

Training Manual



The Rinnai Hydronic Air Handler

(A key component of the Rinnai Tankless Heating System)



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The Rinnai Tankless Heating System

The Hot Way to Heat Your Home –

The Tankless Heating System combines the Rinnai tankless water heater and a new hydronic air handler to provide comfortable residential heat. Now the energy savings and endless hot water of a Rinnai tankless water heater can be applied to heating both residential air and water.

How it Works –

The hydronic air handler connects to a Rinnai tankless water heater through normal plumbing lines. When there is a call for heat, the air handler pump activates and begins to circulate water between the air handler and the water heater. The hot water runs through a copper tube/aluminum fin coil mounted above a blower, which drives air through the coil and into the ductwork, providing comfortable, warm, hydronic heat that can't be matched by gas furnaces or heat pumps.

Installation Codes and Standards

Product Codes and Standards

All national codes, standards and local ordinances must be adhered to in addition to the instructions accompanying each product. The installation must comply with regulations of the local building, heating, plumbing and other codes. Where local codes are not applicable, the installation must comply with national codes and any and all authorities having jurisdiction.

Suggested Codes and Standards for the United States and Canada:

General Installation –

Installation of Air Conditioning and Ventilating Systems NPFP 91

Duct Systems –

Sizing of duct system to be performed prior to product installation

Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

Fundamentals Handbook Chapter 34 or HVAC Systems and Equipment Handbook Chapters 9 and 16

US and CANADA; Air Conditioning Contractors Association (ACCA) Manual D

Acoustical Lining and Fibrous Glass Duct

US and CANADA; current edition of SMACNA; NFPA 90B as tested by UL Standards 181 for Class I Rigid Air Ducts

Electrical Connections

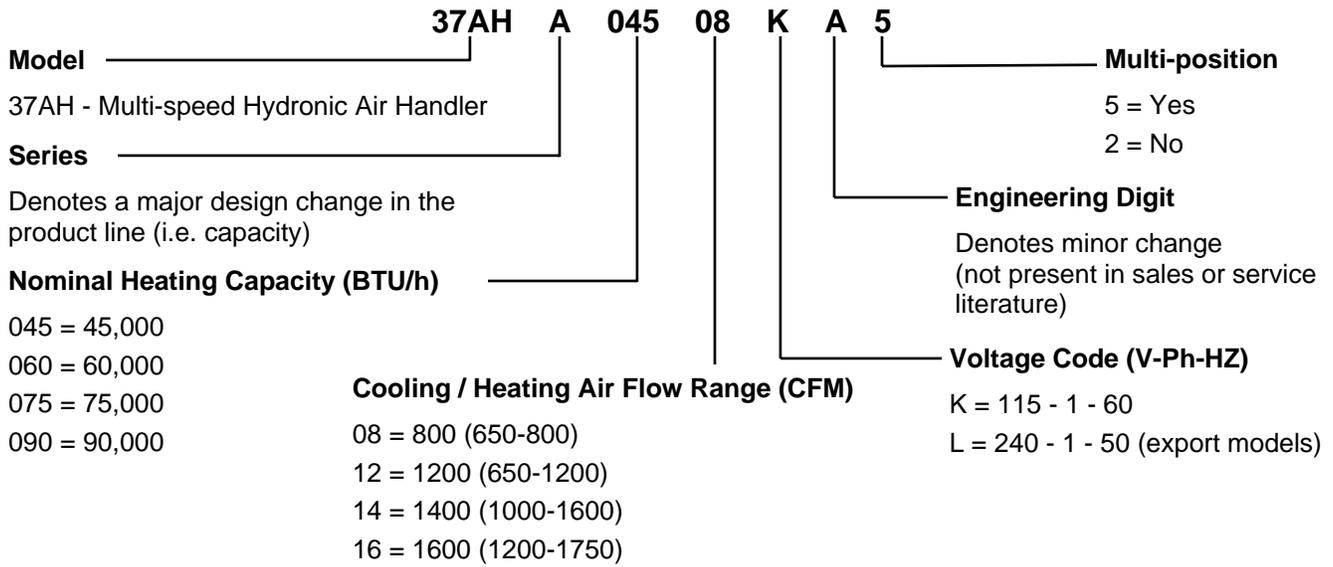
US: National Electrical Code (NEC) ANSI/NFPA 70.

CANADA: Canadian Electrical Code CSA C22.1

Plumbing Systems

US and CANADA: ICC International Plumbing Code (IPC); Uniform Mechanical Code (UMC); Uniform Plumbing Code (UPC)

Model Number Nomenclature



Features

Domestic Hot Water Priority

The Rinnai Hydronic Air Handler includes* a domestic hot water priority flow sensor that will determine when to shut down and re-direct all the water heater's output to whichever fixture and or appliances that are calling for hot water. This feature will turn off the pump to prevent cold air from blowing into the structure and excessive wear on the internal pump components.

* The flow sensor is to be installed at the site



AH45

AH60

AH75

AH90

- Four models covering nominal heating sizes from 45,000 to 90,000 BTU/hour
- Multi-position (upflow, downflow, horizontal left, horizontal right)
 - Modifiable for side-entry return air
 - NOTE: the unit is not designed to be installed on its back.
- Low-flow, high-head pump designed to work with Rinnai's tankless water heaters
- No combustion air infiltration losses when used with a Rinnai tankless water heater
- Four selectable heat blower-off delay times – adjustable fan speeds provide operational efficiency of heat distribution with 30, 60, 90 and 120 second blower off settings
- Multi-speed motor
 - 800 – 1600 Nominal Heating Airflow (CFM)
 - Adjustable to meet the needs of the heating and cooling CFM blower requirements
- Strong steel cabinet
 - Pre-painted galvanized steel

Features

- Fully insulated with foil lining
- Low 34-inch profile on all models
- Multi-position electrical junction box. The junction box will mount on either side of cabinet to adapt to the installation requirements
- Designed for serviceability with removable front panel to obtain access to pump, blower and control board
- Schrader valve integrated into air handler coil to manually purge air from the system
- Side filter rack (option)
- Control board connections for:
 - Electronic Air Cleaner (EAC)
 - Humidifier (HUM)
 - UV Lamp (UV & N4)
- Intelligent Microprocessor Control
 - The Hydronic Air Handler units are equipped with an intelligent microprocessor control that allows for domestic hot water priority and adapts to available hot water flow for space heating by automatically regulating the pump and fan sequence to maximize comfort.
 - During the non-heating season, the microprocessor will cycle the pump every six hours (for two minutes) to prevent the water in the system from becoming stagnant. The microprocessor will adapt to the domestic hot water usage schedule to ensure this maintenance cycle will not come on when there is a call for domestic hot water. During the maintenance cycle, the microprocessor prevents the blower from operating to prevent dispersing hot air. This process will also cycle during the cooling season.
- Fine-Tuned to Work with Rinnai Tankless Water Heaters
 - The unique hydronic air handlers are designed to work in combination with Rinnai tankless water heaters to deliver a wide variety of heating capacities that cover a broad range of residential and light commercial heating spectrums. Because of the matched system, Rinnai Hydronic Air Handlers are not designed to be installed with any other tank, tankless or boiler product.
 - The resulting Tankless Heating System is the only matched tankless hydronic solution within the industry!

Performance Specification Summary

Model	Heating CFM	Water Temperature					CFM RANGE	Tons (A/C or Heat Pump)	Weight	
		Nominal Heating Outputs (BTU/h)							Shipping	Installed
		120°	130°	140°	150°	160°				
AH45	800	28,000	33,750	39,500	45,000	51,000	650-800	1.5 - 2.0	92	107
AH60	1200	37,500	45,000	52,500	60,000	68,000	650-1200	1.5 - 3.0	109	127
AH75	1400	46,000	55,500	65,000	75,000	84,500	1000-1600	2.5 - 4.0	118	138
AH90	1600	55,000	65,250	77,500	90,000	101,000	1200-1750	3.0 - 5.0	136	159

*All heating outputs based on 68°return air
External Static Pressure based on 0.5" W.C. without Evaporator Coil

Inside the Rinnai Hydronic Air Handler

Foil-Faced Insulated Cabinet

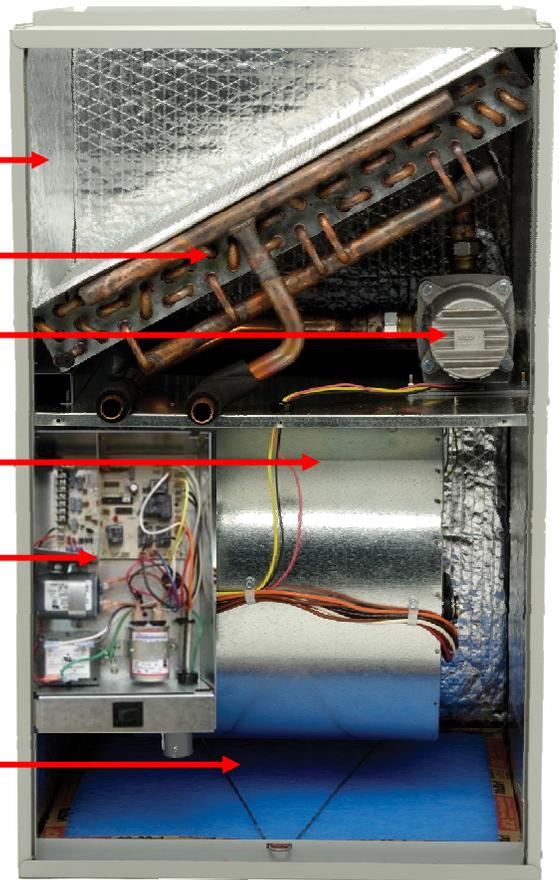
Coil Assembly

Hydronic Pump

Blower Assembly (multi-speed motor)

Control Box and Control Board

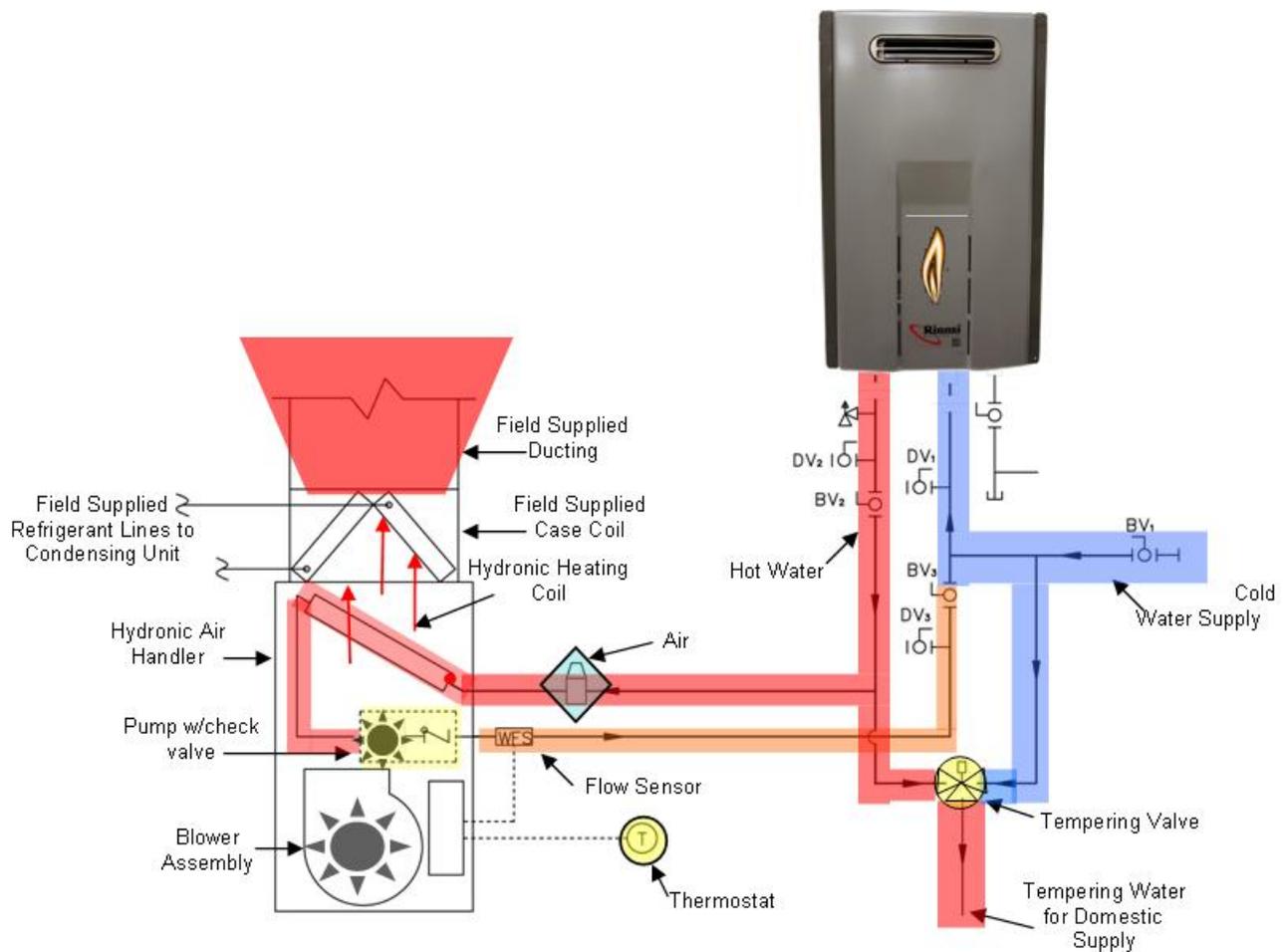
Filter



Basic Sequence of Operation

Typical Open-Loop Air Handler Operation

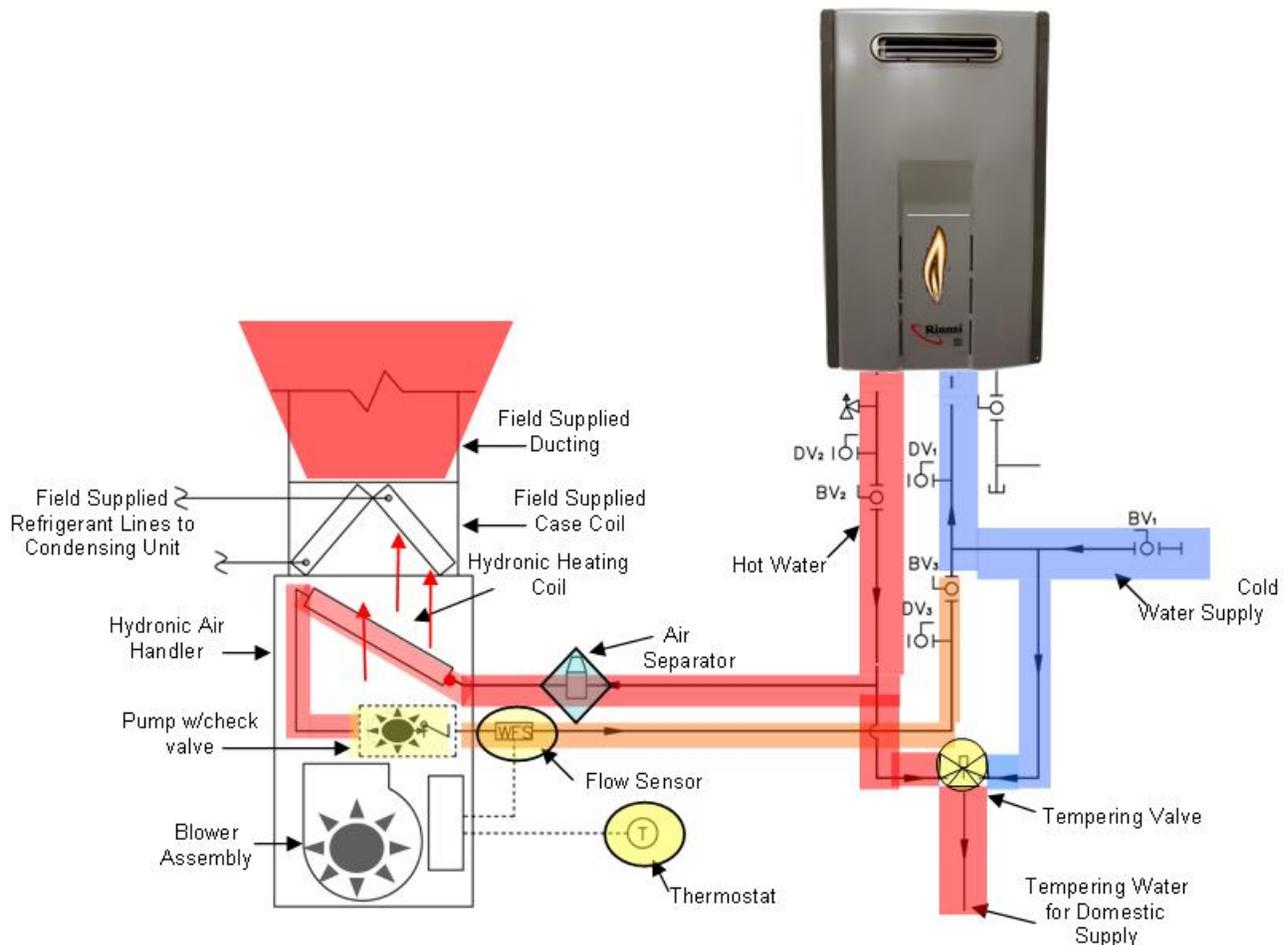
- The thermostat calls for heat and engages air handler pump creating water flow
- The Rinnai tankless water heater fires and begins heating
- The air separator ensures the circulation loop is purged
- Hot water passes through the hydronic heating coil
- After 25 seconds of pump operation, the blower moves heated air into the structure
- Water continues to circulate through the tankless water heater and hydronic heating coil as long as there is a call for heat
- Water also flows to domestic hot water fixtures if there is demand. An installed tempering valve reduces the potential of scalding



Basic Sequence of Operation

Typical Open-Loop Air Handler Operation

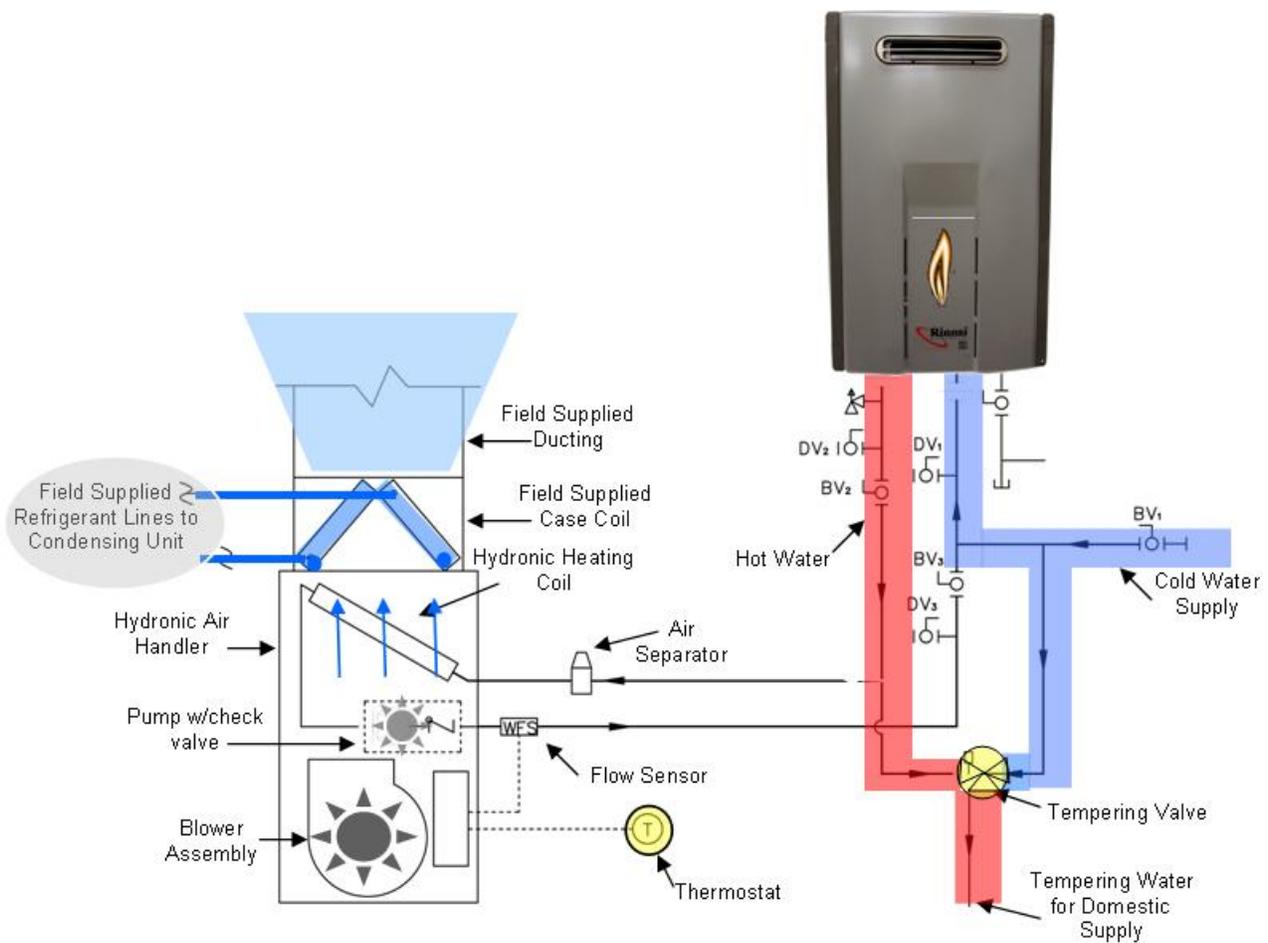
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- Water continues to circulate through the tankless water heater and hydronic heating coil as long as there is a call for heat
- Water also flows to domestic hot water fixtures if there is demand. An installed tempering valve reduces the potential of scalding
- If domestic demand increases to effect heating capability, the air handler flow sensor sends signal to turn pump and blower off until domestic flow has decreased
- When the air handler pump stops (either due to domestic demand or a satisfied thermostat), the blower will continue for 30, 60, 90, or 120 seconds depending on preferred settings



Basic Sequence of Operation

Typical Open Loop-Case coil operation for A/C or Heat Pump

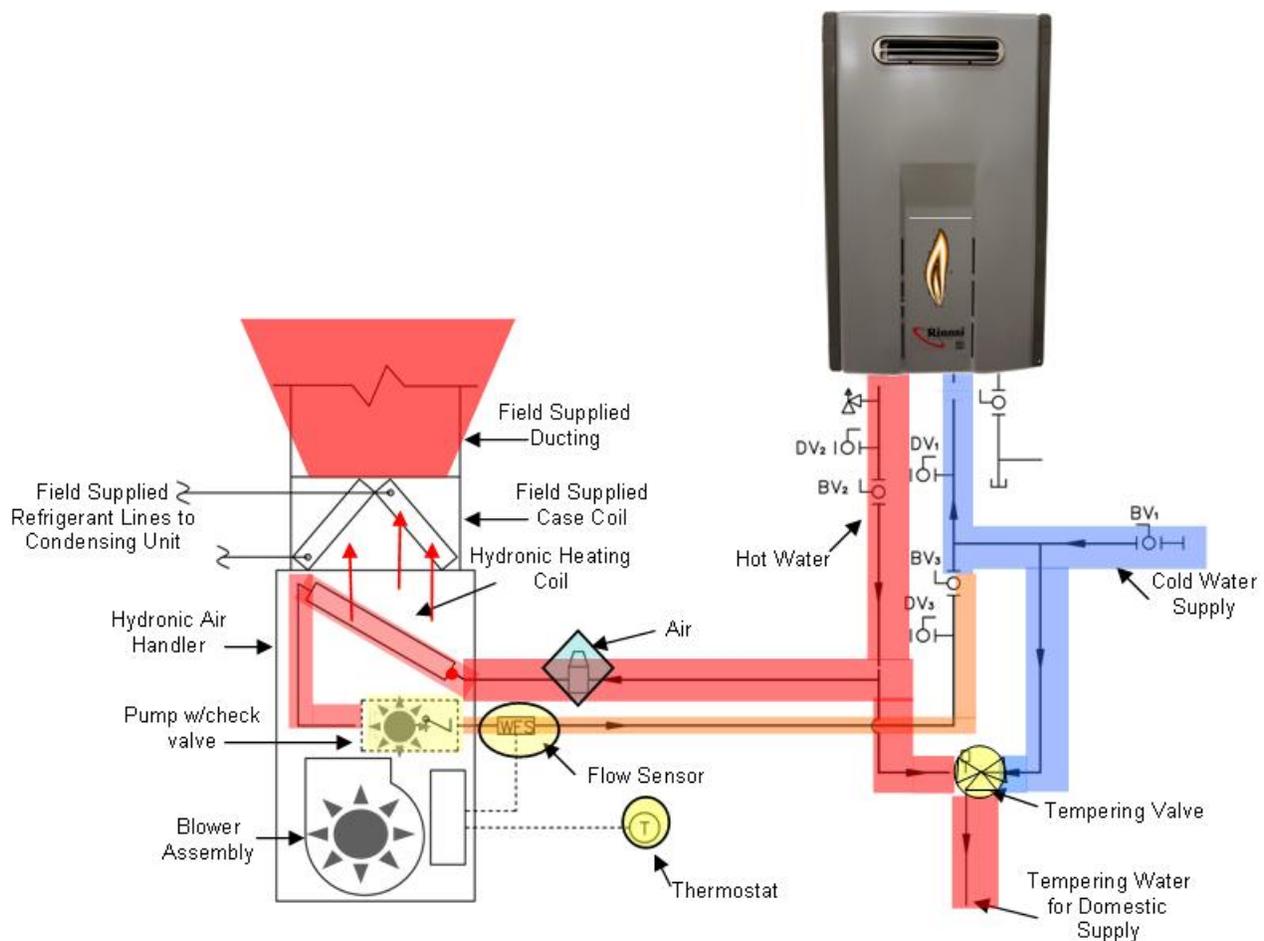
- When the thermostat calls for cooling from the A/C, circulation occurs from the condenser through the evaporator coil
- Air is blown across the evaporator coil moving cool air into structure (no time delay)
- Similarly, when the thermostat calls for heating from the heat pump, circulation occurs from the evaporator-coil through the condenser
- Air is blown across the evaporator-coil moving warm air into structure (no time delay)



Basic Sequence of Operation

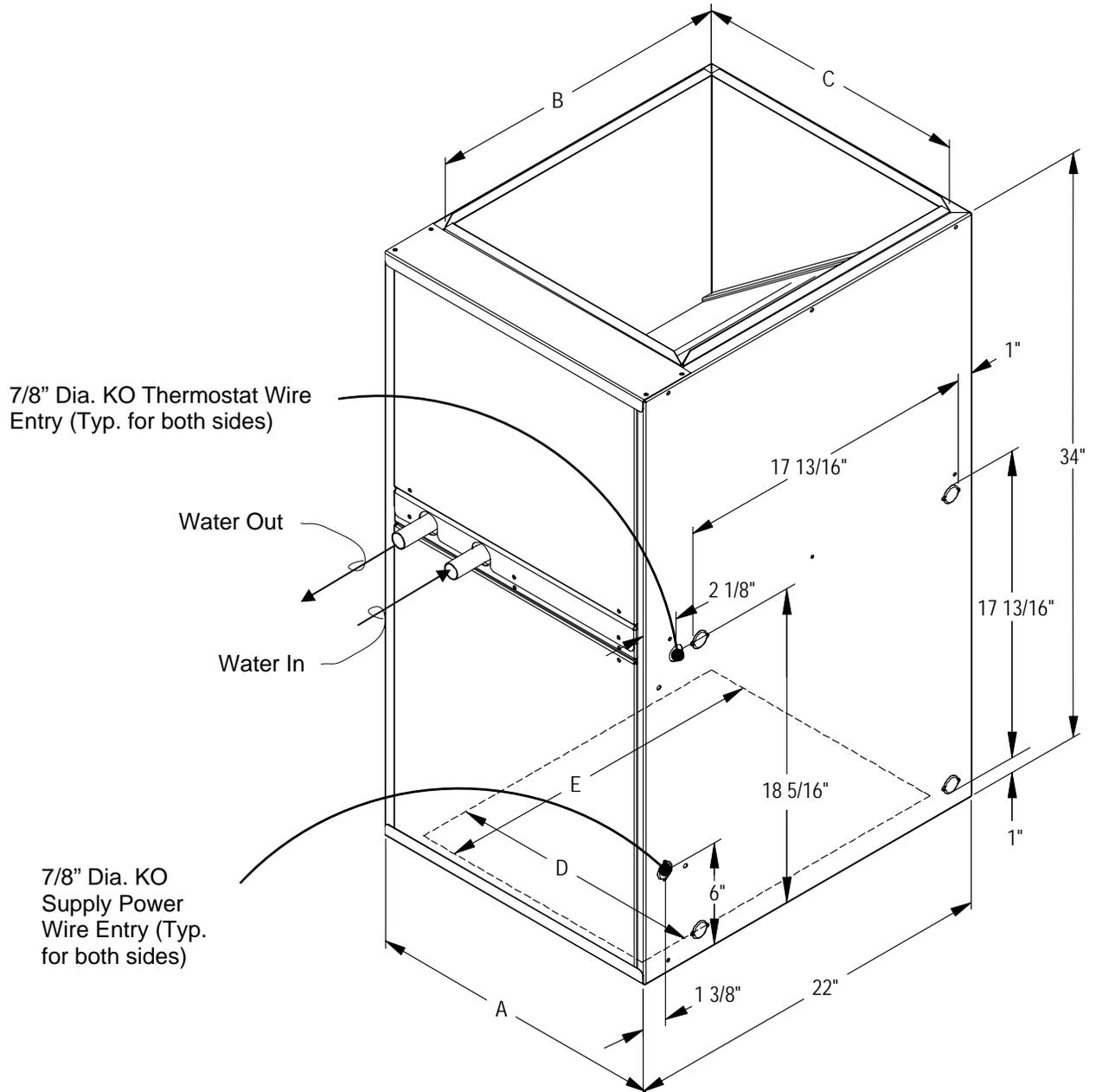
Typical Open-Loop Air Handler Operation

- When the thermostat calls for cooling from the A/C, circulation occurs from the condenser through the evaporator coil
- Air is blown across the evaporator coil moving cool air into structure (no time delay)
- Similarly, when the thermostat calls for heating from the heat pump, circulation occurs from the evaporator coil through the condenser
- Air is blown across the evaporator coil moving warm air into structure (no time delay)
- If the heat pump cannot adequately heat the structure, the thermostat will call for emergency heating and initiate flow from the water heater, engaging the air handler
- While the hydronic system is in use, the flow sensor again monitors water usage to ensure adequate heat is delivered



Specifications

CABINET	MODEL 37AHA04508KA5 "AH45"		MODEL 37AHA06012KA5 "AH60"		MODEL 37AHA07514KA "AH75"		MODEL 37AHA09016KA "AH90"	
	In.	mm	In.	mm	In.	mm	In.	mm
	A	14	355.6	17 ½	444.5	21	533.4	24 ½
B	18	457.2	18	457.2	18	457.2	18	457.2
C	12	304.8	16	406.4	20	508	24	609.6
D	10 ½	266.7	16 11/16	423.9	18 11/16	474.7	21 1/8	536.6
E	19	482.6	19 ¼	489.0	19 ½	495.3	19	482.6

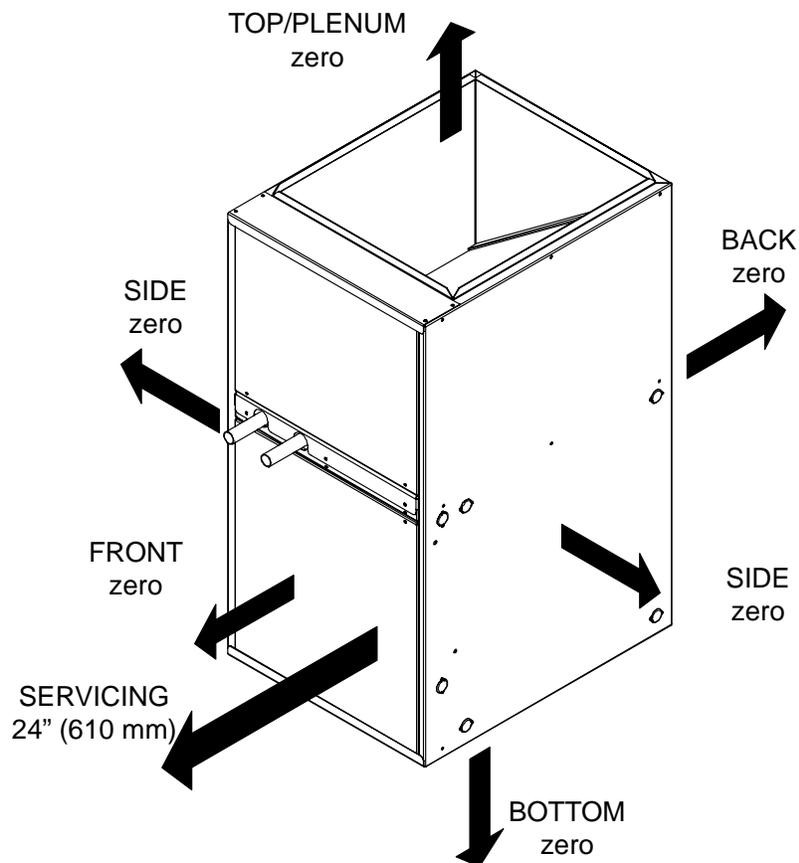


Installation Configurations

To suit a variety of applications, the hydronic air handler) is approved for upflow, downflow and horizontal configurations.

- The hydronic air handler is for indoor installations only
- Ensure that electrical components are protected from any contact with water
- Unit(s) shall not be installed directly on any combustible material other than wood flooring
- The hydronic air handler is designed to be used with an air distribution system (ductwork)
- Access around the product should be adequate to provide access for servicing
- The hydronic air handler units are designed to be installed vertically or horizontally on the floor, units may also be hung from ceiling or a wall. As packaged, the hydronic air handler is pre-configured for bottom return air inlet application.

Minimum Clearance to Combustibles



Installation Configurations

Side Return – Left or Right

To convert the HAH to a right or left return air inlet arrangement, modification to the cabinet is required.

Side Return Components –

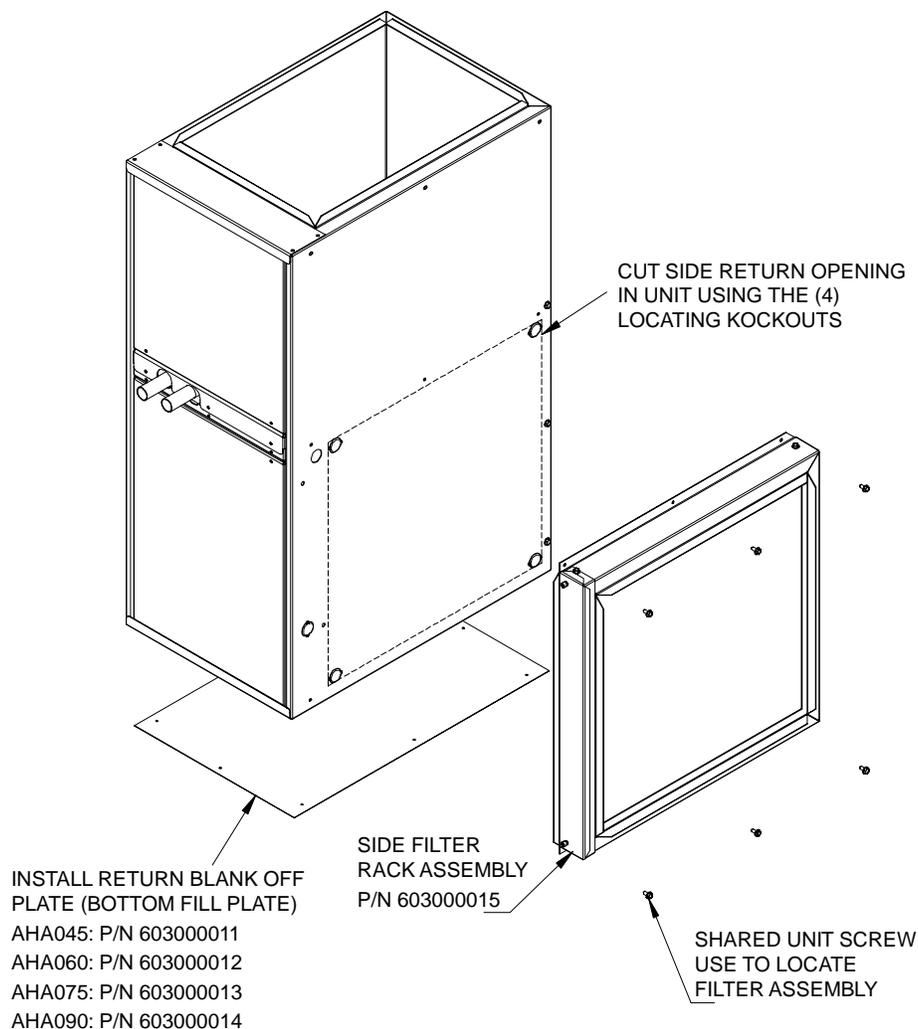
Side Filter Rack and Bottom Fill Plate

Using the Side Filter Rack as a template attach the rack assembly to the cabinet using the filter rack screws.

From the inside of the filter rack, scribe or mark the cabinet using a marker where the cabinet needs to be cut. Remove the filter rack; knock out the four corner knockouts.

Using a jig or reciprocating saw with a metal cutting blade, cut along the line.

Install the side filter rack using the six filter rack screws.



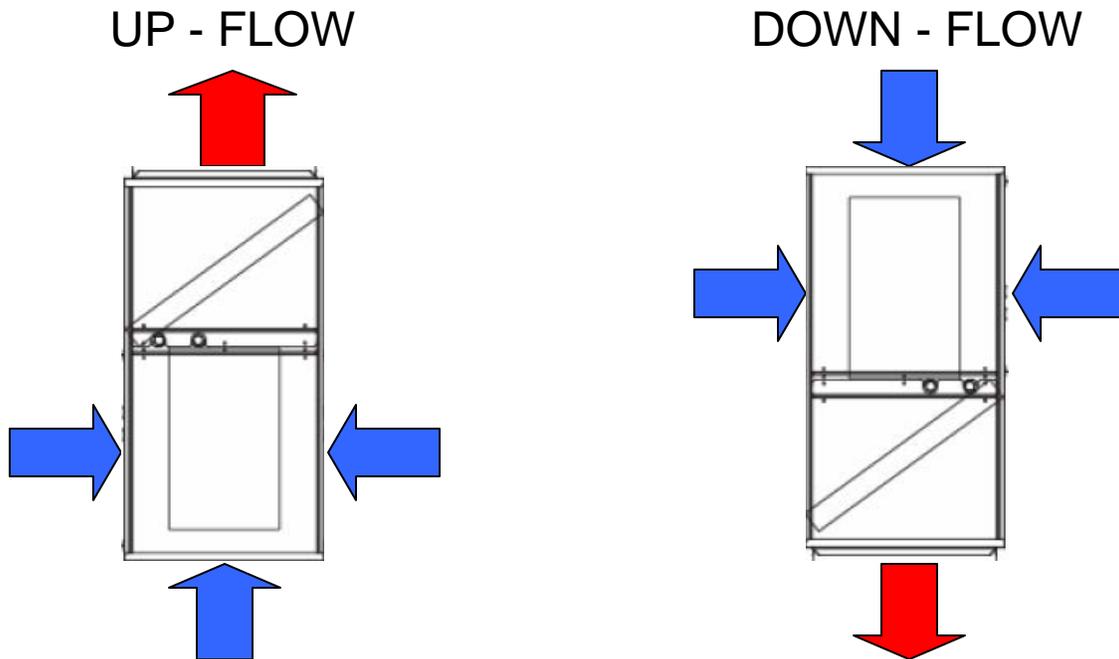
CAUTION: Remove the control box and or relocate any wiring before cutting the cabinet.

Multi-Position Orientation

UP - FLOW and DOWN - FLOW INSTALLATIONS

The hydronic air handler is ready to be installed in an up-flow or down-flow position without modifications.

The unit **MUST** be supported on the bottom **ONLY** and set on a field supplied supporting frame or plenum and secured together.



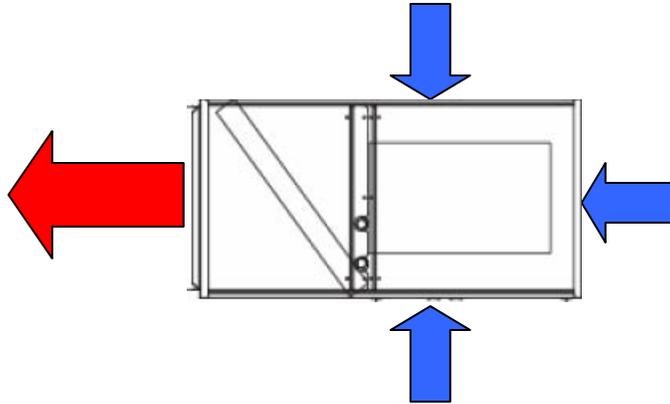
The HAH can be installed in a closet on a support stand, or mounted from the closet wall using the closet door as the return air plenum. Air return opening can be supplied through the closet door, side (thru a wall) or a combination of both. Refer to ACCA, Manual D, or SMACNA for specific guidelines.

Multi-Position Orientation

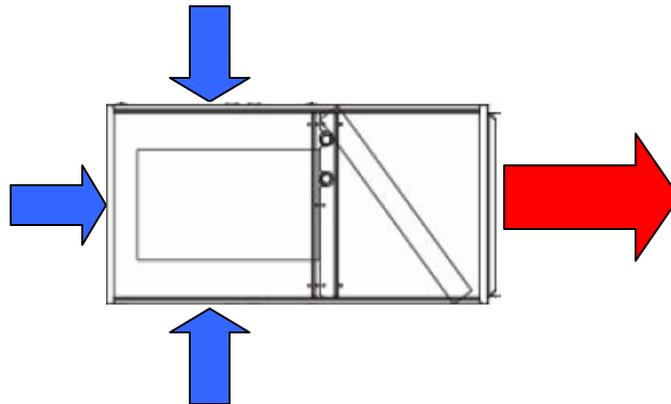
HORIZONTAL LEFT / HORIZONTAL RIGHT INSTALLATIONS (without cased coil)

If a cased evaporator coil is NOT being installed, the cabinet can be placed on either side for horizontal airflow as supplied when configured for bottom return air inlet installations.

HORIZONTAL - LEFT



HORIZONTAL - RIGHT

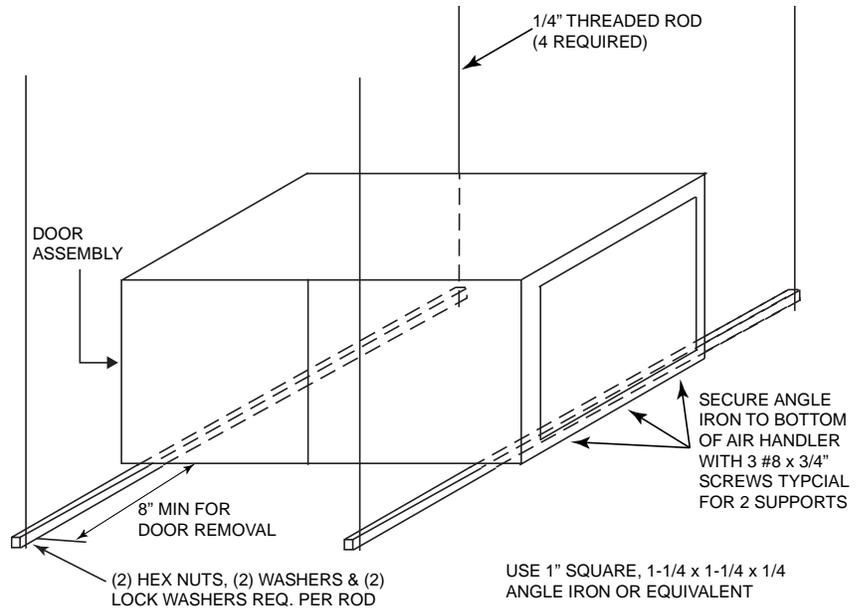


Horizontal configuration may require the installation of a Bottom Fill Plate that must be purchased as an accessory.

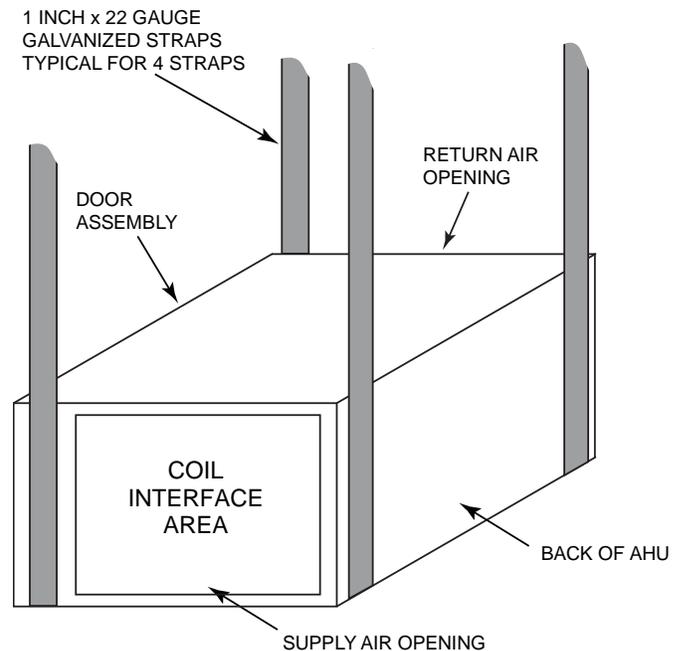
NOTE: Horizontal installations require specialized cased coils

Suspended Cabinet Installation

The hydronic air handler can be installed in a suspended format to comply with installation requirements. Installation of metal strapping and or threaded rod with angle iron are required to properly support the cabinet in parallel with the length of the cabinet.



When installing the HAH using straps, use 4 each, 1 in. x 22 gauge (min) galvanized straps secured to the cabinet with 4 each #8 x 3/4 sheet metal screws for each strap. In two strap installations, install two screws at each side of the cabinet and two at the bottom.



- When a hydronic air handler is matched with an evaporative type split system for cooling and is installed above a finished ceiling and or occupied space, building codes may call for a secondary insulated condensate pan or additional drain line. Consult local codes for compliance.
- If an auxiliary drain pan is required under the hydronic air handler, vibration isolators or Styrofoam blocks should be used between the pan and the air handler unit.
- Please refer to installation manual for complete guidelines.

Duct Connections / Air Distribution Ductwork

Duct Connections –

Supply Duct

Attach supply ductwork to the outside flange of the air discharge end of the unit.

Return Duct

Attach the return ductwork to the air return side (bottom or side) using sheet metal screws or other fasteners.

Air Distribution Ductwork –

Existing Ductwork

The installer must inspect all of the previously installed air distribution system to ensure suitability for the new heating and or cooling system.

Duct Vapor Proofing

All ductwork must contain adequate vapor seals to ensure moisture does not condense in the insulating material.

Ductwork Installation

Connect the supply air duct over the outside of the 3/4-in. flange on the unit's discharge side. Secure the duct to the flange using fasteners for the type of duct being used. Use flexible connectors between the duct and unit to prevent transmission of vibration sounds.

Ductwork Acoustical Treatment

Galvanized or metal duct that do not include a 90° elbow with turning vanes or a main trunk of 10 ft in length between the hydronic air handler and the first branch may require internal acoustical lining.

Alternatively, fibrous duct-board may be used if constructed and installed in accordance with the latest SMACNA construction standards for fibrous glass ducts and compliance with the NFPA, while meeting UL Standard 181 for Class 1 air ducts.

Plumbing

Recommended Piping Arrangements –

When installing water lines, compliance to local sanitary codes must be adhered to.

The Hydronic Air Handler contains two 3/4 in. Dia. X 2-1/2 in. long copper studs to connect the “Water In” and the “Water Out”. Mating connectors using field supplied 3/4 in. FNPT-sweat ends or two field-supplied 3/4 in. SharkBite™ type FNPT-push fittings ends

All associated hydronic piping MUST comply with ICC, UPC and any other local codes or ordinances having jurisdiction. USE POTABLE GRADE PIPING AND ACCESSORIES ONLY

Soldering Copper Tubing –

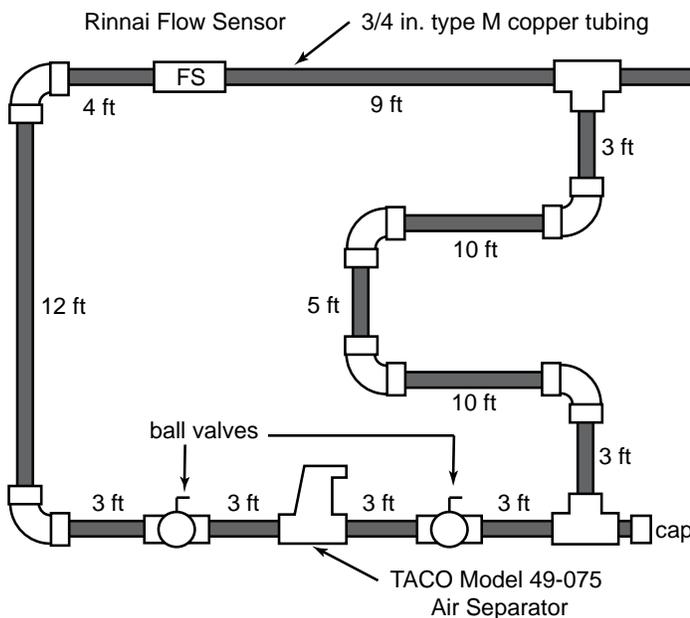
Use only **95/5/tin antimony** solder for all piping systems that incorporates a domestic water supply

Flow Sensor –

Installation of the flow sensor requires two (2) 3/4” female NPT field supplied fittings. Apply Teflon Tape or other pipe sealant to ensure a leak proof connection.

Note: Care must be taken to ensure the flow sensor is not damaged due to excessive tightening. **Do not exceed a maximum torque of 15 ft/lbs when tightening the fittings.**

NOTICE: Where possible the length of pipe should not exceed 150 feet equivalent length.



- 3/4” Tubing (total straight pipe length)....68 ft.
- (6) 3/4” 90 deg. Elbows.....6(2) = 12 ft.
- (2) 3/4” Side port tee.....2(3) = 6.0 ft.
- (1) 3/4” Taco air separator....1(0.3) = 0.3 ft.
- (1) 3/4” Rinnai flow sensor.....1(3.2) = 3.2 ft.
- (2) 3/4” Ball valves.....2(2.2) = 4.4 ft.
- Total Equivalent length.....93.9 ft.**

Fitting or Valve	3/4"
90 deg. Elbow	2
Side port tee	3
Taco 49-075 Air	0.3
Rinnai Flow Sensor	3.2
Ball valve	2.2

Any piping running through unconditioned space MUST be insulated to prevent heat loss, and possible freezing of the lines. Refer to the Installation Manual for more information on pipe equivalency

Programmable Thermostat



Wire Gauge	Maximum Distance (feet)
20 gauge	45
18 gauge	60
16 gauge	100
14 gauge	160
12 gauge	250

Rinnai Thermostat Part Numbers:

Heat Pump P/N:603000021

A/C P/N:603000018

Rinnai offers two 7-Day programmable thermostats for heat pump or air conditioning applications

Thermostat Installation:

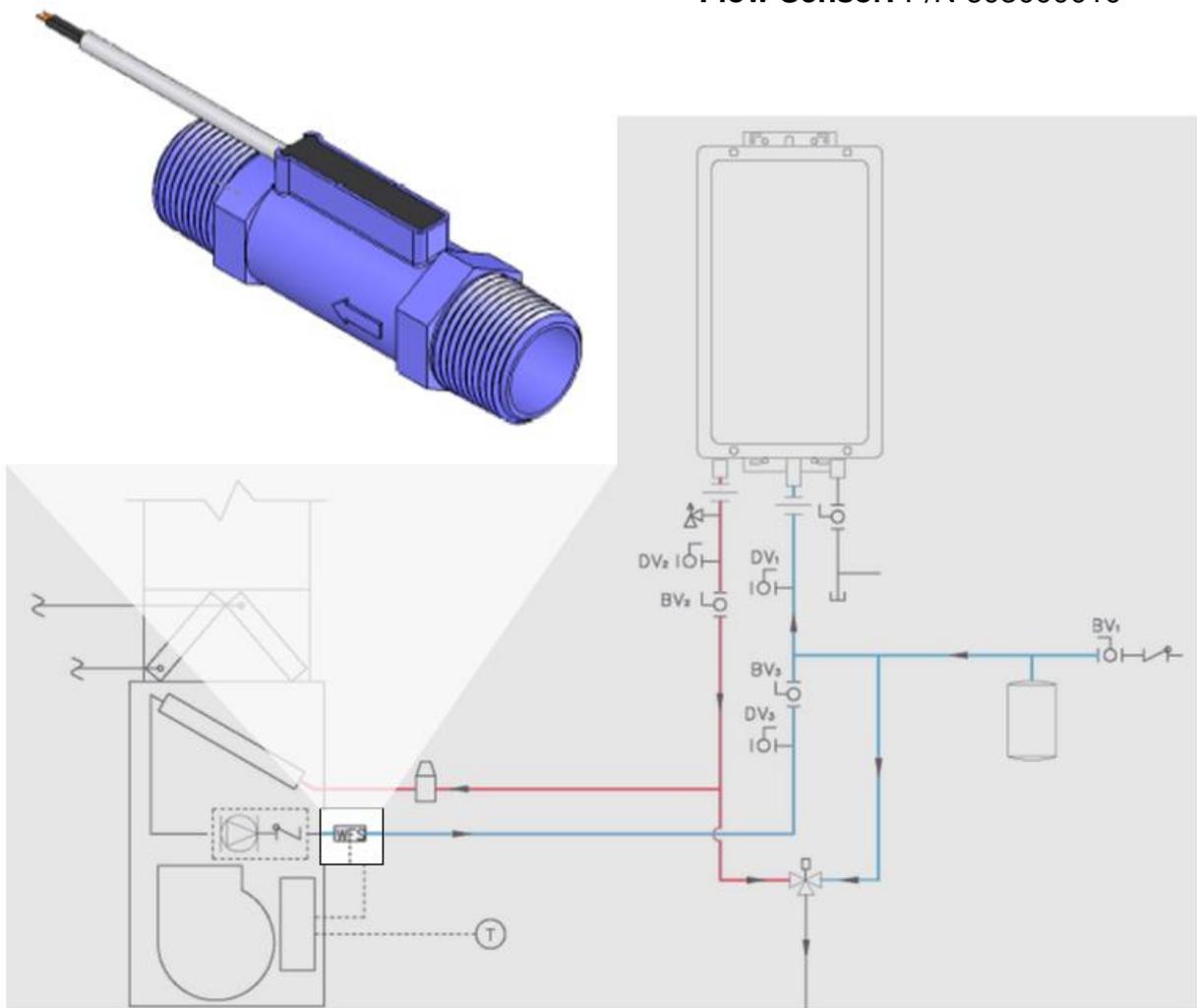
- The thermostat should be installed 5 ft. (1.5 m) from the floor in a frequently used room, or on an inside partitioning wall that is away from pipes or duct work
- Avoid installation in direct sunlight, window, outside wall or fireplace

Flow Sensor

Custom Manufactured for Rinnai Hydronic Air Handlers

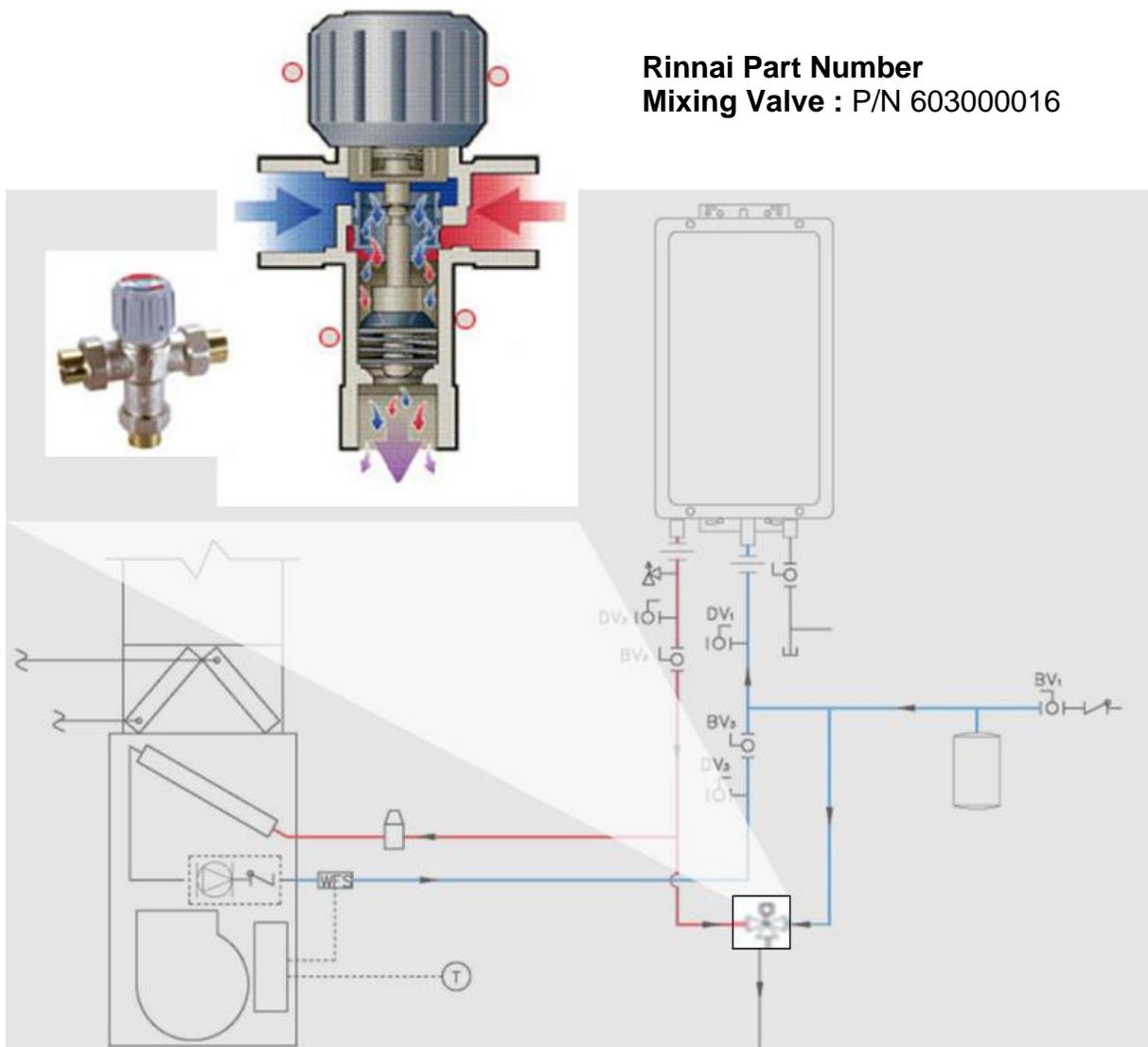
Rinnai's customized flow sensor is required for open loop/domestic hot water priority systems (DHWP). If water moving through the air handler pump is 1 gpm or less in excess of 1 minute due to domestic hot water needs, the flow sensor alerts the PCB to stop the air handler pump and blower. The flow sensor will periodically monitor flow and resume operation when flow greater than 1 gpm resumes. This eliminates the possibility of blowing cool air into the structure.

Flow Sensor: P/N 603000010



Thermostatic Mixing Valve

- Necessary for any open loop system
- Necessary also for DHWP
- Adjustable temperature setting
- Protects against scalding due to air handler's higher temperature demand



Fill Plates / Side Filter Racks

Side Filter Rack (same size for all models)

- Used to hold filter if air return comes in the side
- Each side filter rack comes with one disposable air filter (all models 20 X 20 X 1)

Bottom Fill Plates (different size for each model)

- Used to fill in bottom of cabinet if air return comes in one of the sides

Air Filters

- Each unit is equipped with one disposable air filter (bottom return air inlet) – purchase locally

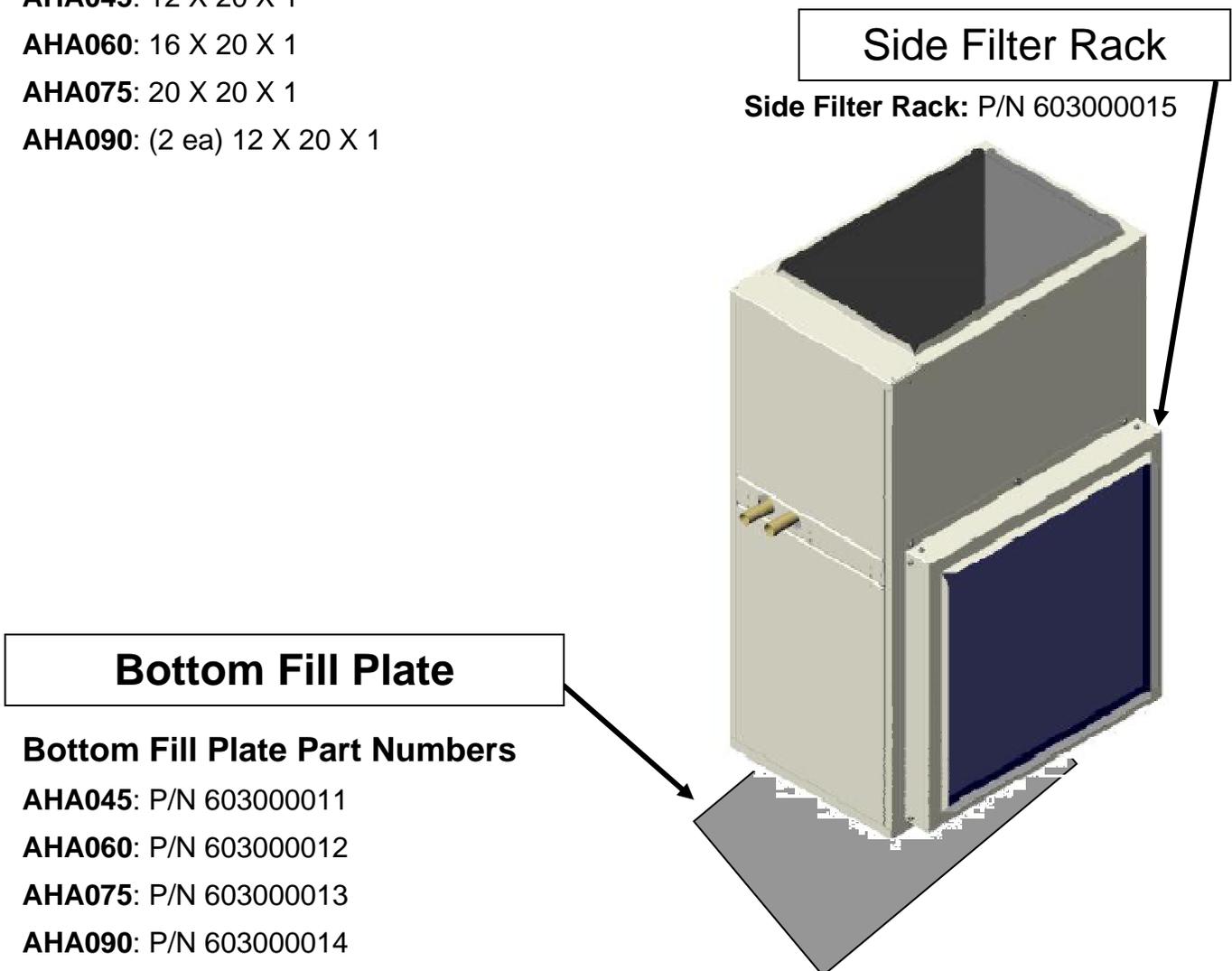
Bottom Air Inlet Filter Dimensions

AHA045: 12 X 20 X 1

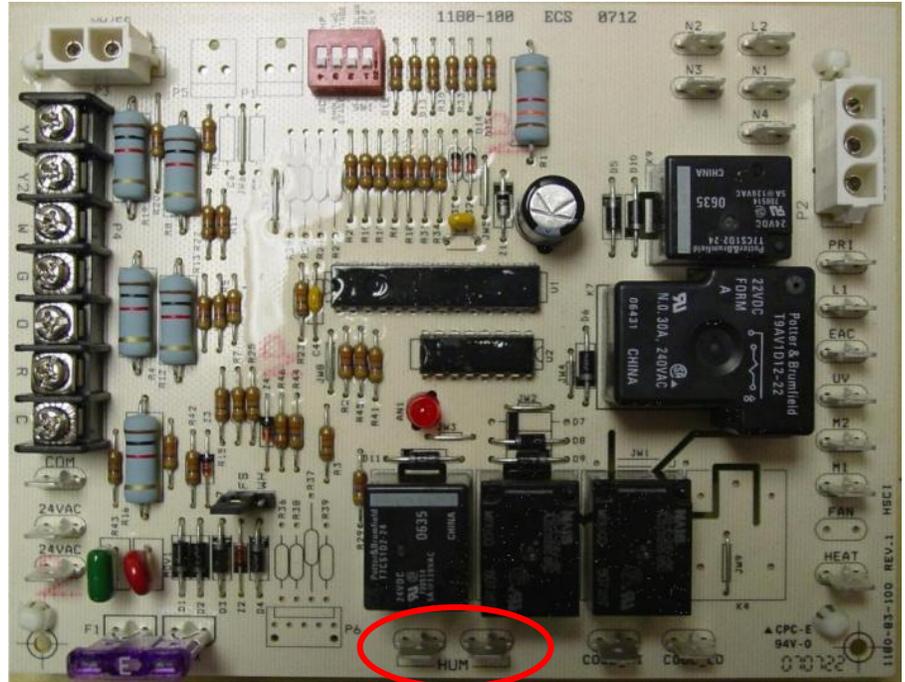
AHA060: 16 X 20 X 1

AHA075: 20 X 20 X 1

AHA090: (2 ea) 12 X 20 X 1



Compatible Field Accessories - Whole House Humidifiers



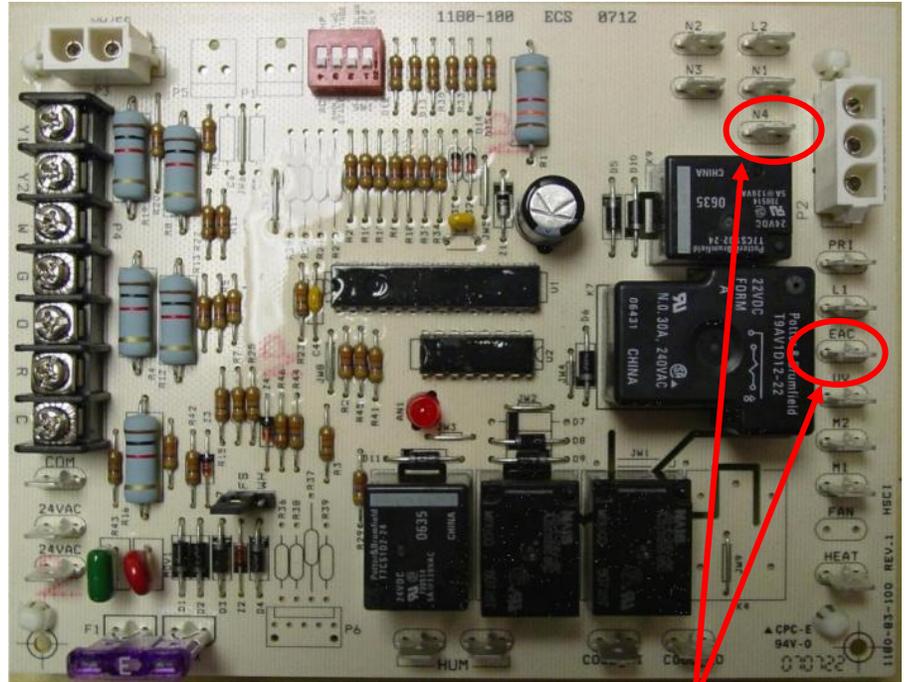
Connect Humidifier at “HUM”
quick connects on PCB

Whole House Humidifiers

Conditions air moisture in entire structure through air handler ductwork. The air handler PCB will accept humidifier **control** connections via the “HUM” quick connects (dry contacts – 24 / 115 VAC). The humidifier output is on whenever a heating demand is being satisfied.

Please refer to humidifier manufacturer’s guidelines for installation and optimal placement in system.

Compatible Field Accessories - Electronic Air Cleaners

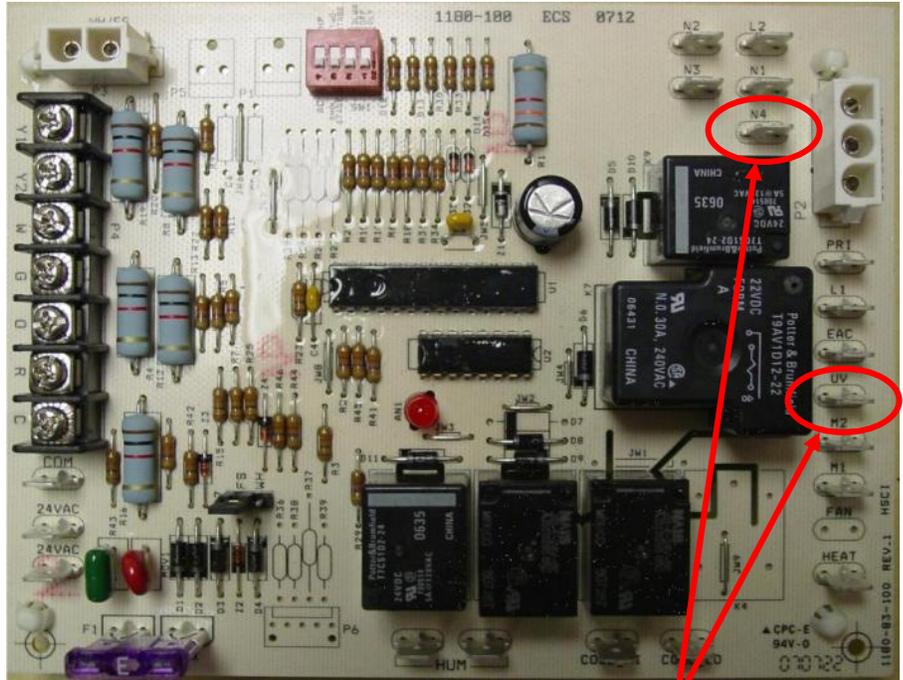
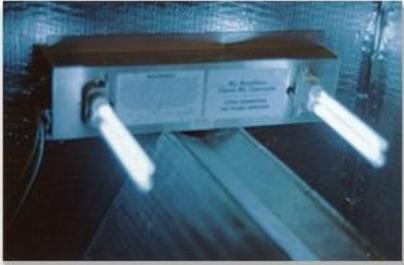


Connect electronic air cleaner at “EAC”
& “N4” quick connects on PCB

Electronic Air Cleaners

Conditions air quality in entire structure through air handler ductwork. The hydronic air handler PCB will accept the electronic air cleaner’s **power** connections via the “EAC” and “N4” quick connects. The output is energized whenever the hydronic air handler blower is on. Please refer to air cleaner manufacturer’s guidelines for installation and optimal placement in system.

Compatible Field Accessories - Ultraviolet Lamps



Connect UV lamp at "UV" & "N4" quick connects on PCB

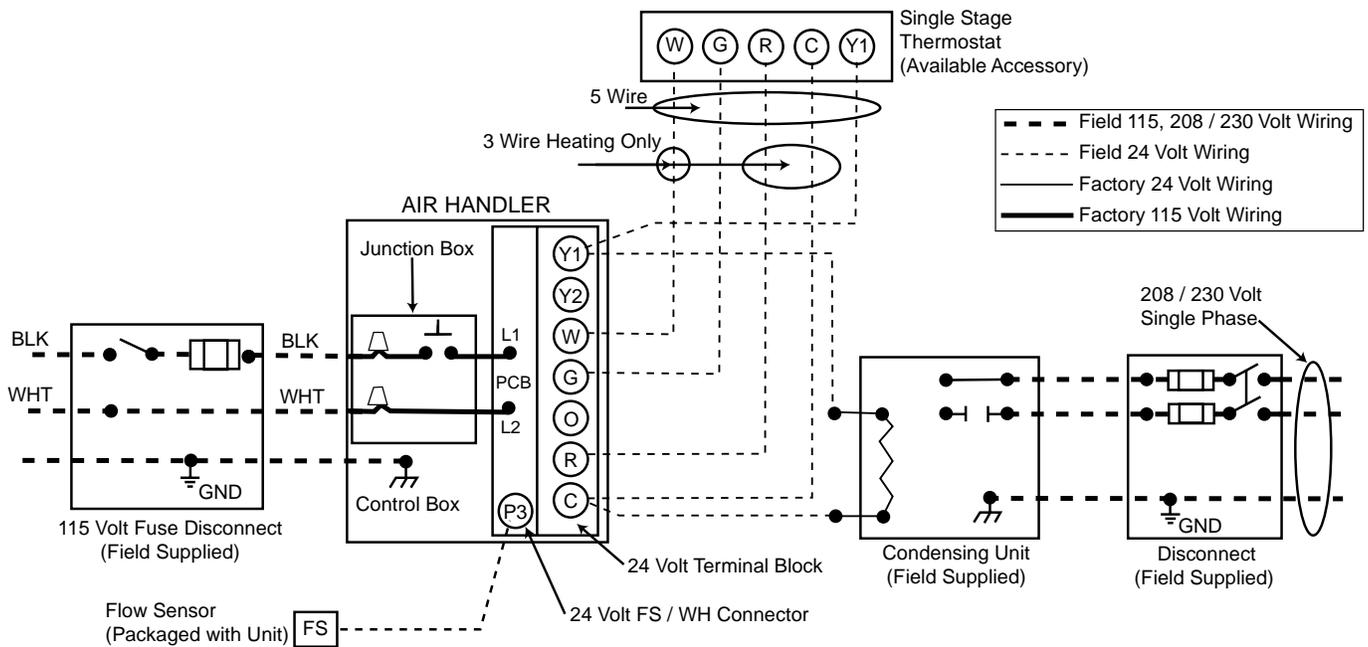
UV Lamps

Conditions air quality in entire structure through air handler ductwork. The air handler PCB will accept the UV lamp's power connections via the "UV" and "N4" quick connects. The output is energized whenever the hydronic air handler blower is on. Please refer to air cleaner manufacturer's guidelines for installation and optimal placement in system.

Electrical Connections

Control Box Connections:

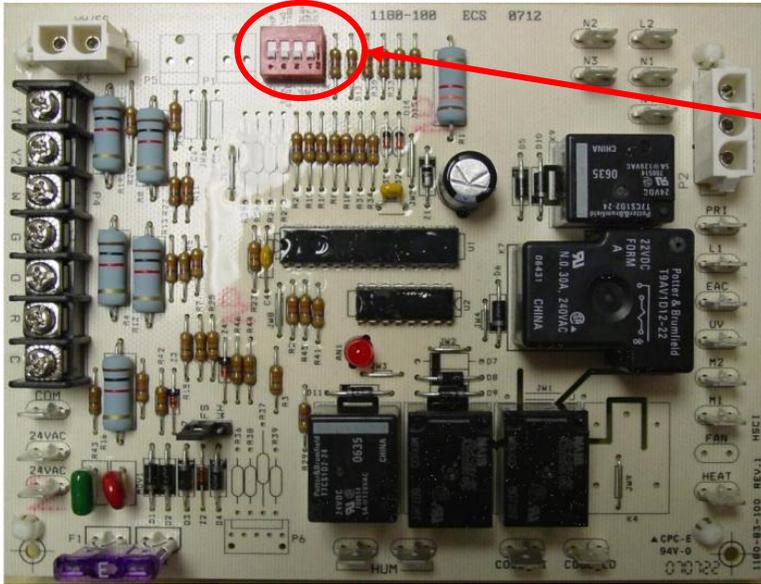
- Route the air handler power supply through the aligned holes in the casing and control box.
 - **Note: Do not use aluminum wire between the air handler and the disconnect switch.**
- Route and secure a field group wire to the ground screw in the control box per local codes
- Accessory and field supplied component connections are to be routed to the air handler control box for internal connection



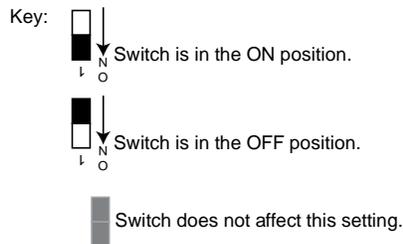
Dip Switch Options

Rinnai Smart Operating System

The Rinnai Smart Operating System is a feature control system that is designed to allow the installer to configure the unit for single, two-stage, A/C or heat pump systems with selectable heat blower-off delay to suit the application.

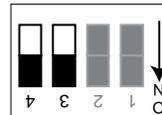


DIP Switches

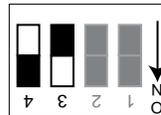


When viewed with the Air Handler in the upflow position, the dip switch will be upside down.

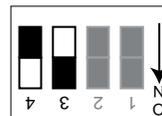
SINGLE-STAGE A/C CONFIGURATION (DEFAULT)



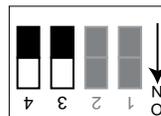
TWO-STAGE A/C CONFIGURATION



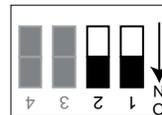
SINGLE-STAGE HP CONFIGURATION



TWO-STAGE HP CONFIGURATION



30 SECONDS OFF DELAY (DEFAULT)



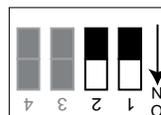
60 SECONDS OFF DELAY



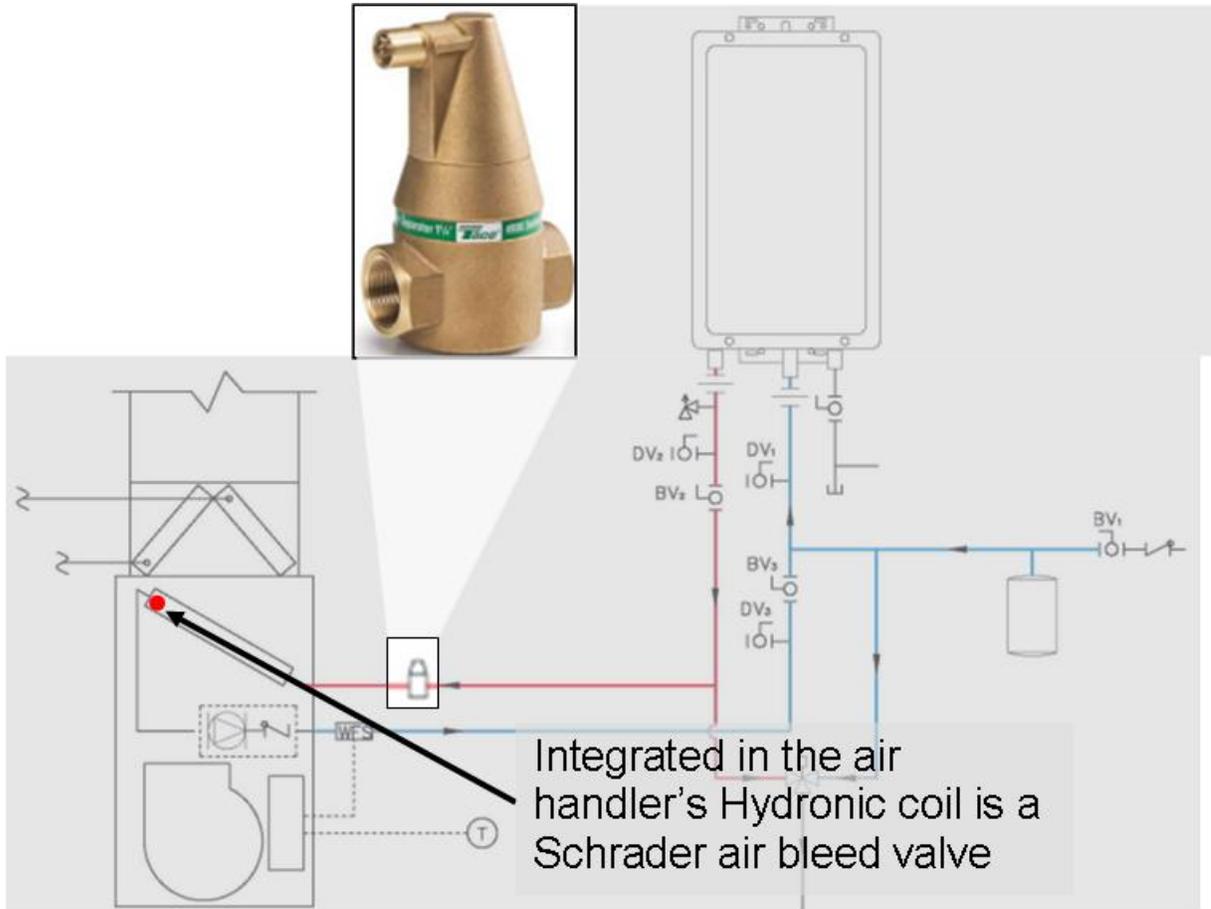
90 SECONDS OFF DELAY



120 SECONDS OFF DELAY



Purging and Priming the System



For proper pump performance and circulation, the air handler plumbing loop must be purged of air upon initial startup.

While there are various methods and products to optimize priming, Rinnai suggests the installation of a Taco 4900 Series Air Separator. The Air Separator will also work as a maintenance device to purge air from the system.

The 4900 Series does not have to be installed at the highest point of the plumbing system as with other air separators.

Rinnai 37AHA series air handlers can be piped without the need for a “purge cart” to fill the system and remove the entrapped air bubbles. See the installation guide for details.

Maintenance

- A qualified service technician should inspect each unit annually and/or perform any needed maintenance.
- Supply/Return Air — The supply and return air should be inspected at least annually for blockages or damage.
- Motors — The motor and pump are permanently lubricated and do not need periodic lubrication. Keep free of dust and dirt by cleaning annually.
- Cleaning — Compartments such as filters and circulating air passage ways of the appliance must be kept clean. Clean as follows:
 - Turn off and disconnect electrical power. Allow to cool.
 - Replace the air filter
 - Use pressurized air to remove dust from the components
 - Use soft dry cloth to wipe cabinet

Pump Assembly Maintenance

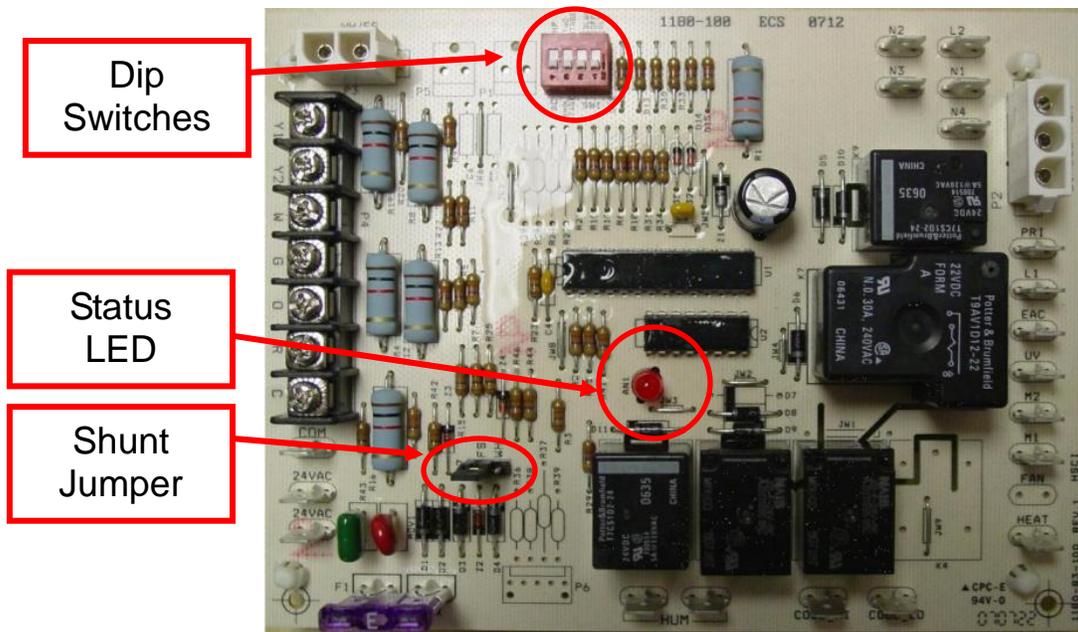
The pump is equipped with a fully replaceable cartridge and seal assembly

Cartridge and Seal Assembly
Pt # 607000016



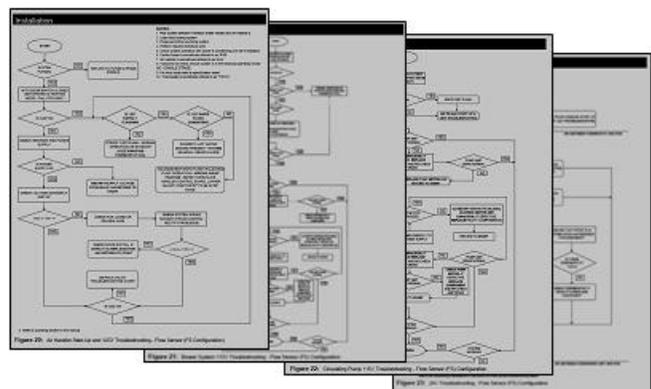
Troubleshooting

- Power is supplied through the door switch. Account for this open circuit when performing any electrical testing and or diagnostics with the door removed
- Status LED—The PCB has a single status LED. It's flashing state indicates the following:
 - Slow flashing LED—normal operation
 - Fast flashing LED—the flow sensor is detecting less that 1 gpm entering the air handler likely due to a significant domestic hot water demand. The pump and blower (time delayed) will be off during this state.
- Dip Switches — Incorrect settings could cause blower to cycle on/off improperly
- Shunt Jumper — Incorrect setting could cause circulation pump to pulsate on and off – “FS / WH” pin connections



Refer to the installation manual for the following troubleshooting flow charts:

- Start-Up and 'LED' Troubleshooting
- Blower System 115V Troubleshooting
- Circulating Pump 115V Troubleshooting
- 24V Troubleshooting



Warranty

RINNAI AIR HANDLER WARRANTY

Item	Period Coverage (from date of purchase)
Parts	5 Years
Reasonable Labor	1 Year

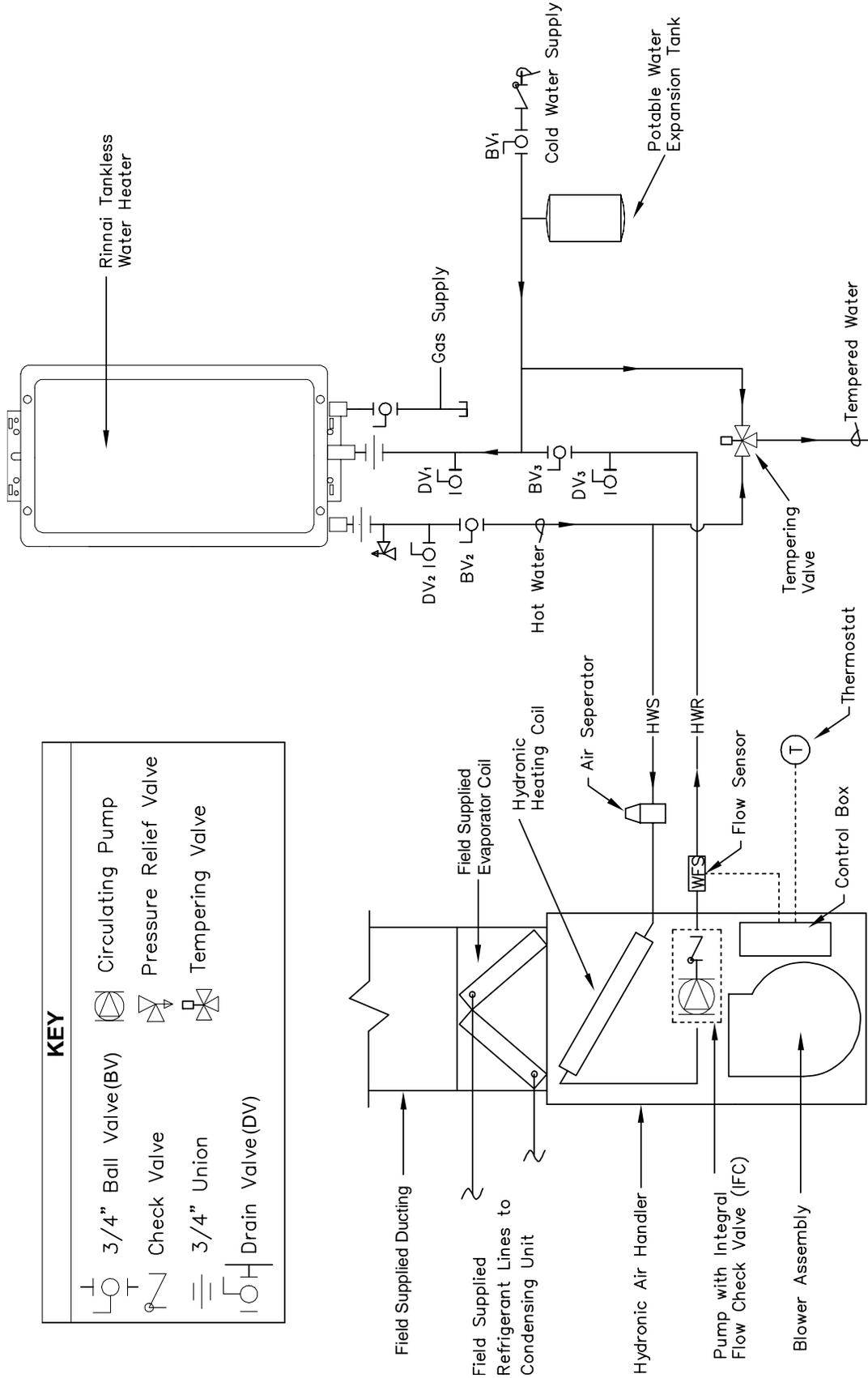
- The hydronic air handler should be installed by a state qualified or licensed contractor(s)
- Improper installation may void the warranty
- Warranty will only be covered when the hydronic air handler is connected to a Rinnai tankless water heater
- See Air Handler's Operation / Installation Manual for full warranty details

RINNAI TANKLESS WATER HEATER WARRANTY when installed with a Rinnai Air Handler

Item	Model Numbers	
	C42, C53, C85, C98	R75LS, R94LS
Heat Exchanger	5 years	10 Years
Parts	5 Years	5 Years
Reasonable Labor	1 Year	1 Year

Hydronic heating is not approved for the R42, R53, R85, or R98 models.
See Tankless Water Heater's Operation / Installation Manual for full warranty details.

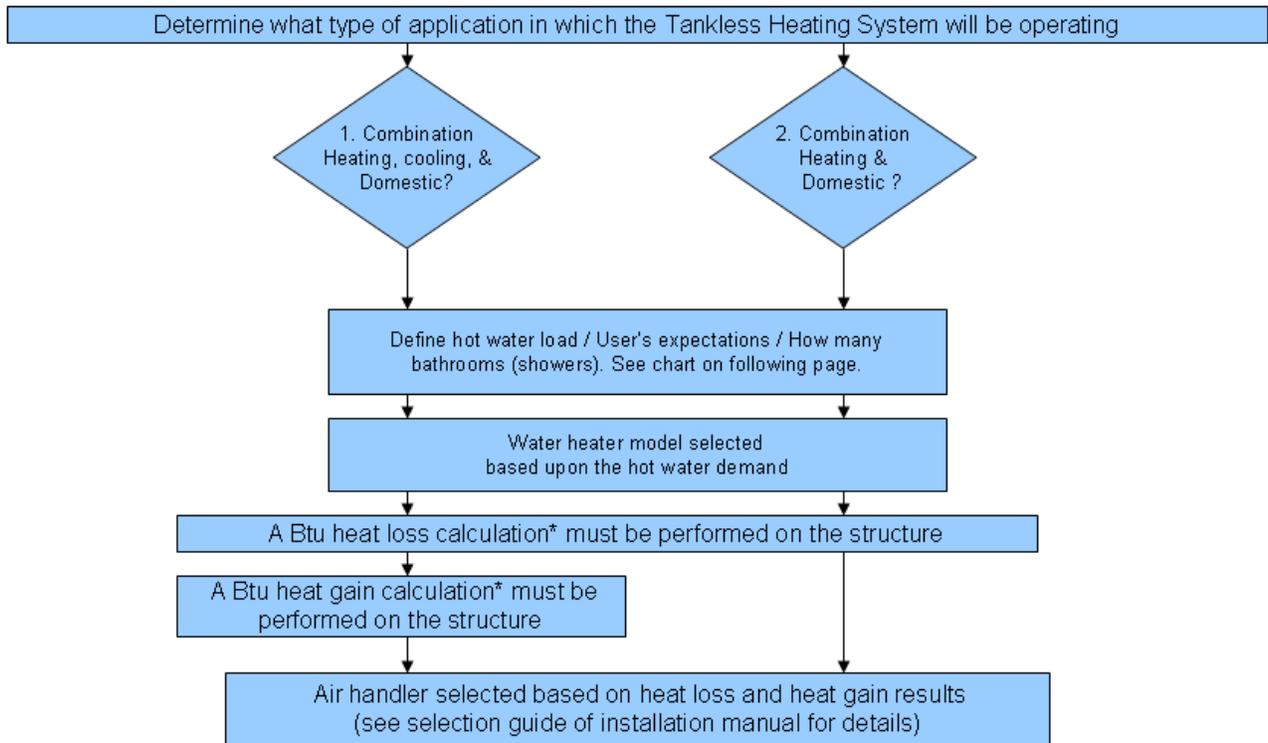
Sample Installation



This drawing is not intended to be used as an exact representation of Rinnai Products

Rinnai Tankless Water Heater Sizing

Hydronic Air Handler and Tankless Water Heater Sizing Guidelines



Btu heat loss and heat gain calculations are comprehensive evaluations on a structure's ability to retain heat. Please visit www.acca.org/tech/manualj for more information.

*Btu heat loss and heat gain calculations are comprehensive evaluations on a structure's ability to retain heat. Please visit www.acca.org/tech/manualj for more information.

Rinnai Tankless Water Heater Sizing

The below chart represents basic sizing for residences and light commercial. For complex applications, please contact Rinnai's Applications department or use Rinnai's comprehensive sizing calculator available at www.rinnaisolutions.com.

Ground Water Temperature: 65° F - 75° F

C42e 0.7-4.2gpm	
C53e 0.7- 5.3 gpm	
C53i 0.7 - 5.3 gpm	
C85i/e 0.5 - 8.5 gpm	
C98i/e 0.6 - 9.8 gpm	
R75 LSi/e 0.6 - 7.5 gpm	
R94 LSi/e 0.6-9.4 gpm	

Ground Water Temperature: 45° F - 55° F

C42e 0.7-4.2gpm	
C53e 0.7- 5.3 gpm	
C53i 0.7 - 5.3 gpm	
C85i/e 0.5 - 8.5 gpm	
C98i/e 0.6 - 9.8 gpm	
R75 LSi/e 0.6-7.5 gpm	
R94 LSi/e 0.6-9.4 gpm	

- Install only one Rinnai Tankless Water Heater per Air Handler and one Air Handler per Tankless Water Heater (contact Rinnai if needed)
- The R94 will provide additional output in areas with ground water greater than 75° F
- Customer has the option of using the following appliances instead of a shower: residential grade clothes washing machines or dishwashers
- Shower heads assumed to be 2.5 gpm mixed flow rate or less. If custom shower fixtures i.e. body sprays, large rain heads, or tubs over 60 gallons in capacity are used, please contact Rinnai
- Bathroom sink faucets assumed to be 2 gpm mixed flow rate or less
- Assumed mixed temperature on bathroom sink faucets and shower heads to be 104° F
- Assumed Rinnai set point to be 120° F
- Assumed 50-80 psi inlet water pressure for maximum flow

Sizing Example

The following example is for demonstration only. Please refer to the Hydronic Air Handler Installation Manual for comprehensive sizing information. Contact Rinnai's Sizing and Application Department if needed.

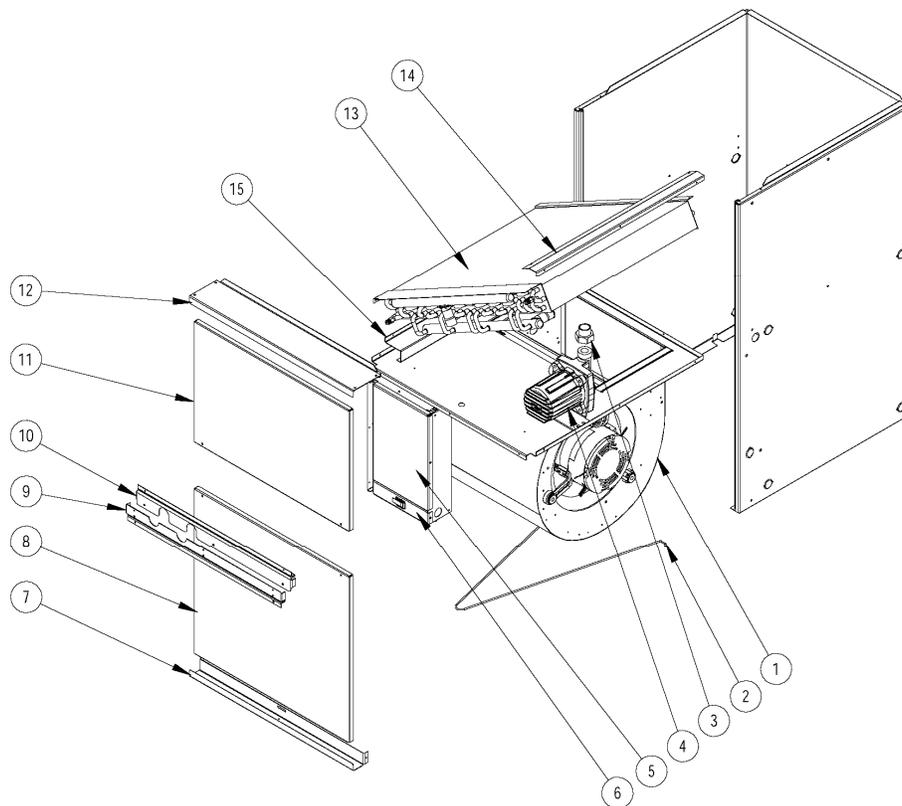
1. Rinnai Tankless Water Heater selected based upon potable hot water needs (average groundwater=50°F, 2 Bath/1 Kitchen) = **R94LSi**
2. Required Heating Capacity (value from Heat Loss Calculation) = **60,000 Btuh**
3. Required Cooling Capacity (value from Heat Gain Calculation) = **34,500 Btuh**
4. Evaporator Air Quantity from Heat Gain Calculation (value supplied by evaporator coil manufacturer) = **1,200 CFM**
5. Determine Total External Pressure Drop
 - External Static Pressure (Ductwork, etc.) = **0.2 in W.C.**
 - Wet Coil (or Evaporative Coil) Pressure Drop = **0.21 in W.C.**
 - Filter Pressure Drop (based on Rinnai supplied filter) = **0.08 in W.C.**
 - **TOTAL EXTERNAL PRESSURE DROP = 0.49 in W.C.**
6. Select Air Handler model based on required cooling capacity airflow (CFM) & Position (bottom, right, or left side return):
Refer to Table 4 in Air Handler Installation Guide (see excerpt below)

Operating Mode	Blower Speed	ESP (in w.c.)									
		0.0	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	
37AHA06012KA5 (Bottom or Right Side)		Airflow (CFM)								*factory	
1 ½ Ton A/C or HP	Low	710	710	700	690	680	670	630	590	520	
2 Ton A/C or HP	Medium-Low	860	850	840	830	820	810	790	750	690	
2 ½ Ton or HP	Medium-High	115	1140	113	111	105	102	950	920	820	
Hydronic Heat / 3 Ton AC or	High	146	1440	141	135	130	124	117	108	100	
37AHA06012KA5 (Left Side Return)		Airflow (CFM)									
1 ½ Ton A/C or HP	Low	720	720	710	700	690	680	640	600	530	
2 Ton A/C/ or HP	Medium-Low	870	860	850	840	830	820	800	760	700	
2 ½ TON or HP	Medium-High	121	1200	118	116	110	107	100	960	860	
Hydronic Heat / 3 Ton AC or	High	157	1550	152	146	140	134	126	116	108	

7. Select Tankless set point temperature to provide the appropriate heating capacity (Btuh) for the Air Handler.
Refer to Tables 6 & 7 in Air Handler Installation Guide (see Table 7 excerpt below).

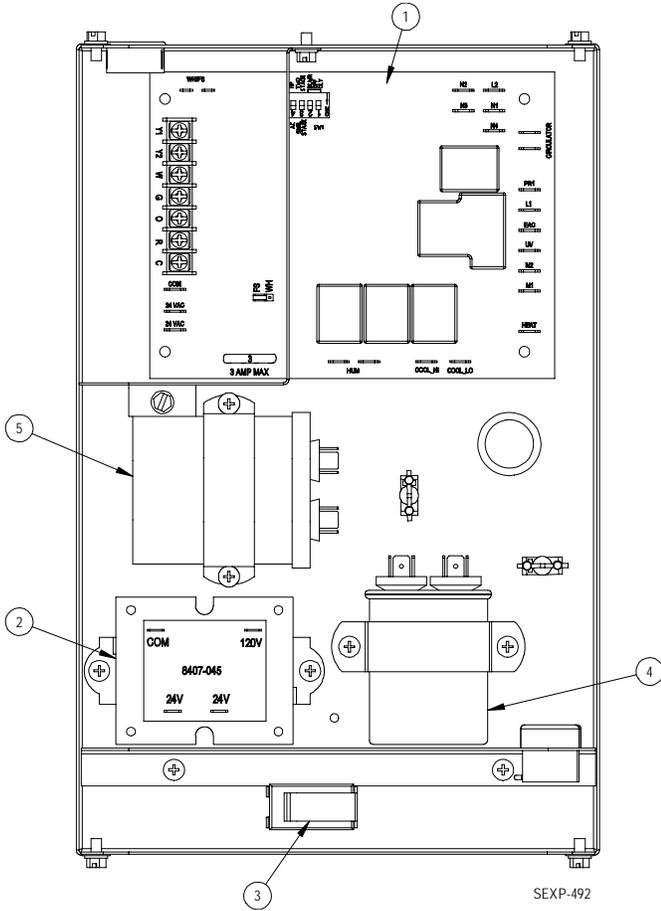
Air Handler Model	Tankless Model	Blower Speed	ESP (in W.C.)	Air Delivery (CFM)	Entering Water Temperature (°F)					Nominal heating Capacity (MBH) (1 MBH = 1000 Btuh)
					120	130	140	150	160	
37AHA60	R94LSi	HIGH	0.5	1200	38.8	45.2	52.1	59.1	66.9	←

Parts List

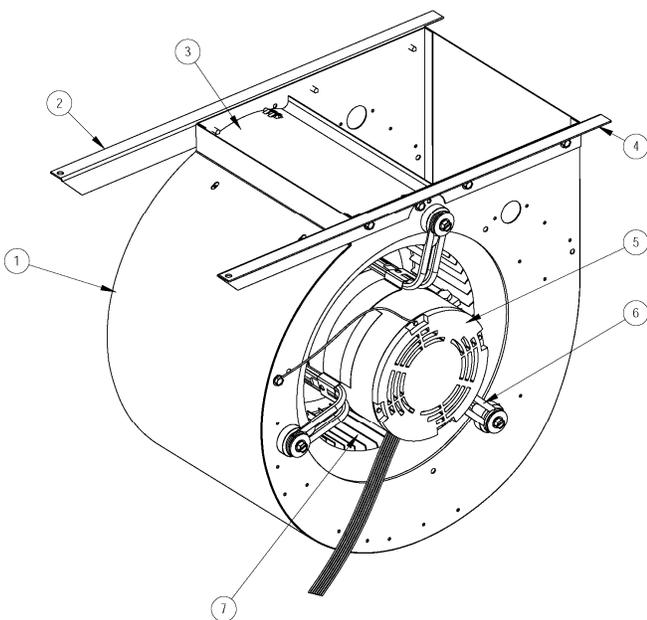


Item #	Description
1	Complete Blower Assembly
2	Fire Retention Wire
3	3/4 " Pump Adaptor Set
4	Hydronic Pump
5	Control Panel Front Cover
6	High Voltage Compartment
7	Lower Front Fill
8	Lower Front Service Door
9	Lower Front Fill Panel
10	Upper Front Fill Panel
11	Upper Front Service Door
12	Top Fill
13	Water Coil
14	Coil Attachment Bracket
15	Coil Support

Parts List



Control Panel Components	
1	Control Board
2	Transformer
3	Door Switch
4	Pump Capacitor
5	Blower Capacitor



Blower Assembly Components	
1	Blower Housing
2	Left Blower Angle
3	Diffuser
4	Right Blower Angle
5	1/3 HP Motor
5a	1/2 HP Motor
5b	3/4 HP Motor
5c	1 HP Motor
6	Motor Mount Kit
7	Blower Wheel

Product Knowledge Test

- The Rinnai Hydronic Air Handler can be installed with other tank and tankless water heaters?
 - True
 - False
- When determining which Rinnai Air Handler fits that need for a specific application, the following must be considered.
 - Heat Loss
 - Heat Gain
 - Equivalent Length of Piping
 - Type and size of ducting
 - Location of Installation
 - All of the above
- The Rinnai Hydronic air Handler can be installed in the following configurations.
 - Horizontal Left
 - Upflow
 - Downflow
 - Horizontal Right
 - Back
 - a, b, c, and d
- If water moving through the air handler pump is less than _____ GPM in excess of one minute, the flow sensor alerts the PCB to stop the air handler pump and blower.
 - 0.05 gpm
 - 1 gpm
 - 1.5 gpm
 - 3.0 gpm
 - 2.5 gpm
 - .08 gpm
- The factory blower off default setting occurs after _____ seconds.
 - 90
 - 60
 - 30
 - 45
 - 120
 - 15
- The current Rinnai Hydronic Air Handler is not approved for a closed loop system?
 - True
 - False
- After the Pump is energized, and the Flow Switch signal is present, the blower will come on after _____ seconds?
 - 90
 - 30
 - 45
 - 60
 - 15
 - 25
- The Flow Sensor primary purpose is designed to?
 - Direct cold water
 - Identify water temps above 120°
 - Control the fan speed
 - Direct domestic hot water
 - Maintain a consistent coil temperature
- The Rinnai Hydronic Air Handlers cover nominal heating capacities of _____ BTU/h?
 - 45k – 90k
 - 45k – 80k
 - 50k – 120k
 - 35k – 85k
 - 25k – 75k
 - 30k – 80k
- The Rinnai Hydronic Air Handler pump is not repairable?
 - True
 - False

ANSWERS:

- B - False**
- D - All of the Above**
- D - A, B, C and D**
- B - 1 gpm**
- C - 30 seconds**
- A - True**
- F - 25 Seconds**
- D - Direct domestic hot water**
- A - 45k – 90k**
- B - False**

Notes

Ask about **Rinnai**

Rinnai's other fine products

Rinnai America Corporation
103 International Drive
Peachtree City, GA 30269
TOLL FREE: 1-800-621-9419
www.rinnai.us



Tankless Water Heaters

- Residential and Commercial Applications
- Continuous Hot Water
- Up to 9.8 GPM
- High Energy Efficiency
- Propane or Natural Gas
- Internal or External Installation
- Digital Temperature Control
- Small, Compact Design



Direct-Vent Ductless Heaters

- "Cool-to-the-Touch" Cabinet
- Easily Installed and Safe for Any Room
- Up to 84% Efficient
- Electronic Ignition - No Pilot Light
- Propane or Natural Gas
- Whisper Quiet Blower
- Primary or Zone Heating



Vent-Free Zone Heaters

- Programmable Thermostat
- Energy Efficient, Vent-free
- No Visible Flame
- Oxygen Depletion Sensor
- Secondary Heat Source
- "Cool-to-the-Touch" Cabinet



Direct-Vent Fireplace, RHFE-750ETR

- Energy Efficient Source of Zone Heating
- Accurate Temperature Control
- Bottom Air Discharge
- Full-function Remote
- Unique Interchangeable Fronts
- Digital Dual Timer Function

To register your hydronic air handler or tankless water heater, please visit www.rinnairegistration.com. For those without internet access, please call 1-866-RINNAI1 (745-6241).