



INSTALLATION INSTRUCTIONS

FOR

AQUECOILTM
HYDRONIC HEATING UNITS

GENERAL INFORMATION

The AQUECOIL Hydronic Heating Unit is offered in many different capacities and physical configurations in order to match up to the installation and load requirements of a broad number of air distribution systems. Check the Model Number to determine if it is the appropriate unit for the Air Handler already selected or installed at the job site.

The AQUECOIL Hydronic Heating Unit consists of a high performance fin tube water-to-air heat exchanger, an optional water-cooled circulating pump and an optional valve package. Pump power is derived from the Air Handler on which it is installed. Pump operation occurs in response to the Heating System Thermostat calling for heat.

CAUTIONS / DISCLAIMERS

The AQUECOIL Hydronic Heating Unit is an appliance that operates in conjunction with the Air Conditioning or Heat Pump System and a Hot Water System. Installation should only be performed by skilled technicians with appropriate training and experience.

The installation must be in compliance with local codes and ordinances. Local Plumbing, Mechanical, and Electrical Codes take precedence over instructions contained herein.

The Manufacturer accepts no liability for equipment damage, personal property damage, or personal injury arising from the improper installation of this Hydronic Heating Unit.

SPECIAL NOTE: Installations subject to freezing ambient temperatures must have provision for freeze protection to avoid damage to this appliance. If you choose install the unit with a freeze stat, remember this type of freeze protection is inoperable in the event of a power outage. The safest method of freeze protection is to provide both for draining the Heat Exchanger and water lines and installation of a freeze thermostat.

LOCATION / MOUNTING THE UNIT

The AQUECOIL Hydronic Heating Unit is designed to mount directly over the discharge end or return side of the Heating/Cooling System Air Handler, depending on the model number of the AQUECOIL. It is suitable for horizontal or vertical upflow Air Handler configurations. Return side models may also be used in downflow configurations. It may also be used in a counter flow configuration, provided the AQUECOIL's optional hand valves are rotated to orient the bleed ports to an upright position. An Air Handler location in the conditioned space is preferred, to minimize the likelihood of freezing ambient temperatures. Reasonable close proximity to the water heater is also a plus, particularly if the piping between the water heater and the AQUECOIL is kept in the conditioned space.

SPECIAL NOTE: The selected location and orientation of the Air Handler and AQUECOIL must allow the Hydronic Heating Unit's circulator pump to be positioned with the motor shaft horizontal. DO NOT install the AQUECOIL Hydronic Heating Unit with its Service Panel and the circulator pump facing vertical, up or down.

The AQUECOIL Hydronic Heating Unit should be mounted directly onto the Air Handler, rotated so that the AQUECOIL Brand Label is facing the same direction as the access door on the Air Handler. Use the fastening strap provided to secure the AQUECOIL to the Air Handler. Use sheet metal screws to secure the fastening strap to the top surface of the AQUECOIL and then to the side of the Air Handler.

INSTALLATION

Before starting the installation of the AQUECOIL into the air distribution system, verify that the System Air Handler has been properly and completely installed. Since the AQUECOIL is designed to mount over the discharge end of the Air Handler, it will be necessary to make sure that both the equipment power and the low voltage lines enter the Air Handler from the side, and not the top or discharge surface. In some Air Handlers this will mean relocating factory installed low voltage wiring to a side knockout.

1. Disconnect primary power to the Air Handler before performing the installation.
2. If the ductwork has already been fitted to the Air Handler discharge, it is now necessary to remove enough of the discharge plenum to insert the AQUECOIL unit.
3. Provide an opening in the top surface of the Air Handler in order to be able to run the AQUECOIL circulator pump connections down into the Air Handler. There may be a Factory supplied knockout usable for this purpose.
 - a. AQUECOILs supplied without the pump option do not require this step.
4. Mount the AQUECOIL onto the Air Handler and secure it to the Air Handler with the strap provided.
5. Connect the discharge plenum to the discharge opening on the AQUECOIL. Fasten it to the collar on the AQUECOIL using appropriate sheet metal screws or ductwork collar.
6. If the AQUECOIL is equipped with the optional circulator pump, remove the access cover from the front face of the AQUECOIL and the Air Handler. Feed the wiring from the AQUECOIL circulator pump down through the opening in the top surface of the Air Handler. **NOTE:** When connecting the AQUECOIL Wiring Harness to the Air Handler, make sure that your routing avoids sharp edges and stays well away from the Blower. Also provide for appropriate strain relief.
 - a. If the Air Handler has electric heat strips already installed, disconnect the wiring that powers the heat strips and reconnect it to the AQUECOIL circulator pump wiring. If there are several heat strips and a sequencer, it will be necessary to disconnect each heat strip to prevent sequencing in first stage heating.
 - b. If the Air Handler is part of a Heat Pump System, you can optionally reverse the thermostat wiring so that the Auxiliary Heat stage calls on the compressor; and first stage heat calls on the AQUECOIL.
 - c. If the Air Handler is not equipped with heat strips, you will need to add a relay or fan center to the Air Handler in order to activate the AQUECOIL on a call for Heat. The AQUECOIL pump connections are made to this relay or fan center as shown in the wiring diagram. We suggest a general purpose switching relay such as the 90-290 series manufactured by White-Rodgers. Installation is as follows: connect the pump through relay terminals 2 & 4 to line voltage at the fuse block or circuit breaker; connect the relay coil at terminals 1 & 3 to the low voltage side of the transformer and thermostat terminals W & R; jumper the pump switching

relay to the blower time delay relay at BTDR terminal 2 and the pump-to relay connection, if so equipped.

7. If the AQUECOIL is supplied without the optional circulator pump, water flow through the Unit is accomplished by an external circulator; such as the system circulator mounted on the system Boiler, or by installation of an AQUECOIL Pump Module.
 - a. In Boiler system applications the AQUECOIL is usually operated as a separate zone, with a zone valve or zone circulator and a bypass to switch water flow through the AQUECOIL.
 - b. The zone valve or zone circulator is operated by the Boiler Control System and zone thermostat. There is no wiring interconnection required back to the AQUECOIL.

WATER LINE INSTALLATION

The AQUECOIL is designed to operate in conjunction with a broad variety of water heaters and hot water boilers including gas-fired, oil-fired, wood-fired and electrically heated. If possible, select a water heater equipped with extra openings for a circulation loop. They may be either side connections or a pair of additional connections on the top of the water heater. A standard water heater may also be used, although some variation in water heater performance will be observed.

NOTE: Shut off electrical power or gas to the water heater or boiler, shut off the water supply, and drain the water heater or boiler before starting water line installation. All plumbing connections should be made with an appropriate lead-free solder.

Plan the water line runs to minimize the run length and the number of bends and elbows. Use at least 3/4 inch (nominal) water tube. Long runs on high capacity AQUECOIL units require larger diameter tube. Both supply and return run should be insulated separately with closed cell foam pipe insulation.

1. The supply run from the water heater to the AQUECOIL should be connected to the hot water opening on top of the water heater; or the upper side opening, if the water heater is equipped for a recirculation loop.
2. The supply run is connected to the AQUECOIL at pipe stub labeled "Hot Water In". Good practice calls for isolation valves at the unit.
3. The return run from the AQUECOIL is connected to the pipe stub, labeled "Hot Water Out". Good practice calls for isolation valves at the unit.
4. The return run may be connected to the water heater in several different locations. If the water heater is equipped for a recirculation loop, use the lower side opening. If you are dealing with a conventional top connect water heater, the return run may be connected to the cold water inlet with a standard copper "Tee"; or may be connected through the drain valve opening. Most installations require flow-check valves to prevent cold water from bypassing the water heater and entering the hot water line to the house through the AQUECOIL.
5. Flow-check valves may be required to prevent thermosyphoning of hot water through the AQUECOIL during Cooling Season System Operation; unless the AQUECOIL is operated as a separate zone in a multi-zone system, as is normally found in Boiler driven

applications. Swing-check valves are preferred to minimize pressure drop during system operation. For best results, use two valves. Install at least one valve vertically, pointing at the ceiling. The other valve can be installed horizontally. This optimizes valve operation by using gravity to help.

Copper tube and fitting (C12200) has been evaluated in the Bindus Manufacturing, LLC HHU by IAPMO R&T Lab to NSF/ANSI 61 for use in drinking water supplies of pH 6.5 and above. Drinking water supplies that are less than pH 6.5 may require corrosion control to limit leaching of copper into the drinking water.

SYSTEM FILL AND START-UP

At this point the AQUECOIL is ready to fill with water and operate, in conjunction with the Air Handler.

1. Shut off the AQUECOIL hand valves and turn on the water supply to the water heater or boiler. **DO NOT TURN ON ELECTRICAL POWER OR GAS YET.**
2. In order to make sure the water heater is full of water, manually open the water heater pressure relief valve and wait until water is discharged before closing it again.
3. Open the hot water faucet furthest from the water heater and wait until it discharges before closing it.
4. Remove the cap from the bleed port on the upper AQUECOIL hand valve, but leave the valve closed.
5. Open the lower valve and wait until the bleed port on the upper valve stops blowing air, then close off the lower valve and replace the bleed port cap on the upper valve.
6. Open the upper valve, remove the cap on the lower valve bleed port, and wait until the air is discharged. Replace the cap on the lower valve bleed port.
7. Now remove the center screw from the AQUECOIL circulator pump and allow any residual air to bleed out of the pump. A small amount of water will discharge from the pump opening during the air bleed process. Replace the pump center screw.
8. Make sure both hand valves are fully open, and both bleed port caps are screwed on.
9. Restore electrical power to the Air Handler and electrical power or gas to the water heater.

YOU ARE NOW READY FOR THE SYSTEM STARTUP.

START-UP

Allow sufficient time for the water heater or hot water boiler to reach normal operating temperature. Check the thermostat setting. AQUECOIL is designed to operate on any hot water source between 140°F and 180°F.

WATER HEATER SIZING FOR AQUECOIL (GAS FIRED WATER HEATERS)

Residential Water Heaters are generally available in 5 nominal sizes: 30, 40, 50, 75 and 100 gallon storage capacity; with a variety of BTU input choices, ranging from 30,000 BTUH to 85,000 BTUH. We recommend avoiding the 30 gallon size, because of the limited storage capacity; and also the 100 gallon size, because they are too large (28" diameter) to fit through

most residential doors. The best choices, then, are the 40 and 50 gallon sizes, with occasional use of the 75 gallon size.

Water heaters come in several choices of burner input:

	40 Gallon	50 Gallon	75 Gallon
Standard Recovery	34,000	40,000	75,000
High Recovery	40,000	50,000	
Extra High Recovery	50,000	65,000	

Water Heaters are generally 76% combustion efficiency, so heat output is as follows:

	40 Gallon	50 Gallon	75 Gallon
Standard Recovery	25,840	30,000	57,000
High Recovery	30,400	38,000	
Extra High Recovery	38,000	49,000	

This Heat Output should be matched against the AQUECOIL and system size selected for use.

SYSTEM SIZE	AQUECOIL CAPACITY	WATER HEATER CHOICE
1 1/2 Ton	25,000	40 gal Standard
2 Ton	28,000	40 gal HiR or 50 gal Std
2 1/2 Ton	32,000	50 gal Std or 40 gal XHiR
3 Ton	38,000	50 gal HiR or 40 gal XHiR
3 1/2 Ton	45,000	50 gal XHiR
4 Ton	50,000	50 gal XHiR
5 Ton	63,000	50 gal XHiR or 75 gal Std

Additional Heating or Hot Water delivery capacity can be achieved by raising the Water Heater thermostat setting above the 140°F temperature assumed in the AQUECOIL specifications; however, we strongly recommend the addition of an anti-scald tempering valve to the hot water line going to the house.

CHOOSING A CHECK VALVE

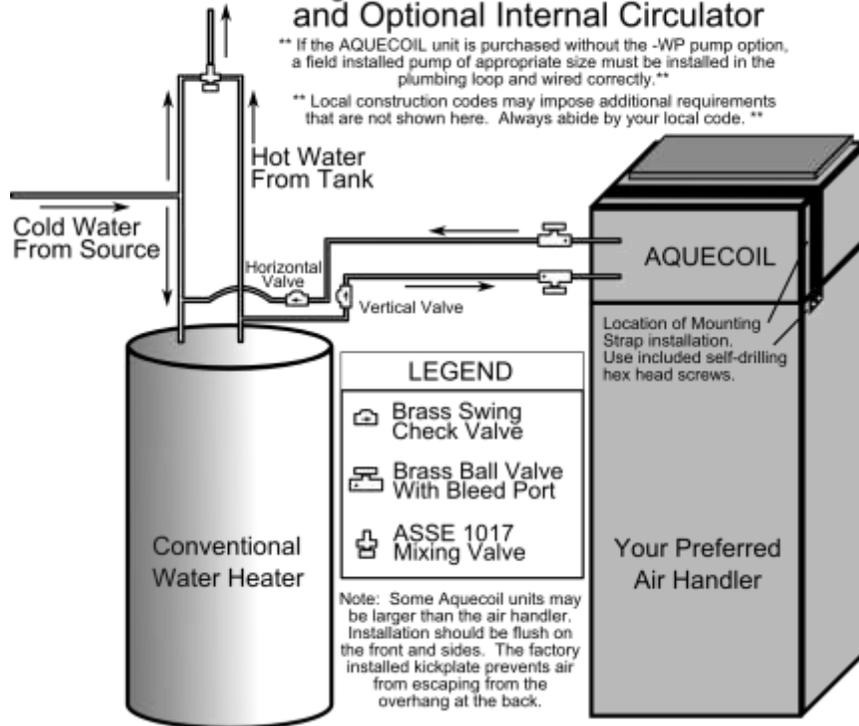
Check Valves are designed to stop thermosyphoning by preventing backflow in your piping. Water flows readily in one direction, but reversing the flow makes the valve close. Check Valves are used in both vertical and horizontal positions, depending on the style of valve chosen. Swing Check valves are recommended on all installations using water heaters. Your choices are:

1. Flow Switch/Flow Detector - This valve is opened and closed by a motor, based on operating conditions. It's best suited for applications where the AQUECOIL is part of a multi-zone system, and is operating from a boiler.
2. Spring Check - A brass disc and Teflon seat driven by a stainless steel guide rod and spring gives a tight seal in either vertical or horizontal position; however, they have a lot of pressure drop, even when open. They are not recommended if the AQUECOIL is used with a potable water heater; since stagnant hot water trapped in the AQUECOIL piping could produce bacteria growth and cause a health risk.
3. Swing Check - The metal flapper should be installed vertically to get a gravity assist for best backflow prevention; they have the least pressure drop when open.

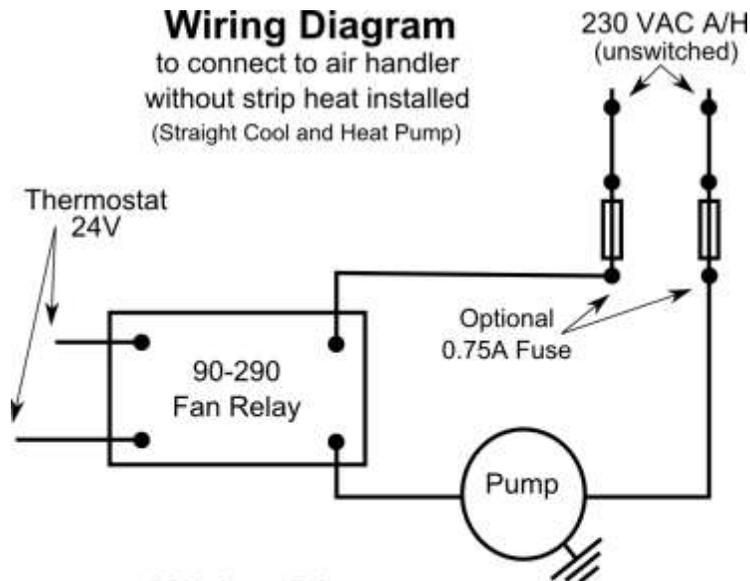
Diagram of Suggested Installation Using a Conventional Water Heater and Optional Internal Circulator

** If the AQUECOIL unit is purchased without the -WP pump option, a field installed pump of appropriate size must be installed in the plumbing loop and wired correctly. **

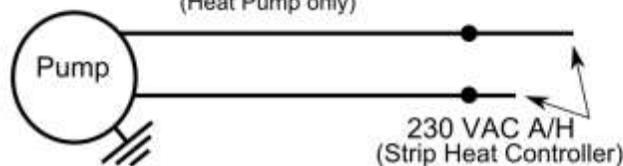
** Local construction codes may impose additional requirements that are not shown here. Always abide by your local code. **



Wiring Diagram to connect to air handler without strip heat installed (Straight Cool and Heat Pump)



Wiring Diagram to connect to air handler strip heat controller (Heat Pump only)



HYDRONIC HEATING UNIT
Limited Warranty
For Residential Applications

Bindus Manufacturing, LLC (herein, "BML") warrants each to be free of defects in materials and workmanship according to the following terms, conditions and time periods:

Part A - Coverage

1. First Year Warranty Includes: Repair or replacement for one year after original installation of all parts found to be defectively manufactured.
2. Second Through Third Year Warranty Includes: Repair or replacement for the second through third year after original installation of unit heat exchanger coil.
 - a. The manufacturer of the pump provides additional warranty coverage, up to 3 years.
3. In the absence of suitable proof of date of installation (Bill of Sale), the specified warranty period will commence 30 days after the date of manufacture.
4. This warranty extends only to units in residential applications that have been properly installed, operated, and maintained. This warranty is nontransferable and applies to the original owner at the original installed location. BML makes no express warranties other than the warranties contained herein

Part B - Exclusions

1. First Year Warranty Excludes:
 - a. All labor charges incurred by any person in connection with the examination, replacement and/or repair of parts claimed to be defective.
 - b. Malfunction of parts due to improper installation or operation.
 - c. Failures resulting from abuse, accident, negligence, freezing or acts of God.
 - d. Damage caused by hard water, scale buildup, excessive oxygenation or external leakage.
2. Second Through Third Year Excludes: All of above "Part B" plus: Sheet metal jacket, insulation, electrical and mechanical components furnished to BML by other manufacturers. BML has requested its dealers to assist consumers in obtaining performance of any warranties that may cover such components.
3. BML requires all alleged defective part(s) be returned through trade channels and replacement part(s) will, if warranty conditions are met, be provided by BML through the wholesaler. In this case, the cost of shipment to BML is borne by the consumer.

Part C - Procedure for Warranty Service:

1. For warranty service, contact your installing contractor with the following information: Unit model number, serial number and the date of installation. The installing contractor will notify the wholesaler from whom the unit was purchased. Alleged defective part(s) must be returned through trade channels and replacement parts will, if warranty conditions are met, be provided by BML through the wholesaler. If there are any questions about the coverage of this warranty, please contact BML at the address shown below.

Part D - Legal Rights

1. No one else is authorized to make any other warranties on BML's behalf. No other warranty expressed or implied, including warranty of merchantability or fitness for a particular purpose is made. This warranty does not extend to liability for incidental, special or consequential damages. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state-to-state.

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