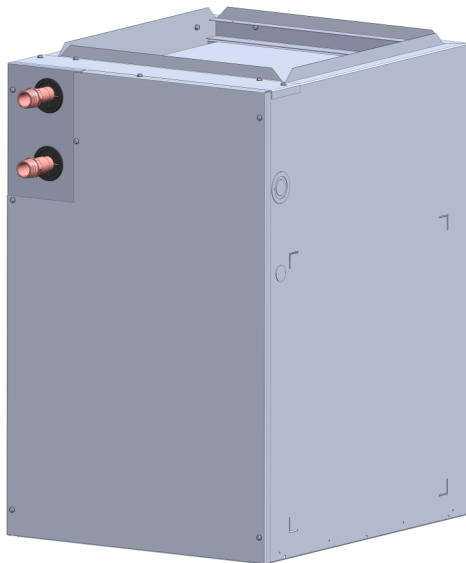




INSTALLATION AND OPERATION MANUAL

Hydronic Air Handler



INDOOR MODELS	
With Internal Circulation Pump	Without Internal Circulation Pump
<ul style="list-style-type: none">• AH083CP• AH084CP• AH125CP• AH166CP• AH206CP	<ul style="list-style-type: none">• AH083P• AH084P• AH125P• AH166P• AH206P



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1. Welcome

Thank you for purchasing Rinnai's hydronic air handler.

Before installing and operating the hydronic air handler, be sure to read these instructions completely and carefully to familiarize yourself with the features and functionality.

This manual provides instructions for installing the hydronic air handler and is a supplement to the Rinnai Tankless Water Heater or Boiler Installation and Operations Manual supplied with the system.

The air handler must satisfy all the requirements in the Tankless Water Heater or Boiler Installation and Operations Manual, as well as the requirements in this manual.

1.1 To the Consumer

- You must read the entire manual to properly operate the air handler.
- It is recommended that a trained and qualified professional who has attended a Rinnai installation training class complete your installation.
- Keep this manual for future reference.

For Your Records

Dealer Name: _____

Dealer Phone: _____

Purchase Date: _____

Serial #: _____

Located on front of unit

1.2 To the Installer

- It is recommended that a trained and qualified professional who has attended a Rinnai installation training class install the air handler, inspect it, and leak test it before use. Improper installation may void the warranty.
- The trained and qualified professional should have skills such as:
 - Connecting water lines, valves, electricity
 - Knowledge of applicable national, state, and local codes
 - Installing ductwork and other HVAC equipment
 - Training in installation of air handlers. Training on Rinnai's hydronic air handler is accessible at www.rinnai-lms.com.
- Read all instructions in this manual before installing the hydronic air handler. The hydronic air handler must be installed according to the exact instructions in this manual.
- When installation is complete, leave this manual with the air handler or give the manual directly to the consumer.
- Proper installation is the responsibility of the installer.

2. Safety

2.1 Safety Symbols

This manual contains the following important safety symbols. Always read and obey all safety messages.



Safety alert symbol. Alerts you to potential hazards that can kill or hurt you and others.



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in personal injury or death.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

2.2 Safety Precautions

The following precautions apply to the installer and consumer. Read and follow all instructions in this section.

- Before any work is undertaken, it is imperative to observe all precautions as stated in this manual.
- Wear safety glasses and work gloves.

- Suitable fire extinguishing equipment should be immediately available in the work area and be maintained in a state of readiness for instant use.
- Do not use this air handler if any part has been under water. Immediately call a licensed professional to inspect the air handler and replace any part that has been under water.
- Do not use substitute materials. Use only parts certified for the air handler.
- Do not use an extension cord or adapter plug with this air handler.
- Any alteration to the air handler can be dangerous and will void the warranty.
- This air handler must be installed indoors.
- Improper installation, modification, service, maintenance or use of the air handler can cause electrical shock, burns or other conditions which may cause personal injury or property damage.
- It is recommended that a trained and qualified professional who has attended a Rinnai installation training class complete your installation.
- Read these installation instructions carefully and adhere to all warning and caution statements. Consult local building codes, Occupational Safety and Health Administration (OSHA), and National Electrical Code (NEC) for special requirements.



WARNING

Before installing or servicing the air handler, turn off the power to unit. There may be more than one disconnect switch. Electrical shock can cause personal injury or death.

3. About

3.1 Description

The hydronic air handler is designed to work with Rinnai tankless water heaters and boilers (models listed below) to deliver a wide variety of heating capacities for residential and light commercial applications.

NOTE

Refer to section “3.8 Specifications” for a complete list of product specifications.

Applicable Tankless Water Heaters and Boilers

The hydronic air handler works with the following Rinnai products:

- **Rinnai Tankless Water Heaters:**
 - SENSEI™ SE+ Series (RU Condensing Models)
 - HE+ Series (RL Non-Condensing Models)
 - HE Series (V Non-Condensing Models)

NOTE

Tankless water heaters must have a minimum input rate of 160,000 Btu/hr.

- **Rinnai Boilers:**
 - I-Series (Condensing) Combi Models

NOTE

If utilizing a boiler, ensure the output of the boiler exceeds the capacity of the air handler in use (the boiler Btu/hr rating must be greater than the air handler Btu/hr rating).

3.2 Codes and Standards

It is the responsibility of the installer to follow all national codes, standards and local ordinances, in addition to the instructions in this manual. 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 the national codes and all authorities having jurisdiction.

The following is a suggested list of codes and standards for the United States and Canada:

General Installation

- Installation of Air Conditioning and Ventilating Systems NFPA 91 (latest edition)

Duct Systems

- Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
- 2001 Fundamentals Handbook Chapter 34 or 2000 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 Standard 181 for Class I Rigid Air Ducts

Electrical Connections

- US: National Electrical Code (NEC) ANSI/NFPA 70 (latest edition)
- CANADA: Canadian Electrical Code CSA C22.1 (latest edition)

Plumbing Systems

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

3.3 Transport

When transporting components of the hydronic air handler, follow the guidelines below:

- Choose the correct hand truck to support the weight and size of the system components. Refer to section “3.8 Specifications” for specific weights and dimensions.
- Use safe lifting and material handling principles to prevent workplace accidents.
- Use proper lifting techniques to load the equipment onto a hand truck.
- Position the equipment onto the hand truck so the weight is evenly balanced.
- Use personal protective equipment, such as gloves and steel-toed boots.

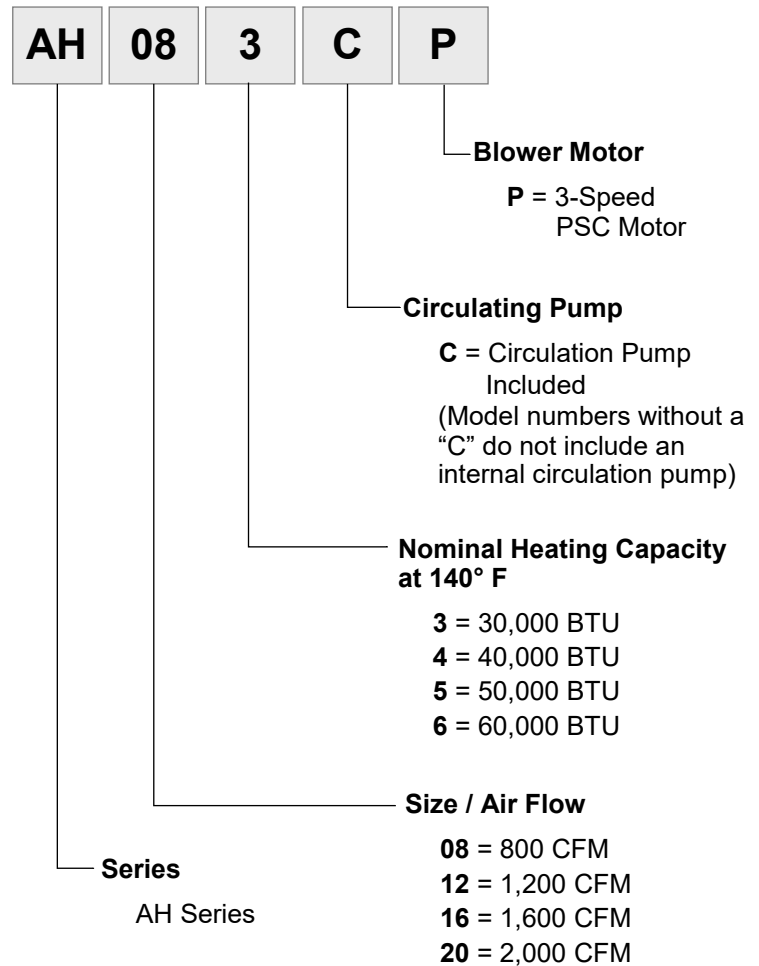
3.4 Storage

If storing components of the hydronic air handler, follow the guidelines below:

- Store system components in a clean, dry environment.
- Components must be protected from direct sunlight.
- Do not store components outdoors.
- If transported or stored at temperatures below 32°F (0°C), the components must be warmed up to 60°F (15°C) before the start of assembly.
- All components must be stored in the original packaging.

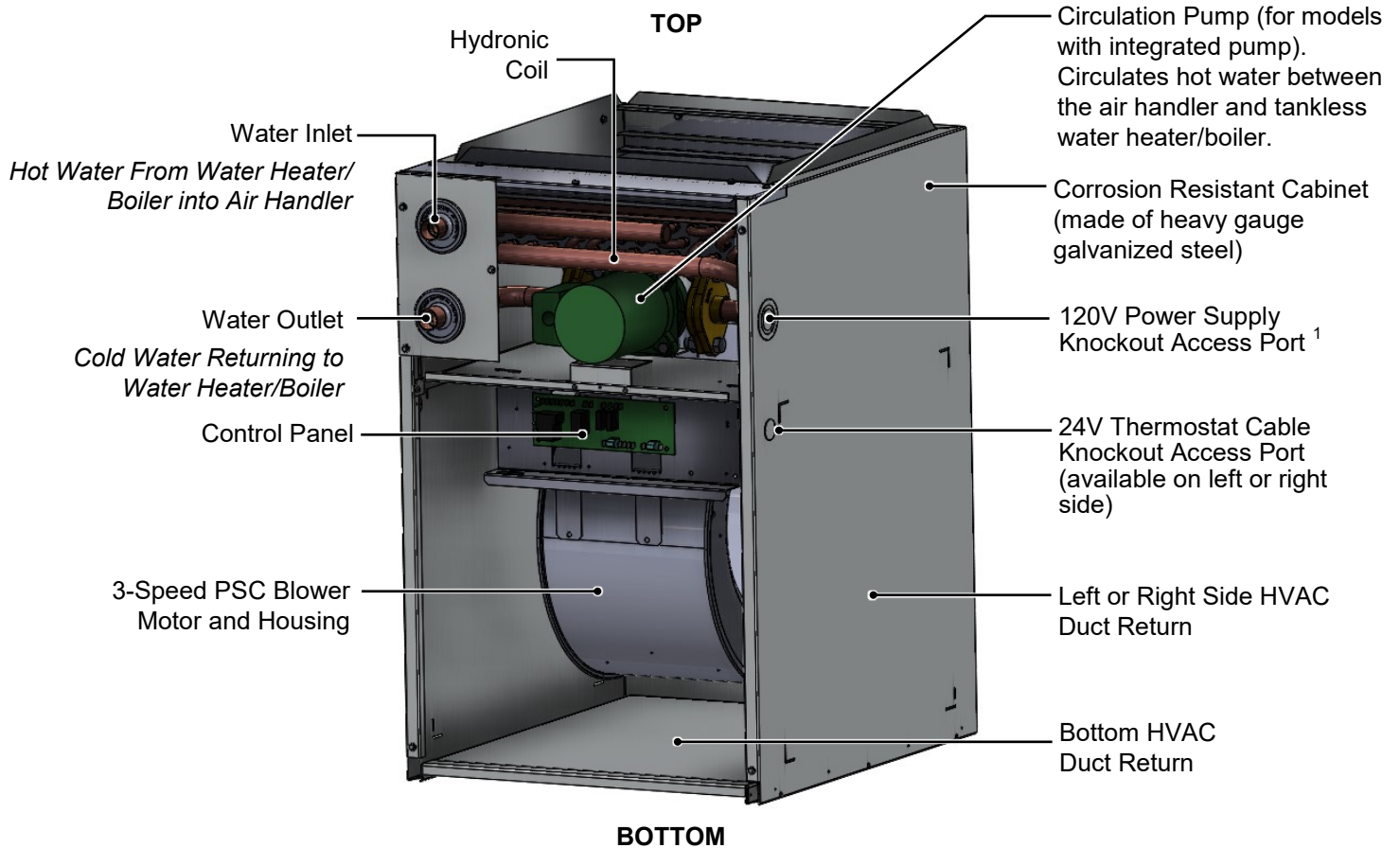
3.5 Model Number Nomenclature

Example:
AH083CP



3.6 Components

3.6.1 Air Handler Components



¹ 120V Power Supply Knockout Access Port:

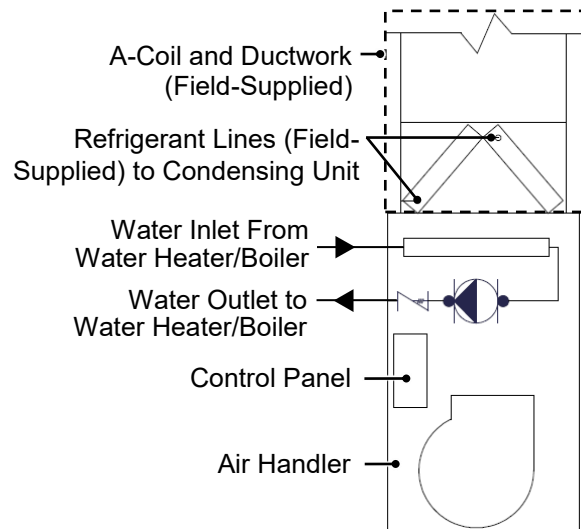
- Located on right side panel for air handler models AH083P/CP, AH084P/CP, AH125P/CP, and AH166P/CP.
- Located on left side panel for air handler models AH206P/CP.

NOTE

- Reference to the "top" and "bottom" are referring to the location in this image and will not change based on orientation of the product.
- Cover is removed in above image to show the air handler internal components.

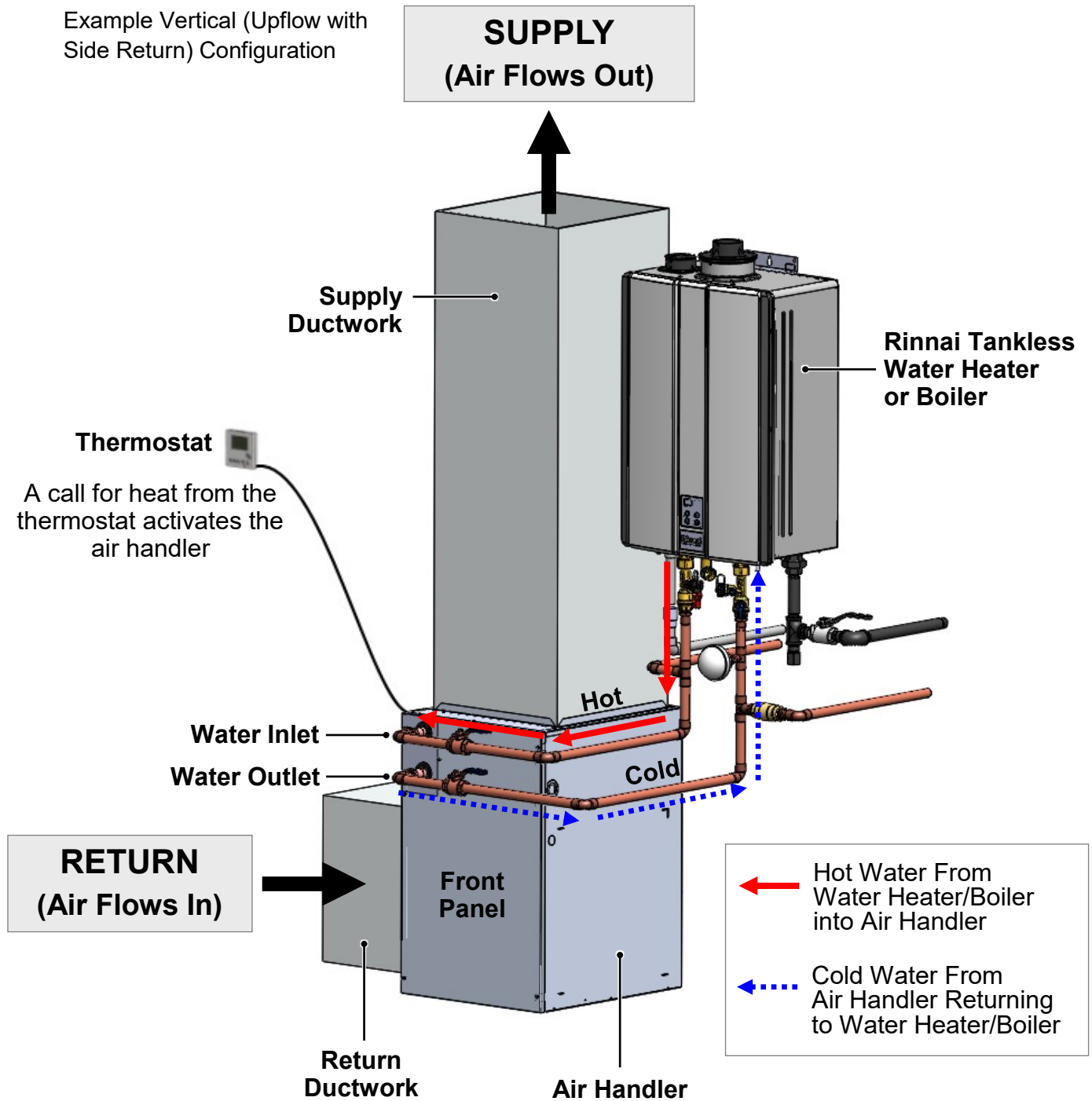
Air Handler with A-Coil (Field-Supplied)

Typical Setup for a Rinnai Hydronic Air Handler with Field-Supplied A-Coil for Cooling



3.6.2 System Components

Example Vertical (Upflow with Side Return) Configuration



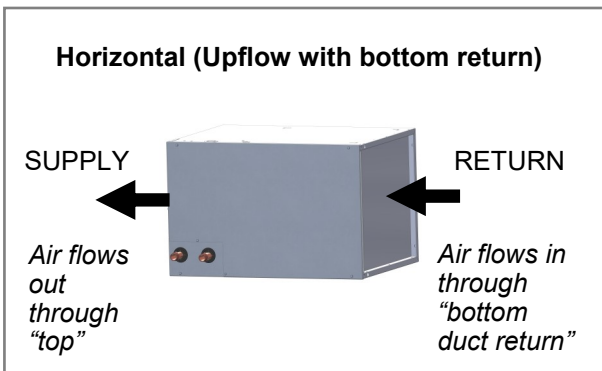
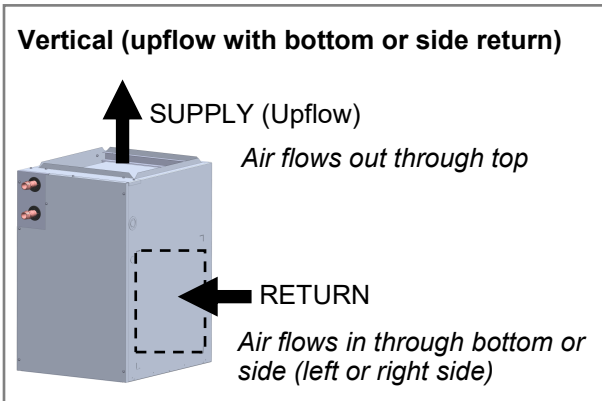
➡ IMPORTANT

The ductwork in the above image is for representation purposes only; it is not a complete system. Please follow standard duct design protocols for installation.

3.7 System Configurations

The air handler is approved for the following configurations:

- Vertical: Upflow with bottom or side (left or right side) return
- Horizontal: Upflow with bottom return

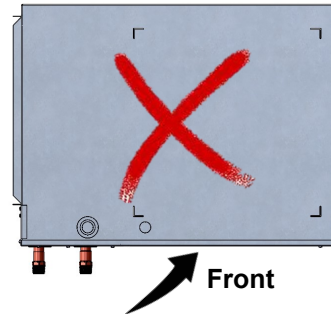


- **Upflow**
The blower should be set on top of the coil section being used and the blower must be supported on the bottom only and set on solid floor or a field-supplied supporting frame.
- **Side Return (Left or Right Side)**
Cut and remove panel as indicated by perforations. Attach evaporator coil with sheet metal screws (if using). Ensure bottom portion of unit is sealed properly to prevent air leakage.
- **Bottom Return**
The air handler must be supported on the underside only and set on a field-supplied supporting frame. Remove the bottom plate of the air handler to create an air return opening. Securely attach the air handler to the supporting frame.

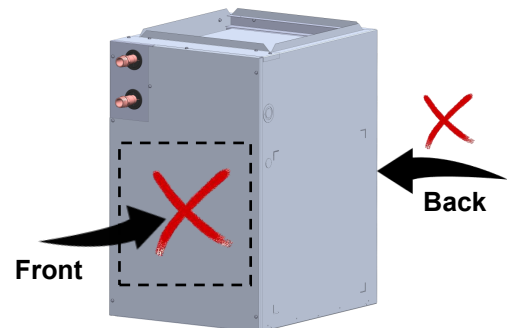
3.7.1 Prohibited Configurations

The air handler is not approved for the following configurations:

- Do not position the air handler on its front panel.



- The air inlet is not allowed in the front or back of the air handler.



- Multiple air handlers configured for installation with a single Rinnai tankless water heater or boiler is prohibited.

3.8 Specifications

3.8.1 Hydronic Air Handler With Internal Circulation Pump

Used with Rinnai Tankless Water Heaters (Applicable Models)

	AH083CP	AH084CP	AH125CP	AH166CP	AH206CP
Appliance Type	Hydronic Air Handler (With Internal Circulation Pump)				
Installation	Indoor (approved for manufactured housing and mobile homes)				
Suitable for Potable Water Systems	Yes				
Configurations	<ul style="list-style-type: none"> Vertical: Upflow with bottom or side (left or right side) return Horizontal: Upflow with bottom return 				
Circulation Pump Included	Yes (Factory Installed)				
Product Weight - lb. (kg) (approximate)	66 (30)	66 (30)	66 (30)	71 (32)	83 (38)
Cabinet Construction	Embossed cabinet in heavy gauge galvanized steel to prevent corrosion. Cabinet lined with 5/8 in. foil faced insulation.				
Nominal CFM (Cubic Feet/Minute)	800	800	1,200	1,600	2,000
Nominal Output Btu/hr at 140°F ¹	30,000	40,000	50,000	60,000	60,000
Rated Voltage	120 V, 60 Hz, 1 Ph				
Transformer Size and Type	40 VA, Class 2				
Blower Wheel (Diameter x Width)	9x6 in.	9x6 in.	10x8 in.	10x8 in.	10x10 in.
Blower Motor Type	3-Speed PSC				
Hot Water Coil Rows	3	4			3
Coil Material	Copper Coil				
Blower Motor Horsepower (HP)	1/3	1/3	1/2	3/4	3/4
Blower Full Load Amps (FLA)	5.3	5.3	7.1	7.5	10.5
Water Connection	3/4 in. Sweat				
Pump Voltage	120 V				
Pump Amps	1.4 Amps				
Control Board	<ul style="list-style-type: none"> Factory Installed Freeze protection activates at 40°F and deactivates at 70°F Thermostat connections 60-second time delay for blower activation Pump timer circulates water for one minute every six hours to prevent stagnation of water in the system Boiler activation dry contact 24V AC isolation valve control 				
Certifications	ETL Listed				

¹ Reference tables in sections 3.8.4 and 3.8.5 for specific BTU output.

Rinnai products are continually being updated and improved; therefore, specifications are subject to change without prior notice.

3.8.2 Hydronic Air Handler Without Internal Circulation Pump

Used with Rinnai I-Series Combi Boilers

	AH083P	AH084P	AH125P	AH166P	AH206P
Appliance Type	Hydronic Air Handler (Internal Circulation Pump Not Included)				
Installation	Indoor (approved for manufactured housing and mobile homes)				
Suitable for Potable Water Systems	Yes				
Configurations	<ul style="list-style-type: none"> Vertical: Upflow with bottom or side (left or right side) return Horizontal: Upflow with bottom return 				
Circulation Pump Included	No				
Product Weight - lb. (kg) (approximate)	57 (26)	57 (26)	57 (26)	62 (28)	74 (34)
Cabinet Construction	Embossed cabinet in heavy gauge galvanized steel to prevent corrosion. Cabinet lined with 5/8 in. foil faced insulation.				
Nominal CFM (Cubic Feet/Minute)	800	800	1,200	1,600	2,000
Nominal Output Btu/hr at 140°F ¹	30,000	40,000	50,000	60,000	60,000
Rated Voltage	120 V, 60 Hz, 1 Ph				
Transformer Size and Type	40 VA, Class 2				
Blower Wheel (Diameter x Width)	9x6 in.	9x6 in.	10x8 in.	10x8 in.	10x10 in.
Blower Motor Type	3-Speed PSC				
Hot Water Coil Rows	3	4			3
Coil Material	Copper Coil				
Blower Motor Horsepower (HP)	1/3	1/3	1/2	3/4	3/4
Blower Full Load Amps (FLA)	5.3	5.3	7.1	7.5	10.5
Water Connection	3/4 in. Sweat				
Control Board	<ul style="list-style-type: none"> Factory Installed Freeze protection activates at 40°F and deactivates at 70°F Thermostat connections 60-second time delay for blower activation Boiler activation dry contact 24V AC isolation valve control 				
Certifications	ETL Listed				

¹ Reference tables in sections 3.8.4 and 3.8.5 for specific BTU output.

Rinnai products are continually being updated and improved; therefore, specifications are subject to change without prior notice.

3.8.3 Domestic Hot Water Recirculation



IMPORTANT

This section is referring to domestic hot water recirculation in the plumbing system and not the circulation of hot water between the air handler and tankless water heater/boiler.

Domestic hot water recirculation circulates hot water through the plumbing system so that instant hot water is available. Domestic hot water recirculation operates between calls for heat to ensure a balance of comfort for HVAC heating and domestic hot water. If pairing a Rinnai Hydronic Air Handler with a tankless water heater for domestic hot water recirculation capabilities, Rinnai recommends the following:

- Use an external recirculation pump controlled by a timer, aquastat, and/or an on-demand type control. Do not use a Rinnai Tankless Water Heater equipped with recirculation capability¹ with the Rinnai Hydronic Air Handler.
- Size the air handler based off of the maximum allowable temperature for the domestic hot water system.

Refer to section “5.7.3 Domestic Hot Water Recirculation Piping Diagrams” for domestic hot water recirculation piping diagrams.

For more information on domestic hot water recirculation, refer to the tankless water heater installation and operation manual.

¹ Rinnai Tankless Water Heaters equipped with recirculation capability include the SE+ Series featuring ThermaCirc360™ models (Super High-Efficiency Plus RUR Models).

3.8.4 Blower Performance Data

3-Speed PSC Motor Speed Table

Air Handler Models	Speed	Air Flow (CFM) vs External Static Pressure (WC)				
		0.1	0.2	0.3	0.4	0.5
AH083P AH083CP	Low	749	705	658	614	558
	Med ²	865	815	760	708	646
	High	904	836	801	740	681
AH084P AH084CP	Low	749	705	658	614	558
	Med ²	865	815	760	708	646
	High	904	836	801	740	681
AH125P AH125CP	Low	1,198	1,144	1,086	1,018	962
	Med ²	1,257	1,198	1,130	1,072	1,010
	High	1,273	1,215	1,158	1,094	1,018
AH166P AH166CP	Low	1,576	1,514	1,433	1,338	1,264
	Med	1,643	1,576	1,490	1,407	1,320
	High ²	1,707	1,606	1,545	1,441	1,364
AH206P AH206CP	Low	1,759	1,691	1,652	1,580	1,512
	Med	1,838	1,788	1,729	1,644	1,555
	High ²	1,928	1,867	1,810	1,729	1,637

² Factory default setting for both heating and cooling.

- Results are obtained while air handler is operating with a dry DX coil and air filter installed.
- Values are nominal and blower performance can vary higher or lower from these values based on the evaporator coil that is used. Hot water heat air flow performance data includes associated air pressure drop across a four-row hot water coil for models AH084P/CP, AH125P/CP, and AH166P/CP, and air pressure drop across a three-row hot water coil for models AH083P/CP and AH206P/CP.

3.8.5 Water Heating Capacity

Values shown in following tables may vary depending on the static pressure of the duct system.

Hydronic Air Handler With Internal Circulation Pump

- SENSEI™ SE+ Series (RU Condensing)

Air Handler Model	Entering Water Temperature	Blower Speed (Btu/hr)		
		Low	Medium	High
AH083CP	120°F	21,000	23,000	24,000
	140°F*	29,000	31,000*	34,000
	160°F	37,000	40,000	43,000
AH084CP	120°F	22,000	25,000	27,000
	140°F*	31,000	35,000*	38,000
	160°F	40,000	44,000	47,000
AH125CP	120°F	31,000	33,000	34,000
	140°F*	43,000	45,000*	47,000
	160°F	55,000	58,000	61,000
AH166CP	120°F	40,000	41,000	42,000
	140°F*	55,000	57,000	58,000*
	160°F	70,000	73,000	75,000
AH206CP	120°F	40,000	41,000	41,000
	140°F*	55,000	56,000	57,000*
	160°F	70,000	71,000	72,000

* Bold text is default setting.

- HE+ Series (RL Non-Condensing) and HE Series (V Non-Condensing)

Air Handler Model	Entering Water Temperature	Blower Speed (Btu/hr)		
		Low	Medium	High
AH083CP	120°F	21,000	23,000	25,000
	140°F*	29,000	32,000*	34,000
	160°F	38,000	41,000	45,000
AH084CP	120°F	23,000	26,000	28,000
	140°F*	32,000	35,000*	39,000
	160°F	41,000	45,000	49,000
AH125CP	120°F	32,000	34,000	35,000
	140°F*	44,000	46,000*	49,000
	160°F	57,000	60,000	63,000
AH166CP	120°F	42,000	43,000	44,000
	140°F*	57,000	59,000	61,000*
	160°F	74,000	76,000	79,000
AH206CP	120°F	41,000	42,000	43,000
	140°F*	56,000	57,000	58,000*
	160°F	73,000	74,000	76,000

* Bold text is default setting.

NOTE

Tankless water heaters must have a minimum input rate of 160,000 Btu/hr.

NOTE

Tankless water heaters must have a minimum input rate of 160,000 Btu/hr.

Hydronic Air Handler Without Internal Circulation Pump

- I-Series Boiler Models: i060C, i090C

Air Handler Model	Entering Water Temperature	Blower Speed (Btu/hr)		
		Low	Medium	High
AH083P	120°F	21,000	23,000	25,000
	140°F*	29,000	32,000*	35,000
	160°F	38,000	42,000	45,000
AH084P	120°F	23,000	25,000	27,000
	140°F*	32,000	35,000*	38,000
	160°F	41,000	46,000	50,000
AH125P	120°F	32,000	33,000	35,000
	140°F*	44,000	47,000*	49,000
	160°F	57,000	60,000	63,000
AH166P	120°F	41,000	42,000	44,000
	140°F*	58,000	60,000	62,000*
	160°F	75,000	78,000	80,000
AH206P	120°F	41,000	42,000	43,000
	140°F*	58,000	60,000	61,000*
	160°F	75,000	77,000	78,000

* Bold text is default setting

- I-Series Boiler Model: i120C

Air Handler Model	Entering Water Temperature	Blower Speed (Btu/hr)		
		Low	Medium	High
AH083P	120°F	21,000	23,000	25,000
	140°F*	29,000	32,000*	35,000
	160°F	38,000	41,000	45,000
AH084P	120°F	23,000	25,000	27,000
	140°F*	32,000	35,000*	39,000
	160°F	41,000	46,000	50,000
AH125P	120°F	32,000	34,000	35,000
	140°F*	45,000	47,000*	50,000
	160°F	58,000	61,000	64,000
AH166P	120°F	41,000	43,000	44,000
	140°F*	58,000	60,000	62,000*
	160°F	75,000	78,000	80,000
AH206P	120°F	41,000	42,000	43,000
	140°F*	58,000	60,000	61,000*
	160°F	76,000	77,000	79,000

* Bold text is default setting

➔ IMPORTANT

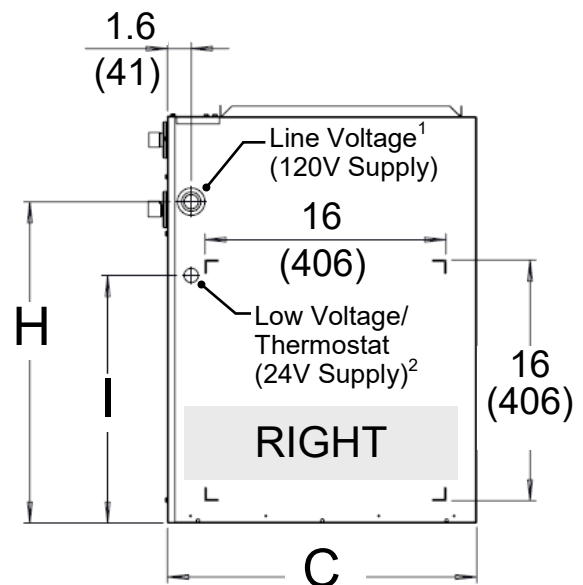
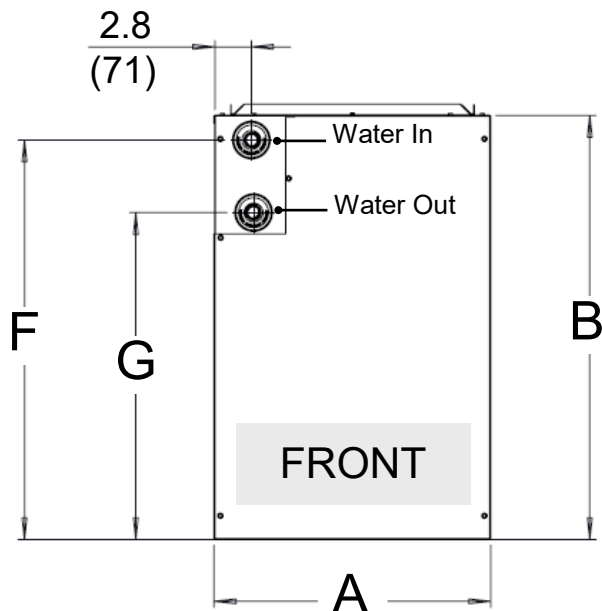
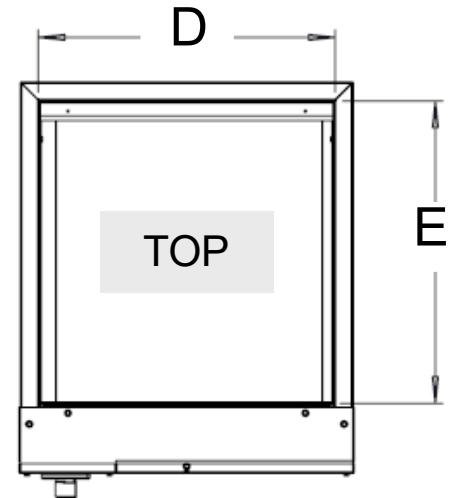
- All capacities are based on 70°F entering air temperature.
- For entering air temperatures other than 70°F, use the following capacity correction factors: (72°F x .982), (68°F x 1.02), (66°F x 1.04)
- Glycol correction factors: (10% X .98), (20% X .95), (30% X .92), (40% X .88)
- Refer to the “Approved Cleaners, Inhibitors and Antifreezes” section (in the Appendix of the “I-Series Condensing Combi Boiler Installation and Operation Manual”) for a complete list of approved glycols.

3.9 Dimensions

Measurements: in. (mm)

Hydronic Air Handler Models					
	• AH083CP • AH083P	• AH084CP • AH084P	• AH125CP • AH125P	• AH166CP • AH166P	• AH206CP • AH206P
A	17.5 (445)			21.0 (533)	24.5 (622)
B	27.0 (686)			28.0 (711)	28.0 (711)
C	20.5 (521)			20.5 (521)	20.5 (521)
D	15.5 (394)			19.0 (483)	22.5 (572)
E	16.0 (406)			16.0 (406)	16.0 (406)
F	25.4 (645)			26.4 (671)	26.4 (671)
G	21.5 (546)			22.5 (572)	22.5 (572)
H	21.4 (544)			22.4 (569)	21.4 (543)
I	16.5 (419)			17.5 (445)	17.5 (445)

NOTE
 CP = Models *with* Internal Circulation Pump
 P = Models *without* Internal Circulation Pump



¹ Line Voltage knockout is located at the specified height on the cabinet *right* side panel for models: AH083P/CP, AH084P/CP, AH125P/CP, AH166P/CP

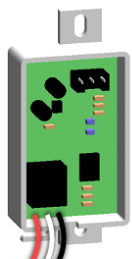
Line Voltage knockout is located at the specified height on the cabinet *left* side panel for models: AH206P/CP

² Low Voltage/Thermostat knockouts are also available at same location on cabinet left side.

3.10 Accessories



Universal Air Handler Rack Assembly	Part #
Universal rack assembly that mounts to the Rinnai Tankless Water Heater or Boiler for simple installation with the hydronic air handler. Works with all Rinnai AH Series Hydronic Air Handler models. Includes hardware for mounting the tankless water heater or boiler to the air handler rack assembly, and hardware for assembling the rack.	AHRACK-1



Domestic Priority Switch	Part #
Normally Closed (NC) switch that connects to the PC Board in the Rinnai tankless water heater or boiler. Allows the tankless water heater or boiler to give priority to domestic hot water by shutting off the air handler when necessary. When used with a hydronic air handler, the switch gives priority to domestic hot water. When domestic hot water demand exceeds a certain point, the air handler will turn off to ensure the demand is met.	REU-OPU3



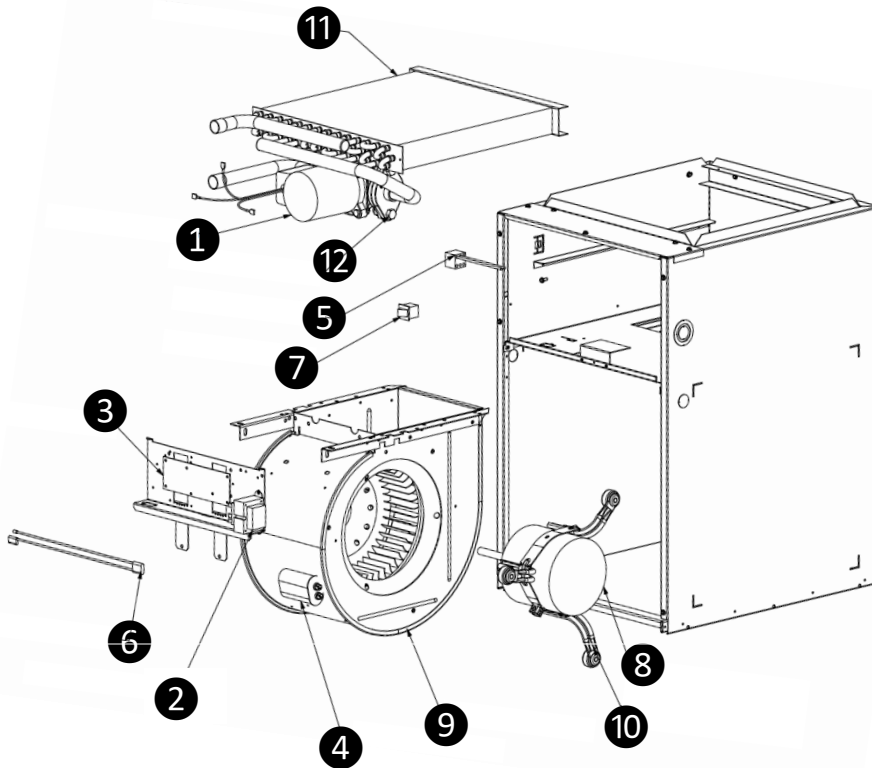
Pipe Cover Enclosure	Part #
Encloses the piping below the tankless water heater or boiler for aesthetic purposes.	
<ul style="list-style-type: none"> • Pipe cover for HE+ Series (RL Non-Condensing) Tankless Water Heater Models 	PCD03-SM2
<ul style="list-style-type: none"> • Pipe cover for SENSEI™ SE+ Series (RU Condensing) Tankless Water Heater Models and I-Series (Condensing) Combi Boiler Models 	PCD07-SM
<ul style="list-style-type: none"> • Pipe cover for HE Series (V Non-Condensing) Tankless Water Heater Models 	PCD03-EWV



24V NC Brass Solenoid Valve (3/4" NPT)	Part #
Optional accessory for use in domestic hot water recirculation applications. The solenoid valve installs in line with the air handler pump and is wired to the 24V Valve terminal on the air handler control board. 1.12A Max Current Draw.	607000018

Product images are for illustrative purposes only.

3.11 Parts List



Models With Internal Circulation Pump					Models Without Internal Circulation Pump				
AH083CP	AH084CP	AH125CP	AH166CP	AH206CP	AH083P	AH084P	AH125P	AH166P	AH206P

#	Description	Rinnai Part #	Quantity									
1	Pump - With Internal Check Valve, 120 Volts	607000033	1	1	1	1	1	0	0	0	0	0
2	Transformer - 120 Volt, 60 Hz.	605000044	1	1	1	1	1	1	1	1	1	1
3	Multi-Function Control Board	605000033	1	1	1	1	1	1	1	1	1	1
4	7.5 MFD Capacitor	605000034	1	1	0	0	0	1	1	0	0	0
	10 MFD Capacitor	605000035	0	0	1	0	0	0	0	1	0	0
	12.5 MFD Capacitor	605000036	0	0	0	1	1	0	0	0	1	1
5	6 Pin Wire Harness	605000037	1	1	1	1	1	1	1	1	1	1
6	Rinnai Wiring Harness	605000038	1	1	1	1	1	1	1	1	1	1
7	Door Switch	605000039	1	1	1	1	1	1	1	1	1	1
8	Blower Motor 1/3 HP, 120 Volt, 60 Hz.	605000040	1	1	0	0	0	1	1	0	0	0
	Blower Motor 1/2 HP, 120 Volt, 60 Hz.	605000041	0	0	1	0	0	0	0	1	0	0
	Blower Motor 3/4 HP, 120 Volt, 60 Hz.	605000042	0	0	0	1	0	0	0	0	1	0
	Blower Motor 3/4 HP, 120 Volt, 60 Hz.	605000043	0	0	0	0	1	0	0	0	0	1
9	9" x 6" Blower Housing Assembly	608000029	1	1	0	0	0	1	1	0	0	0
	10" x 8" Blower Housing Assembly	608000030	0	0	1	1	0	0	0	1	1	0
	10" x 10" Blower Housing Assembly	608000031	0	0	0	0	1	0	0	0	0	1
10	Motor Mount Assembly (includes ring and legs)	609000063	1	1	1	1	1	1	1	1	1	1
11	Hot Water Replacement Coil With Pump and Valve Assembly	607000022	1	0	0	0	0	0	0	0	0	0
		607000023	0	1	1	0	0	0	0	0	0	0
		607000025	0	0	0	1	0	0	0	0	0	0
		607000026	0	0	0	0	1	0	0	0	0	0
	Hot Water Replacement Coil With No Pump and Valve Assembly	607000027	0	0	0	0	0	1	0	0	0	0
		607000028	0	0	0	0	0	0	1	1	0	0
		607000030	0	0	0	0	0	0	0	0	1	0
	607000031	0	0	0	0	0	0	0	0	0	1	
12	3/4" Sweat Flange Kit	607000032	1	1	1	1	1	0	0	0	0	0

4. Installation Preparation

4.1 Inspect Shipment

Carefully unpack the air handler. If the unit is damaged, contact your local dealer/distributor. Do not attempt to use the air handler if it appears damaged.

The blower section is factory assembled and all components are performance tested.

The air handler consists of a blower assembly and controls in an insulated, galvanized steel factory finished enclosure. Knockouts are provided for electrical wiring entrance.

Inspect the following:

- Check the air handler rating plate to confirm specifications are as ordered.
- Upon receipt of air handler, thoroughly inspect the system for possible shipping damage. If the carton appears damaged, closely examine the air handler inside the carton.
- If the air handler appears to be damaged or is torn loose from its anchorage, the air handler must be immediately examined by the receiving party before removal. If damage is found, the receiving party must sign the driver's delivery receipt noting all damage (i.e. carton damage and/or product damage), as well as contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.
- To prevent loss or damage, leave all parts in original packages until installation.

4.2 Items Needed

Gather the required tools and parts before starting installation. Read and follow the instructions provided with any tools listed below.

- 1/4 in. nut driver
- Level
- Screwdriver
- Adjustable wrench
- Tape Measure
- Hammer
- AHRI Approved Duct Sealant
- UL listed wire nuts

4.3 Choose an Installation Location

When choosing an installation location, you must ensure proper clearances will be met; the installation environment; water quality; and the need for freeze protection.

4.3.1 Water Quality Guidelines

This section provides information on the importance of water quality to the air handler. The information is intended to serve as general guidelines only and is not a complete list of water quality guidelines.

Consideration of care for the air handler should include evaluation of water quality.

- The water must be potable, free of corrosive chemicals, sand, dirt, or other contaminants.
- It is up to the installer to ensure the water does not contain corrosive chemicals or elements that can affect or damage the boiler or tankless water heater.
- Water that contains chemicals exceeding the levels below can damage the boiler or tankless water heater.

Contaminant	Maximum Level
Total Hardness	Up to 200 mg/L
Aluminum *	Up to 0.2 mg/L
Chlorides *	Up to 250 mg/L
Copper *	Up to 1.0 mg/L
Dissolved Carbon Dioxide (CO ₂)	Up to 15.0 mg/L
Iron *	Up to 0.3 mg/L
Manganese *	Up to 0.05 mg/L
pH *	6.5 to 8.5
TDS (Total Dissolved Solids) *	Up to 500 mg/L
Zinc *	Up to 5 mg/L

* Source: Part 143 National Secondary Drinking Water Regulations

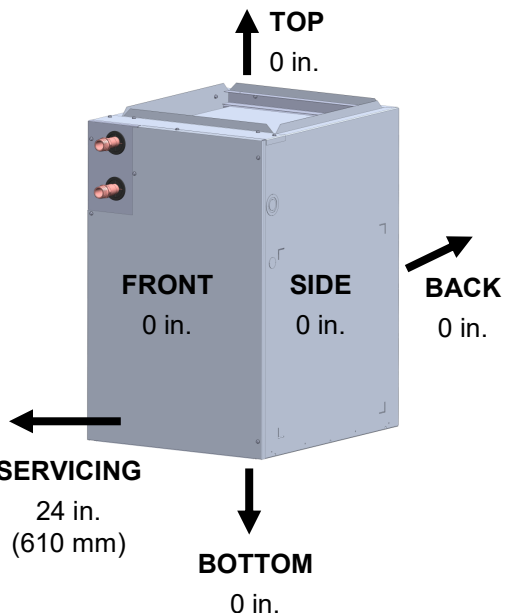
- Unsuitable heating system water can cause the formation of scale or sludge, which affects system efficiency. It can also cause corrosion and reduce life of the heat exchanger.
- Never use water that has been treated by a reverse osmosis, deionized, or distilled water to soften the water to fill the heating system.

➔ IMPORTANT
 Replacement of components due to water quality damage is not covered by the warranty.

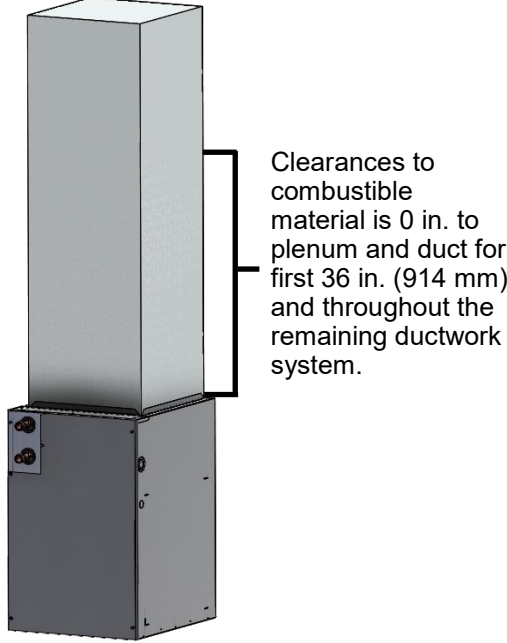
4.3.2 Clearances

Non-Ducted Return Closet Installation

- Clearances to combustible material is 0 in. from unit casing, and 0 in. to plenum and duct for first 36 in. (914 mm) and throughout the remaining ductwork system.
- Clearance for servicing is 24 in. (610 mm) in front of air handler.



Images are not to scale and are for illustration purposes only. Images do not show a complete system with plenums, duct pipes, etc.



- Louvers or return air grilles are field-supplied. Local codes may limit application of systems without a ducted return to single-story buildings.
- For a unit installed in a closet with a louvered return opening, the minimum open area for the louvers are:

Air Handler Models	Minimum Opening Area
<ul style="list-style-type: none"> • AH083P/AH083CP • AH084P/AH084CP 	320 square inches (0.206 square meters)
<ul style="list-style-type: none"> • AH125P/AH125CP 	360 square inches (0.23 square meters)
<ul style="list-style-type: none"> • AH166P/AH166CP • AH206P/AH206CP 	450 square inches (0.29 square meters)

- If the free area is not known, assume a 25% free area for wood or a 75% free area for metal louvers or grilles. Using the louver dimensions and the 25% or 75% assumption, determine if the louver open area meets the minimum open area listed above.
- If the return air plenum is used, the return air grille should be immediately in front of the opening in the plenum to allow for the free flow of return air.
- When not installed in front of the opening, there must be adequate clearance around the air handler to allow for the free flow of return air.

4.4 Installation Requirements

- This air handler is certified for installation in residential and light commercial applications and approved for the following configurations:
 - Vertical: Upflow with bottom or side (left or right side) return
 - Horizontal (upflow with bottom return)
- All models are designed for indoor installation only.
- These instructions are intended as a general guide only and do not supersede national or local codes. Compliance with all local, state, or national codes pertaining to this type of equipment should be determined prior to installation.
- Read this entire manual, as well as the instructions supplied in separate equipment, before starting installation.
- It is recommended that a trained and qualified professional who has attended a Rinnai installation training class complete your installation.
- Installation of the blower section, field wiring, warm air ducts, etc. must conform to the requirements of the National Electrical Code, ANSI/NFPA No. 70 (latest edition) in the United States, and any state laws, and local ordinances (including plumbing or wastewater codes). Local authorities having jurisdiction should be consulted before installation begins. Such applicable regulations or requirements take precedence over the general instructions in this manual.
- Install the conditioned air plenum, ducts and air filters (not provided) in accordance with NFPA 90B Standard for the Installation of Warm Air Heating and Air-Conditioning Systems (latest edition). The blower section is provided with flanges for the connection of the plenum and ducts. Air filters must be listed as Class 2 furnace air filters. The blower section is shipped from the factory completely assembled.
- For ease in installation, it is best to make any necessary coil configuration changes before connecting the air handler to the coil.
- Do not remove the cabinet knockouts until it has been determined which knockouts need to be removed for the installation.
- Select the final installation position that best suits the site conditions. Consider required clearances, space, and routing requirements for refrigerant line, condensate disposal, filters, ductwork, wiring, and accessibility for service. Refer to the rating plate on the blower section for specific information.
- When the unit is installed in a humid space and used in cooling applications, excessive sweating may occur on outside of unit. To prevent excessive sweating wrap unit with 1 in. (25 mm) fiberglass insulation. All openings should be sealed to prevent air leakage that could cause condensate to form inside the cabinet.
- If installed in an unconditioned space, sealant should be applied around the electrical wires, refrigerant tubing, and condensate lines where they enter the cabinet.
- Electrical wires should be sealed on the inside where they exit the conduit opening. Sealant is required to prevent air leakage and condensate from forming inside the blower, control box, and on the electrical controls.
- The air handler and its complementing cooling coil must be installed in such a way as to allow free access to the air handler/control compartment.
- The air handler and its complementing cooling coil must be installed with a 3/4 in. (19 mm) drop in the horizontal position towards the drain pan to ensure proper condensate drainage. The air handler and coil should also be tilted 1/2 in. (13 mm) from back to front toward the drain line.



IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HFC's) as of July 1, 1992. Approved methods of reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.



WARNING



- Do not install this air handler if it is damaged.
- Do not install this air handler if any part or all of the unit has been under water.

Explosion Hazard:

- Keep flammable materials and vapors, such as gasoline, away from this unit.
- Failure to follow these instructions can result in death, explosion or fire.

4.5 Ductwork Requirements

- Install ductwork in accordance with NFPA 90B and any local codes.
- Install the conditioned air plenum, ducts and air filters (not provided) in accordance with NFPA 90B Standard for the installation of Warm Air Heating and Air-Conditioning Systems (latest edition).
- Isolation connectors (if utilized) must be nonflammable.
- Duct connections for the air handler with hot water heat must allow room for water piping connections to be made in the upflow configuration.
- A return air duct system is recommended. If the unit is installed in a confined space or closet, a return connection must be run, full size, to a location outside the closet.
- The air handler is provided with flanges for the connection of the plenum and ducts.
- Air filters must be listed as Class 2 furnace air filters.
- Supply and return ductwork must be adequately sized to meet the system's air requirements and static pressure capabilities. Ductwork should be insulated with a minimum of 1 in. (25 mm) thick insulation with a vapor barrier in conditioned areas or 2 in. (51 mm) minimum in unconditioned areas.
- Supply plenum should be the same size as the flanged opening provided around the blower outlet and should extend ideally at least 3 ft. (1 m) from the air handler before turning or branching off plenum into duct runs. The plenum forms an extension of the blower housing and minimizes air expansion losses from the blower.

4.6 Thermostat Requirements

WARNING

Before installing or servicing the air handler, turn off power to unit. There may be more than one disconnect switch. Electrical shock can cause personal injury or death.

- All wiring must conform to local and national electrical codes. Improper wiring or installation may damage thermostat.
- Air Conditioner Model: The Standard Model A/C thermostat may be wired with or without connecting a common wire between the indoor equipment and the thermostat. However, it is recommended to use a common wire whenever possible to prevent power stealing by the thermostat.
- Heat Pump Model: The standard model heat pump thermostat is not "power stealing" and must have both 'R' and 'C' wires connected to operate properly. The thermostat should have an indicator for when auxiliary heat is in use.
- The thermostat should NOT be mounted:
 - Close to a window, on an outside wall, or next to a door leading to the outside
 - Exposed to direct light and heat from a lamp, sun, fireplace, or other heat-radiating objects which may cause a false reading
 - Close to or in direct airflow from supply registers and return-air grilles
 - In areas with poor air circulation, such as behind a door or in an alcove

4.7 Electrical Requirements

WARNING



Electrical Shock:

- Disconnect power before servicing.
- Replace all parts and panels before operating.
- Electrically ground the air handler.
- Connect ground wire to ground terminal marked “GRD”.
- Failure to do so can result in death or electrical shock.
- Before installing or servicing the air handler, turn off power to unit. There may be more than one disconnect switch.
- If a disconnect switch is to be mounted on the unit, select a location where a drill or fastener will not contact electrical or hydronic components.
- Electrical shock can cause personal injury or death.

WARNING



Explosion Hazard:

- Keep flammable materials and vapors, such as gasoline, away from this unit.
- Failure to follow these instructions can result in death, explosion or fire.

Line-Voltage Connections:

- U.S. Installations: Make all electrical connections in accordance with National Electrical Code (NEC) ANSI/NFPA 70 and all local codes or ordinances having jurisdiction.
- Canadian Installations: Make all electrical connections in accordance with Canadian Electrical Code CSA C22.1 and all authorities having jurisdiction.
- Check all factory wiring per unit wiring diagram and inspect factory wiring connections to be sure none were loosened in transit.

- Use copper conductors only.
- All field wiring must be done in accordance with National Electrical Code, applicable requirements of UL and local codes, where applicable.
- Electrical wiring, disconnect means and over-current protection are to be supplied by the installer. Refer to the air handler rating plate for maximum over-current protection, minimum circuit ampacity, as well as operating voltage.
- The power supply must be sized and protected according to the specifications supplied on the product.
- This air handler is factory-configured for 120 Volts, single phase, 60 Hz.
- Prior to making any electrical connections, ensure that supply voltage, frequency, and phase are as specified on unit rating plate.
- Check to ensure that the existing electrical service is adequate to handle the additional load imposed by the Hydronic Furnace. Refer to unit wiring diagram for proper electrical connections.
- All electrical connections MUST comply with NEC and any other local codes or ordinances having jurisdiction. **USE COPPER WIRE ONLY.** Provide separate branch electric circuit with field supplied disconnect switch.
- Location of disconnect switch to be in clear site, accessible and in close proximity to the unit.
- Correct polarity MUST be maintained for 120 V wiring. If polarity is incorrect unit will NOT operate.

4.8 Plumbing Requirements

WARNING

Solder joints on domestic water lines must be made with NO-LEAD SOLDER.

IMPORTANT

Use only approved piping and fitting materials. If used in an open loop system with domestic hot water, potable, lead-free piping must be used.

Thermal Expansion of Piping

In all hydronic systems, piping undergoes temperature swings as the system operates. This causes changes in the length of the piping due to thermal expansion.

If the piping is rigidly mounted, this expansion can cause annoying popping or squeaking sounds and in extreme cases, the piping can even buckle.

To counter expansion movement, design piping circuits with sufficient elbows, tees or expansion loops (only used in large systems) or piping supports that allow the tubing to expand and contract freely.

Another alternative is to install an expansion compensator fitting capable of absorbing the movement.

Hydraulic Resistance of Fittings, Valves, and Other Devices

Before the total hydraulic resistance of a piping circuit can be found, the individual hydraulic resistances of all fittings, valves, or other such components must be determined. One approach is to consider each fitting, valve, or other device as an equivalent length of copper tube of the same pipe size.

By using the equivalent length of piping for all components in the circuit, the circuit can be treated as if it were a single piece of pipe having a length equal to the sum of the actual pipe length, the total equivalent lengths of all fittings, valves, or other devices.

Pipe Sizing Considerations

When selecting a pipe size for a given flow rate, the resulting average flow velocity should be between 2 ft. (0.61 m) and 4 ft. (1.22 m) per second.

At water flow velocities of approximately 2 ft. (0.61 m) per second, flowing water will carry air bubbles along a vertical pipe. Average flow velocities of 2 ft. (0.61 m) per second or higher can draw along air bubbles in a downward flow. At the above stated velocities air bubbles shall be routed to an air separator where they can be collected and discharged from the system.

Average flow velocities higher than 4 ft. (1.22 m) per second could cause flow noise and premature wear of piping and fittings and should be avoided.

Expansion Tanks

All liquids used in hydronic heating systems expand when heated. For all practical purposes, liquids are incompressible. Any container completely filled with a liquid and sealed from the atmosphere will experience a rapid increase in pressure as the liquid is heated. To prevent this from occurring, all hydronic systems **MUST** be equipped with an expansion tank. See the following sections for the expansion tank plumbing location:

- 5.7.1 Rinnai Tankless Water Heater and Air Handler Piping Diagram
- 5.7.2 Rinnai I-Series Boiler and Air Handler Piping Diagram

5. Installation

➔ IMPORTANT

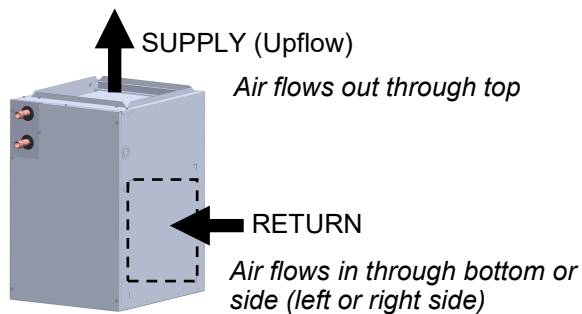
Read section “4. Installation Preparation” before starting installation steps.

5.1 Position the Air Handler

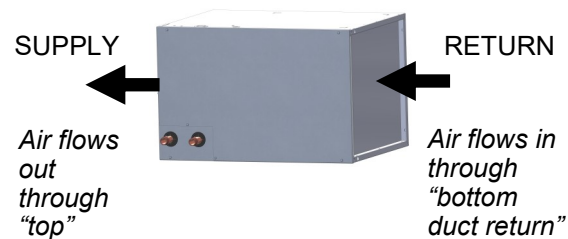
Refer to the previous section (section “4. Installation Preparation”) for more information on location and configuration requirements.

1. Place the air handler in the desired location and configuration. Approved configurations:
 - Vertical: Upflow with bottom or side (left or right side) return
 - Horizontal: Upflow with bottom return

Vertical (upflow with bottom or side return)



Horizontal (Upflow with bottom return)

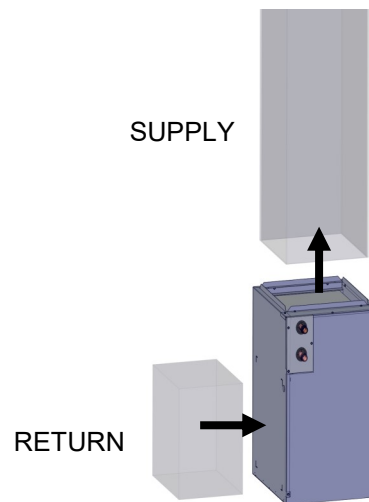


5.2 Install Ductwork

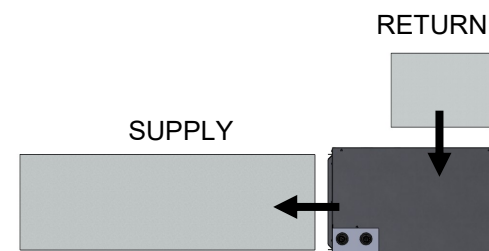
Refer to section “4.5 Ductwork Requirements” for complete ductwork installation requirements.

1. Connect the supply air duct to the flange on top of the blower section of the air handler.

Example Vertical Installation



Example Horizontal Installation



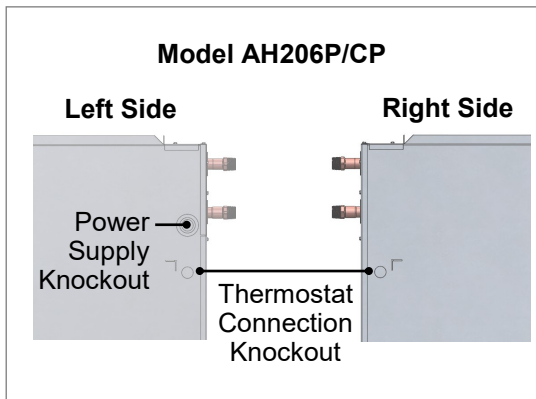
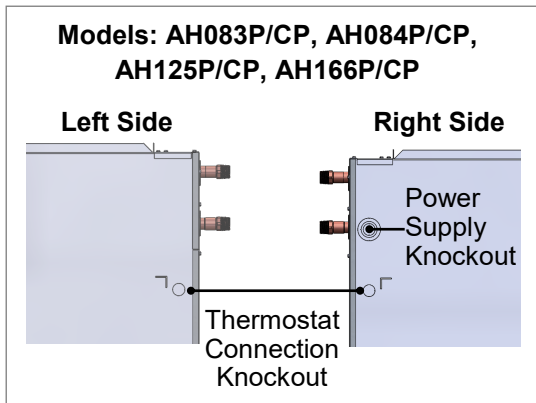
➔ IMPORTANT

- A return air duct system is recommended. If the unit is installed in a confined space or closet, a return connection must be run, full size, to a location outside the closet.
- The isolation connector (if used) must be nonflammable.

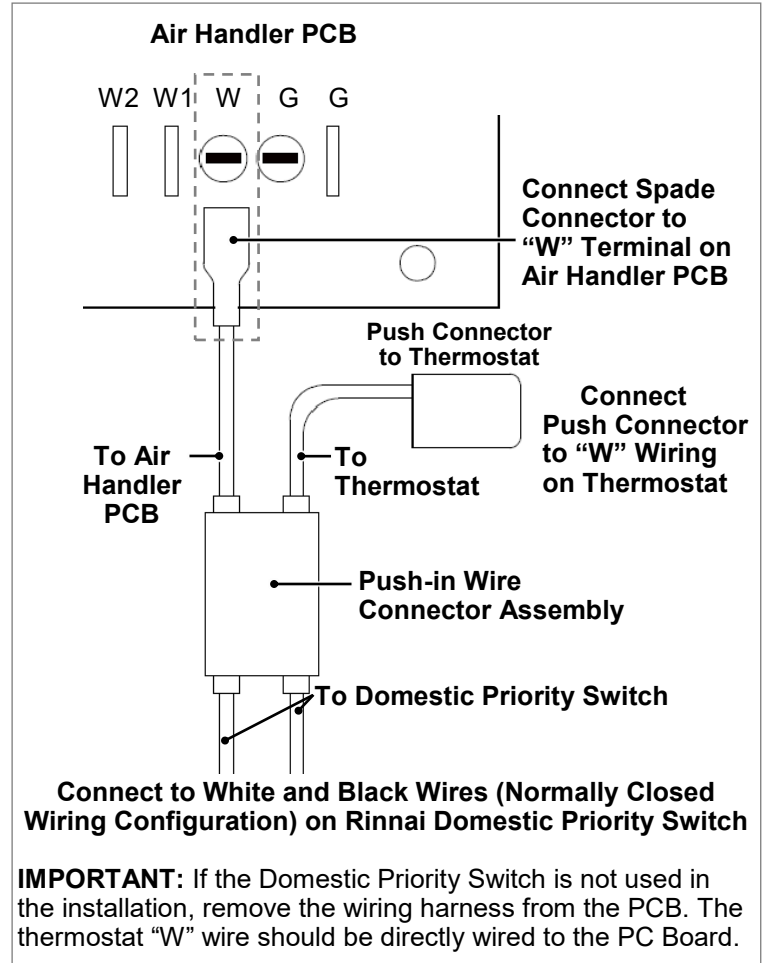
5.3 Connect Electrical

Refer to section “4.7 Electrical Requirements” for complete electrical requirements.

Note: Electrical cables go through the knockout holes on the left or right side of the cabinet. See the images below for specific locations.

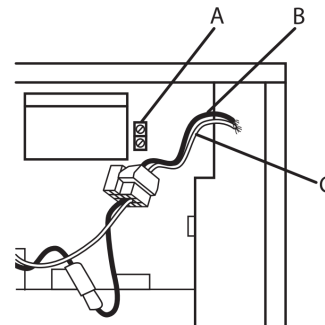
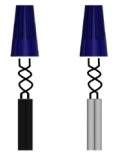


1. Disconnect all power supplies.
2. Remove the air handler access panel by removing the 4 screws that secure the panel.
3. Route the 120V power supply cable (field-supplied) through the power supply connection knockout hole and connect to the air handler PC Board.
4. Route the 24V thermostat cable (field-supplied) through the thermostat connection knockout hole and connect to the air handler PC Board.
5. If installing the Domestic Priority Switch (recommended optional accessory purchased separately), connect it to the air handler PC Board (see following image).



Connections to the Air Handler PC Board

6. Using UL listed wire nuts, connect the field-supplied wires to the air handler (black to black and white to white).
7. Connect the following:
 - A. Connect ground wire to ground terminal marked “GND”
 - B. Connect black to black
 - C. Connect yellow to yellow, or white to white



8. (Optional) If you would like to change the fan motor speed, follow the steps in section “8.2 Change Fan Motor Speed.”
9. Replace the air handler access panel.

5.4 Connect Thermostat

Refer to section “4.6 Thermostat Requirements” for complete thermostat installation requirements.

1. Mount the thermostat approximately 5 ft. (1.5 m) from the floor and close to, or in, a frequently used room, preferably on an inside partitioning wall or a section of wall without pipes or duct work.
2. Connect the thermostat to the air handler. Follow the wiring diagrams in the next section: “5.4.1 Thermostat Wiring Diagrams.”

5.4.1 Thermostat Wiring Diagrams

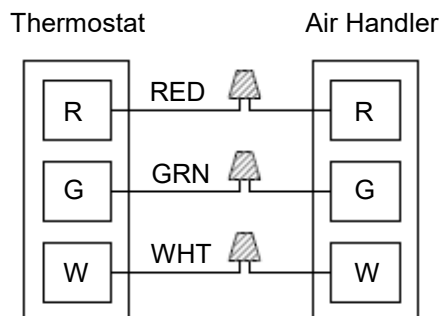
NOTE

For thermostat wiring with the Domestic Priority Switch, refer to section “5.6.6 Air Handler and Thermostat Wiring.”

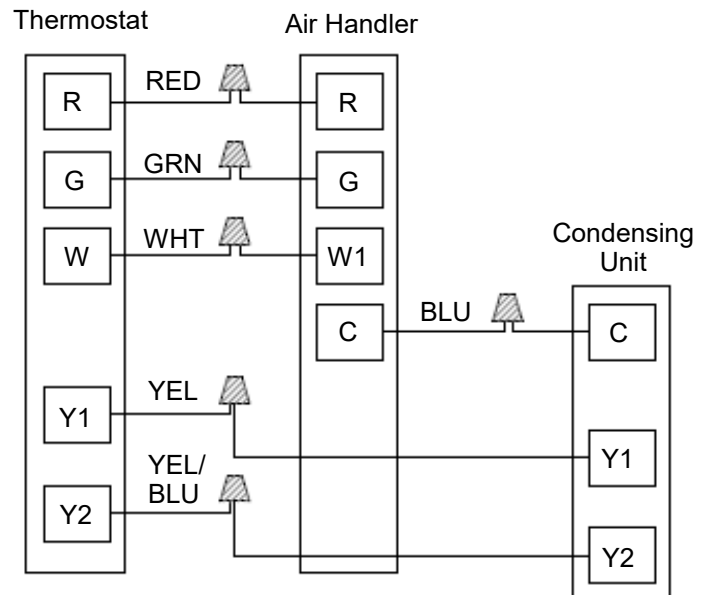
3-Speed PSC Motor

Maximum allowable current draw from power-stealing thermostats or other accessories is 18 mA. Exceeding this value may cause the air handler control board to operate abnormally.

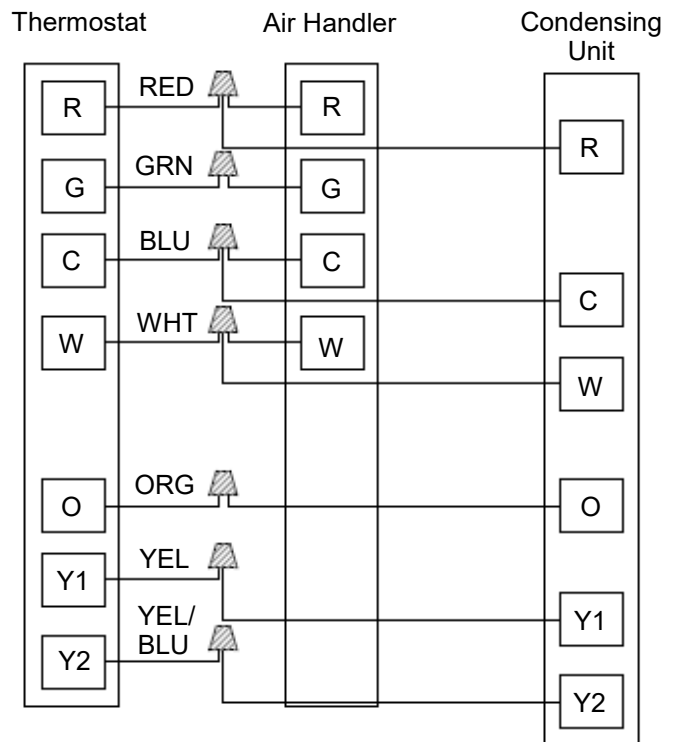
Hot Water Heat Only Application



Cooling Application with Hot Water Heat



Heat Pump Application with Hot Water Heat



NOTE: Connect common (C) wire only if required. See thermostat installation instructions for more information.

5.5 Install Tankless Water Heater or Boiler

Install the Rinnai Tankless Water Heater or Boiler by following the Installation and Operation Manual supplied with the unit.

5.6 Install Domestic Priority Switch (*Optional Accessory*)

IMPORTANT

If you are not installing the Domestic Priority Switch:

- Skip this section and proceed to section “5.7 Connect Water Lines.”
- Ensure not to short out the harness connectors that would normally be used with the Domestic Priority Switch.

The Domestic Priority Switch (part # REU-OPU3) is an optional accessory (purchased separately) recommended for use with the hydronic air handler.

The Domestic Priority Switch allows the tankless water heater or boiler to give priority to domestic hot water by shutting off the air handler when necessary. When used with a hydronic air handler, the switch gives priority to domestic hot water. When domestic hot water demand exceeds a certain point, the air handler will turn off to ensure the demand is met.

The Domestic Priority Switch is a Normally Closed (NC) switch that connects to the PC Board in the Rinnai tankless water heater or boiler.

To install the Domestic Priority Switch, open the contents of the Domestic Priority Switch shipping package and follow the remaining instructions in this section.

You Will Need:

- Parts inside switch shipping package
- Philips head screwdriver (for removal of water heater or boiler front cover)
- Double-sided tape (for boiler models)

IMPORTANT

- **For Tankless Water Heaters - SENSEI™ SE+ Series (RU Condensing) Models:** Refer to the next section: “5.6.1 Option A: Installation Instructions for SENSEI™ SE+ Series (RU Condensing) Tankless Water Heaters”
- **For Tankless Water Heaters - HE+ Series (RL Non-Condensing) and HE Series (V Non-Condensing) Models:** Refer to section: “5.6.2 Option B: Installation Instructions for HE+ Series (RL Non-Condensing) and HE Series (V Non-Condensing) Tankless Water Heaters”
- **For I-Series Boiler Models:** Refer to section “5.6.3 Option C: Installation Instructions for I-Series Combi Boilers”

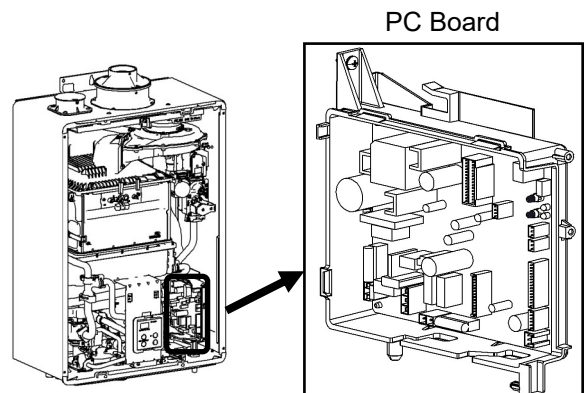
5.6.1 Option A: Installation Instructions for SENSEI™ SE+ Series (RU Condensing) Tankless Water Heaters

WARNING

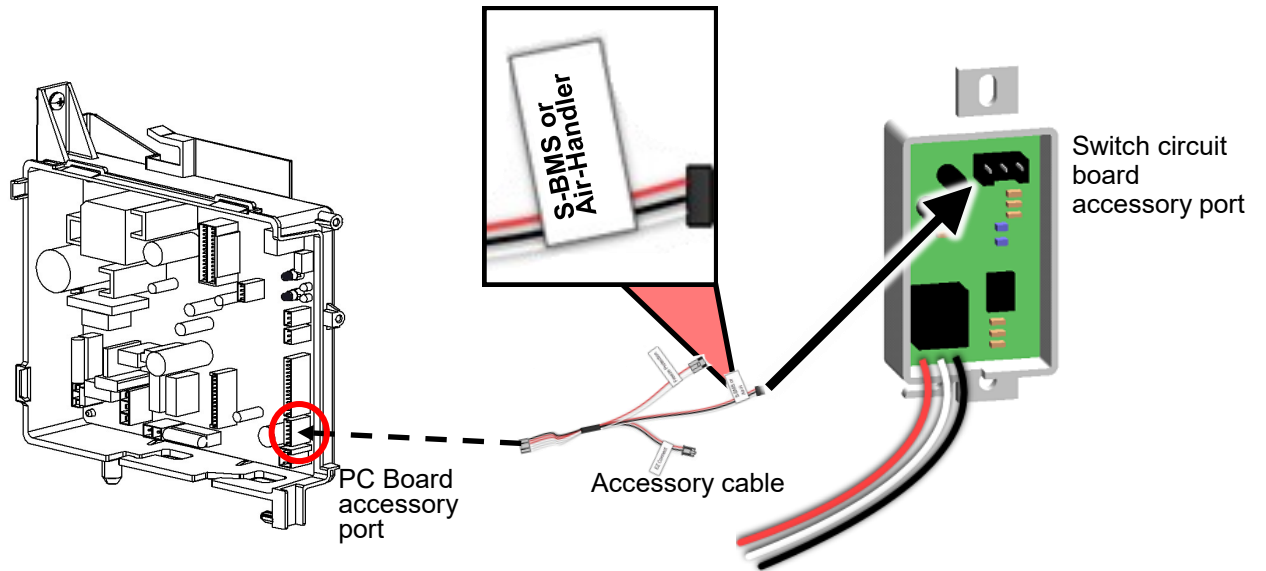
Ensure the power supply to the water heater and hydronic air handler is disconnected before starting installation. Removing the front cover will expose live mains voltage connections.

5.6.1.1 Install Switch Circuit Board

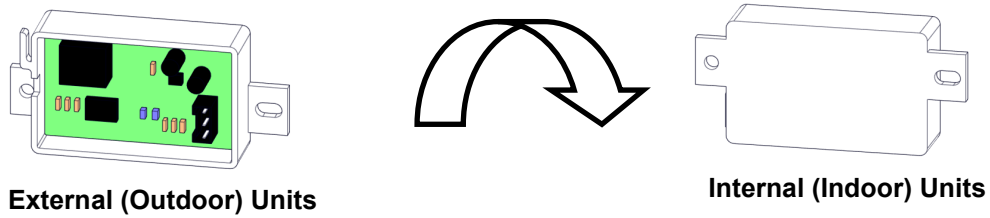
1. Power off the water heater by unplugging the power cord or turning off the circuit breaker. The controller on the water heater does not control the electrical power.
2. Remove the front panel of the water heater by removing the four screws that secure the panel in place.
3. Locate the PC Board in the bottom, right corner of the water heater.



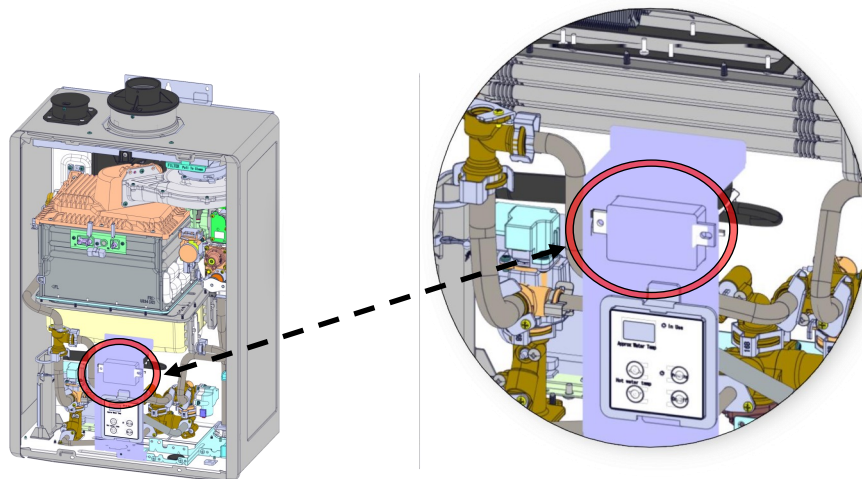
4. Connect one end of the accessory cable to the accessory port on the PC Board. Connect the other end of the cable to the switch circuit board accessory port.



5. For internal units, flip the switch circuit board to where the circuit board side will be facing the inside of the unit.

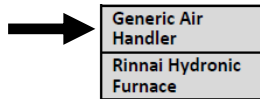


6. Install the switch circuit board to the controller bracket using the hooks at the top of the controller bracket.



5.6.1.2 Wiring Instructions

1. Attach the harness plug from the Domestic Priority Switch (black, white, and red) as described in Table 1 (located on next page).
2. Install the hydronic air handler per the instructions in the “S-BMS/Air Handler Switch Installation Instructions.” Follow steps for a “Generic Air Handler.”

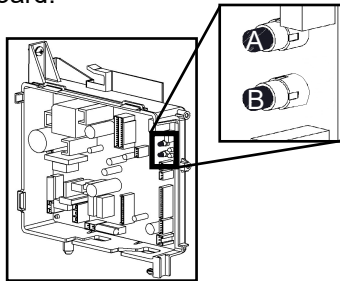


5.6.1.3 Set Parameter Instructions

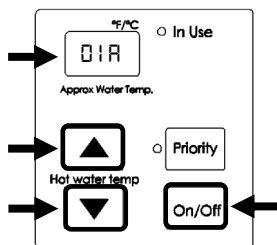
! WARNING

Adjust only the parameter settings listed below. Do not adjust any other parameter settings unless specifically instructed to do so.

1. Locate the two push buttons (A and B) on the PC Board.



2. Press the **A** button for 1 second. **01A** appears on the controller display.



3. Press the **▲ (Up)** button until **06A** appears on the display.
4. Press the **On/Off** button to change the selection between **06A** for BMS and **06b** for Air Handler (AH).
5. Selecting the primary water heater is complete. Press the **A** button to exit.

5.6.1.4 Next Steps

Proceed to section “5.6.4 Test the Switch After Installation.”

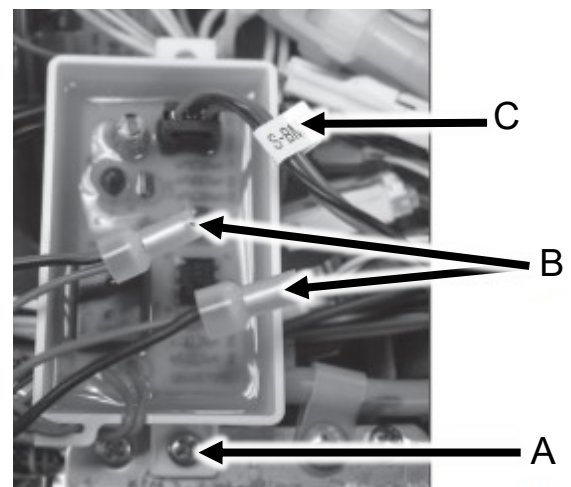
5.6.2 Option B: Installation Instructions for HE+ Series (RL Non-Condensing) and HE Series (V Non-Condensing) Tankless Water Heaters

! WARNING

Ensure the power supply to the water heater and hydronic air handler is disconnected before starting installation. Removing the front cover will expose live mains voltage connections.

5.6.2.1 Install Switch Circuit Board

1. Power OFF the tankless water heater or boiler by unplugging the power cord or turning off the circuit breaker. The controller on the water heater or boiler does not control the electrical power.
2. Remove the front panel of the water heater or boiler.
3. Locate the wiring bundle and find the wiring tagged “Air-H.” Temporarily remove the cable tie and separate this connector from the main bundle. Fasten the cable tie around the remaining bundle.
4. Attach the switch circuit board using the mounting screw provided (A in image below). If required, adjust the position of the main wiring bundle to provide enough room.
5. Attach the harness plug labeled “Air-H” to the matching socket on the Domestic Priority Switch (C in image below).



5.6.2.2 Wiring Instructions

Thermostat Wiring: Using the provided crimp connectors (B in image on previous page), connect the white and black leads of the switch circuit board to the “W” contact on the indoor thermostat and air handler (polarity is not important). See Table 1 below and the wiring diagrams in this section for additional details. The final crimp connector should be connected to the unused red wire lead on the switch circuit board.

5.6.2.3 Set Parameter Instructions

Table 1: Domestic Priority/Maintenance Indication with (DPS/MIS)					
Switch Configuration	Required Leads (Wires)	Connection	Function	DIP Switch Configuration	
				ID	Position
Air Handler (AH) - Generic	White and Black	In series with thermostat "W" wire	N.C.	Bank 1 (Yellow); #4	ON

N.C. = Normally Closed

5.6.2.4 Next Steps

Proceed to section “5.6.4 Test the Switch After Installation.”

5.6.3 Option C: Installation Instructions for I-Series Combi Boilers

WARNING

Ensure the power supply to the boiler and hydronic air handler is disconnected before starting installation. Removing the front cover will expose live mains voltage connections.

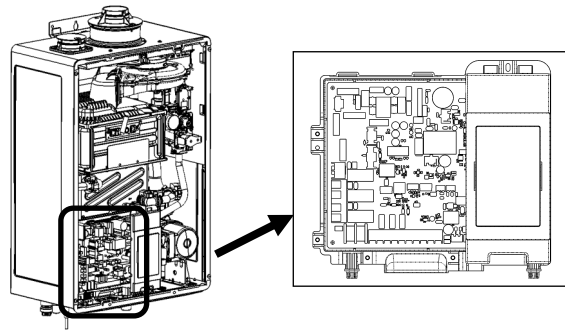


IMPORTANT

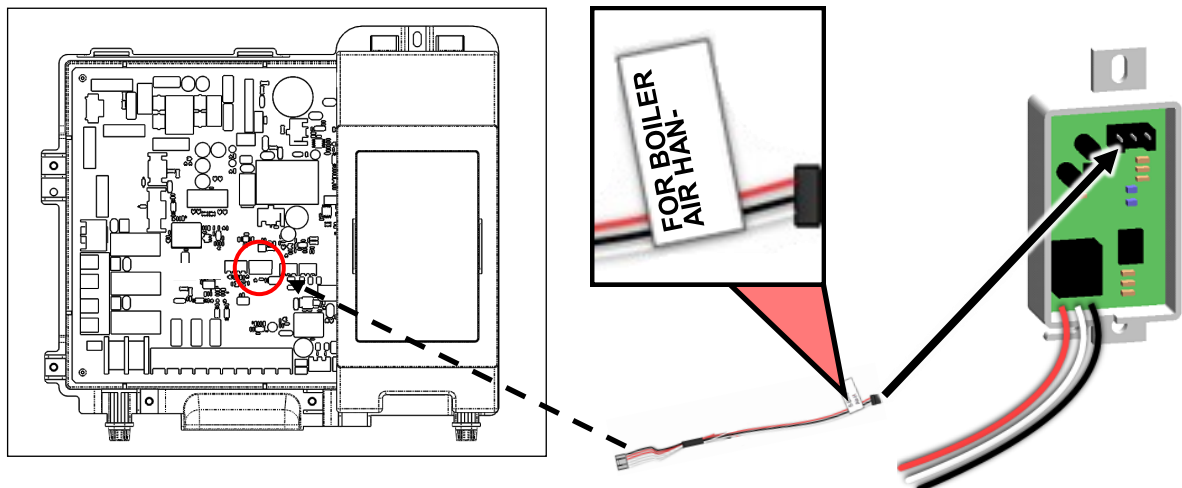
To prevent cold air from being produced, it is recommended to set Parameter 42 to “A - Continuous Run.” See the “Rinnai I-Series Boiler Installation and Operation Manual” for more information.

5.6.3.1 Install Switch Circuit Board

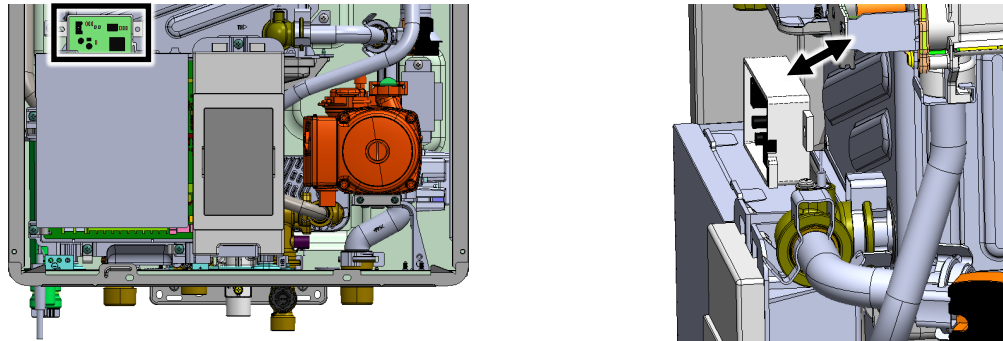
1. Power OFF the boiler by unplugging the power cord or turning off the circuit breaker. The controller on the boiler does not control the electrical power.
2. Remove the front panel of the boiler by removing the four screws that secure the panel in place.
3. Locate the PC Board in the bottom, left corner of the boiler.



4. Connect one end of the boiler air handler cable to the accessory port on the PC Board. Connect the other end of the cable to the switch circuit board accessory port.



- Attach the air handler/OPU circuit board to the PC Board via double-sided tape. Ensure the circuit board does not make contact with the heat exchanger.



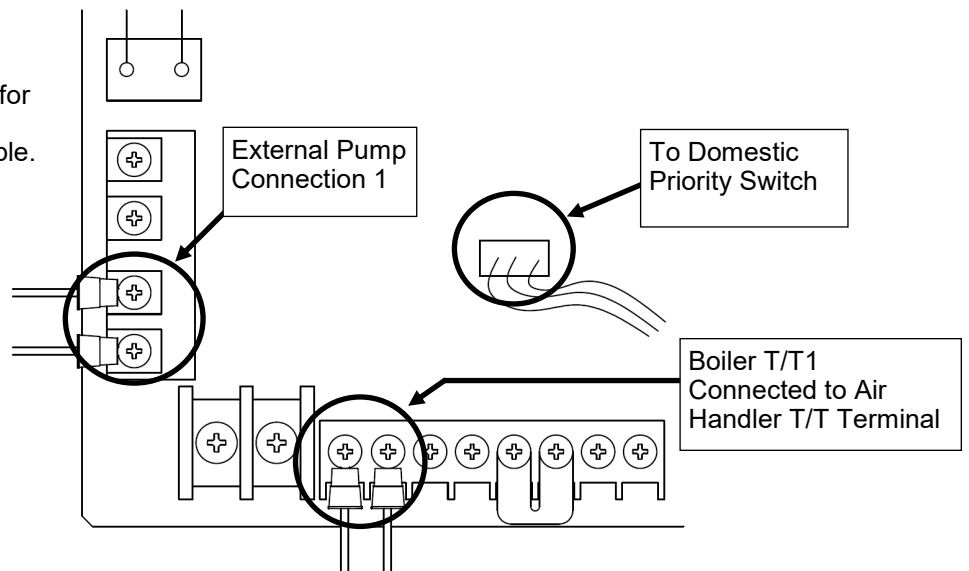
5.6.3.2 Wiring Instructions

- Attach the harness plug from the Domestic Priority Switch (black, white, and red) as described in Table 2.
- Check all wiring and reattach the front cover.
- Reconnect power.

Table 2: Domestic Priority Configuration

Switch Configuration	Required Leads/Wires	Function
Generic Air Handler	White/Black	Normally Closed

PC Board Wiring for the above application example.



5.6.3.3 Next Steps

Proceed to the next section: "5.6.4 Test the Switch After Installation."

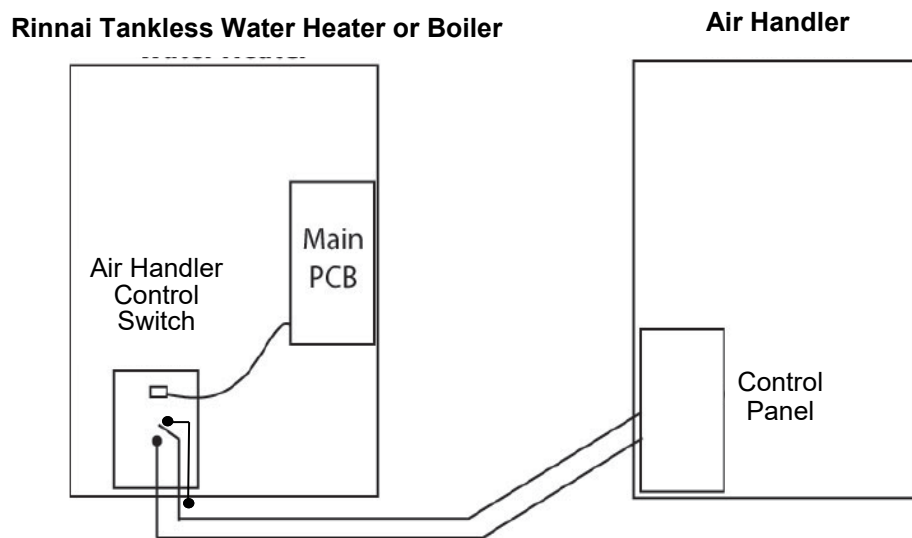
5.6.4 Test the Switch After Installation

The domestic priority switch allows the tankless water heater or boiler to give priority to domestic hot water by shutting off the air handler when necessary. When used with a hydronic air handler, the switch gives priority to domestic hot water. When domestic hot water demand exceeds a certain point, the air handler will turn off to ensure the demand is met.

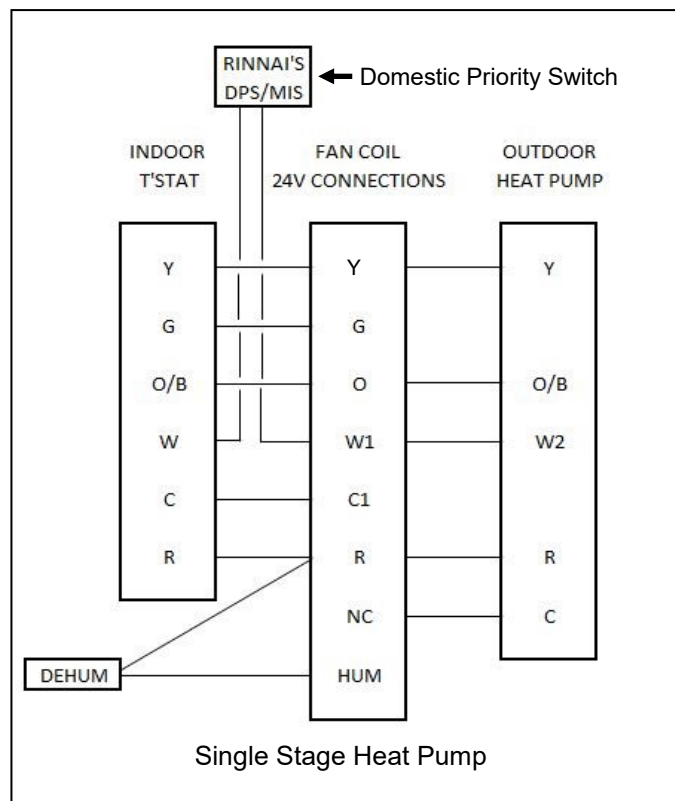
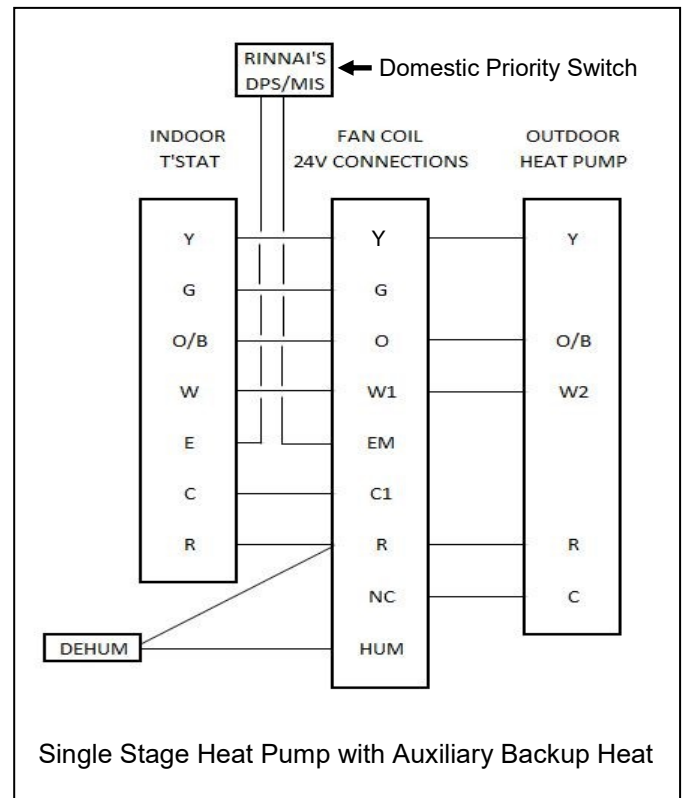
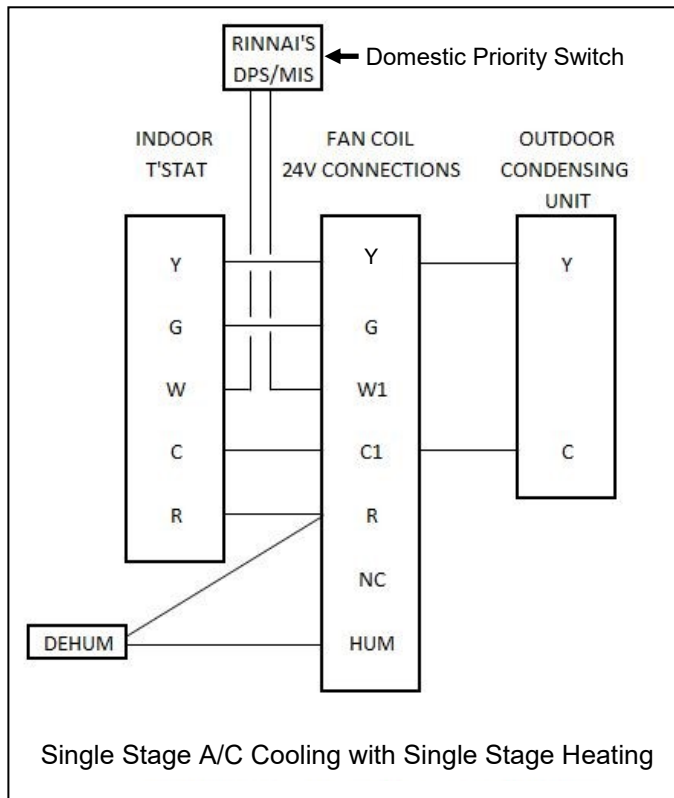
To test this function:

1. Turn on the water heater/boiler and air handler.
2. Open the hot water taps until the air handler turns off.
3. Close the hot water taps.
4. The air handler should turn back on if the thermostat is calling for heat.

5.6.5 Schematic Layout



5.6.6 Air Handler and Thermostat Wiring

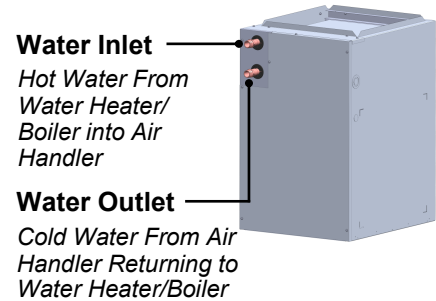


5.7 Connect Water Lines

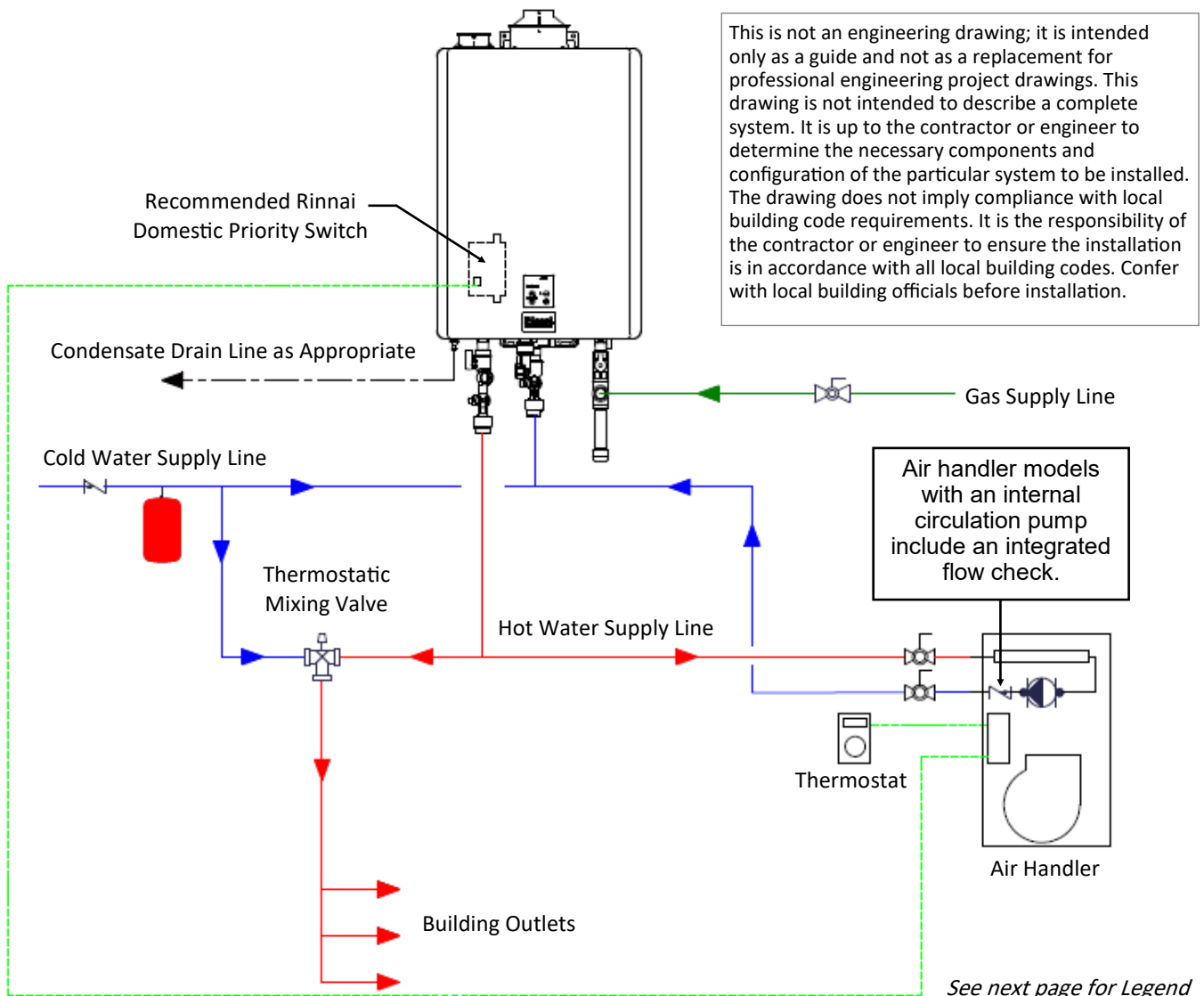
▶ IMPORTANT

- Refer to section “4.8 Plumbing Requirements” for complete plumbing requirements.
- For standard installations, refer to the piping diagrams in sections 5.7.1 and 5.7.2.
- For more information on the tankless water heater or boiler plumbing connections, refer to the unit’s Installation and Operation Manual.
- Water connections to the air handler should follow all state and local plumbing codes.

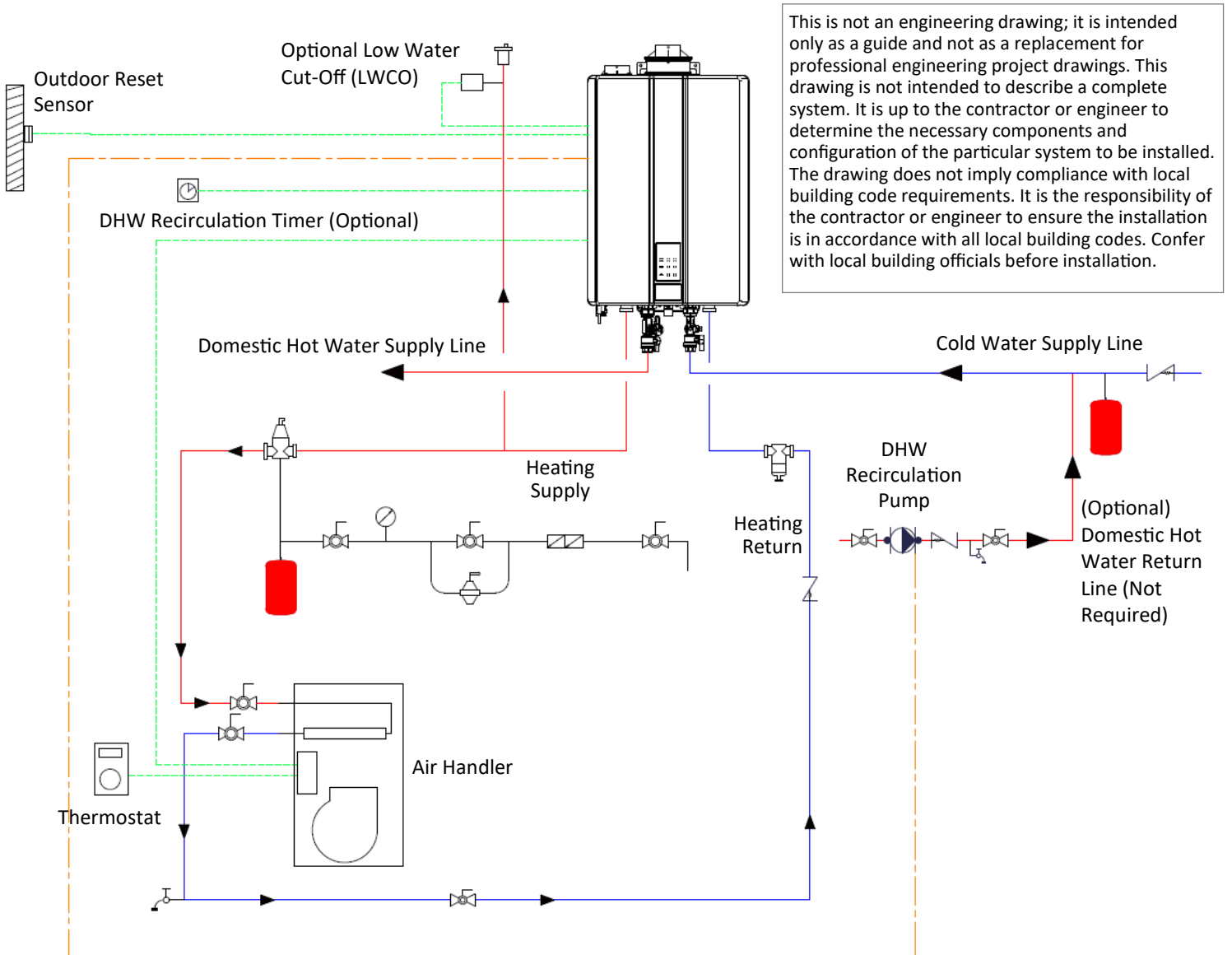
1. Plumb the water out/supply of the Rinnai tankless water heater or boiler to the inlet (top connection) of the air handler.
2. Plumb the air handler water outlet (bottom connection) to the water inlet/return of the Rinnai tankless water heater or boiler.



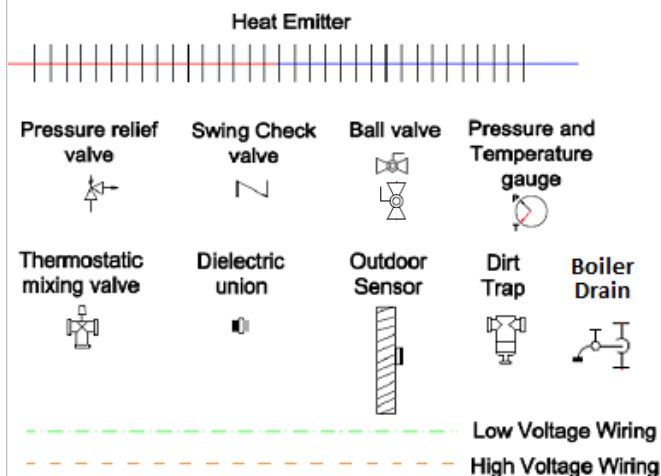
5.7.1 Rinnai Tankless Water Heater and Air Handler Piping Diagram



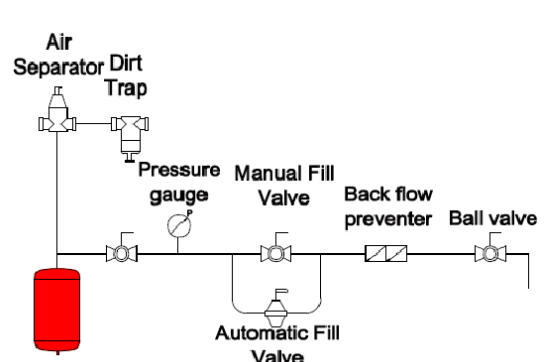
5.7.2 Rinnai I-Series Boiler and Air Handler Piping Diagram



LEGEND

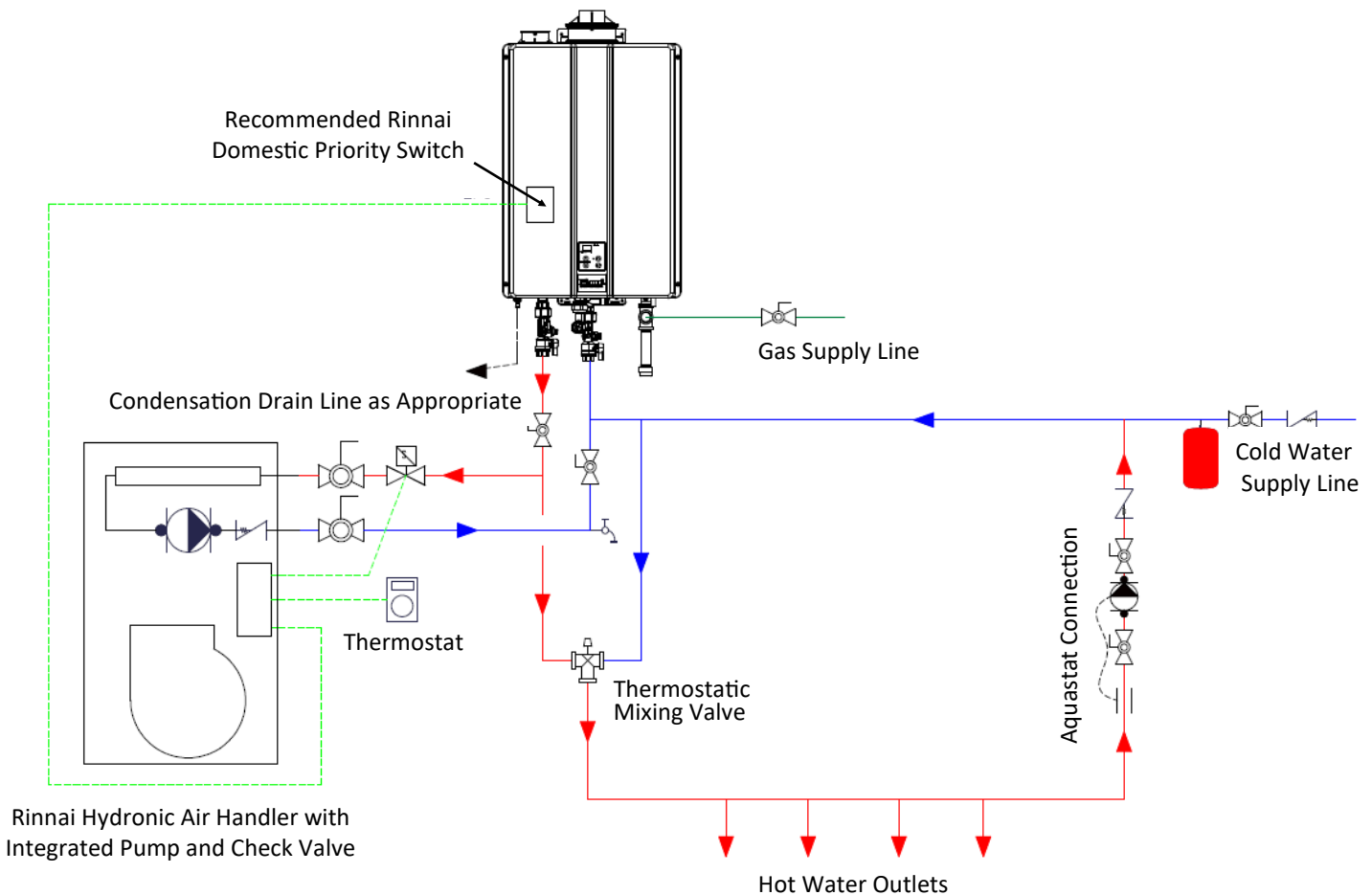


The image below illustrates a suggested arrangement. Some of the fittings are optional.



5.7.3 Domestic Hot Water Recirculation Piping Diagrams

Recirculation (Dedicated Mode) Piping Diagram

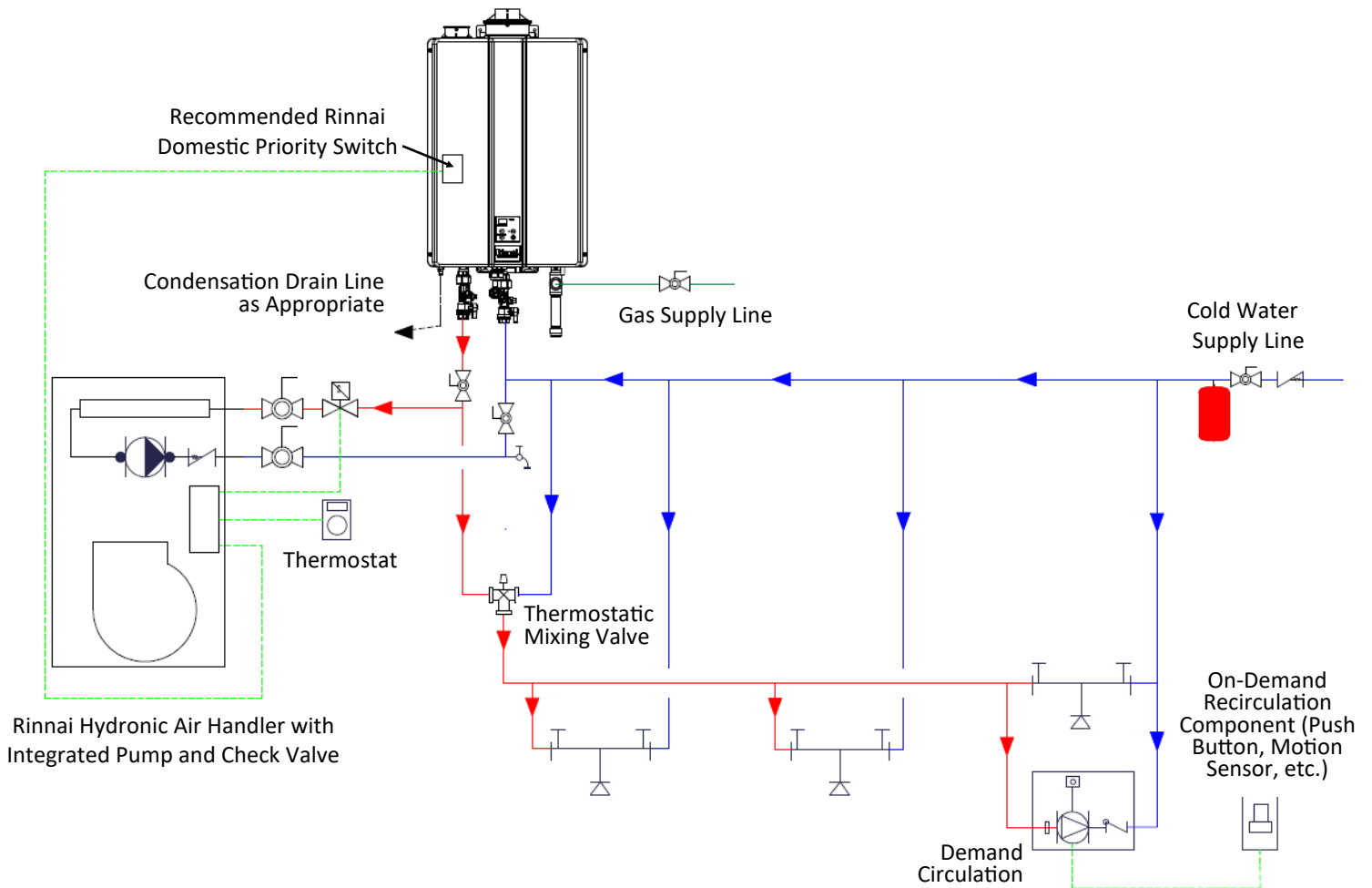


NOTE

- Schematic does not apply to Rinnai Tankless Water Heaters equipped with recirculation capability: SE+ Series featuring ThermaCirc360™ models (Super High-Efficiency Plus RUR Models)
- Wire solenoid to 24V valve connection on air handler.

This is not an engineering drawing; it is intended only as a guide and not as a replacement for professional engineering project drawings. This drawing is not intended to describe a complete system. It is up to the contractor or engineer to determine the necessary components and configuration of the particular system to be installed. The drawing does not imply compliance with local building code requirements. It is the responsibility of the contractor or engineer to ensure the installation is in accordance with all local building codes. Confer with local building officials before installation.

Recirculation (Crossover Mode) Piping Diagram



NOTE

- Schematic does not apply to Rinnai Tankless Water Heaters equipped with recirculation capability: SE+ Series featuring ThermaCirc360™ models (Super High-Efficiency Plus RUR Models)
- Wire solenoid to 24V valve connection on air handler.

This is not an engineering drawing; it is intended only as a guide and not as a replacement for professional engineering project drawings. This drawing is not intended to describe a complete system. It is up to the contractor or engineer to determine the necessary components and configuration of the particular system to be installed. The drawing does not imply compliance with local building code requirements. It is the responsibility of the contractor or engineer to ensure the installation is in accordance with all local building codes. Confer with local building officials before installation.

5.7.4 Flush Hot Water Coil

Flushing the hot water coil prior to start up is required to remove any residual material from the installation or manufacturing processes as well as remove any air from the system.

A bleed valve comes standard on all air handlers with factory installed circulating pumps. If using an external circulating pump, please use an external purge valve or other mechanism to flush hot water coil after installation. Take precautions while flushing the air handler to keep the multi-function control board and other electrical components from getting wet. Hot water is preferred for flushing.

Follow the flushing steps listed below. Use a bucket or hose to dispose of water from the bleed valve during flushing.

1. Flush the return line by closing the inlet valve (supply) and opening the outlet valve (return). Open the bleed valve. Close the bleed valve when flushing is complete.
2. Flush the supply line and coil by closing the outlet valve (return) and opening the inlet valve (supply). Open the bleed valve. Close the bleed valve when flushing complete.
3. Apply power to the air handler. Open inlet and outlet valves. Engage pump and open bleed valve. Verify proper flow direction— inlet should become warm before outlet. Close the bleed valve when flushing is complete.
4. Operate pump for five minutes immediately after flushing system to purge remaining air from the pump bearing chamber.

CAUTION

- Follow piping manufacturer's requirements for any additional required flushing or cleaning of coil and piping if using non-copper piping.
- Do not engage pump until the flushing process is completed. Running pump dry will cause damage.

5.8 Post-Installation Checklist

The following conditions must be met prior to starting the air handler. Refer to outdoor condensing unit installation instructions for system start-up instructions and refrigerant charging instructions.

<input type="checkbox"/>	Is unit properly located, secure, and serviceable?
<input type="checkbox"/>	Is the unit elevated when installed in a garage or where flammable vapors may be present?
<input type="checkbox"/>	Is the unit protected from vehicular or other physical damage?
<input type="checkbox"/>	Is the return air not obtained from areas where there may be objectionable odors, flammable vapors or products of combustion such as carbon monoxide (CO), which may cause serious personal injury or death?
<input type="checkbox"/>	Does the air handler and evaporator coil exhibit a ¼ in. pitch in the horizontal position towards the drain pan to ensure proper condensate drainage?
<input type="checkbox"/>	Has an auxiliary pan been provided under the unit with separate drain for units installed above a finished ceiling or in any installation where condensate overflows could cause damage?
<input type="checkbox"/>	Auxiliary drain is installed when necessary and pitched to allow for draining?
<input type="checkbox"/>	Has the drain pan and drain tubing been leak checked?
<input type="checkbox"/>	Have all webs been removed from the drain connections that are being used? Have all drain pan plugs not used been properly plugged?
<input type="checkbox"/>	Has the condensate line been properly sized, run, trapped, pitched, and tested?
<input type="checkbox"/>	Is the ductwork correctly sized, run, taped, and insulated?
<input type="checkbox"/>	Have all cabinet openings and wiring been sealed?
<input type="checkbox"/>	Is the indoor coil orifice size correct?
<input type="checkbox"/>	Have all unused orifice replacement parts and packaging been disposed of or recycled?
<input type="checkbox"/>	Is the filter clean, in place, and of adequate size?
<input type="checkbox"/>	Are all electrical connections properly sized and tightened?
<input type="checkbox"/>	Is the wiring neat, correct, and in accordance with the wiring diagram?
<input type="checkbox"/>	Is the unit properly grounded and protected (fused)?
<input type="checkbox"/>	Is the thermostat correctly wired and in a good location?
<input type="checkbox"/>	Are all access panels in place and secure? For air tight application, neoprene gasket must be positioned at prescribed locations to achieve 2% leakage.
<input type="checkbox"/>	Check Blower Operation: Set the thermostat to "FAN ON." Does the indoor blower turn on?

Continued on next page

☐ **Air Flow Inspection:**

- For proper cooling operation, the airflow through the indoor coil should be between 350 and 450 CFM per ton of cooling capacity (or 350 – 450 CFM per 12,000 BTU/HR) based on the rating of the outdoor unit.
- The cooling blower speed is factory configured to provide correct airflow for an outdoor unit that matches the maximum cooling capacity rating of the air handler.
- If the outdoor unit is smaller than the maximum cooling capacity rating for the air handler, the cooling blower speed may need to be changed. Refer to section “3.8.4 Blower Performance Data” for more information.

IMPORTANT: The cooling blower speed must be set to provide a minimum of 350 CFM airflow per ton (12,000 BTU/hr) of outdoor cooling capacity.

- **Air Handler Models AH083P/CP, AH084P/CP, AH125P/CP, AH206P/CP:**

1. Disconnect all power supplies.
2. Remove the air handler access panel.
3. Locate the blue wire (Med) running from the blower motor to the control board.
4. Remove this blue wire from the control board and cover this loose end of this wire now with an insulating cap.
5. Locate the Red or Black wires connected to the blower motor. Connect the Red (Low) to the control board at its respective terminal for low speed or connect the Black (High) to the control board at its respective terminal for high speed.
6. Replace all panels.
7. Reconnect power.

- **Air Handler Models AH166P/CP:**

1. Disconnect all power supplies.
2. Remove the air handler access panel.
3. Locate the black wire (High) running from the blower motor to the control board.
4. Remove this black wire from the control board and cover this loose end of this wire now with an insulating cap.
5. Locate the Blue or Red wires connected to the blower motor. Connect the Blue (Med) to the control board at its respective terminal for medium speed or connect the Red (Low) to the control board at its respective terminal for low speed.
6. Replace all panels.
7. Reconnect power.



IMPORTANT

For blower performance data, refer to section “3.8.4 Blower Performance Data.”

6. Sequence of Operation

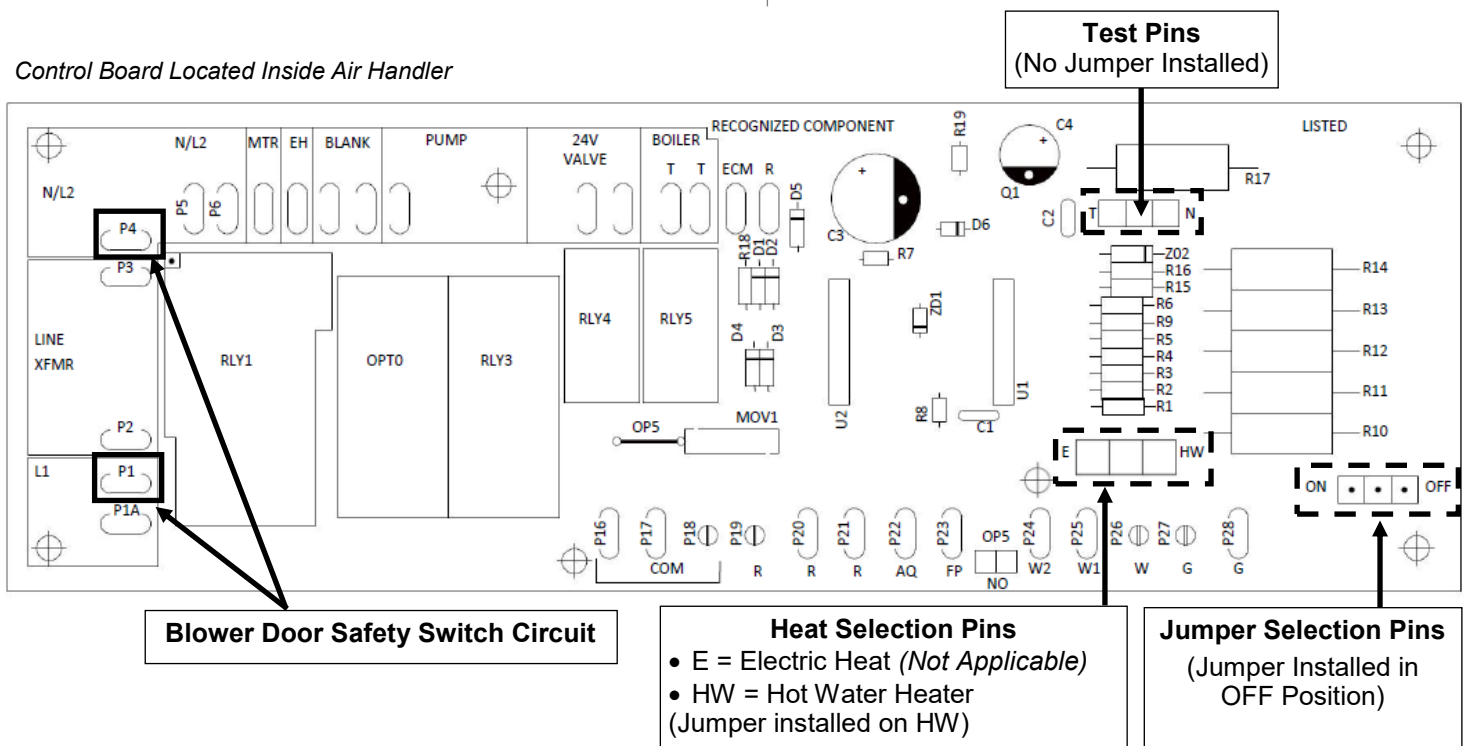
6.1 Cooling

- When the thermostat calls for cooling, the thermostat circuit between R and G is completed.
- The normally open contacts close, causing the indoor blower motor to operate.
- The thermostat circuit between R and Y is also completed; this circuit closes the contactor in the outdoor fan motor.
- Thermostat circuits R and O, or R and B, energizes the reversing valve, switching it to the cooling position (depends on outdoor HVAC unit).
- The air handler blower will turn off 45 seconds after the thermostat stops calling for cooling.

6.2 Heating

- When the thermostat calls for heat, the thermostat circuit between R and W is completed, activating the hot water circulating pump.
- If a field-installed circulating pump is being used, the control board can still be wired to the pump directly or to an isolation valve supplying hot water to the air handler using the control board's 24V relay switch. A similar 24V dry switching relay labeled TT can be used to activate a boiler or water heater valve.
- A time delay of 60 seconds follows before the thermostat circuit between R and G are complete, activating the blower motor.
- The thermostat circuit between R and W is completed.
- The air handler blower will turn off 30 seconds after the thermostat stops calling for heating.

Control Board Located Inside Air Handler



IMPORTANT

- The Blower Door Safety Switch circuit (across P4 and P1 connections shown above) must be complete for all sequence of operations to take place.
- During installation, use caution to not let the control board and other controls get wet.

6.3 Freeze Protection

If the temperature of the water within the hot water coil were to drop below 40°F, the thermostat circuit between R and W is completed, activating the hot water circulating pump, external circulating pump or isolation valve. When the water temperature rises above 70°F, the thermostat circuit between R and W is opened and hot water will stop circulating within the hot water coil.

To prevent the freeze protection from activating the water circulating pump when in cooling mode, move freeze stat to far left or far right of water coil, and insulate with foam tape insulation.



IMPORTANT

The factory-installed freeze protection on all air handlers is designed to protect the coil from freezing. The installer must take steps to protect the water piping from freezing. Insulating the piping is highly recommended.

6.4 Pump Timer

The State of Massachusetts requires the use of a pump timer on domestic water applications to periodically circulate water during the off cycle. This pump timer requirement is a standard, factory-installed feature on this air handler. The pump timer activates the circulating pump or isolation valve for one minute every six hours by completing the thermostat circuit between R and W. The pump timer is skipped while the outdoor compressor is operating.

7. Service and Maintenance

WARNING



Electrical Shock:

- Before servicing the air handler, turn off power to unit. There may be more than one disconnect switch.
- Improper installation, modification, service, maintenance or use of the air handler can cause electrical shock, burns or other conditions which may cause electrical shock, personal injury, property damage or death.

WARNING

- It is recommended that a trained and qualified professional who has attended a Rinnai installation training class perform service to the air handler.
- Do not use this air handler if any part has been under water. Immediately call a licensed professional to inspect the unit and replace any part that has been under water.
- Do not use substitute materials. Use only parts certified for the air handler.
- Any alteration to the air handler can be dangerous and will void the warranty.

To service the air handler, follow the steps below.

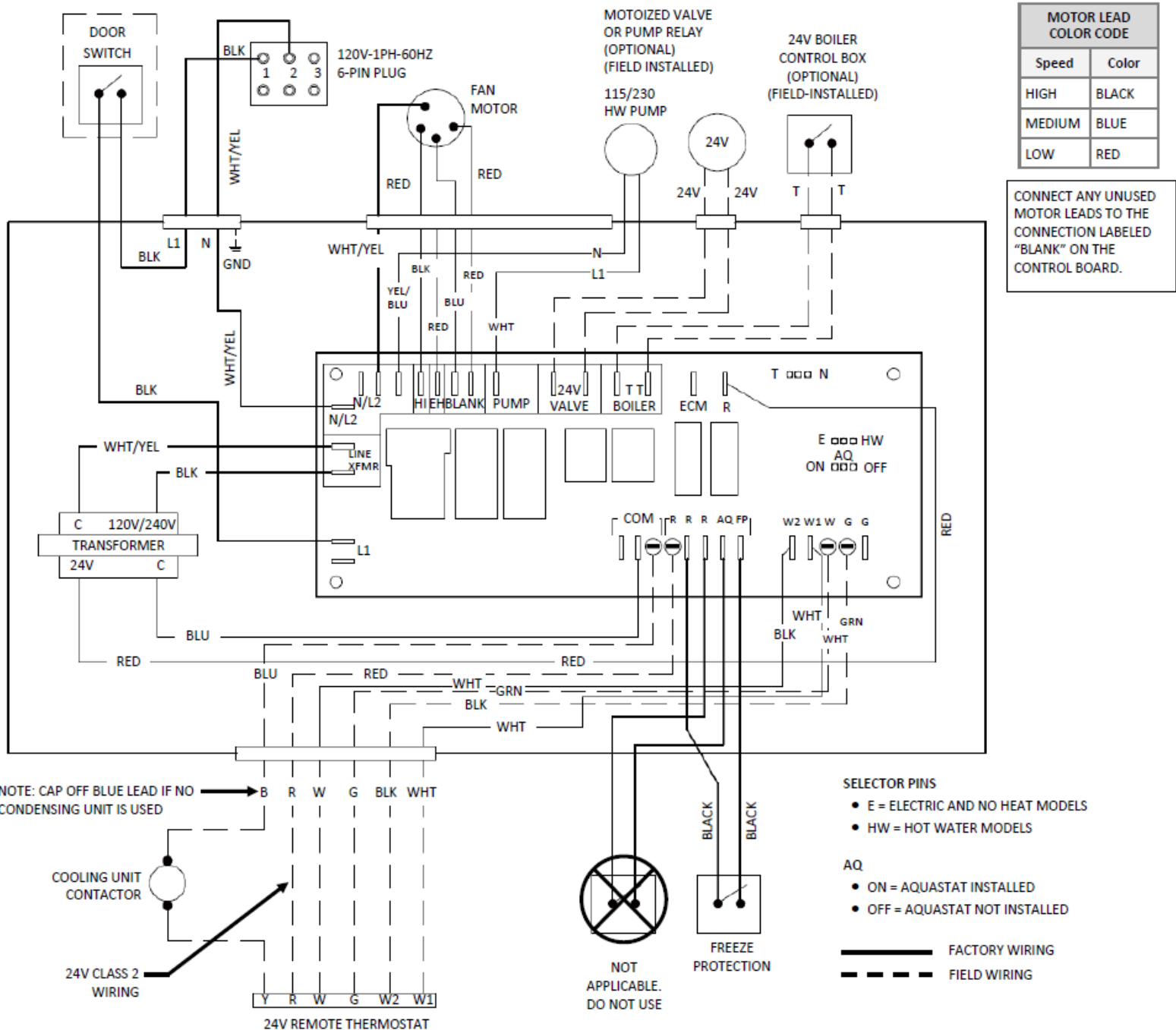
1. Turn off power to the unit.
2. Remove the four screws securing the front panel.
3. Perform service or maintenance to the air handler, and then reinstall the four screws to secure the front panel.

Maintenance:

- At the beginning of each heating season, the air handler should be serviced by a qualified installer or servicing agency. Verify proper operation after servicing.
- It is important that compartments, filter, and circulating air passage ways of the appliance be kept clean.
- The supply and return air ducts should be inspected at least annually for blockages or damage.
- Keep the motor free of dust and dirt by cleaning annually.

8. Appendices

8.1 Wiring Diagram



IMPORTANT
 Specific blower wire connections may vary by model.

8.2 Change Fan Motor Speed

The speed of the air handler is factory default set as per the table to the right. To adjust speed settings, follow the steps below:

1. Disconnect power to the air handler.

⚠ WARNING

Failure to not disconnect power can result in electrical shock, personal injury or death.

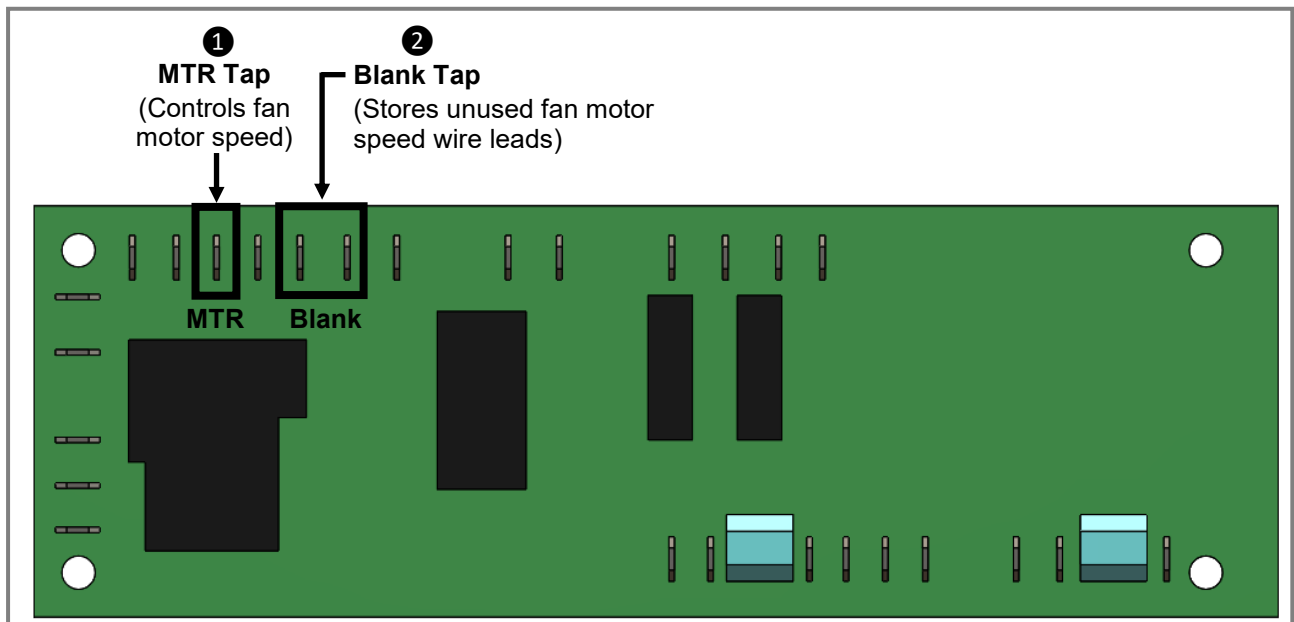
2. Remove the air handler access panel by removing the four screws that secure the panel.
3. Locate the PC Board.
4. On the PC Board, remove the wire lead from the “MTR” tap (this tap controls the fan motor speed). See ❶ in image below.

Default Setting Speeds	
Model	Speed
<ul style="list-style-type: none"> • AH083CP • AH083P 	Medium
<ul style="list-style-type: none"> • AH084CP • AH084P 	Medium
<ul style="list-style-type: none"> • AH125CP • AH125P 	Medium
<ul style="list-style-type: none"> • AH166CP • AH166P 	High
<ul style="list-style-type: none"> • AH206CP • AH206P 	High

5. Remove the desired wire lead from the “Blank” tap and place in the “MTR” tap (the “Blank” tap is where unused fan motor speed wire leads are stored). See ❷ in image below. Refer to the following table for wire lead color descriptions:

Fan Motor Speed Wire Lead Color Code	
Speed	Color
High	Black
Medium	Blue
Low	Red

6. Connect the unused wire lead to the “Blank” tap.
7. Replace the air handler access panel.



8.3 Hydronic Air Handler System Sizing

8.3.1 Equivalent Feet of Pipe Per Fitting

Copper		
	Diameter	
Fitting	3/4 in.	1 in.
90 Degree Elbow	2	0.75
45 Degree Elbow	0.75	0.3
Straight Through Tee	0.4	0.135
Side Port Tee	3	1.35
Reducer Coupling	0.5	0.18
Gate Valve	0.25	0.09
Ball Valve	2.2	1.29
Swing Check Valve	3	1.35
Multiplier Per Linear Foot of Pipe	1	0.3
PEX		
Fitting	3/4 in.	1 in.
90 Degree Elbow	19.44	6.9
Straight Through Tee	2.7	0.78
Side Port Tee	28.08	7.62
Reducer Coupling	4.68	1.62
Ball Valve	5.94	2.58
PEX x NPT	4.86	2.28
Multiplier Per Linear Foot of Pipe	1.8	0.6
CPVC		
Fitting	3/4 in.	1 in.
90 Degree Elbow	2.2	1
45 Degree Elbow	1.21	0.56
Straight Through Tee	1.54	0.68
Side Port Tee	5.5	2.4
Male/Female Adapter	1.65	0.8
Multiplier Per Linear Foot of Pipe	1.1	0.4

NOTE

All values have been normalized to 3/4 in. copper pipe as a baseline.

System Sizing Example

<ul style="list-style-type: none"> • 50 ft. of 3/4 in. CPVC pipe • Four (4) 90 degree elbows • Two (2) straight through tees 	} Total Equivalent Length	= 50 x 1.1 (Total linear foot equivalency) + 4 x 2.2 (Total for 90 degree elbows) + 2 x 1.54 (Total for tees)
		Approximately 67 Equivalent Feet of Piping

8.3.2 Air Handler System Capacity Tables

Rinnai Tankless Water Heaters

Models:

- SENSEI™ SE+ Series (RU Condensing)
- HE+ Series (RL Non-Condensing)
- HE Series (V Non-Condensing)

NOTE

Tankless water heaters must have a minimum input rate of 160,000 Btu/hr.

Entering Water Temperature	Flow Rate	Blower Speed Setting	BTU Output (Air Handler Models)					Maximum Equivalent Pipe Length (ft.) ¹	
			AH083CP	AH084CP	AH125CP	AH166CP	AH206CP	SENSEI™ SE+	HE+ and HE
120°F	2	Low	18,000	20,000	26,000	31,000	30,000	100	100
		Medium	19,000	22,000	27,000	32,000	30,000		
		High	20,000	23,000	28,000	33,000	30,000		
140°F		Low	25,000	28,000	37,000	44,000	42,000		
		Medium	27,000	30,000	38,000	45,000	42,000		
		High	29,000	32,000	40,000	46,000	43,000		
160°F		Low	33,000	36,000	48,000	57,000	54,000		
		Medium	35,000	39,000	50,000	58,000	55,000		
		High	37,000	42,000	51,000	59,000	56,000		
120°F	3	Low	20,000	22,000	30,000	37,000	36,000	50	70
		Medium	21,000	24,000	32,000	38,000	37,000		
		High	23,000	26,000	33,000	39,000	37,000		
140°F		Low	25,000	31,000	42,000	53,000	51,000		
		Medium	30,000	34,000	45,000	54,000	52,000		
		High	32,000	37,000	46,000	56,000	53,000		
160°F		Low	33,000	40,000	55,000	68,000	66,000		
		Medium	39,000	44,000	58,000	70,000	68,000		
		High	42,000	48,000	60,000	72,000	69,000		
120°F	4	Low	21,000	23,000	32,000	41,000	40,000	10	20
		Medium	23,000	26,000	34,000	43,000	41,000		
		High	24,000	28,000	36,000	44,000	42,000		
140°F		Low	29,000	32,000	46,000	58,000	57,000		
		Medium	32,000	36,000	48,000	60,000	58,000		
		High	35,000	39,000	51,000	62,000	60,000		
160°F		Low	38,000	42,000	59,000	75,000	74,000		
		Medium	41,000	47,000	62,000	78,000	76,000		
		High	45,000	51,000	66,000	80,000	77,000		

¹ Refer to section “8.3.1 Equivalent Feet of Pipe Per Fitting” for more information on determining the maximum equivalent pipe length.

Rinnai I-Series Combi Boilers

Models:

- i060C
- i090C
- i120C



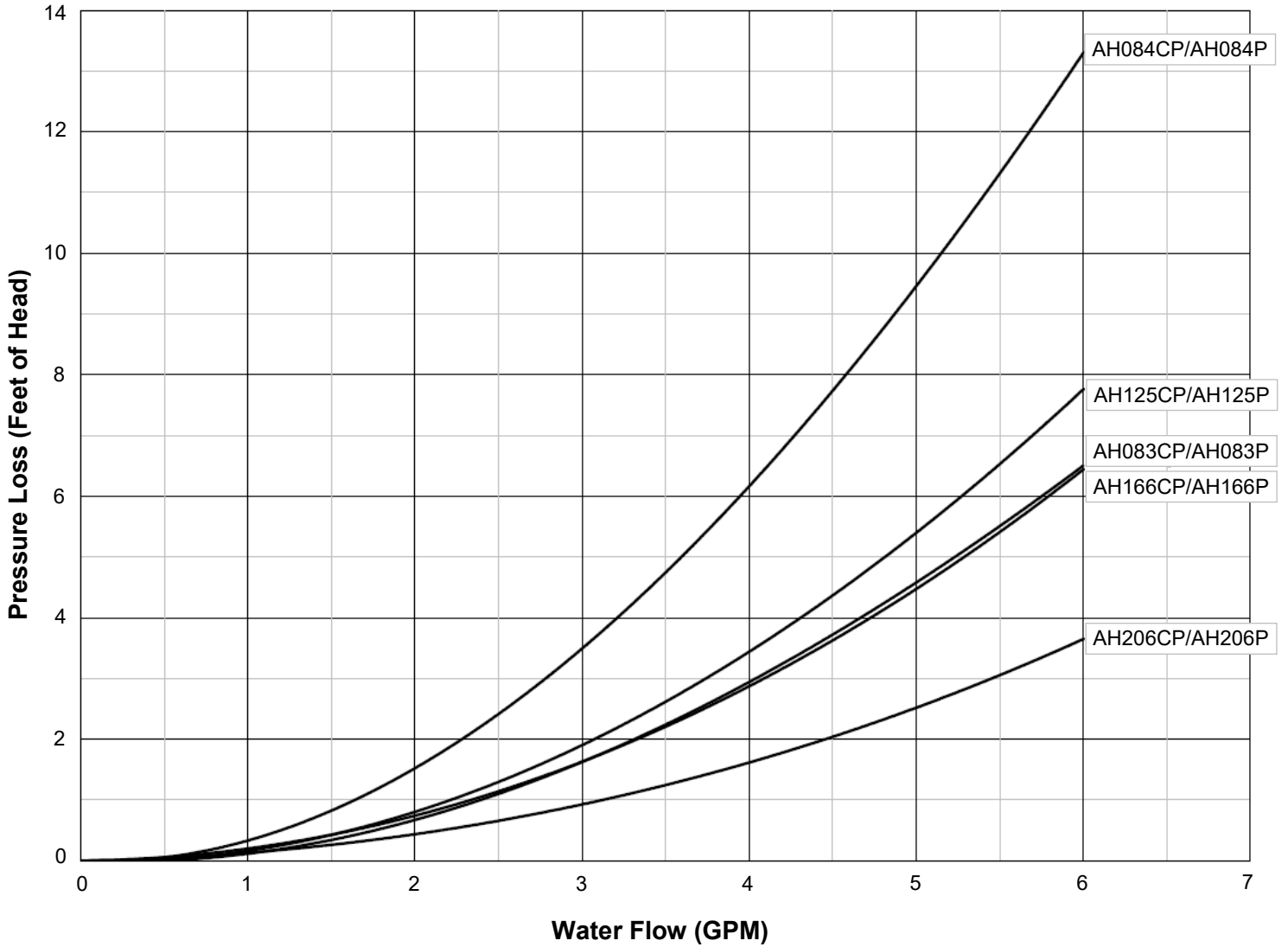
IMPORTANT

If more than 40 equivalent feet of plumbing is needed with the I-Series Boiler, Rinnai recommends the use of hydraulic separation with an external circulation pump. Hydraulic separation uses primary/secondary piping to separate the boiler from the heating system. Hydraulic separator examples include a low loss header (field-supplied), closely spaced tee (field-supplied), or the Primary-Secondary Heating Kit offered by Rinnai (part # 807000212).

Entering Water Temperature	Flow Rate	Blower Speed Setting	BTU Output (Air Handler Models)					Maximum Equivalent Pipe Length (ft.) ¹	
			AH083P	AH084P	AH125P	AH166P	AH206P	i060C/ i090C	i120C
120°F	3	Low	20,000	22,000	30,000	37,000	36,000	40	40
		Medium	21,000	24,000	32,000	38,000	37,000		
		High	23,000	26,000	33,000	39,000	37,000		
140°F		Low	25,000	31,000	42,000	53,000	51,000		
		Medium	30,000	34,000	45,000	54,000	52,000		
		High	32,000	37,000	46,000	56,000	53,000		
160°F		Low	33,000	40,000	55,000	68,000	66,000		
		Medium	39,000	44,000	58,000	70,000	68,000		
		High	42,000	48,000	60,000	72,000	69,000		
120°F	4	Low	21,000	23,000	32,000	41,000	40,000	10	10
		Medium	23,000	26,000	34,000	43,000	41,000		
		High	24,000	28,000	36,000	44,000	42,000		
140°F		Low	29,000	32,000	46,000	58,000	57,000		
		Medium	32,000	36,000	48,000	60,000	58,000		
		High	35,000	39,000	51,000	62,000	60,000		
160°F		Low	38,000	42,000	59,000	75,000	74,000		
		Medium	41,000	47,000	62,000	78,000	76,000		
		High	45,000	51,000	66,000	80,000	77,000		

¹ Refer to section "8.3.1 Equivalent Feet of Pipe Per Fitting" for more information on determining the maximum equivalent pipe length.

8.3.3 Hydronic Coil Pressure Drop Table



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