT WATER CAN SCALD: WATER HEATED TO A TEMPERATURE WHICH WILL SATISFY SPACE HEATING, CLOTHES WASHING, DISH WASHING, AND OTHER SANITIZING NEEDS CAN SCALD AND PERMANENTLY INJURE A PERSON UPON CONTACT. SOME PEOPLE ARE MORE LIKELY TO BE PERMANENTLY INJURED BY HOT WATER. THESE INCLUDE THE ELDERLY, CHILDREN, THE INFIRM, OR PHYSICALLY HANDICAPPED. IF ANYONE USING HOT WATER IN A HOME FITS INTO ONE OF THESE GROUPS, OR IF THERE IS A LOCAL CODE OR STATE LAW REQUIRING A CERTAIN MAXIMUM TEMPERATURE WATER AT THE HOT WATER TAP, THEN SPECIAL PRECAUTIONS MUST BE TAKEN. IN ADDITION TO USING THE LOWEST POSSIBLE TEMPERAATURE SETTING THAT SATISFIES HOT WATER NEEDS, SOME TYPE OF TEMPERING DEVICE SUCH AS A MIXING VALVE, MUST BE USED TO ENSURE THAT PEOPLE WHO MIGHT BE ADVERSELY AFFECTED ARE NOT SUBJECTED TO HARMFUL WATER TEMPERATURES.

C. Unpacking the Unit

The unit should be unpacked on receipt and if damage is found, a claim should be made immediately to the shipping carrier. This is the responsibility of the entity receiving the equipment. The air handler is completely assembled, as received. Electric power, thermostat wiring, water piping, refrigerant piping and duct connections are needed to complete an installation. Additionally, a drain connections will be needed.

Check the rating plate for unit size, voltage, phase etc. to make sure unit meets your requirements.

D. Physical Installation

MINIMUM CLEARANCES

These units have a 0" minimum clearance to combustible materials rating from all cabinet surfaces. The unit should be installed with serviceability clearance of 30" from the front of the unit. The unit can be serviced entirely from the front, including replacing the filter. **Be sure and route primary and secondary drain connections so as not to obstruct filter replacement.**

ARRANGEMENT

Unit is shipped from the factory arranged to be installed in a vertical upflow or horizontal right to left airflow position (standard) or field convertible to a horizontal left to right airflow position.

Upflow Application

In an upflow installation the discharge outlet is at the top. Care should be taken to ensure unit is level to permit proper condensate drainage. Normal upflow installation will be in a basement or closet. If installed in a closet, the closet should have a platform framed in, with an opening on top of the platform centered in the closet. Connect the supply air outlet to a warm air plenum. Install return air grilles from outside the closet to space below the platform. Platform must be at least 10" above the floor. Run all supply and return ductwork in accordance with local codes.

Caution!! A "P" trap must be installed in the coil drain line! Cap unused drain fittings.

Horizontal application

Horizontal application will normally be used in an attic or crawl space. This type installation requires a return air duct be attached to the air handler inlet. The opposite end of the return air duct is attached to a return air filter grill through the ceiling or wall. Remove filter from unit if filter grill is used. The unit is shipped in right to left configuration. **(Warning! To ensure unit will not interfere with drains and refrigerant lines modification must be made prior to installing these lines).** For left to right applications.

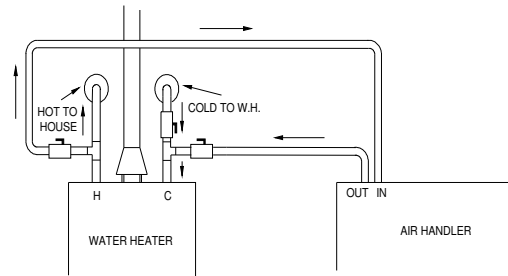
1. Remove and set aside front panels.
2. Remove the coil support bracket (4-screws).
3. Remove horizontal drain pan retaining clip (1-screw).
4. Carefully remove coil assembly and bottom drain pan.
5. Move horizontal drain pan from left hand side of coil to right side.
6. Install modified coil assembly back into unit.
7. Reinstall coil support bracket and horizontal drain pan retaining clip.
8. Determine drain holes being used and reposition knockout caps.
9. Reinstall doors.

CAUTION: IT IS MANDATORY TO USE AN EMERGENCY AUXILIARY DRAIN PAN WITH ANY COIL OR AIR HANDLER INSTALLED IN AN ATTIC OR ABOVE A FINISHED CEILING!
E. PIPING

Do not exceed 70 feet of piping between the air handler and water heater. The water heater must be installed in accordance with its installation instructions and local codes and should be as close to the unit as practical, with the piping system for the air handler as short as possible. The air handler/water and water heater must be located indoors and not subject to freezing temperature. If water lines pass through an unconditioned space, they must be protected so as to prevent freezing. See section on Low Temperature Protection for Operational Coil Protection.

WARNING

AIR HANDLER MUST BE LOCATED SO THAT IF ANY CONNECTIONS SHOULD LEAK, WATER WILL NOT CAUSE DAMAGE TO THE ADJACENT AREA. IF DAMAGE MAY BE POSSIBLE, A SUITABLE DRAIN PAN MUST BE INSTALLED UNDER THE AIR HANDLER, NOT OVER 1½ INCHES DEEP, WITH MINIMUM LENGTH AND WIDTH AT LEAST TWO INCHES GREATER THAN THE AIR HANDLER DIMENSIONS AND CONNECTED TO AN ADEQUATE DRAIN. THE MANUFACTURER ASSUMES NO RESPONSIBILITY FOR ANY WATER DAMAGE IN CONNECTION WITH THIS AIR HANDLER.



Typical water heater application (circulating pump to air handler not shown)

Total piping footage should not exceed 140 feet. All piping should be ¾" copper or approved plastic. It is recommended that a water shut off valve for the water heater be located close to the water heater. Isolation Valves are recommended also. See diagram above. All valves are supplied by others. It is recommended that any installed devices, which could create a closed system, have a by-pass and/or the system have an expansion tank to relieve the pressure built by thermal expansion in the water system. Contact the local water supplier and/or plumbing contractor for assistance. This air handler is designed to be used with a potable water system.

WARNING

TOXIC CHEMICALS SUCH AS USED FOR FREEZE PROTECTION, BOILER TREATMENT OR NONPOTABLE WATER HEATING APPLIANCES MUST NEVER BE INTRODUCED INTO A POTABLE WATER/SPACE HEATING SYSTEM.

WARNING

IF THE SYSTEM REQUIRES WATER AT TEMPERATURES HIGHER THAN REQUIRED FOR OTHER USES, A TEMPERING MEANS, SUCH AS A MIXING VALVE, MUST BE INSTALLED TO TEMPER THE WATER FOR THOSE OTHER USES IN ORDER TO REDUCE SCALD HAZARD POTENTIAL. MIXING VALVES ARE AVAILABLE AT PLUMBING SUPPLY OR HARDWARE STORES. FOLLOW

MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION OF THESE VALVES.

After piping has been installed, fill the system with water and check connections for leaks. To ensure complete filling of the system follow start-up procedure section.

E. POWER WIRING

Refer to the unit's nameplate for specific electrical data.

CAUTION! DISCONNECT POWER AT MAIN FUSE OR CIRCUIT BREAKER DISTRIBUTION PANEL BEFORE WIRING UNIT TO PREVENT SHOCK OR FIRE HAZARD.

Use copper conductors only.

Tighten all wire connectors. Refer to unit nameplate for minimum circuit ampacity. For correct wire size, refer to the National Electrical Code. Use 75°C minimum wire in unit wiring compartment.

NOTE: SEE UNIT FOR COMPLETE WIRING DIAGRAM LOCATED ON BLOWER HOUSING.

F. CONTROL WIRING

Field connections are made to the low voltage terminal strip. Consult installation instructions provided with accessory items for specific information on control wiring. Use 18 AWG minimum copper control conductors for control wiring up to 50 feet between units. 16 AWG control conductors are recommended for lengths up to 100 feet. Class 2 wiring is acceptable. Do not short control leads. Transformer burn-out will result. Set thermostat heat anticipator at 0.15 amps for air handler.

G. BLOWER MOTOR

Units are equipped with a three-speed blower motor. Two factory-selected motor speed leads are connected to the fan relay (FR) to provide automatic speed change for heating and cooling airflow volumes. The pre-selected motor speeds would normally not have to be changed in the field. All AHB models contain a blower "ON" time delay (BDR) as well as a post purge timer (TDR) that delays the blower turning off at the end of the cooling cycle, this improves energy efficiency. Terminal number 4 on the (FR) fan relay is the cooling blower speed and terminal number 6 on the (FR) is the heating blower speed.

H. REFRIGERANT PIPING

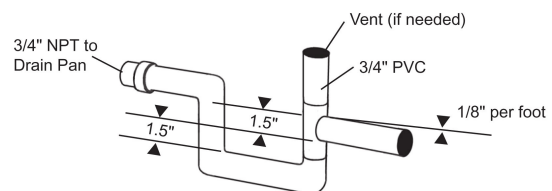
All air handlers have DX refrigerant cooling coils installed, liquid and suction piping should be sized in accordance with condensing unit manufacturer's recommendations. An adapter (by others) may be required to make the transition between the line set and the coil connector. The evaporator coil has sweat copper connections. The suction line is a swaged solder cup connection. The liquid line connection is made to a tail piece portion of the TXV. Remove the nut on the inlet to the expansion valve and place it on the tail piece prior to brazing the liquid line. DO

NOT connect the tail piece to the TXV until the liquid line has been brazed to the tail piece. Refrigerant lines should be soldered with silver solder or other high temperature brazing alloy. Dry nitrogen must flow through the refrigerant lines during the brazing operation to prevent oxidation.

I. REFRIGERANT FLOW CONTROL

As shipped, the TXV installed on the A-coil is for the nominal capacity of a 13 SEER matched with Heat Controller Inc. condensing units. The TXV is for use on an R-22 system. For other refrigerants, contact the factory. TXV has a built-in check valve for reverse flow and is suitable for heat pump operation. All are externally equalized with non-adjustable superheat and have 15% bleed. Hard start capability for outdoor units is not normally required when a 15% bleed valve is used. The external equalizer line attached to the TXV has a female flare nut and is attached to the suction line at the coil. Install the TXV bulb to the suction line using the bulb clamp furnished with the kit. The bulb should be installed on a horizontal run of the suction line if possible. On a line less than 7/8" OD, the bulb may be installed on top of the line. With 7/8" OD or over, the bulb should be installed in a position of about 4 or 8 o'clock. If the bulb installation is made on a vertical run, the bulb should be located at least 6 inches from any bend and on the tubing side opposite the plane of the bend. On vertical bulb installations, the bulbs should be positioned with the bulb capillary tube at the top. The bulb must be insulated using thermal insulation to protect it from the effects of the surrounding ambient temperature.

J. CONDENSATE DRAIN



The air handler drain pan has 3/4" FPT primary and secondary connections whether used in an upflow or horizontal configuration. Piping from each stub is to have a 1 1/2" minimum trap and each run pitched so as to provide for adequate drainage and secondary fittings together into a common drain. When an air handler is installed above a finished ceiling, an auxiliary drain pan must be provided under the unit as required by most local building codes. The secondary drain must be piped to a location that would provide the occupant a warning if the primary drain is blocked.

K. AIR FILTER

Air handlers are factory equipped with an air filter. If the return grille has its own filter, the filter installed in the air handler should be removed. Air filter should be inspected and cleaned or replaced as often as is necessary to prevent restriction of air flow

(minimum every three months for normal installations). Always replace the filter with the same type originally furnished.

L. CHECK TEST AND START UP

The unit should be tested after the system has been completely installed to determine proper operation.

NOTE: HEATING SYSTEM SHOULD NOT BE SWITCHED ON UNTIL SYSTEM IS FILLED AND HOT WATER COIL IN THE AIR HANDLER AND SUPPLY AND RETURN LINES ARE VENTED.

1. Fill and pressurize the water heater and air handler.
2. Vent air from the water tank by opening a hot water spigot.

Energize the unit by switching on the line voltage source and the thermostat. Depending on how the AHB was interfaced with the heat supply, hot water should start flowing through the water to air coil and 30-45 seconds after a call for heat the blower will energize.

UNITS ARE RATED AT TEMPERATURES OF 130°-180° F. SET ENTERING WATER TEMPERATURE AT DESIGN TEMPERATURE AND TAKE PROPER SAFEGUARDS FOR WATER USAGE AT SUPPLY POINTS, AS PER LOCAL CODES AND SAFETY CONSIDERATIONS.

M. SYSTEM SHUTDOWN

For short periods of time during freezing temperatures if the system is to be left unused, to prevent freezing of the air handler and piping, do the following: Do not turn the system off. Leave the air handler's thermostat on heat setting. If the water and air handler must be shut down for extended periods, a qualified service technician needs to be contacted to ensure the air handler and piping are drained of all water as to prevent freeze damage.

N. PERIODIC MAINTENANCE

Inspect and clean or replace filters at least every three months to ensure good airflow and optimum system capacity, efficiency and life. This equipment should **NEVER BE RUN WITHOUT AN AIR FILTER** in place (see Section AIR FILTER). The blower motor is permanently lubricated. **ALWAYS** disconnect power before removing access doors!

O. LOW TEMPERATURE PROTECTION - HOT WATER COIL

The unit is equipped with two low temperature protection thermostats located on the discharge face of the hot water coil. These thermostats provide protection as follows:

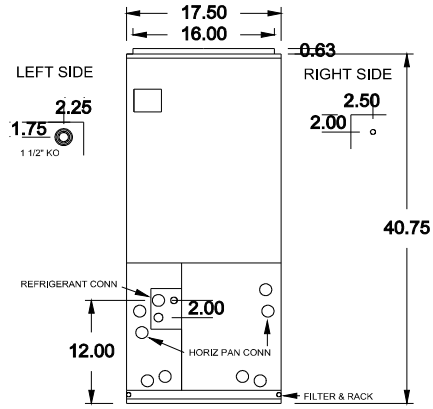
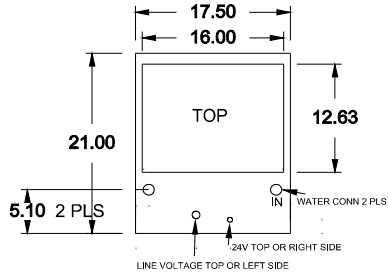
CFP - Stops the outdoor unit (condensing unit of AC system) if the discharge air becomes sufficiently low to cause possible freezing of the water in the hot water coil. Cycling of this thermostat is an indication of a problem. Possible causes are inadequate air flow, blocked filter, or blocked air system.

HFP - Provides power to the heating terminal (W) of the unit terminal strip to start the heating equipment in the event the air temperature above the coil becomes sufficiently low to cause possible freezing of the water in the hot water coil. **CAUTION!** If the heating equipment is turned off, some part of the heating equipment has failed, or during power outages this thermostat cannot provide necessary protection and freeze damage could occur. If these circumstances could occur, separate freeze protection must be provided. Antifreeze solution is recommended except on potable water systems. On potable water system, backup heat may be required to avoid freeze damage.

CFP and HFP - Thermostats are located on the discharge of the unit. Access to these thermostats for service replacement will require an opening in the discharge duct with suitable replaceable cover or the discharge duct must be removed temporarily. **WARNING!** Under no circumstances will the CFP and/or HFP devices provide freeze protection to any equipment exterior to the AHB unit and protection of the AHB unit is subject to the limitations described above. Under no circumstances will Heat Controller, Inc. be responsible for any damage that might result from failure of these devices or other components.

Dimensions

AHB 1324, 1330



AHB 1336, 1348, 1360

