

# IBC®

## INSTALLATION & OPERATING MANUAL

# AHU

AIR HANDLER



AHU 800 - model IAHCCF1-0800

AHU 1200 Low Velocity - model IALCCF1-1200

AHU 1200 - model IAHCCF1-1200

AHU 1600 - model IAHCCF1-1600

AHU 2000 Low Velocity - model IALCCF1-2000





## Warning

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury, or loss of life. Read and understand the entire manual before attempting installation, start-up, operation, or service. Installation and service must be performed only by an experienced, skilled installer or service agency.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.



## Note

If using a heat pump or air conditioner: consult the heat pump or air conditioner's wiring instructions before connecting to the AHU.

A heat pump or air conditioner producing its own control voltage will require isolation relays. If the heat pump or air conditioner's wiring diagram shows a thermostat connecting directly to the heat pump or air conditioner's board (without an external transformer), then isolation relays will be required.

See "Worked Examples" under "Installation." If in doubt, power the heat pump or air conditioner before connecting to it, and measure for voltage across control contacts Y and C: a voltage greater than ~2 Volts AC or DC indicates that isolation relays will be necessary.



## Note

When using medium and high velocity systems, ensure proper duct design for optimal system performance and noise levels. For reference, see "Duct Work" under "Installation."

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# Safety information

## Manual safety markings



### Danger

Points out an immediate hazardous situation that must be avoided to prevent serious injury or death.



### Warning

Points out a potential hazardous situation that must be avoided to prevent serious injury or death.



### Caution

Points out a potential hazardous situation that must be avoided to prevent possible moderate injury and/or property damage.



### Note

Points out installation, maintenance and operational notes to enhance efficiency, longevity and proper operation of the air handling appliance.



### Danger

Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance. If you smell gas vapors, do not try to operate any appliance - do not touch any electrical switch or use any phone in the building. Immediately, call the gas supplier from a phone located remotely. Follow the gas supplier's instructions, or if the supplier is unavailable, contact the fire department.



### Warning

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury, or loss of life. Read and understand the entire manual before attempting installation, start-up, operation, or service. Installation and service must be performed only by an experienced, skilled installer or service agency.

Failure to follow all instructions in the proper order can cause personal injury or death. Read all instructions, including all those contained in component manufacturers' manuals before installing, starting up, operating, maintaining, or servicing the appliance.



### Warning

Disconnect power supply before any wiring/service is performed. Failure to do so could result in damage to appliance and/or electric shock.



### Caution

Do not pierce cabinet as internal damage may occur to electrical and hydronic components.

**Caution**

The air handler must be installed so that electrical components are not exposed to water during operation.

**Note**

All wiring on IBC air handlers must adhere to the National Electrical Code and/or local regulations.

**Note**

All appliances conform to CSA C22.2 NO. 236-15 and UL 1995 Stds. Water coil conforms to NSF / ANSI Std. 372.

## Important safety instructions

Failure to read and comply with all instructions and applicable national and local codes may result in hazardous conditions that could result in property damage and injury to occupants, and in extreme cases to death. Keep instructions near the air handling appliance for future reference.

When using electrical appliances, follow safety precautions to reduce the risk of fire, electric shock, or injury to persons, including:

- » Install or locate the air handling appliance only in accordance with the provided installation instructions.
- » Use the air handling appliance only for its intended use as described in this manual.
- » Do not operate the air handling appliance if it is not working properly, or if it has been damaged or dropped.
- » Installation, start-up and servicing of IBC's air handling appliances must be done with care and attention, and should only be performed by competent, qualified, licensed and trained plumbing and heating technicians. Contact your nearest authorized service facility for examination, repair, or adjustment.
- » If subjected to flooding, the appliance must be replaced.

# 1.0 Specifications

Specification	AHU 800	AHU 1200 LV*	AHU 1200	AHU 1600	AHU 2000 LV*
Max. water temperature	195°F / 90°C	195°F / 90°C	195°F / 90°C	195°F / 90°C	195°F / 90°C
Coil performance at 180°F, 5 GPM	65,800 Btu/h	67,500 Btu/h	67,500 Btu/h	71,300 Btu/h	81,000 Btu/h
Water pipe connections (inches)	3/4" MPT	3/4" MPT	3/4" MPT	3/4" MPT	3/4" MPT
External static pressure <i>default</i>	0.50" w.c.	0.50" w.c.	0.50" w.c.	0.50" w.c.	0.50" w.c.
Low					
Medium	1.0" w.c.	-	1.0" w.c.	1.0" w.c.	-
High	1.5" w.c.	-	1.5" w.c.	1.5" w.c.	-
Max. operating water pressure	150 psi	150 psi	150 psi	150 psi	150 psi
Width	17.5"	21"	21"	24.6"	24.6"
Depth	26"	26"	26"	26"	26"
Height	32"	38"	38"	42"	42"
Supply air opening width	16"	19.6"	19.6"	23"	23"
Supply air opening depth	19.6"	19.6"	19.6"	19.6"	19.6"
Side return air opening height	7"	10.5"	10.5"	13"	13"
Side return air opening width	23"	23"	23"	23"	23"
Bottom return air opening width	13"	10.5"	10.5"	14"	14"
Bottom return air opening depth	23"	23"	23"	23"	23"
Max. internal current power rating 120 Volts	2.4 A	2.8 A	3.2 A	3.3 A	3.3 A
External pump supply 120V	4 A	4 A	4 A	4 A	4 A
Voltage	120 V	120 V	120 V	120 V	120 V
Max. return air temperature	122°F / 50°C	122°F / 50°C	122°F / 50°C	122°F / 50°C	122°F / 50°C
Boxed weight	98lbs / 45kgs	111lbs / 50kgs	111lbs / 50kgs	130lbs / 59kgs	130lbs / 59kgs

\* Low velocity only

## Heating capacity

AHU 800 - Heating Capacity (Entering Dry Bulb Temperature 70°F) @ 800 CFM					
Entering Water Temperature	3 GPM	4 GPM	5 GPM	6 GPM	7 GPM
185°F (85°C)	62.2 MBH	64.1 MBH	68.9 MBH	70.1 MBH	71.0 MBH
180°F (82°C)	59.4 MBH	61.3 MBH	65.8 MBH	67.0 MBH	67.9 MBH
170°F (77°C)	53.9 MBH	55.7 MBH	59.5 MBH	60.8 MBH	61.7 MBH
160°F (71°C)	48.4 MBH	50.1 MBH	53.3 MBH	54.6 MBH	55.5 MBH
150°F (66°C)	42.8 MBH	44.4 MBH	47.0 MBH	48.4 MBH	49.2 MBH
140°F (60°C)	37.3 MBH	38.8 MBH	40.7 MBH	42.3 MBH	43.0 MBH
130°F (54°C)	31.8 MBH	33.2 MBH	34.5 MBH	36.1 MBH	36.8 MBH
120°F (49°C)	26.2 MBH	27.5 MBH	28.2 MBH	29.9 MBH	30.5 MBH
110°F (43°C)	20.7 MBH	21.9 MBH	21.9 MBH	23.7 MBH	24.3 MBH

**Table 1** Heating Capacity rating at 800 scfm (standard cubic feet / minute) - AHU 800

AHU 1200 & AHU 1200 LV - Heating Capacity (Entering Dry Bulb Temperature 70°F) @ 1200 CFM					
Entering Water Temperature	3 GPM	4 GPM	5 GPM	6 GPM	7 GPM
185°F (85°C)	63.7 MBH	67.7 MBH	70.6 MBH	71.7 MBH	73.0 MBH
180°F (82°C)	60.9 MBH	64.7 MBH	67.5 MBH	68.6 MBH	69.8 MBH
170°F (77°C)	55.3 MBH	58.8 MBH	61.4 MBH	62.4 MBH	63.5 MBH
160°F (71°C)	49.7 MBH	52.9 MBH	55.2 MBH	56.2 MBH	57.2 MBH
150°F (66°C)	44.4 MBH	46.9 MBH	49.1 MBH	50.0 MBH	50.8 MBH
140°F (60°C)	38.4 MBH	41.0 MBH	42.9 MBH	43.8 MBH	44.5 MBH
130°F (54°C)	32.8 MBH	35.0 MBH	36.8 MBH	37.6 MBH	38.2 MBH
120°F (49°C)	27.2 MBH	29.1 MBH	30.6 MBH	31.4 MBH	31.8 MBH
110°F (43°C)	21.6 MBH	23.2 MBH	24.5 MBH	25.2 MBH	25.5 MBH

**Table 2** Heating Capacity rating at 1200 scfm (standard cubic feet / minute) - AHU 1200

AHU 1600 - Heating Capacity (Entering Dry Bulb Temperature 70°F) @ 1600 CFM					
Entering Water Temperature	3 GPM	4 GPM	5 GPM	6 GPM	7 GPM
185°F (85°C)	65.4 MBH	69.5 MBH	74.6 MBH	76.8 MBH	77.7 MBH
180°F (82°C)	62.6 MBH	66.5 MBH	71.3 MBH	73.4 MBH	74.4 MBH
170°F (77°C)	57.0 MBH	60.5 MBH	64.8 MBH	66.7 MBH	67.7 MBH
160°F (71°C)	51.4 MBH	54.6 MBH	58.4 MBH	60.1 MBH	61.0 MBH
150°F (66°C)	45.8 MBH	48.6 MBH	51.9 MBH	53.4 MBH	54.2 MBH
140°F (60°C)	40.1 MBH	42.6 MBH	45.4 MBH	46.7 MBH	47.5 MBH
130°F (54°C)	34.5 MBH	36.6 MBH	38.9 MBH	40.0 MBH	40.8 MBH
120°F (49°C)	28.9 MBH	30.6 MBH	32.4 MBH	33.3 MBH	34.1 MBH
110°F (43°C)	23.3 MBH	24.7 MBH	25.9 MBH	26.6 MBH	27.4 MBH

**Table 3** Heating Capacity rating at 1600 scfm (standard cubic feet / minute) - AHU 1600

AHU 2000 LV - Heating Capacity (Entering Dry Bulb Temperature 70°F) @ 2000 CFM					
Entering Water Temperature	3 GPM	4 GPM	5 GPM	6 GPM	7 GPM
185°F (85°C)	74.1 MBH	80.1 MBH	84.7 MBH	87.4 MBH	89.2 MBH
180°F (82°C)	71.0 MBH	76.6 MBH	81.0 MBH	83.6 MBH	85.3 MBH
170°F (77°C)	64.7 MBH	69.8 MBH	73.7 MBH	76.1 MBH	77.6 MBH
160°F (71°C)	58.5 MBH	63.0 MBH	66.3 MBH	68.6 MBH	69.9 MBH
150°F (66°C)	52.2 MBH	56.2 MBH	58.9 MBH	61.0 MBH	62.2 MBH
140°F (60°C)	45.9 MBH	49.4 MBH	51.6 MBH	53.5 MBH	54.4 MBH
130°F (54°C)	39.6 MBH	42.6 MBH	44.2 MBH	45.9 MBH	46.7 MBH
120°F (49°C)	33.4 MBH	35.8 MBH	36.8 MBH	38.4 MBH	39.0 MBH
110°F (43°C)	27.1 MBH	29.0 MBH	29.5 MBH	30.8 MBH	31.3 MBH

**Table 4** Heating Capacity rating at 2000 scfm (standard cubic feet / minute) - AHU 2000

## Cabinet and air supply dimensions

### Dimensions for the AHU 800 model

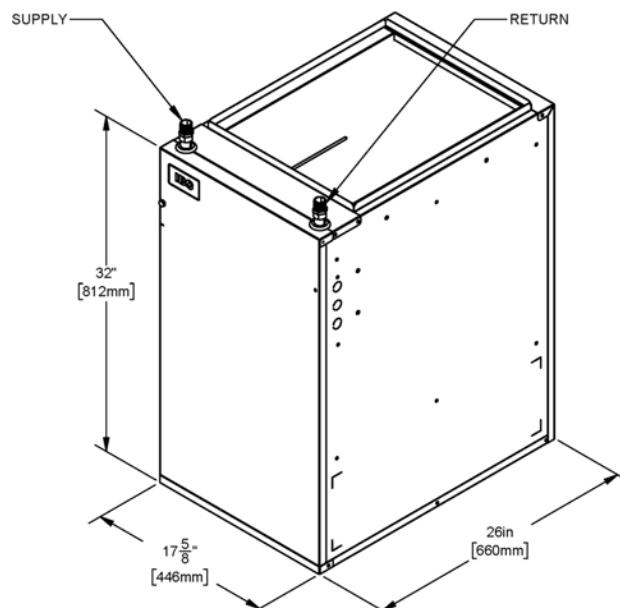


Figure 1 Front / right view

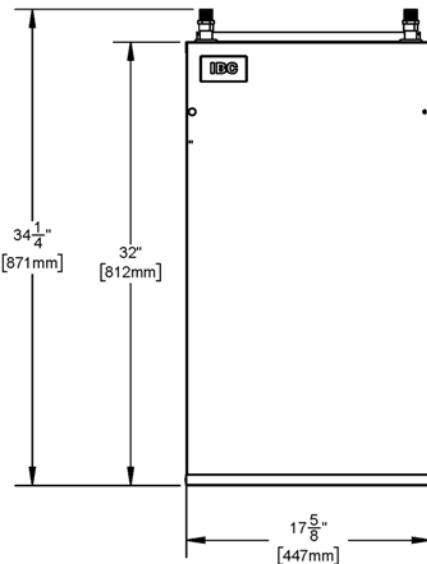


Figure 2 Frontal view

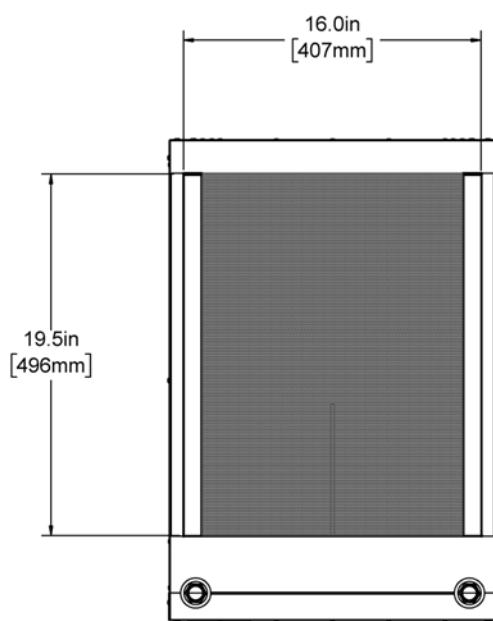


Figure 3 Top supply air opening

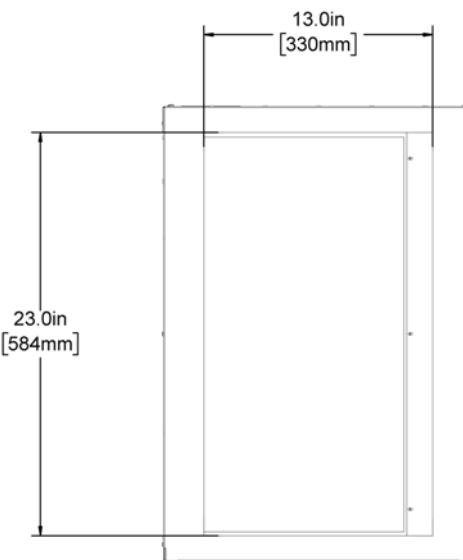


Figure 4 Bottom return air opening

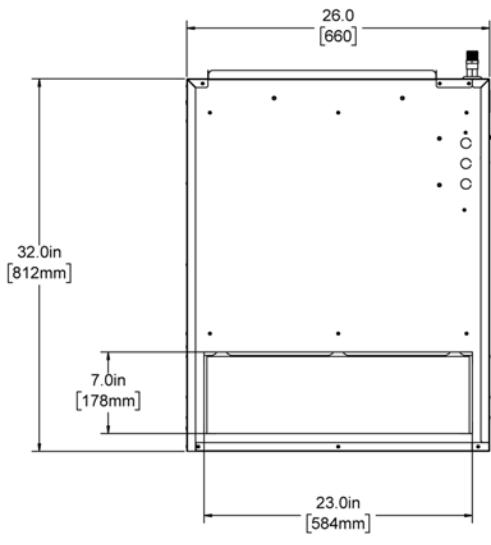


Figure 5 Left side return air opening

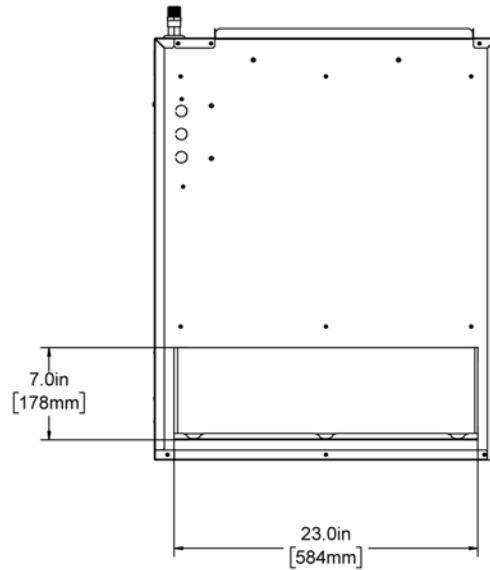


Figure 6 Right side return air opening

## Dimensions for the AHU 1200 LV and AHU 1200 models

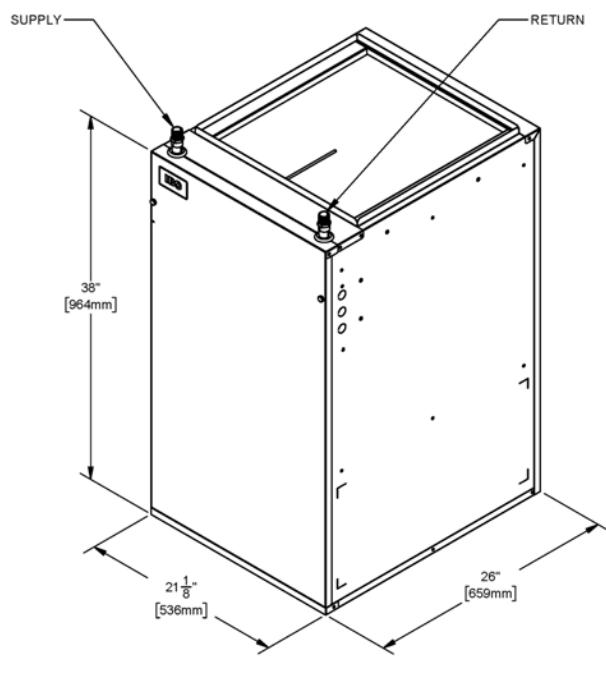


Figure 7 Front/left view

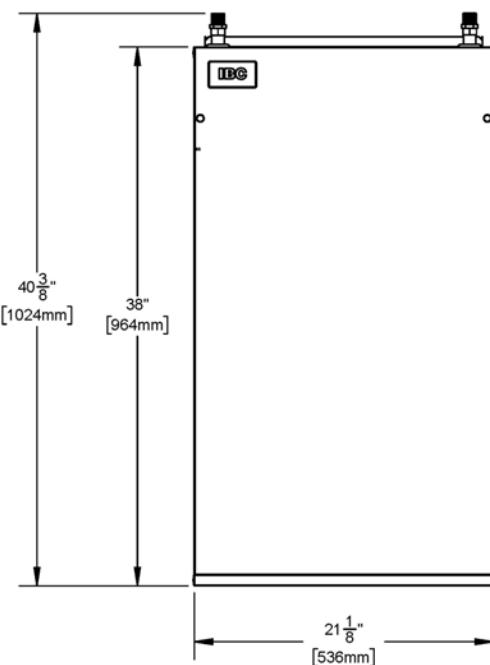


Figure 8 Frontal view

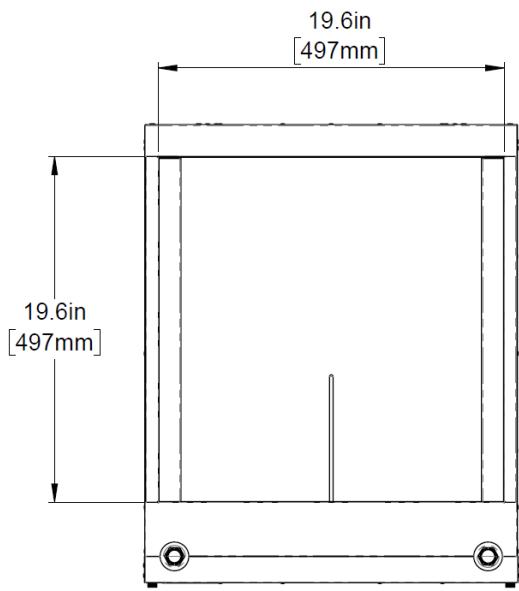


Figure 9 Top view

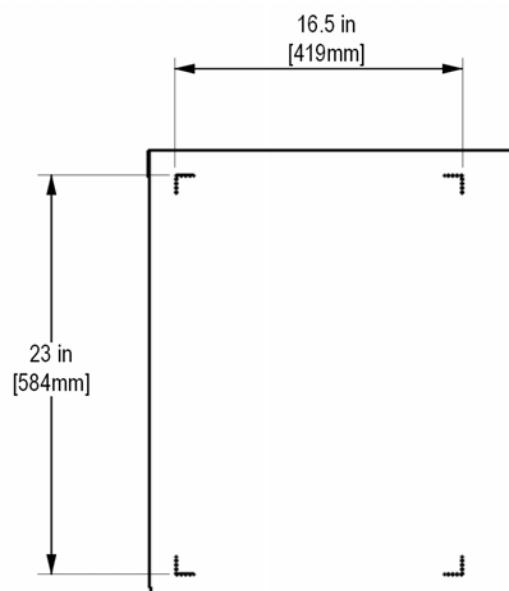


Figure 10 Bottom view

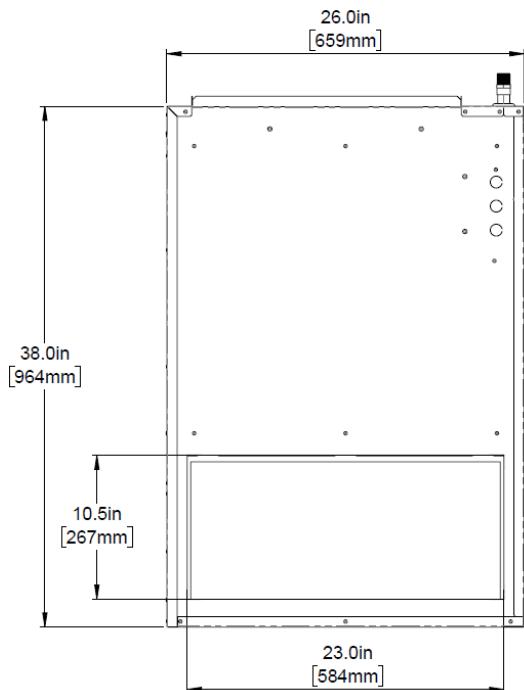


Figure 11 Left side return air opening

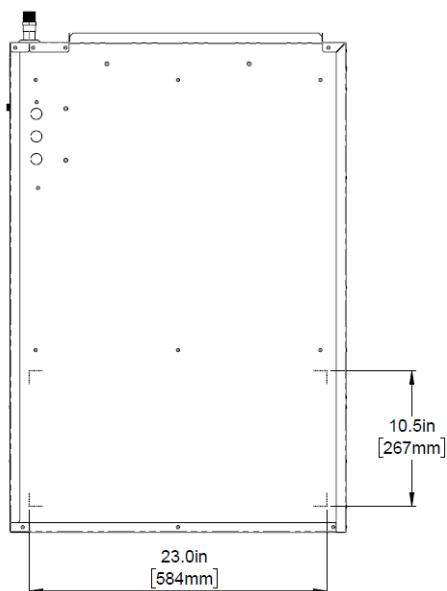


Figure 12 Right side return air opening

## Dimensions for the AHU 1600 and AHU 2000 LV models

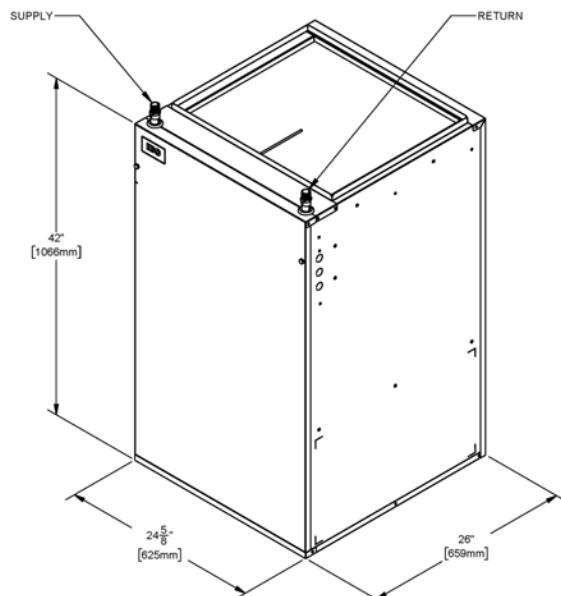


Figure 13 *Front/left view*

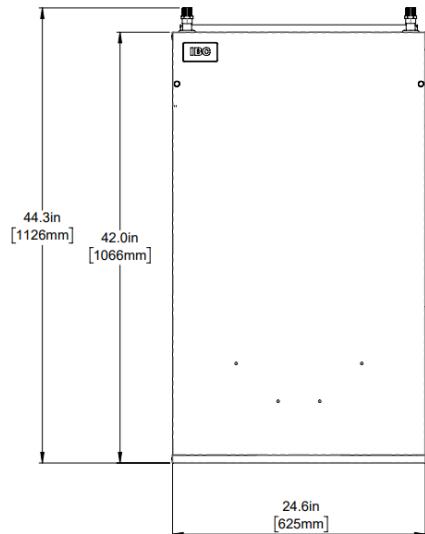


Figure 14 *Frontal view*

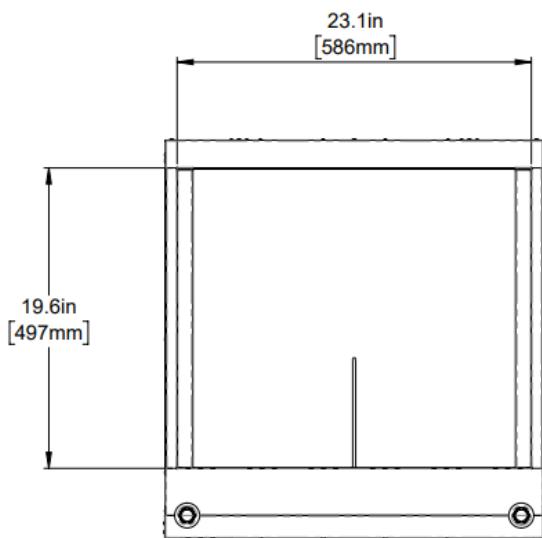


Figure 15 *Top view*

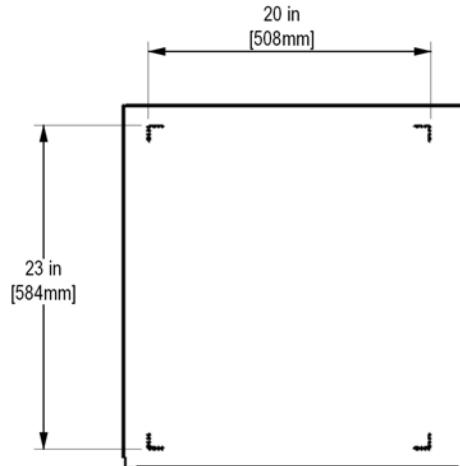


Figure 16 *Bottom view*

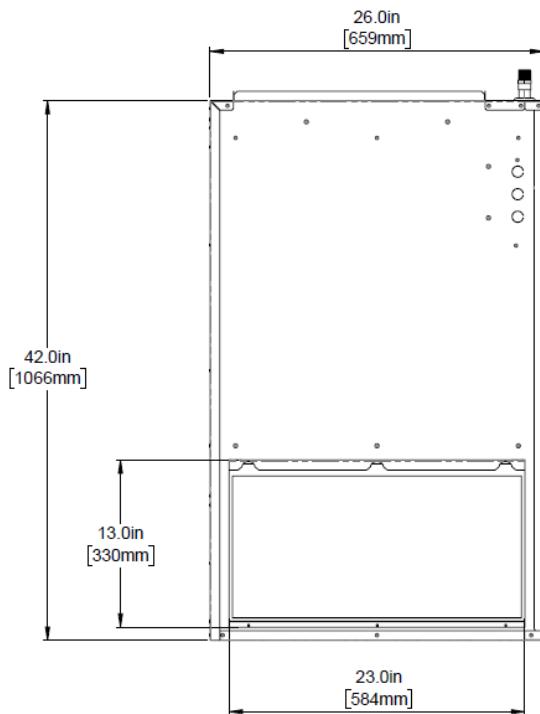


Figure 17 Left side return air opening

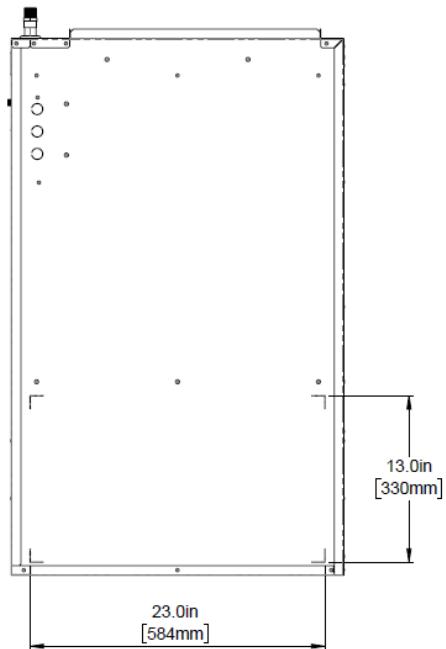


Figure 18 Right side return air opening

## 2.0 Introduction

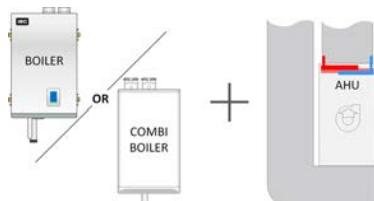
Our air handlers (AHUs) provide ducted heating and cooling, combining with other appliances to satisfy most HVAC requirements. In addition, the AHU offers support for humidifiers and dehumidifiers to prevent bacteria or mold. And for ease of use and operation, IBC delivers the AHU with pre-programmed settings for each model. If customizing is required, HVAC professionals can download the free *IBCconnect* app to program the air handler (see *Operating the air handler using the IBCconnect app on page 59*).

We've illustrated the AHU's diverse applications below. To view corresponding wiring and configuration instructions, see *Installation on page 19*.



### Caution

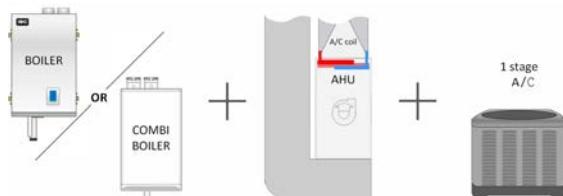
Do not use the AHU coil for cooling. For cooling, chilled water should be piped through a coil designed to drain condensate; see *Adding air conditioning coils or heat pump coils on page 23*



For setup instructions, see *Wiring single-stage heating with a boiler or combi boiler on page 37*.



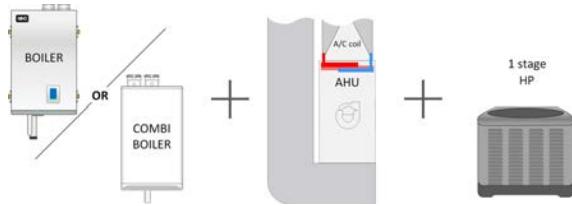
For setup instructions, see *Wiring single-stage heating with a tankless water heater as a heat source on page 38*.



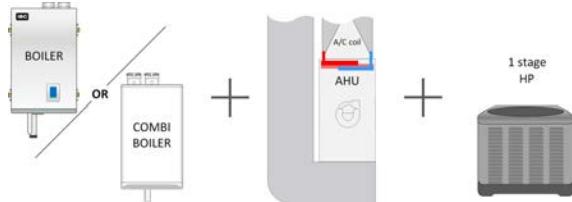
For setup instructions, see *Wiring single-stage heating with boiler or combi boiler, and single-stage cooling on page 39*.



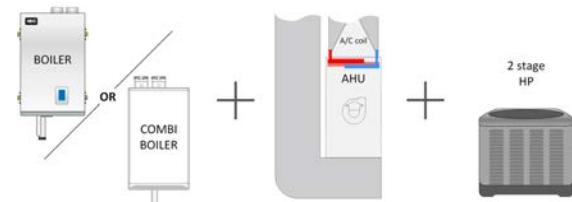
For setup instructions, see *Wiring two-stage cooling with a boiler or combi boiler heating using a 2-stage thermostat on page 40*.



For setup instructions, see [Wiring single-stage heat pump with a boiler or combi boiler as backup on page 41](#).



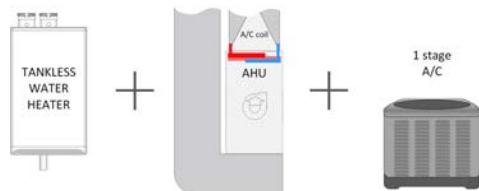
For setup instructions, see [Wiring single-stage heat pump with a boiler or combi boiler as backup \(emergency heat on T-stat\) on page 43](#).



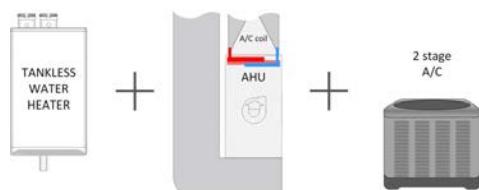
For setup instructions, see [Wiring two-stage heat pump with a boiler or combi boiler as backup \(2-stage thermostat\) on page 45](#).



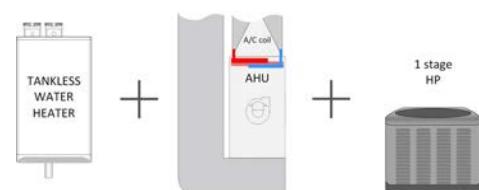
For setup instructions, see [Wiring two-stage heat pump \(2-stage thermostat\) on page 47](#).



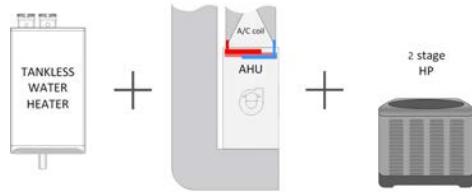
For setup instructions, see [Wiring single-stage heating, single-stage cooling, with the tankless water heater as the heat source on page 49](#).



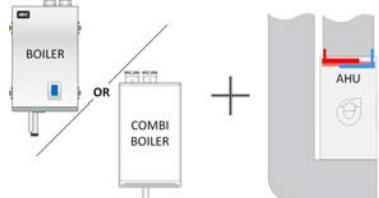
For setup instructions, see [Wiring two-stage cooling with a tankless water heater as a heat source on page 50](#).



For setup instructions, see [Wiring single-stage heat pump with a tankless water heater as a backup on page 51](#).

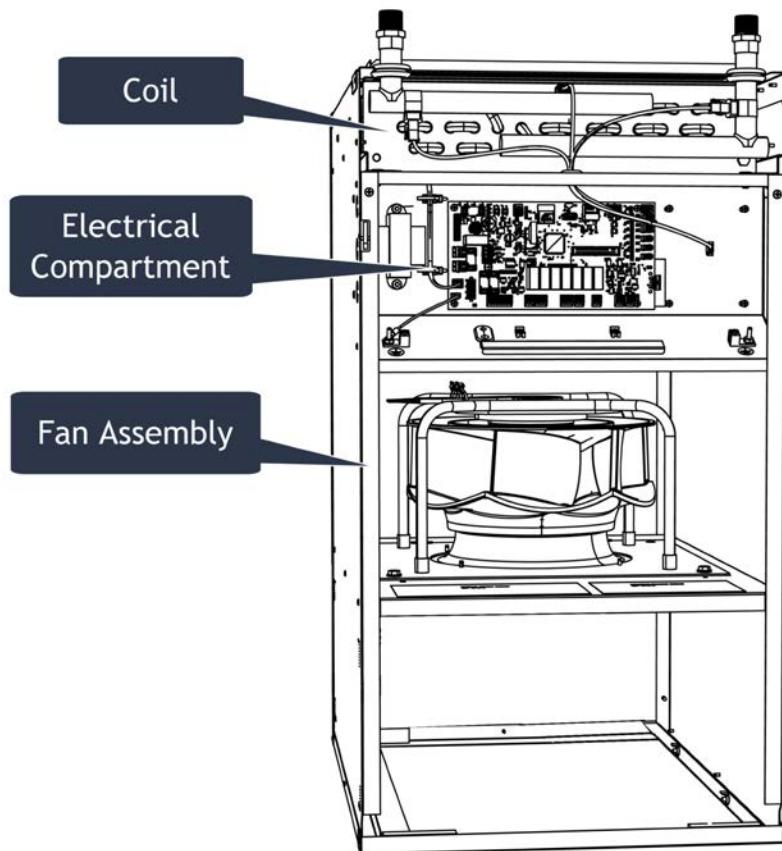


For setup instructions, see [Wiring two-stage heat pump with a tankless water heater as a backup on page 52](#).



For setup instructions, see [Wiring make-up air with a boiler or a combi as a heat source on page 53](#).

The appliance provides up to four mounting options for flexibility and ease of installation. Return air duct connections can be connected left, right, and bottom to suit the appliance's mounting position. For information on mounting positions and sizing, see [Cabinet and air supply dimensions on page 10](#).



## 2.1 Standard features and benefits

- » Integrated air handling appliance
- » High efficiency motor with variable speed (ECM) centrifugal fan
- » Quiet operation
- » Slide out fan assembly
- » High efficiency fin tube coil
- » Multi-position configurations
- » Industry standard duct sizes – supply air opening compatible with cased and uncased A/C and heat pump coils
- » Single stage or 2-stage heating and cooling, or 2-stage heat pump
- » Compact design for those awkward spaces; the ability to orient horizontally or vertically
- » Heat pump capable
- » Control for external pump (5A - 120V)
- » Flexible electrical connection knock-outs on left and right sides
- » Standard thermostat capable
- » WiFi connection for programming with the IBCconnect mobile app
- » Maximum return air temperature 122°F (50°C)
- » Sensors for protection and operation:
  - » **Included**
    - » Sensors for supply air, return air, supply water, return water, humidifier, de-humidifier, and Cold Air Sentry
  - » **Available options**
    - » Outdoor sensor IBC part # P-9067
    - » AC Freeze sensor IBC part # P-1015

## 2.2 Conformity

Installation must conform to the requirements of the authority having jurisdiction. In the absence of such requirements, the installation must conform to the National Electrical Code ANSI/NFPA No. 70, current edition.

The air handling appliance water circuit is certified to meet the NSF lead-free standard.

## 3.0 Installation

---

Inspect shipment carefully for signs of damage. All equipment is carefully inspected and packed. IBC's responsibility ceases upon delivery of the air handling appliance to the carrier. Any claims for damage or shortage must be filed immediately against the carrier. No claims for variances or shortages will be allowed by the manufacturer.

This section provides installation guidelines for the air handling appliance including locating the appliance, mounting positions, ducting, piping, and wiring.

### 3.1 Locating the appliance

#### 3.1.1 Conditioned space

- » Even though the air handling appliance operates quietly, try to locate the appliance to minimize noise transmission to conditioned spaces. Avoid locating the appliance next to bedrooms or other noise sensitive locations.
- » If connecting a cooling system to the appliance, we recommend insulating the supply air ducting with a minimum of 1" thick fiberglass insulation with a vapor barrier. All insulated joints must be sealed with a tape designed for this purpose.

#### 3.1.2 Un-conditioned space

If locating the appliance in an un-conditioned space, protect the hydronic coil from freezing conditions. Propylene glycol may be required to prevent freezing of the coil. Use a minimum of 25% to a maximum of 50% mixture of propylene glycol with water.

Insulate the supply air and return air ducting with a minimum 2" thick fiberglass insulation with a vapor barrier. All insulated joints must be sealed with tape designed for this purpose. The appliance should also be insulated with a minimum 2" thick fiberglass insulation with a vapor barrier.

#### 3.1.3 New construction

The appliance is not designed to provide temporary heat during construction. If used, you must thoroughly clean the appliance (including the fan and coil) to remove all contaminates and install with a new air filter. If used for temporary heating during construction, the warranty may be void.

#### 3.1.4 Mobile home

The appliance can be installed in a mobile home. Appliances installed in a mobile or manufactured home must conform to the Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280 and/or CAN/CSA Z240 MH Series, Mobile Homes.

#### 3.1.5 Closet

The appliance is approved for installation in a closet.

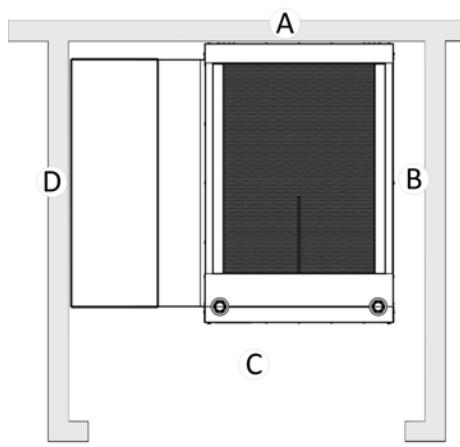


Figure 19 View from top of air handling appliance and duct in a closet

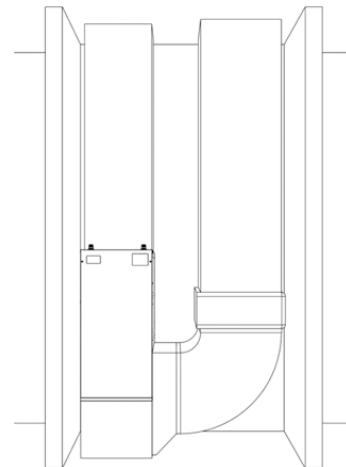


Figure 20 Front view of air handling appliance in a closet with ducting on the right

Orientation	Clearance to Combustible	Clearance for servicing
Back	0 inches / cm	0 inches / cm
Right Side	0 inches / cm	min. 3 inches / 8 cm
Front	1 inch / 2.5 cm	24 inches / 61 cm
Left Side	0 inches / cm	min. 3 inches / 8 cm
Top	0 inches / cm	6 inches / 15 cm
Bottom	0 inches / cm	0 inches / cm (if no connection)

Table 5 Recommended minimum clearance for combustibles and servicing

### 3.1.6 Garage

Garage installations must be in a fully enclosed garage. The appliance is not suitable for outdoor installations.



#### Danger

Install the appliance at a minimum of 18" above the garage floor to prevent flammable vapors reaching the appliance. Failure to follow this directive could result in an explosion or electric shock, potentially causing serious personal injury and/or property damage.

### 3.1.7 Serviceability

Install the appliance so that the front access panel is readily accessible for servicing. The front panel must be removed for access to the control board for wiring and setup. For more information

on maintenance, see [Service and maintenance on page 73](#). For wiring diagrams, see [Electrical connections on page 30](#).

## 3.2 Positioning and mounting the appliance

This section provides guidance on ways to orient and install the appliance. Ensure that:

- » You install the air handling appliance level and plumb.
- » If the appliance is sitting on the floor, shim as needed to level the appliance.
- » If the appliance is suspended, it is secured to the mounting system.

The appliance offers four mounting options for supply air discharge: up, down, left, or right. For diagrams on the possible orientations including dimensions, see [Cabinet and air supply dimensions on page 10](#).

### 3.2.1 Return air openings for ducting

The appliance provides three options for return air opening: left or right side return air and bottom return air.

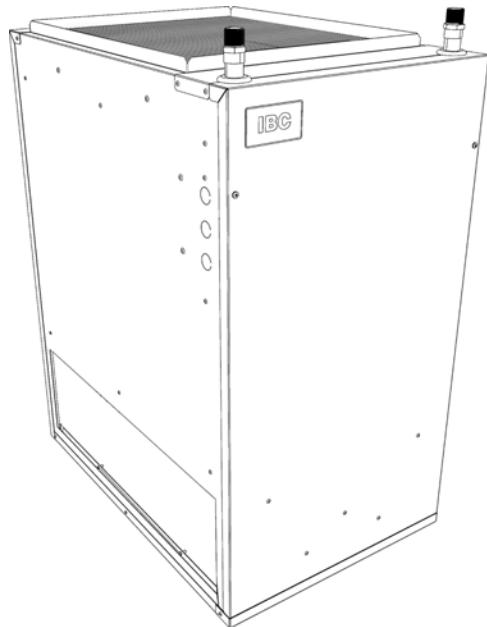


Figure 21 Left return air opening

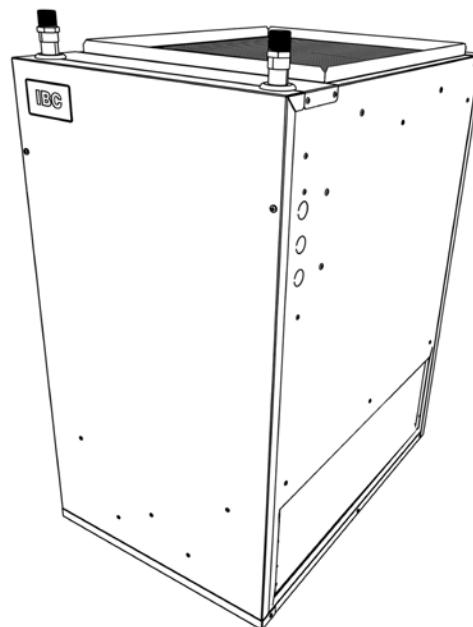


Figure 22 Right return air opening

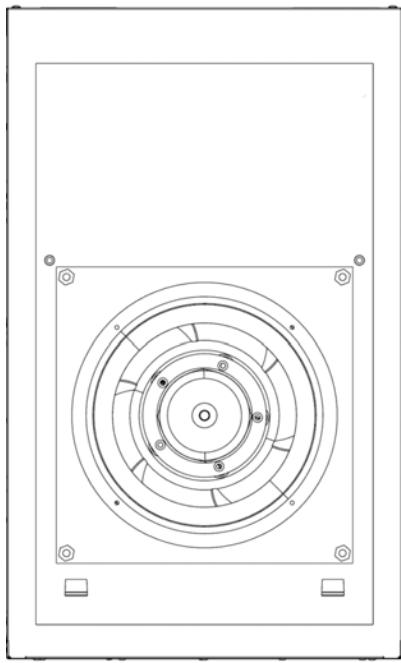


Figure 23 Bottom return air opening

For most applications using only one side return air connection will be too constrictive. Provide adequate return air by using the bottom connection, the bottom in conjunction with a side connection, or connections on both sides.

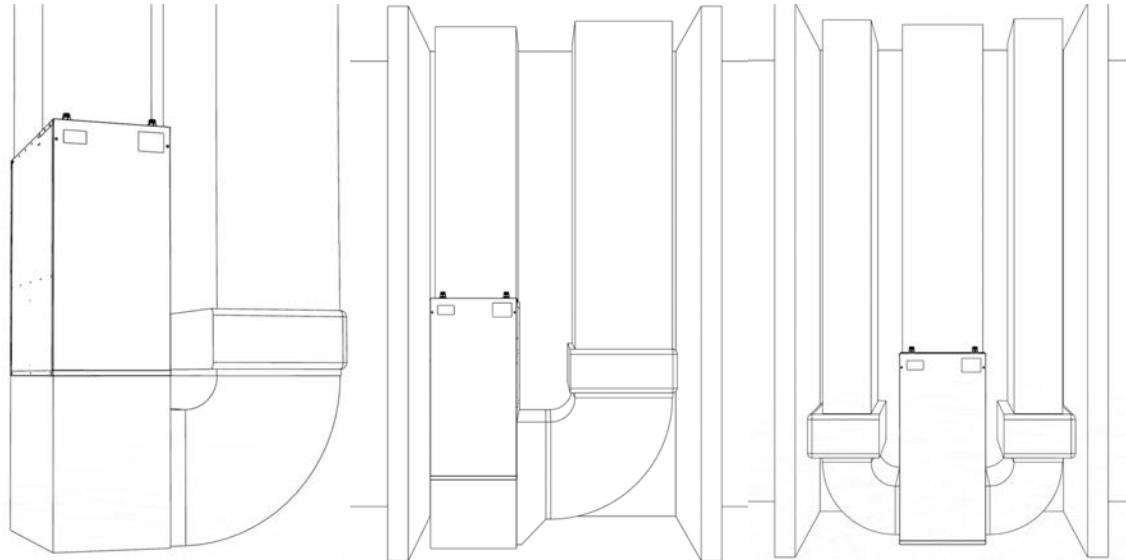


Figure 24 Unrestricted bottom return

Figure 25 Bottom and side return

Figure 26 Both sides return

### 3.2.2 Positioning the air handling unit

You can install the appliance so the air flows in a vertical up-flow or down-flow direction, or in a horizontal left or right direction.

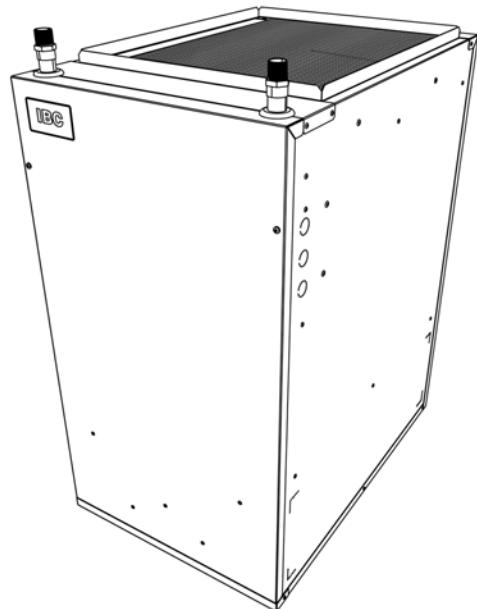


Figure 27 : Upflow installation

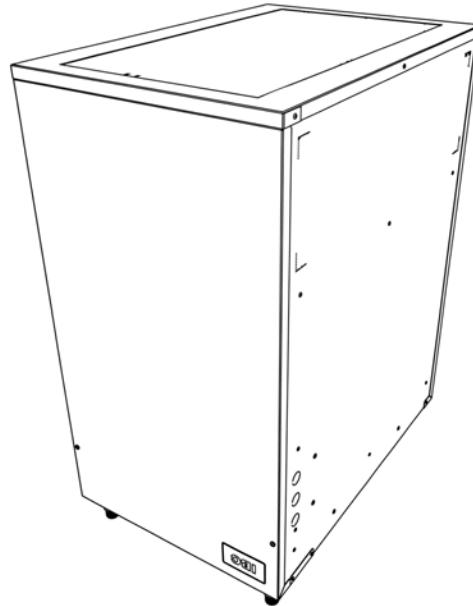


Figure 28 : Downflow installation

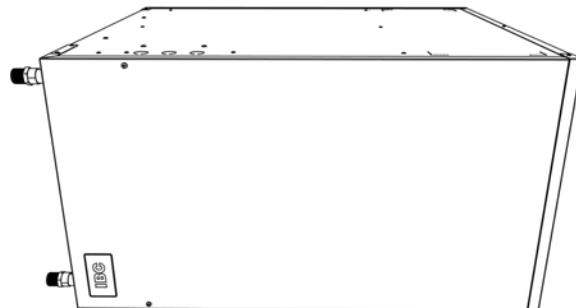


Figure 29 : Left side installation

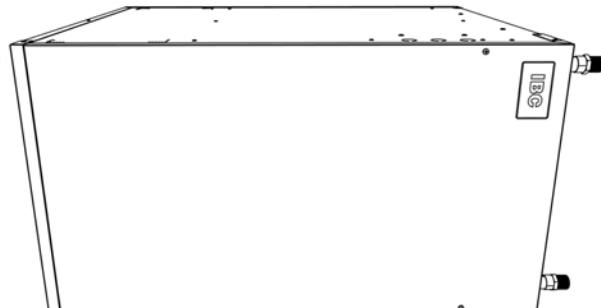


Figure 30 : Right side installation

### 3.2.3 Adding air conditioning coils or heat pump coils

Cased evaporator coils used for providing cold air can be positioned above or below the air handling appliance as shown below. When using A/C coils, also install [P-1015 A/C Freeze Kit](#) (sold separately).

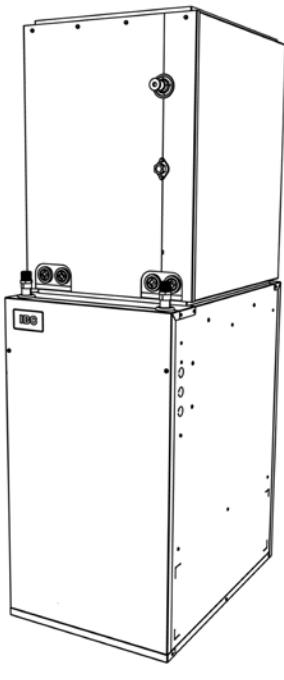


Figure 31 : Air conditioning/heat pump cased coil mounted on top of the appliance - upflow

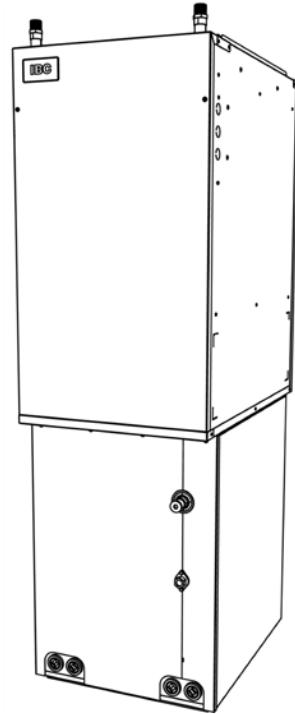


Figure 32 : Heat pump cased coil on the bottom of the appliance on the return side - upflow

### 3.2.4 Mounting an appliance on the wall

Mount the appliance with a pair of field-supplied wall brackets.

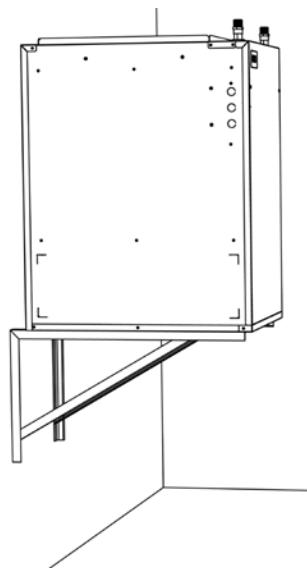


Figure 33 : Wall mounted air handling appliance

### 3.2.5 Air filters

All models require an external field-supplied air filter, before the left, right and / or bottom return air supply opening.

## 3.3 Duct work

Ducting design and installation should adhere to SMACNA and/or ASHRAE guidelines. Install the ducting system to NFPA 90B (latest edition). Adhere to the following:

- » Size the supply air plenum duct fitting to the size of the appliance's supply air opening, and extend for 3' above the appliance.
- » Size the supply and return air ducting according to ASHRAE standards or equivalent.
- » Seal all joints and connections to prevent air leakage from the ducting system.
- » Choose accessories that will not excessively restrict the air flow and create excessive pressure drop on the system.



#### Note

When using medium and high velocity systems, ensure proper duct design for optimal system performance and noise levels.

### 3.3.1 Sizing the ducts

The tables below provide examples of conventional duct types and sizing for the AHU appliance running at low velocity. If using flex / insulated flex ducting, ensure that you allow for a higher pressure drop.

Branch Duct - CFM at 0.25"wc external static pressure (galvanized duct)	
Round	CFM range
3"	20-30
4"	30-35
5"	55-65
6"	90-100
7"	135-160

**Table 6** Sizing round galvanized duct for CFM range

Supply / Return Air Trunk Size CFM at 0.25"wc external static pressure (galvanized duct)		
Round	Rectangular	CFM range
8"	8 x 6	160-190
8"	8 x 7	190-230

Supply / Return Air Trunk Size CFM at 0.25"wc external static pressure (galvanized duct)		
Round	Rectangular	CFM range
9"	8 x 8	230-275
10"	10 x 8	275-360
11"	12 x 8	360-460
12"	14 x 8	460-570
13"	16 x 8	570-650
13"	18 x 8	650-750
14"	20 x 8	750-850
14"	22 x 8	850-950
15"	24 x 8	950-1050

**Table 7** Supply air trunk size CFM at galvanized duct .25"wc ESP for return and supply air

### 3.3.2 Ducting installed in conditioned space

If a cooling system is connected to the appliance, we recommend insulating the supply air ducting with a minimum of 1" thick fiberglass insulation with a vapor barrier. All insulated joints must be sealed with tape designed for this purpose.

### 3.3.3 Ducting installed in un-conditioned spaces

Supply air and return air ducting should be insulated with a minimum 2" thick fiberglass insulation with a vapor barrier. All insulated joints must be sealed with a tape designed for this purpose.

### 3.3.4 Making the return air openings

Both sides and the bottom provide markings for the maximum return air opening. Use suitable metal cutters to perforate the marked area for the return air supply. Ensure that you cut within the marked area.

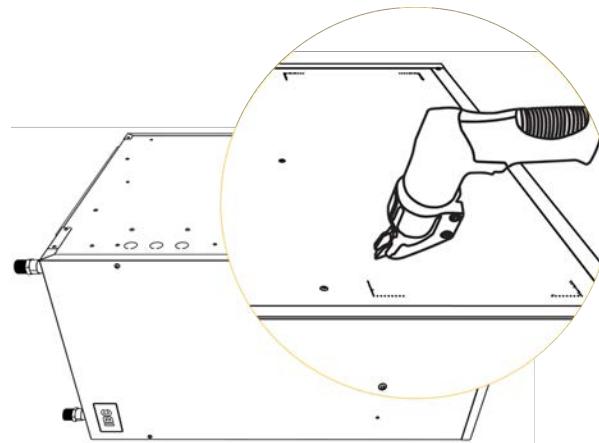


Figure 34 *Opening with shears*

## 3.4 Connecting the appliance to a boiler

Generally it's best to place the appliance as close as practical to the boiler. Ensure the piping system is designed to allow the easy removal of air from the boiler piping and easy flushing of the system.

Copper Pipe Sizing	BTU / HR Capacity @ 20°F (11°C) ΔT
1/2"	16,000 BTU
3/4"	36,000 BTU
1"	72,000 BTU
1 1/4"	110,000 BTU

Table 8 Pipe sizing

### 3.4.1 Sizing pumps



#### Note

To size the pump, refer to the Installation manual of the boiler manufacturer for boiler head loss specifications.

Air Handler Coil Head Loss - AHU 800			
Flow rate	3 GPM	4 GPM	5 GPM
Fluid pressure drop	1.6 ft.	2.7 ft.	3.5 ft.

Table 9 Air handler coil head loss at 180°F (82°C) - AHU 800

Air Handler Coil Head Loss - AHU 1200 LV and AHU 1200			
Flow rate	3 GPM	4 GPM	5 GPM
Fluid pressure drop	2.7 ft.	4.6 ft.	6.3 ft.

**Table 10** Air handler coil head loss at 180°F (82°C) - AHU 1200 & AHU 1200 LV

Air Handler Coil Head Loss - AHU 1600 and AHU 2000 LV			
Flow rate	3 GPM	4 GPM	5 GPM
Fluid pressure drop	2.2 ft.	3.4 ft.	5.1 ft.

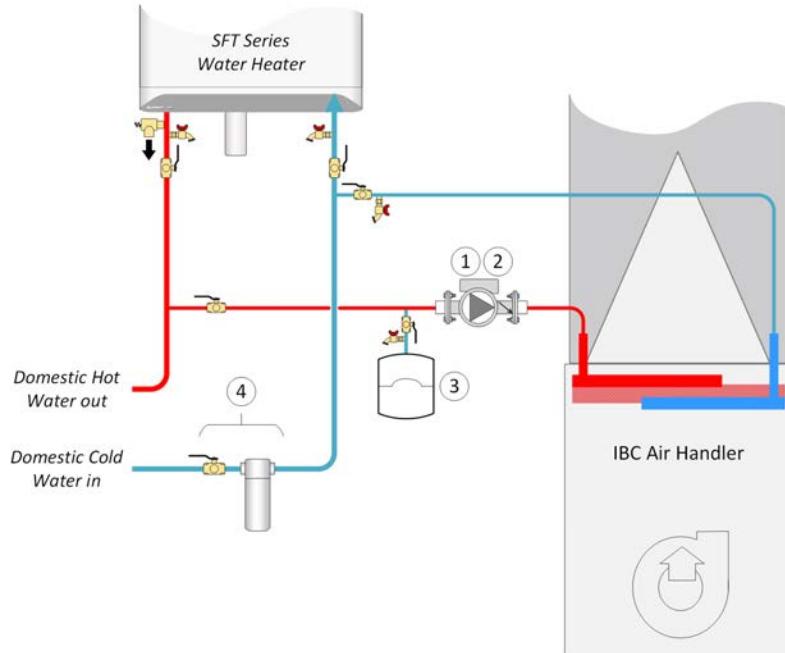
**Table 11** Air handler coil head loss at 180°F (82°C) - AHU 1600 & AHU 2000 LV

### 3.4.2 Using Propylene Glycol

Using a propylene glycol / water mixture with the boiler/ air handling appliance reduces the heating capacity of the system by up to 10%, and increases the pump head required to circulate the heating fluid. Use a minimum of 25% to a maximum of 50% propylene glycol mixture.

It is important to install the system with the correct pipe size to achieve optimum heating capacity from the air handling appliance. It is equally important to choose the correct circulator, sized for combined head loss of boiler/water heater, air handler - interconnecting piping).

## 3.5 Connecting the appliance to a tankless water heater



- ① Non-ferrous pump
- ② Check valve (may be built into pump)
- ③ Potable water expansion tank
- ④ Filter required where contaminants are present in the supply water

Figure 35 Basic installation with tankless water heater

Check local codes to ensure that piping the appliance to a tankless water heater is allowed. The air handler is approved for potable water use.

The air handling appliance must be installed in close proximity to a tankless water heater. As a guideline, we recommend a maximum distance of 10 feet between the appliance and the tankless water heater using  $\frac{3}{4}$ " copper piping.

The table below provides pipe sizing specifications for IBC's tankless water heater. Refer to other manufacturers' manuals for correct sizing of pipes.

**Note**

For pipe sizing, refer to the Installation manual of the water heater manufacturer for head loss specifications.

**Tankless Water Heater Head Loss - Superflow SFT 199**

Flow rate	3 GPM	4 GPM	5 GPM
Head loss @ flow	14 ft.	23 ft.	33 ft.

**Table 12** Tankless water heater head loss: SFT 199

Connection to the space heating circuit through a drinkable water system as shown may be prohibited by local code.

**Note**

The SFT 199 maximum water temperature is 149°F (65°C). Ensure that this is hot enough to meet the heating requirements of the space being heated.

If piped correctly, DHW takes priority over space heating. When the appliance detects reduced water temperature (that is, a call for DHW), the system will reduce the fan speed.

## 3.6 Cold Air Sentry (a.k.a. Freeze Protection)

The tankless water heater installation shown in [Basic installation with tankless water heater on page 29](#) above lends itself to the Cold Air Sentry feature, i.e. freeze protection: see Section 4.1 *Sequence of Operation* for details.

Alternatively, with the addition of TT contacts (and app setting *Tankless Mode* set to *Off*) a boiler heat source can be used for Cold Air Sentry.

## 3.7 Electrical connections

All electrical wiring to the boiler (including grounding) must conform to local electrical codes and/or the National Electrical Code, ANSI/NFPA No. 70 – latest edition, or the Canadian Electrical Code, C22.1 - Part 1. In addition, you should refer to the boiler's installation manual.

The control board diagram below shows the various wiring connections such as the thermostat, accessories, heat pump, and external pump.

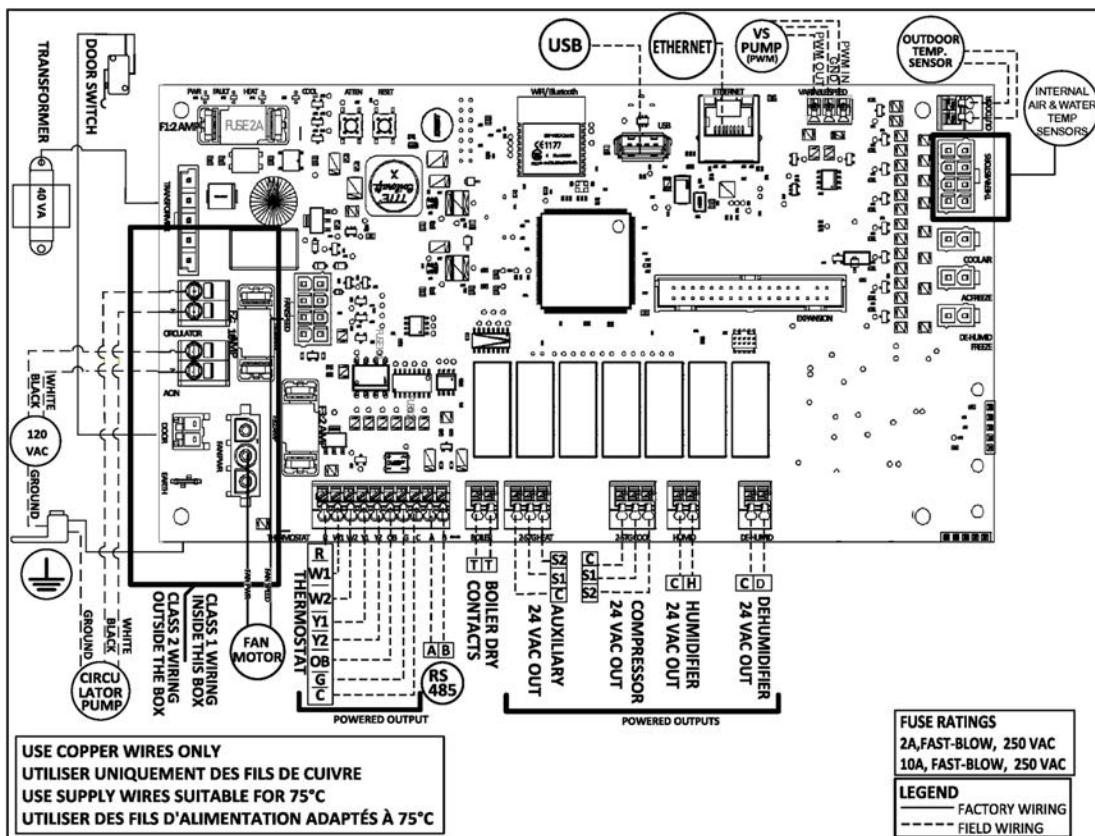


Figure 36 Air handling appliance - electrical wiring diagram.

### 3.7.1 Thermostat and appliance connections

The AHU board is compatible with conventional thermostats. Typical connections are detailed in the section [3.8](#).



#### Caution: power-stealing thermostats

The AHU board does not support power-stealing thermostats. Power stealing thermostats take their operating power from the thermostat line. If a t-stat has electronic display but does not use a C-wire or a battery, it is power-stealing.

## Connections

Terminal	Description	Notes
Thermostat - powered output		
R	24V power	Power to the low voltage thermostat.
W1	Heating Stage 1	Thermostat connects R to W1 for first stage heating. Note: A jumper between W1 and W2 will initiate W2 speed.
W2	Heating Stage 2	Thermostat connects R to W2 for second stage heating.
Y1	Cooling Stage 1	Thermostat connects R to Y1 for first stage cooling.
Y2	Cooling Stage 2	Thermostat connects R to Y2 for second stage cooling.
O/B	Reversing valve	Thermostat connects R to O/B for reversing valve operation; energized for cooling by default.
G	Fan	Thermostat connects R to G to energize fan for ventilation speed.
C	24V common	Common return from the thermostat – not required for all thermostats.
RS-485		
A		(Future application)
B		
Boiler - dry contact		
T	Boiler / Aux	Call for heat dry contact
T	Boiler / Aux	Call for heat dry contact
2-Stage Heat ("Auxiliary" / O/B) - powered output		
Com	Common	24V Common for O/B, Compressor, Humid, De-humid

Terminal	Description	Notes
S1 O/B	Stage 1 / Reversing valve	Can be configured for reversing valve to energize (24VAC) during cooling (by default) or heating (app can set this).
S2	-	Connects to outdoor appliance (2nd Stage if applicable).
2-Stage Cool (Compressor)- powered output		
Com	Common	24V Common for O/B, Compressor, Humid, De-humid
S1	Compressor Stage 1	Connects to outdoor appliance.
S2	Compressor Stage 2	Connects to outdoor appliance (2nd Stage if applicable).
Humidifier- powered output		
Com	Humidifier	24V Common for O/B, Compressor, Humid, De-humid
HUM	Humidifier	24VAC to activate the humidifier.
De-humidifier- powered output		
Com	De-humidifier	24V Common for O/B, Compressor, Humid, De-humid
DEH	De-humidifier	24VAC to activate the dehumidifier; alternate operation Fresh Air Damper.

**Table 13** Thermostat connections

### 3.7.2 Wiring of the external pump and 120VAC line

Line voltage consists of a 120 VAC / 15 amp supply, external Pump – maximum 4 Amps 120 Volts.

To wire the external pump and the 120VAC line: Insert a wire into the connector (at the front of the block). To remove the wire, insert a 3 mm flat-bladed screwdriver into the connector.

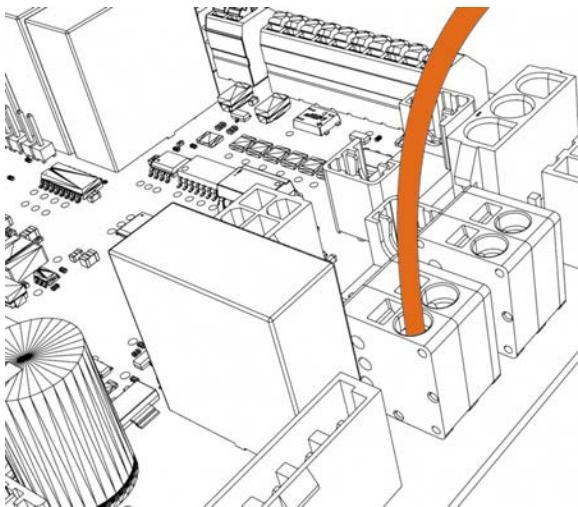


Figure 37 : Inserting a wire for an external pump and 120VAC line

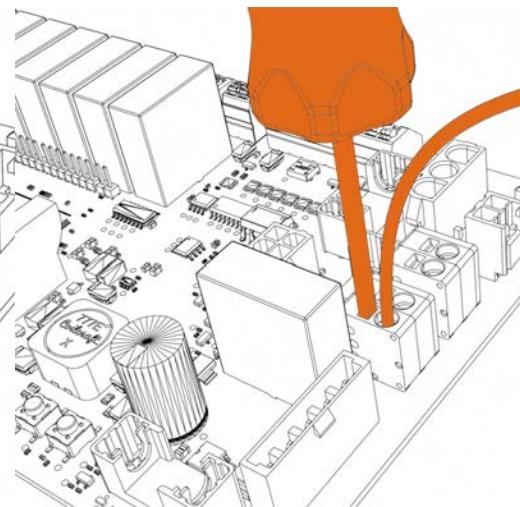


Figure 38 : Removing a wire

### 3.7.3 PWM Pump connections

Pulse width modulation (PWM) control for a pump is a feature under development at the time of publication. Check our website for more information in future releases of this manual.

## 3.8 Worked examples

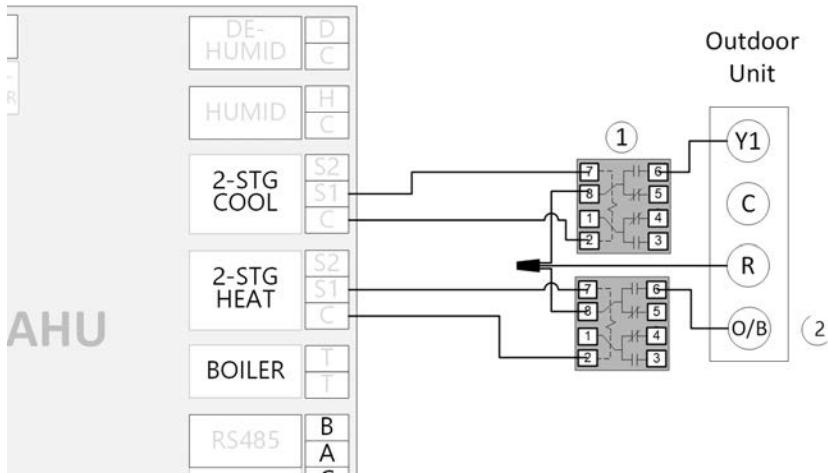
This section includes thirteen worked examples to help you set up the air handler for various applications. Note that to configure the air handler, you need to download the *IBCconnect* app (see [Operating the air handler using the IBCconnect app on page 59](#)).



#### Note

If using an air conditioner or heat pump: consult the air conditioner or heat pump's wiring instructions before connecting to the AHU. An air conditioner or heat pump producing its own control voltage will require isolation relays.

If the air conditioner or heat pump's wiring diagram shows a thermostat connecting directly to the air conditioner or heat pump's board (without an external transformer), then isolation relays will be required. See <sup>7</sup> on [Figure 39](#). If in doubt, power the air conditioner or heat pump before connecting to it, and measure for voltage across control contacts Y and C: a voltage greater than ~2 Volts AC or DC indicates that isolation relays will be necessary.



- ① **Required relays:** if outdoor unit requires a dry contact; typical of bonded controls. Check your outdoor unit installation manual.
- ② The reversing valve operation is selectable with the AHU app: the default setting energizes the O/B terminal during cooling

Figure 39 Heat pump with with isolation relays

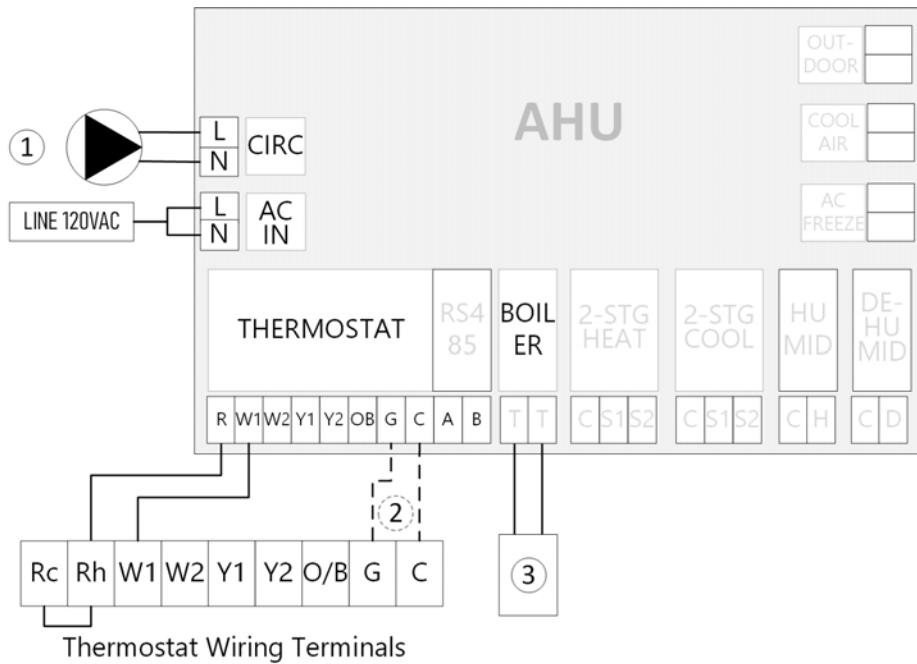
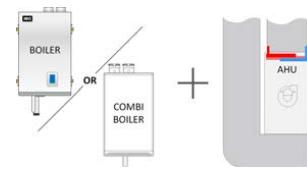
Worked examples:

1. [Wiring single-stage heating with a boiler or combi boiler on page 37](#)
2. [Wiring single-stage heating with a tankless water heater as a heat source on page 38](#)
3. [Wiring single-stage heating with boiler or combi boiler, and single-stage cooling on page 39](#)
4. [Wiring two-stage cooling with a boiler or combi boiler heating using a 2-stage thermostat on page 40](#)
5. [Wiring single-stage heat pump with a boiler or combi boiler as backup on page 41](#)
6. [Wiring single-stage heat pump with a boiler or combi boiler as backup \(emergency heat on T-stat\) on page 43](#)
7. [Wiring two-stage heat pump with a boiler or combi boiler as backup \(2-stage thermostat\) on page 45](#)
8. [Wiring two-stage heat pump \(2-stage thermostat\) on page 47](#)
9. [Wiring single-stage heating, single-stage cooling, with the tankless water heater as the heat source on page 49](#)
10. [Wiring two-stage cooling with a tankless water heater as a heat source on page 50](#)
11. [Wiring single-stage heat pump with a tankless water heater as a backup on page 51](#)
12. [Wiring two-stage heat pump with a tankless water heater as a backup on page 52](#)
13. [Wiring make-up air with a boiler or a combi as a heat source on page 53](#)

### **3.8.1 Tankless Mode**

Tankless Mode should always be chosen when a tankless water heater is a heat source. Tankless mode recognizes that when DHW is being drawn the water heater is in effect temporarily unavailable, so reduces the fan speed when outlet temperature drops.

### 3.8.2 Wiring single-stage heating with a boiler or combi boiler



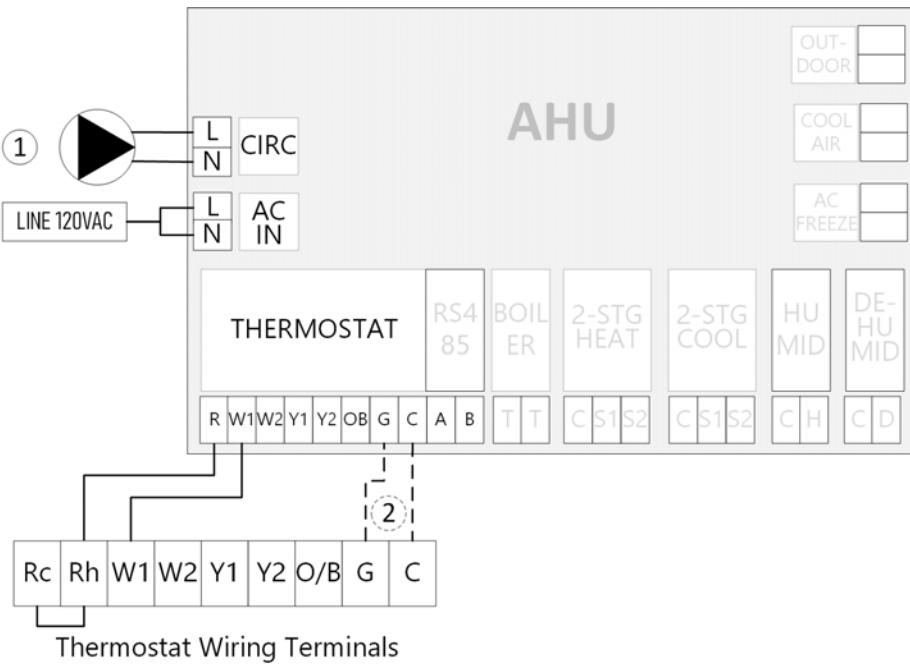
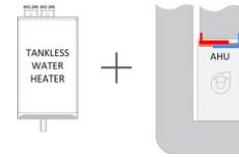
- ① Required if the boiler or combi does not have control of the pump.
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common.
- ③ Dry contact from the air handler to the boiler or combi boiler enables a call for heat.

Figure 40 Single-stage heating with a boiler or combi boiler wiring

#### Settings in the IBCconnect app

1. Tap (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**.
3. Set **Cool Mode** to **No Cooling**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.3 Wiring single-stage heating with a tankless water heater as a heat source



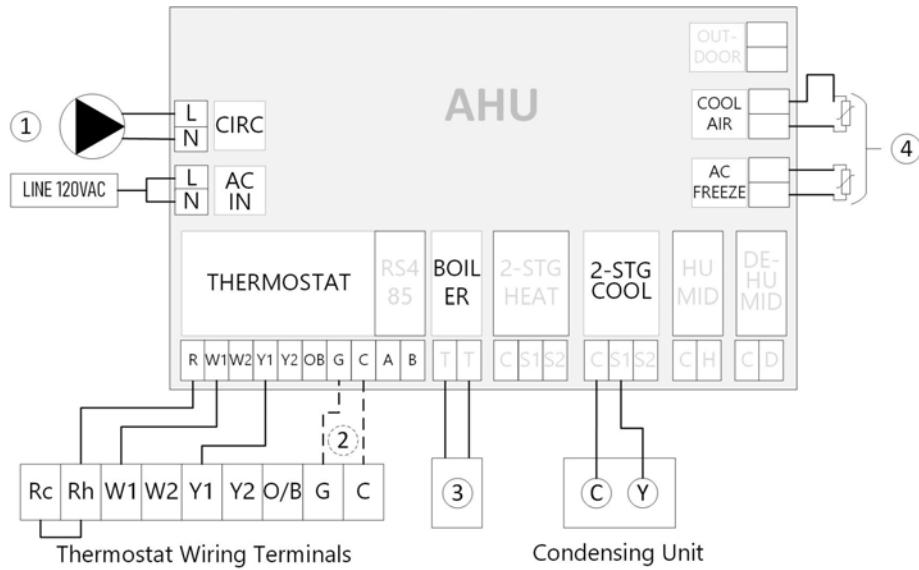
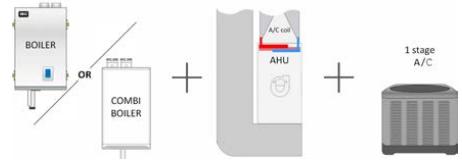
- ① **Required:** Pump initiates a call for tankless water heater heat source.
- ② **Optional:** 'G' for fan-only operation and 'C' for t-stat common.

Figure 41 Single-stage heating with a tankless water heater as a heat source wiring

#### Settings in the IBCconnect app

1. Tap (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**.
3. Set **Cool Mode** to **No Cooling**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.4 Wiring single-stage heating with boiler or combi boiler, and single-stage cooling



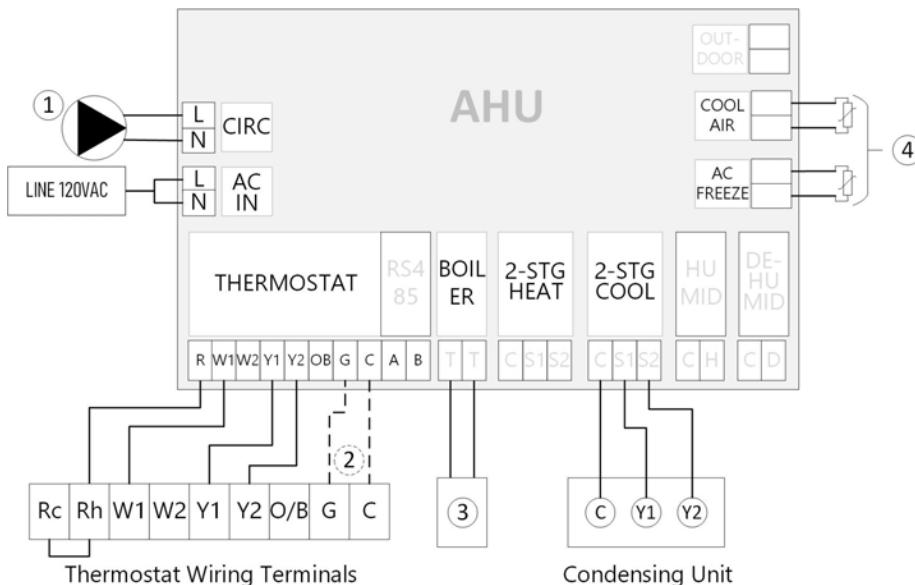
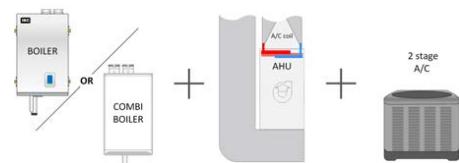
- ① Required if the boiler or the combi boiler does not have control of the pump.
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common.
- ③ Dry contact from the air handler that enables a call for heat to the boiler or combi boiler .
- ④ Required: sensors for cooling applications are available separately as IBC A/C sensor package [P-1015](#).

Figure 42 Single-stage heating with boiler or combi boiler, and single-stage cooling wiring

#### Settings in the IBCconnect app

1. Tap (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**.
3. Set **Cool Mode** to **1 Stage Cool**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.5 Wiring two-stage cooling with a boiler or combi boiler heating using a 2-stage thermostat



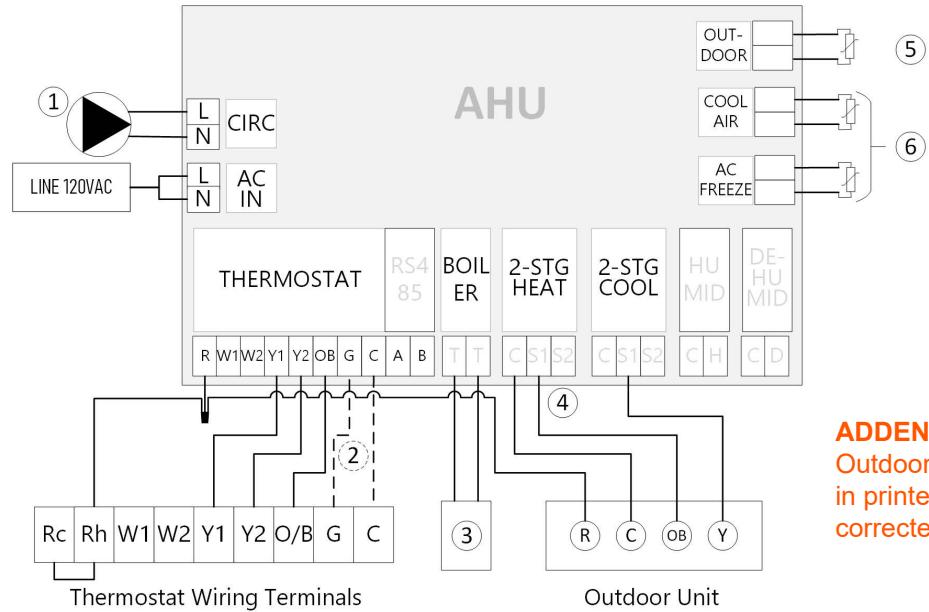
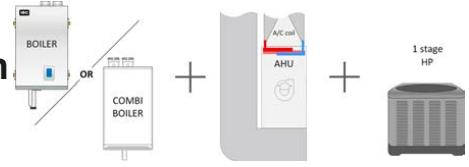
- ① Required if the boiler or the combi boiler does not have control of the pump
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ Dry contact from the air handler to the boiler or combi boiler that enables a call for heat
- ④ Required: sensors for cooling applications are available separately as IBC A/C sensor package [P-1015](#).

Figure 43 Two-stage cooling with a boiler or combi boiler heating using a 2-stage thermostat wiring

#### Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**.
3. Set **Cool Mode** to **2 Stage Cool**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.6 Wiring single-stage heat pump with a boiler or combi boiler as backup



- ① Required if the boiler or the combi boiler does not have control of the pump
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ Dry contact from the air handler to the boiler or combi boiler that enables a call for heat
- ④ The reversing valve operation is selectable with the AHU app: the default setting energizes the O/B terminal during cooling
- ⑤ Optional (because t-stat has control of staging): the outdoor sensor for balance point control of backup heat source is available separately as IBC outdoor sensor kit [P-9067](#).
- ⑥ **Required:** sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#)

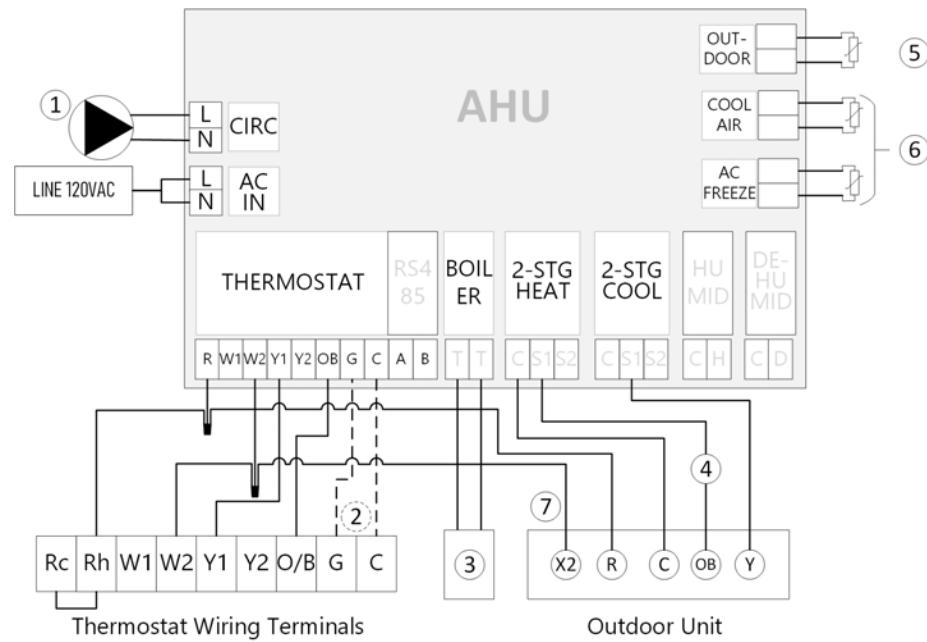
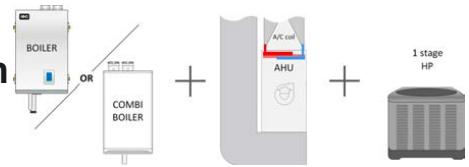
Figure 44 Single-stage heat pump with a boiler or combi boiler as backup wiring

See over

## Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **Stg 1 HP, Stg 2 Aux**.
3. Set **Cool Mode** to **1 Stage HP**.
4. Set **Boiler Heating** to **Boiler Backup**.
5. Set **Tankless Mode** to **Off**.
6. Tap **SAVE**.

### 3.8.7 Wiring single-stage heat pump with a boiler or combi boiler as backup (emergency heat on T-stat)



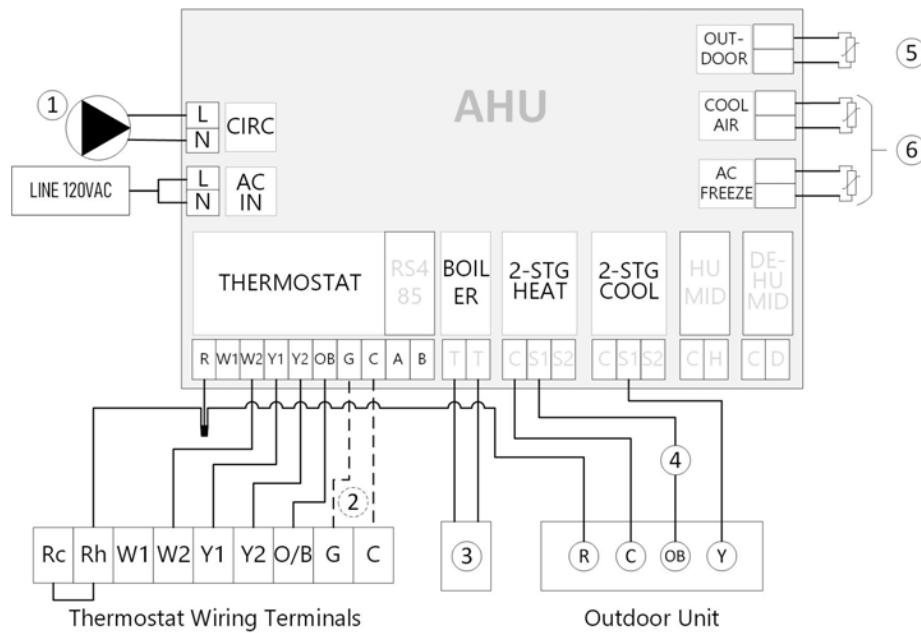
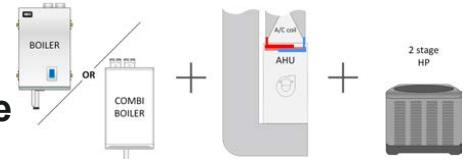
- ① Required if the boiler or the combi boiler does not have control of the pump
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ Dry contact from the air handler to the boiler or combi boiler that enables a call for heat
- ④ The reversing valve operation is selectable with the AHU app: the default setting energizes the O/B terminal during cooling
- ⑤ **Required:** the outdoor sensor for balance point control of backup heat source is available separately as IBC outdoor sensor kit [P-9067](#).
- ⑥ **Required:** sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#)
- ⑦ W2 call from T-stat activates the outdoor unit emergency heat

Figure 45 Single-stage heat pump with a boiler or combi boiler as backup, emergency heat on T-stat wiring

## Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **Stg 1 HP, Stg 2 Boiler**.
3. Set **Cool Mode** to **1 Stage HP**.
4. Set **Boiler Heating** to **Boiler Backup**.
5. Set **Tankless Mode** to **Off**.
6. Tap **SAVE**.

### 3.8.8 Wiring two-stage heat pump with a boiler or combi boiler as backup (2-stage thermostat)



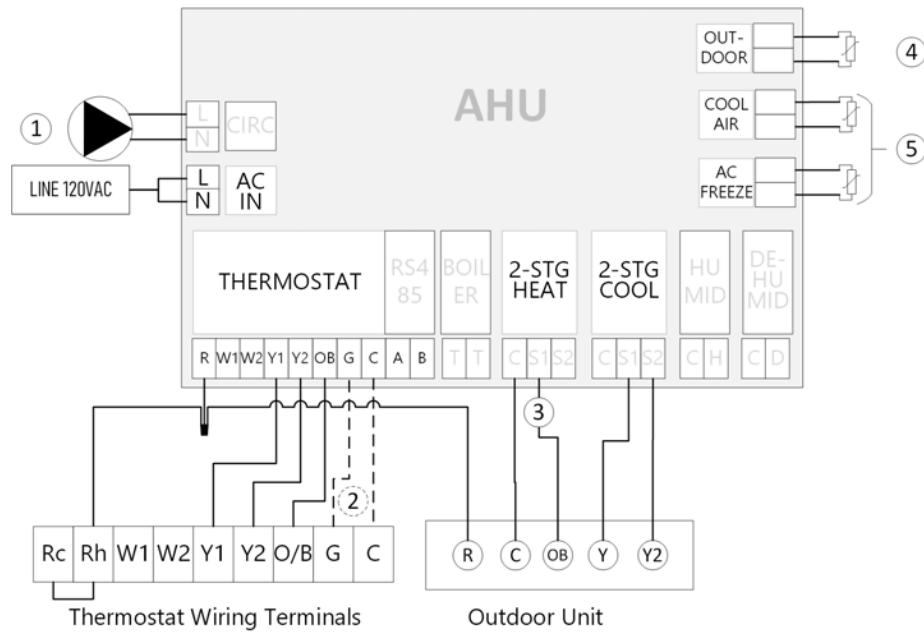
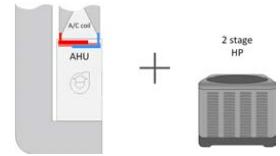
- ① Required if the boiler or the combi boiler does not have control of the pump
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ Dry contact from the air handler to the boiler or combi boiler that enables a call for heat
- ④ The reversing valve operation is selectable with the AHU app: default setting energizes O/B terminal during cooling
- ⑤ **Required:** outdoor sensor for balance point control of backup heat source is available separately as IBC outdoor sensor [P-9067](#).
- ⑥ **Required:** sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#)

Figure 46 Two-stage heat pump with a boiler or combi boiler as backup (2-stage thermostat) wiring

## Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **Stg 2 HP**.
3. Set **Cool Mode** to **2 Stage HP**.
4. Set **Boiler Heating** to **Boiler Backup**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.9 Wiring two-stage heat pump (2-stage thermostat)



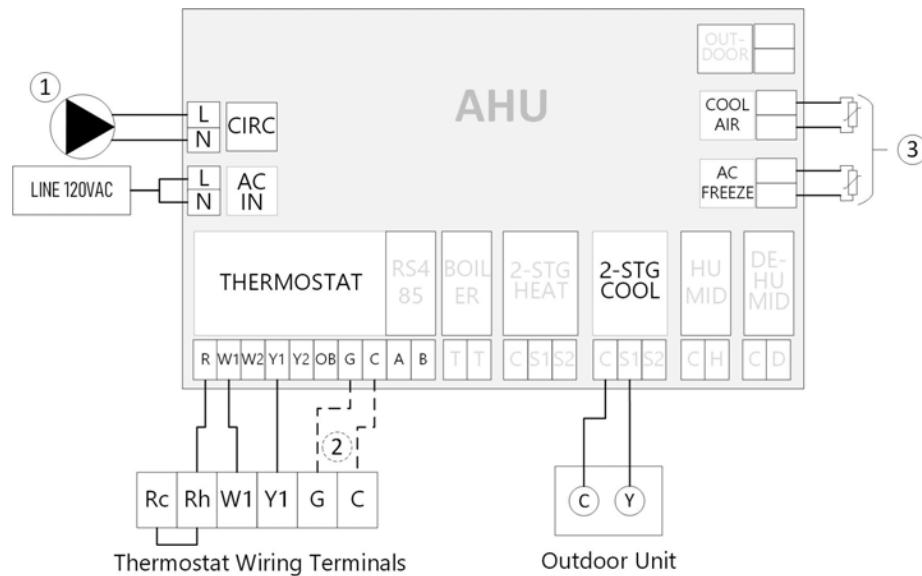
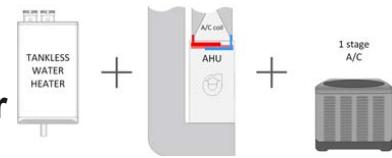
- ① Required if the boiler or the combi boiler does not have control of the pump
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ The reversing valve operation is selectable with the AHU app: default setting energizes O/B terminal during cooling
- ④ Optional: outdoor sensor reset heating is available separately as IBC outdoor sensor [P-9067](#).
- ⑤ **Required:** sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#)

Figure 47 Two-stage heat pump (2-stage thermostat) wiring

## Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **Stg 2 HP**.
3. Set **Cool Mode** to **2 Stage HP**.
4. Set **Boiler Heating** to **None**.
5. Tap **SAVE**.

### 3.8.10 Wiring single-stage heating, single-stage cooling, with the tankless water heater as the heat source



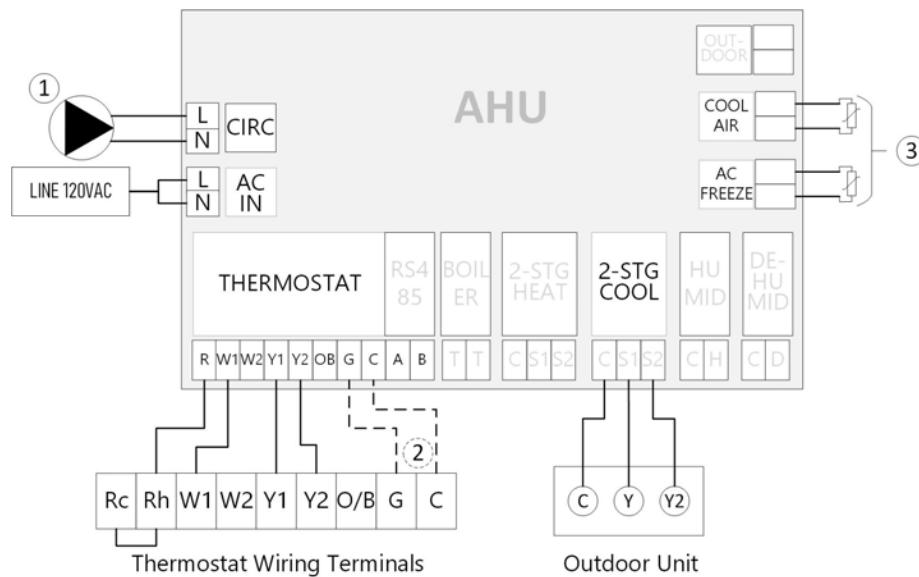
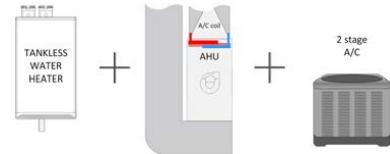
- ① **Required:** The pump initiates a call from the tankless water heater heat source.
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common.
- ③ **Required:** Sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#).

Figure 48 Single-stage heating, single-stage cooling, with the tankless water heater as the heat source wiring

#### Settings in the IBCconnect app

1. Tap (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**.
3. Set **Cool Mode** to **1 Stage Cool**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.11 Wiring two-stage cooling with a tankless water heater as a heat source



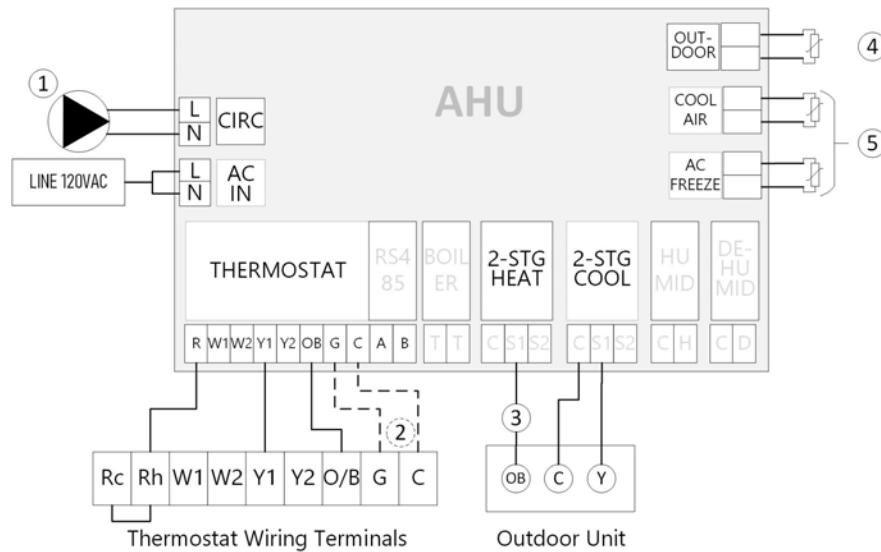
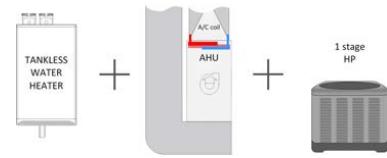
- ① Required: The pump initiates a call from the tankless water heater heat source.
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ Required: Sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#)

Figure 49 Two-stage cooling with a tankless water heater as a heat source wiring

#### Settings in the IBCconnect app

1. Tap (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**.
3. Set **Cool Mode** to **2 Stage Cool**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.12 Wiring single-stage heat pump with a tankless water heater as a backup



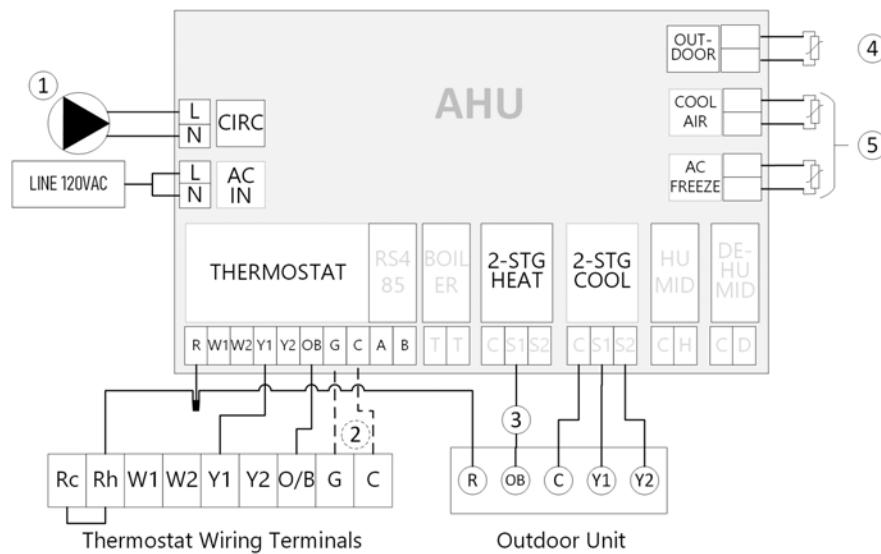
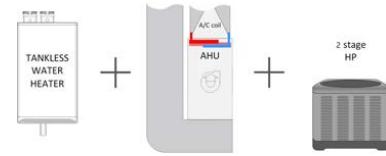
- ① **Required:** the pump initiates a call from the tankless water heater heat source as a backup.
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common.
- ③ The reversing valve operation is selectable with the AHU app: the default setting energizes O/B terminal during cooling.
- ④ **Required:** The outdoor sensor for balance point control of backup heat source is available separately as IBC outdoor sensor [P-9067](#).
- ⑤ **Required:** Sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#).

Figure 50 Single-stage heat pump with a tankless water heater as a backup wiring

#### Settings in the IBCconnect app

1. Tap (settings icon) for Basic Settings.
2. Set **Heat Mode** to **Stg 1 HP, Stg 2 Aux**.
3. Set **Cool Mode** to **1 Stage HP**.
4. Set **Boiler Heating** to **Boiler Backup**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.13 Wiring two-stage heat pump with a tankless water heater as a backup



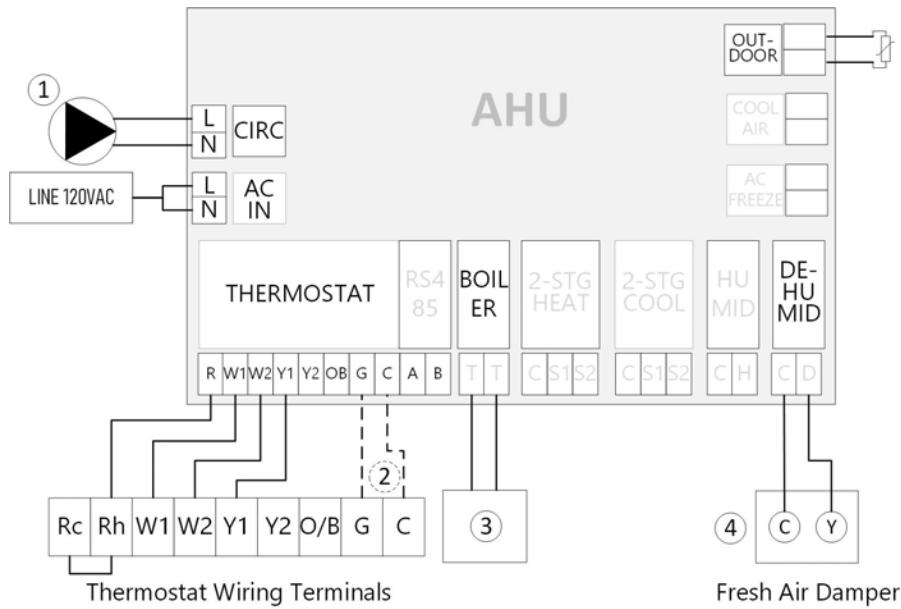
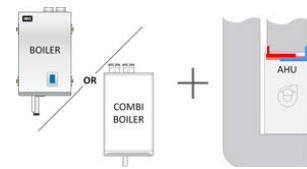
- ① **Required:** the pump initiates a call for tankless water heater as a backup.
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common.
- ③ The reversing valve operation is selectable with the AHU app: the default setting energizes O/B terminal during cooling
- ④ **Required:** The outdoor sensor for balance point control of backup heat source is available separately as IBC outdoor sensor [P-9067](#).
- ⑤ **Required:** Sensors for cooling applications are available separately as IBC A/C sensor kit [P-1015](#)

Figure 51 Two-stage heat pump with a tankless water heater as a backup wiring

#### Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **Stg 1 HP, Stg 2 Aux**
3. Set **Cool Mode** to **2 Stage HP**.
4. Set **Boiler Heating** to **Boiler Aux**.
5. Set **Tankless Mode** to **On**.
6. Tap **SAVE**.

### 3.8.14 Wiring make-up air with a boiler or a combi as a heat source



- ① Required if: boiler or combi does not have control of the pump
- ② Optional: 'G' for fan-only operation and 'C' for t-stat common
- ③ Dry contact from the air handler to the boiler or combi enables a call for heat
- ④ Fresh air damper wired to de-humidifier contacts, operation configured using the IBCconnect app
- ⑤ Required: for temperature control of Fresh Air Damper, the outdoor sensor is available separately as IBC outdoor sensor [P-9067](#).

Figure 52 Make-up air with a boiler or a combi as a heat source

## Settings in the IBCconnect app

1. Tap  (settings icon) for Basic Settings.
2. Set **Heat Mode** to **1 Stage Heat**
3. Set **Cooling** to **No Cooling**.
4. Set **Boiler Heating** to **Boiler Only**.
5. Select **Advanced Settings**.
6. Toggle **FA Damper** On.
7. Set **FA Damper Open T (°F)** to lowest Fresh Air temperature.
8. Tap **SAVE**.

## 4.0 Before operating the air handler

Once installation of the appliance is completed, and before operation, review the following checklists:

### Checking electrical conditions

### Check

Ensure the power supply to the air handling appliance is 120V 15A circuit.

The appliance is **not** designed to work with 208-240V. If connected to 208-240V, electrical damage will result, and the appliance or components may need to be replaced.

Check all line voltage electrical connections to ensure all connections are correct and tight.

Check thermostat connections.

Thermostat is in a suitable location.

If using a heat pump, consult the manufacturer's wiring instructions. Heat pumps producing their own control voltage will require isolation relays. See [Installation on page 19](#)

### Checking supply and return water piping connections

### Check

All connections are pressure tested and leak-free.

All piping flushed to ensure all air is removed.

Check valve is installed and the external pump is flowing in the correct direction.

Boiler / water heater is installed as per the manufacturer's instructions and is safe to operate.

### Checking ducting connections

### Check

All connections are pressure tested and leak-free.

All duct work is sized correctly and joints are sealed.

All supply air dampers and registers are opened.

Duct insulation is installed and sealed as required.

Inspect the filter, return air ducting and registers to ensure free air movement.

### Checking boiler / water heater settings

### Check

Ensure the water temperature to the heating coil is sufficient to meet the heating demands of the space.

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## 5.0 Operation

Once installation of the appliance is completed, and before operating the appliance, review the following guidelines:

### 5.1 Sequence of operation

Mode	Call From	Activity
Heating	Thermostat	<ul style="list-style-type: none"><li>» When there is a call for heat, R → W1 or W2 is energized; fan speed ramps up to the maximum value of its W1 or W2 range value.</li><li>» When an AHU is connected to a tankless water heater or boiler, the external pump is energized (pump relay is closed).</li><li>» When there is a boiler call for heat, the TT (boiler on Heat 1) contacts close. Once demand is satisfied, the TT contacts open to remove the call for heat. Then the fan operates for a further 45 seconds while the pump contacts operate for 30 seconds.</li></ul>
Cooling	Thermostat	<ul style="list-style-type: none"><li>» When there is a call for cooling, R → Y1 or Y2 is energized; fan speed ramps up to the maximum value of its Y1 or Y2 range value.</li><li>» If there is a heat pump, the O/B terminal is energized.</li><li>» Once demand is satisfied, the compressor S1 and / or S2 contacts open, and O/B is de-energized if there is a heat pump. The fan operates for a further 45 seconds.</li></ul>
Heat pump	Heat pump	<ul style="list-style-type: none"><li>» When there is a call for heat, R → Y1 or Y2 is energized whereas R → O/B remains de-energized. The operation of O/B can be changed in the IBCconnect app.</li><li>» The fan is energized and operates at Y1 or Y2 speed; operates a low speed for 60 seconds.</li><li>» Once demand is satisfied, the compressor S1 and / or S2 contacts open. The fan will continue to operate for 45 seconds.</li></ul>
Humidification		When the fan is running, and the humidifier is connected, the AHU will activate the humidifier as required.
De-		When the fan is running, and the dehumidifier is connected,

Mode	Call From	Activity
humidification		the AHU will activate the dehumidifier as required.
Cold Air Sentry	Return air temperature sensor	<ul style="list-style-type: none"> <li>» Cold Air Sentry mode monitors the return air temperature into the air handling appliance.</li> <li>» If the internal return air temperature sensor detects a return air temperature below 41 °F, the air handling appliance will energize the fan, the pump contacts, and the TT (boiler) contacts to create a call for heat. When the return air temperature increases to 46 °F or more the air handling appliance will turn off the fan, TT (boiler) contacts, and pump contacts.</li> </ul>
		<ul style="list-style-type: none"> <li>» If the internal return air temperature sensor detects a return air temperature below 35 °F, the air handling appliance will turn off the fan, and continue to energize TT (boiler) contacts and pump contacts.</li> </ul>

## 5.2 Status indicators

The appliance displays four LED indicators, each representing an operating status.

POWER (Green background)	FAULT (Red background)	HEAT (Green background)	COOL (Green background)		
State	LED(s)			Description	
Standby	<b>POWER</b>	<b>FAULT</b>	<b>HEAT</b>	<b>COOL</b>	LEDs blink on and off
Heating	<b>POWER</b>		<b>HEAT</b>		LED displays a steady state.
Cooling	<b>POWER</b>			<b>COOL</b>	LED displays a steady state.
Fan only (G)	<b>POWER</b>		<b>HEAT</b>	<b>COOL</b>	Short synchronized flashing.
Warning	<b>POWER</b>	<b>FAULT</b>			LED flashes on. The appliance will continue to operate; however, certain operations may not function correctly.
Fault	<b>POWER</b>	<b>FAULT</b>			LED displays a steady state. The appliance will not service heat or cooling calls.
Connected to app	<b>POWER</b>	<b>FAULT</b>	<b>HEAT</b>	<b>COOL</b>	Each LED blinks on and off twice repeatedly.

**Table 14** Status indicators

## 5.3 Operating the air handler using the IBCconnect app

All air handlers come configured with default factory settings. To program the air handler, you will need to download the IBCconnect app to a tablet or smartphone. IBC's free mobile app "IBCconnect" (Android or iOS app) enables users to monitor and adjust default settings in a single air handling appliance. This app is **compatible only** with Android and iOS devices.



### Note

Alternatively, it's possible to change settings using a USB stick with a custom configuration text file. Using a USB with a custom text file is the best approach for configuring multiple air handlers that will use the same settings (see [Configuring settings and parameters via a USB text file on page 70](#)).

### 5.3.1 Downloading the IBCconnect app



Scan the respective QR codes above, or search for "IBCconnect" (one word) on the Google Play or Apple App store and tap **Install**.

### 5.3.2 Connecting through the app

With blue control boards in production as of May 2025 :

You can connect the app on your device to the air handler through WiFi. Future versions will also include a Bluetooth connection option.

#### Connecting through WiFi - Android

You can connect your device to the air handler through the app's WiFi network settings.



### Note

While your device is connected to the air handler WiFi, you will not have internet access.

Tip: We recommend setting the WiFi connection to 'Low Data Mode' while using the app.

If the WiFi connection is unstable, see [Unstable WiFi connection on page 85](#) in the manual.

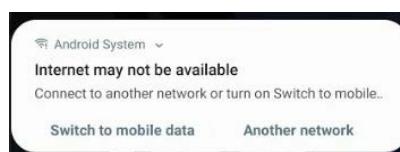
1. Open the app.

If the WiFi connection is not displayed as IBC-AHU2, tap the **WiFi SETTINGS** button.

The WiFi network screen appears. The air handler will appear in the device's list of WiFi available networks as "IBC-AHU2-xxxxx", where "xxxxx" is the serial number of the controller in the AHU. If there are multiple AHUs in the area, select the ID that matches the ID printed on the sticker on the controller you want to connect to.

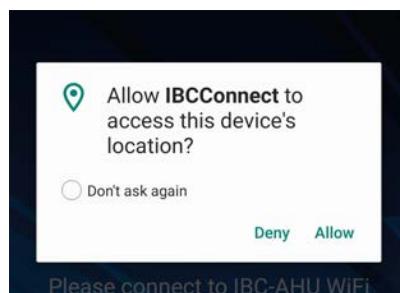
2. Select **IBC-AHU2-xxxxx** (where "xxxxx" is the controller serial number).
3. Enter **1234567890** when prompted for a password.

Depending on the version of Android your device has, after a few seconds you may see a warning, as shown below. You can ignore this.



With the air handler cover removed, observe that the circuit board LEDs will start blinking simultaneously in a **○-○---** pattern when connected.

An Android prompt may request that you make your device's location discoverable.



If prompted to make your device location discoverable, tap **Allow** and then **OK** to grant permission.

4. If prompted, do not check the "Don't ask again for this network"; the device will likely default to "NO" for staying connected if this is selected.
5. Tap the device's back button to return to the app, then tap **GET STARTED** to begin adjusting settings.



#### Note

Once you have finished using the app, remember to disconnect from the air handler WiFi.

## Connecting with WiFi - Apple

You need to first change some app settings after installation. This may vary depending on device and iOS version.

1. In the main iPhone settings, select **Cellular**.
2. Navigate to the device's **WiFi Settings**.
3. Locate and select the -xxx WiFi.

The air handler will appear in the device's list of WiFi Access Points as "IBC\_AHU2-xxxxx", where "xxxxx" is the serial number of the controller in the air handler. If there are multiple units in the area, the appliance with the strongest signal will likely be the controller you want to connect to.

4. Select **IBC-AHU2-xxxxx**.
5. Enter **1234567890** when prompted for a password.

With the air handler cover removed, observe the circuit board LEDs blinking simultaneously in a **○-○---** pattern when connected.

6. Exit from the "Setting" screen and open the app.
7. Check your device is connected to the AHU-HC-xxxx WiFi connection.
8. If prompted, do not check the "Don't ask again for this network"; the device will likely default to "NO" for staying connected if this is selected.
9. Tap **GET STARTED** to begin adjusting settings.



### Note

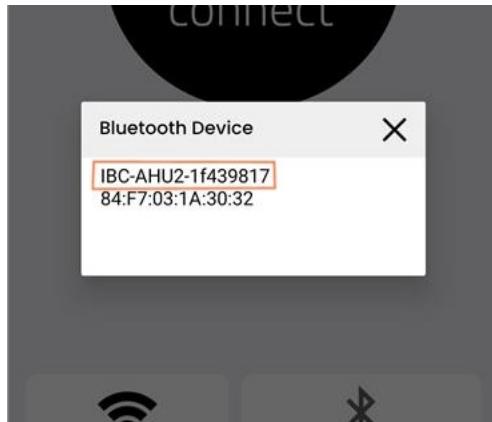
Once you have finished using the app, remember to disconnect from the air handler WiFi.

## Connecting through Bluetooth (not available with app version 2.1)

On the app startup screen, press the Connect Bluetooth icon.



A pop-up will appear with scanned nearby devices. Choose the Bluetooth ID beginning with "IBC-AHU2."



Tip: If the scan detects more than one AHU HC, select the ID that matches the ID printed on the control board sticker.

A pop-up will ask you to confirm the connection: press **Pair**.

The **Connect Bluetooth** tile will become active (green text). Tap again to open the app.

## 5.4 Operational settings in the app

When the app launches, the status page will be shown first. To select one of the following options:

- » Basic Settings (defaults)
- » Advanced Settings
- » Advanced Status

## 5.4.1 Basic settings

The following table shows the factory-default settings.

Setting	Default	Description
Heat Mode	2 Stage Heat	<p>Set heating mode. Options:</p> <ul style="list-style-type: none"> <li>» No heating</li> <li>» 1 Stage Heat</li> <li>» 2 Stage Heat</li> <li>» Stg 1 HP, Stg 2 Aux</li> <li>» 2 Stage Heat Pump</li> </ul>
Cool Mode	1 Stage Cool	<p>Set cooling mode. Options:</p> <ul style="list-style-type: none"> <li>» No Cooling</li> <li>» 1 Stage Cool Only</li> <li>» 2 Stage Cool Only</li> <li>» 1 Stage Heat Pump</li> <li>» 2 Stage Heat Pump</li> </ul>
Boiler Heating	Boiler/Aux Backup	<p>Set boiler heating mode. Options:</p> <ul style="list-style-type: none"> <li>» None</li> <li>» Boiler/Aux Backup</li> <li>» Boiler Only</li> </ul>
Temperature	Fahrenheit	<p>Set temperature format. Options:</p> <ul style="list-style-type: none"> <li>» Fahrenheit</li> <li>» Celsius</li> </ul>
Tankless	Off	<p>Set tankless water heater mode.</p> <ul style="list-style-type: none"> <li>» Toggles On / Off</li> </ul>

## 5.4.2 Advanced settings

Certain Advanced settings are available only after modes have been set up in Basic settings.

Setting	Default	Description
Pump Enabled	On	Set to off, if no pump connected to AHU.

Setting	Default	Description
Pump Exercise Interval (hours)	24	Circulates water in coil every (set) hours; set per local code
Pump Exercise Duration (sec)	60	Circulates water in coil for (set) seconds; set per local code
Pump Off Delay (sec)	0	After call for heat is satisfied, run pump for (set) seconds
Fan Off Delay (sec)	45	After call for heat is satisfied, run fan for (set) seconds
Fan Only CFM	Varies by model. See <a href="#">Fan speed operation on page 66</a>	Fan circulation mode only
Heat Stage 1 CFM	Varies by model. See <a href="#">Fan speed operation on page 66</a>	Fan circulates in heat mode
Heat Stage 2 CFM	Varies by model. See <a href="#">Fan speed operation on page 66</a>	Fan circulates in heat mode
AC/HP Stage 1 CFM	Varies by model. See <a href="#">Fan speed operation on page 66</a>	Fan circulates in cool mode
AC/HP Stage 2 CFM	Varies by model. See <a href="#">Fan speed operation on page 66</a>	Fan circulates in cool mode
Stage Delay (min)	10	The minimum time a heating or cooling stage will run for before engaging the second stage.
Minimum Cycle Time (min)	0	The minimum run time for a heating or cooling call.
Compressor Delay (min)	2	Delay in xx (minutes) to allow compressor pressures to equalize. If time delay in thermostat is enabled, then this value can be set to '0'.

Setting	Default	Description
Heated Air Target (°F)	109	Fan speed ramps up based on supply air temperature. e.g., higher target gives higher fan speed. If Tankless mode is selected, the fan can modulate below the stage 1 and 2 speeds.
Cooled Air Target (°F)	55	Fan speed ramps up based on supply air temperature. e.g., lower target gives higher fan speed. If Tankless mode is selected, the fan can modulate below the stage 1 and 2 speeds.
S1 O/B Control	O/B Cool (Energized for cooling)	Reversing valve is energized for heating or cooling based on the setting.
Heat Pump Balance Point (°F)	14	Calculated based on building heat loss and selected heat pump.
Static Pressure (inches WC)	0.5	Based on the ducting system design. Cannot be adjusted on LV (low velocity) models.
Humidifier	Off	Sends 24V to activate the humidifier. Activates based on the return air sensor.
Dehumidifier	On	Sends 24V to activate the dehumidifier. Activates based on the return air sensor.
Humidity Minimum (%)	15	Based on the humidity sensor in the return air.
Humidity Maximum (%)	45	Based on the humidity sensor in the return air.
FA Damper	Off	Fresh air damper.
FA Damper Open T (°F)	41	Temperature to open fresh air damper. Uses the dehumidifier contact. Based on the outdoor sensor.
Cold House Sentry	On	Maintains the minimum ambient temperature inside the house.
Network ID	0	For future development

### 5.4.3 Advanced status

The Advanced Status values will vary based on the current system settings and operating conditions. See [Advanced settings on page 63](#) for detailed descriptions for each status.

Advanced status - System Feedback	
Mode	AC/HP Air Temp (°F)
Pump On	AC/HP Coil Temp (°F)

Advanced status - System Feedback	
Fan RPM	Dehumidifier Temp (°F)
Fan CFM	Dampers Open
Outdoor Temp (°F)	Humidity Target %
Inlet Temperature (°F)	Humidity Actual %
Outlet Temperature (°F)	Barometer (inHg)
Return Air Temp (°F)	Cold House Sentry
Outlet Air Temp (°F)	
Call Status*	
W1 <input type="checkbox"/> W2 <input type="checkbox"/> Y1 <input type="checkbox"/> Y2 <input type="checkbox"/> G <input type="checkbox"/>	

\*A check box will display to indicate a call for heating and cooling, stage 1 or 2.

## Fan speed operation



### Note

For safety reasons, a switch is built into the door. The switch prevents the fan from operating if the door is not installed. With the door removed, the appliance's control board will remain powered, enabling programming of the mobile app.

For fan speed defaults and ranges, see the table below:

Fan Speed Operation		
Voltage Terminal	Description and Defaults	Range (CFM)
<b>AHU 800</b>		
W1	Heating stage 1 = 500 CFM	150–1000
W2	Heating stage 2 = 800 CFM	150–1000 (must be $\geq$ 1 Stage Heat)
Y1	Cooling stage 1 = 700 CFM	150–1000
Y2	Cooling stage 2 = 1000 CFM	150–1000 (must be $\geq$ AC/HP Stage 1)
G	Fan on speed = 200 CFM	150–1000
<b>AHU 1200 LV</b>		
W1	Heating stage 1 = 600 CFM	180–1200
W2	Heating stage 2 = 1000 CFM	180–1200 (must be $\geq$ 1 Stage Heat)
Y1	Cooling stage 1 = 800 CFM	180–1200
Y2	Cooling stage 2 = 1200 CFM	180–1200 (must be $\geq$ AC/HP Stage 1)

Fan Speed Operation		
Voltage Terminal	Description and Defaults	Range (CFM)
G	Fan on speed = 240 CFM	180–1200
<b>AHU 1200</b>		
W1	Heating stage 1 = 600 CFM	180–1200
W2	Heating stage 2 = 1000 CFM	180–1200 (must be $\geq$ 1 Stage Heat)
Y1	Cooling stage 1 = 800 CFM	180–1200
Y2	Cooling stage 2 = 1200 CFM	180–1200 (must be $\geq$ AC/HP Stage 1)
G	Fan on speed = 240 CFM	180–1200
<b>AHU 1600</b>		
W1	Heating stage 1 = 1000 CFM	240–1600
W2	Heating stage 2 = 1400 CFM	240–1600 (must be $\geq$ 1 Stage Heat)
Y1	Cooling stage 1 = 800 CFM	240–1600
Y2	Cooling stage 2 = 1600 CFM	240–1600 (must be $\geq$ AC/HP Stage 1)
G	Fan on speed = 400 CFM	240–1600
<b>AHU 2000 LV</b>		
W1	Heating stage 1 = 1200 CFM	300–2000
W2	Heating stage 2 = 1800 CFM	240–2000 (must be $\geq$ 1 Stage Heat)
Y1	Cooling stage 1 = 1500 CFM	300–2000
Y2	Cooling stage 2 = 2000 CFM	240–2000 (must be $\geq$ AC/HP Stage 1)
G	Fan on speed = 500 CFM	240–2000 (must be $\geq$ AC/HP Stage 1)

**Table 15** Fan speed operation

## 5.5 Programming the air handler

The IBC factory pre-programs the name of the model in the appliance. You will need to set up the mode before you can make changes to settings. Settings must be saved by pressing the **Save** button after changes are made.

### 5.5.1 Setting the mode

To set the mode using the IBCconnect app:

1. Tap  (settings icon) for Basic Settings.
2. Set the mode(s) that apply. For example, if you are connecting the air handler:
  - » With a heat pump for heating, select either 1 or 2-stage heating.
  - » With a heat pump for cooling, select either 1 or 2-stage cooling.
  - » With a boiler for heating, select Boiler Heating.
  - » With a tankless, select On.
3. (optional) To change the default temperature unit to Imperial, tap Fahrenheit (toggles to Celsius).
4. Tap **SAVE**.

Once you have set the mode(s), you can adjust each parameter in detail under  > **Advanced Settings**.

### 5.5.2 Adjusting the default settings/parameters

Before adjusting the settings, ensure that you have previously set up a Mode.

1. Tap  (settings icon), then select **Advanced Settings**.

We recommend setting "Tankless" to "On" in most applications for optimal performance.

2. Configure settings as desired (or accept defaults), and then tap **SAVE**.

### 5.5.3 Setting the static pressure



#### Note

The static pressure cannot be adjusted for LV (low velocity) models.

IBC's air handlers are set up with a default of 0.5" WC low static pressure. Aside from the LV (low velocity) models, you can adjust the static pressure for other models to optimize the air flow of the fan. For rated static pressure per model, see [Advanced settings on page 63](#).

### 5.5.4 Setting the reversing valve

The settings for the reversing valve is displayed as **S1 O/B Control** under **Advanced Settings**.

IBC's air handlers are energized for cooling (O/B Cool) as a default. Some heat pumps have different setting requirements; check with your heat pump manufacturer to determine the setting.

### 5.5.5 Checking the Call status

To check if the fan is operating when there is a call for heating or cooling:

1. Tap  (status icon), then select **Advanced Status**.
2. Go to **Call Status**. A check mark is displayed in one of the boxes to indicate a call for heating or cooling (stage 1 or 2).

### 5.5.6 Connecting to another air handler on the network

If you want to connect to another air handling appliance, on the landing page tap the **WiFi SETTINGS** button, and choose the required AHU WiFi connection. To return to the landing page, exit the app, and then reopen it.

### 5.5.7 Finding the model number



To find the air handler model number, tap  (settings icon), and then select **About**.

### 5.5.8 Checking the software version



To view the software version for the air handler, tap  (settings icon) and then select **About**.

About	
Model	1
Rated Blower CFM	1000
ESN	00009
Hardware Version	A
Firmware Version	1.04a
Bootloader Version	1.01
Wifi SW Version	1.7.0.0
Application Version	---
Wifi IP	0.0.0.0
Ethernet IP	0.0.0.0

## 5.6 Updating the software version

The AHU software update process is in three steps::

1. **Download the software to a USB. Unzip the folder.**
  - a. Go to IBC Technical Information pages and select the tab *Software Update > AHU series Air Handlers*. You will see a *Download* button that allows you to save a zipped folder to your computer.
  - b. Unzip the folder. You will use the .mfw inside (not the folder).
2. **Copy the file to the USB stick:**
  - a. Place a high-quality USB stick in your computer and note the drive letter (for example, **D:\**). It must be formatted in FAT 32. (It must *not* be NTFS enabled or formatted.)
  - b. Copy the .mfw file to the stick's root directory.
3. **Take the USB to the AHU site, insert it into the top side of the AHU board, and update the software:**
  - a. The controller should be in "Standby"
  - b. Insert the flash drive into the controller.
  - c. The three status LEDs should come on solid.
  - d. When all three status LEDs start blinking simultaneously, remove the flash drive.
  - e. The controller will then reboot, and is ready to go again.

## 5.7 Configuring settings and parameters via a USB text file

For large projects with multiple AHU appliances, settings and parameters can be saved and quickly applied across each appliance using a USB stick.

You can change and customize the default settings in one or more air handlers via a single .config ASCII text file labeled "ahusetup.cfg". Note that file name for the configuration file must be in lowercase. The custom text file can be placed on a USB stick and inserted into each air handling appliance. To obtain a custom text file, contact [IBC Technical Support](#).

```
UnitID=IBC-AHCU-150
HeatMode=2
CoolMode=2
PumpEnabled=1
Tankless=0
FanOnlyMin=20
FanMin1=50
FanMin2=80
Humidifier=0
DeHumidifier=0
FreezeGuard=1
OpenTherm=0
Zones=1
CompressorDelay=240
DesignMin=-15
DesignMa=35
FanOffDelay=60
```

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## 6.0 Service and maintenance

The IBC air handling appliance is designed for durability and easy access to the main components: fan assembly, hot water coil assembly and control board. Over time, components such as sensors may require replacing and servicing. Note that failure to use the correct procedures or parts could result in unsafe operation.

### 6.1 Maintenance checklist for owners

Owners should arrange follow-up inspections and simple maintenance procedures according to IBC's suggested servicing guidelines below.

Maintenance Required	Frequency	Check
Check and replace filter as needed. Replace the filter monthly. Inspect system for unusual noises. Call your local heating contractor for service if needed.	Monthly	<input type="checkbox"/>
Have your local heating contractor inspect the system annually. This service should include the heat appliance connected to the Air Handling appliance.	Annually	<input type="checkbox"/>

### 6.2 Maintenance checklist for service contractor

Maintenance Required	Frequency	Check
Check and replace filter as needed.	As needed	<input type="checkbox"/>
Check the condition of the fan.	Annually	<input type="checkbox"/>
Check the condition of the heating coil	Annually	<input type="checkbox"/>

### 6.3 Maintenance for the heating contractor

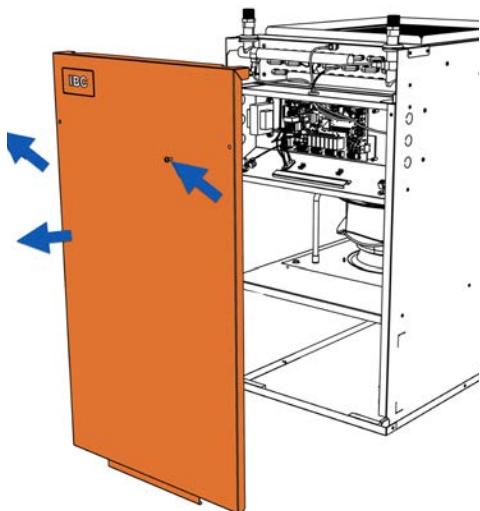
#### 6.3.1 Removing the fan assembly



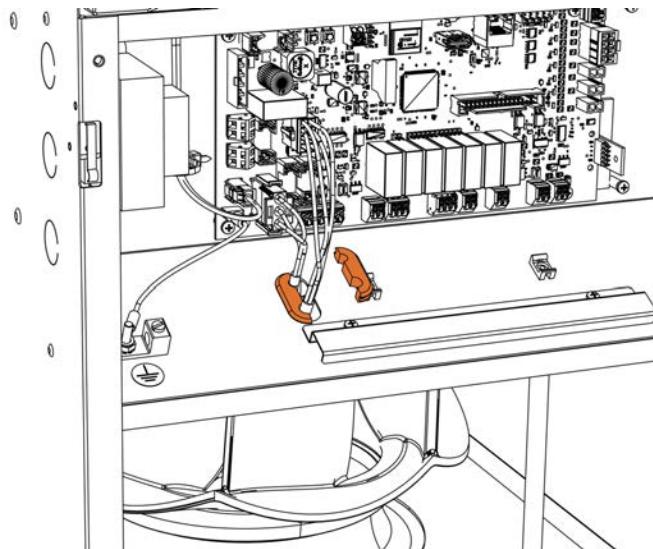
##### Warning

Before performing the above procedure, turn off the power to the air handler.

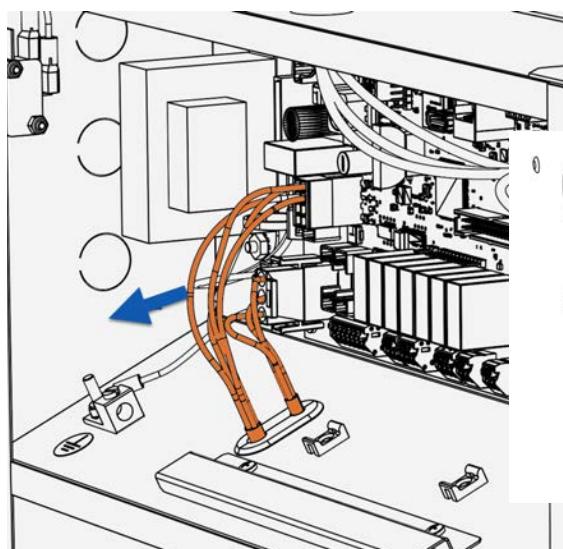
**1.** Remove the two screws from the front cover, and set aside.



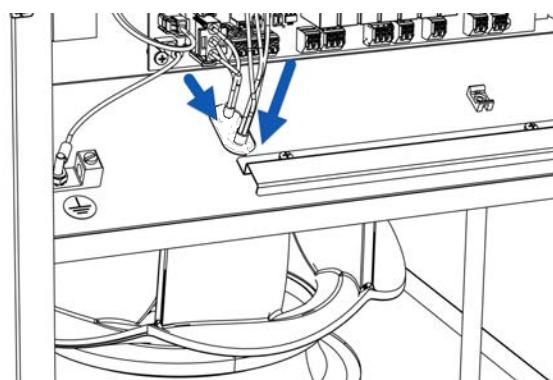
**2.** Remove the grommet around the electrical wires.



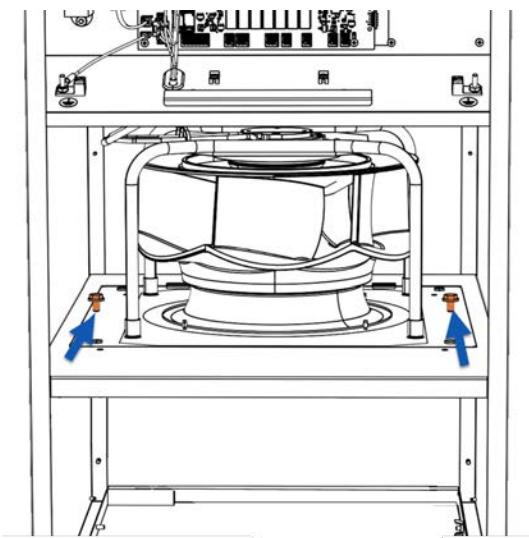
**3.** Disconnect the fan electrical wires from the control board.



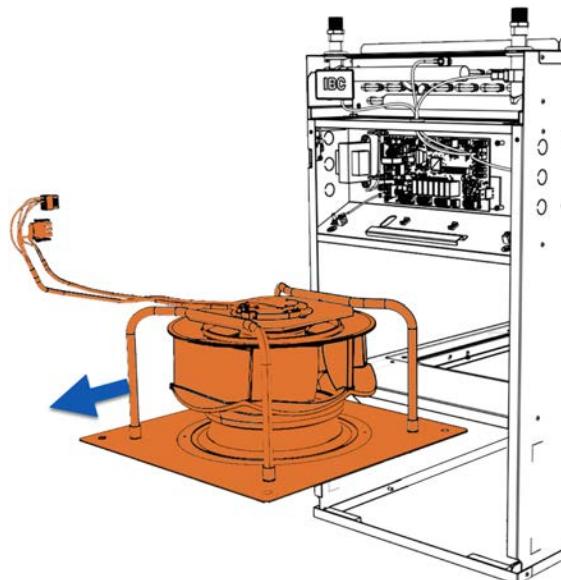
**4.** Thread the wires through the grommet hole.



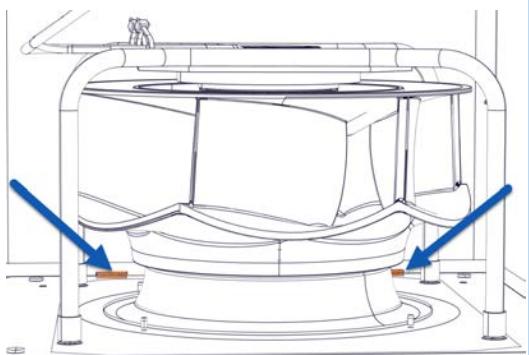
**5.** Remove the bolts and washers securing the fan to the air handler.



**6.** Tilt up the front edge of the fan and slide it out.



**7.** When installing the new fan, ensure that the back edge of the fan base slides into the tabs.



**8.** Reinstall components in the reverse order.



#### Note

When you install the replacement fan assembly:

- » Ensure that you install the fan assembly, so that the fan cables can reach the control board, that is, the cables are positioned towards the front left of the fan assembly.
- » Reinsert the split fan grommet correctly. See images below.



Note large and small holes.



### 6.3.2 Replacing the heating coil in the air handler

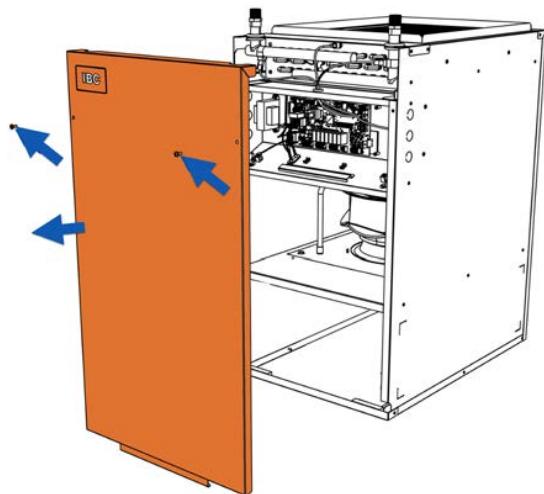


#### Warning

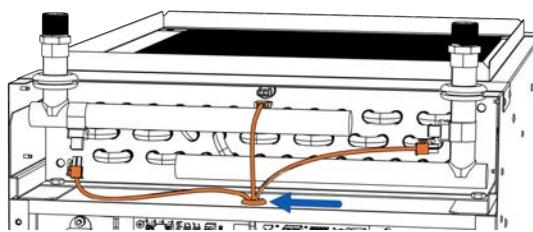
Before performing the above procedure:

- » Turn off the electric power.
- » Close off the isolation valves for the water lines to the water heater, and drain.
- » Disconnect the water lines from the coil.

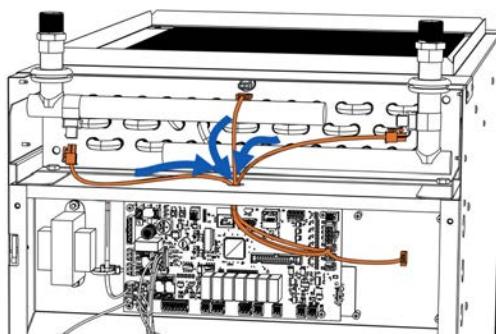
**1.** Remove the two screws from the front cover, and set aside.



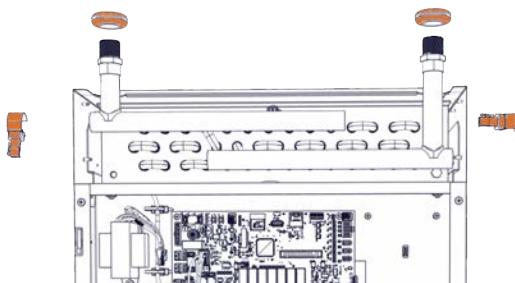
**2.** Carefully unclip each of the sensor wires, and then remove the grommet holding the wires in position.



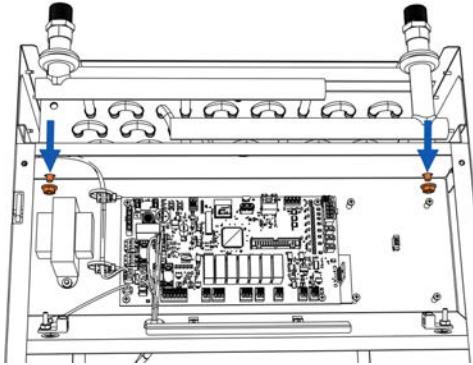
**3.** Carefully thread the sensor wires through the grommet hole.



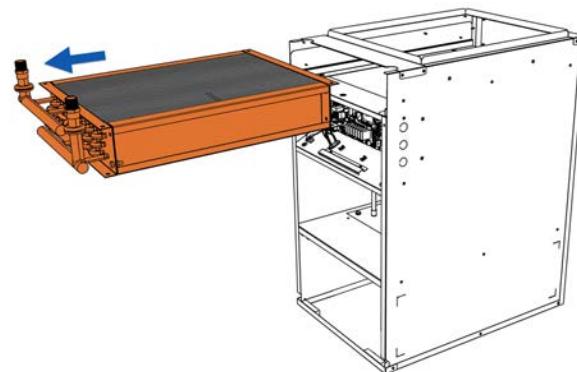
**4.** Remove the rubber grommets from the coil inlet and outlet pipes, and then remove the temperature sensor clips.



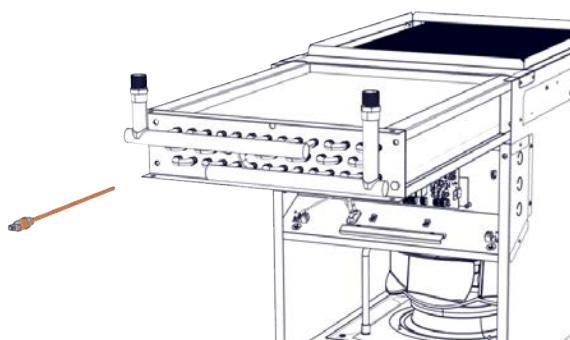
**5.** Remove the bolts from under the chassis.



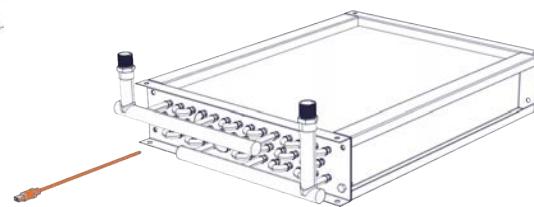
**6.** Slide out the hot water coil.



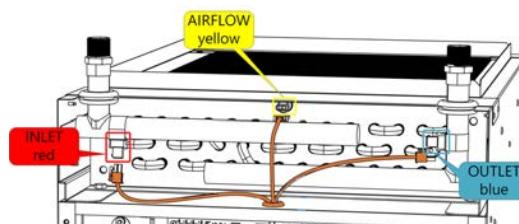
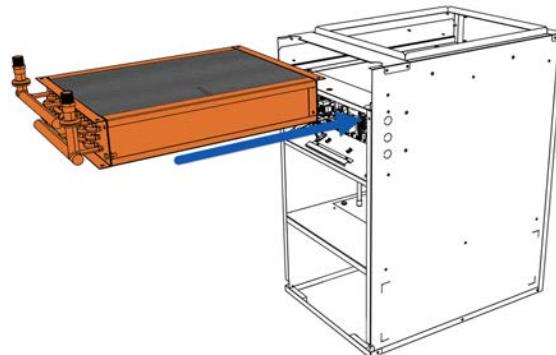
**7.** Remove the temperature probe.



**8.** Insert the temperature probe into the new hot water coil.



**9.** Replace the new heating coil, and reassemble parts in the reverse order.

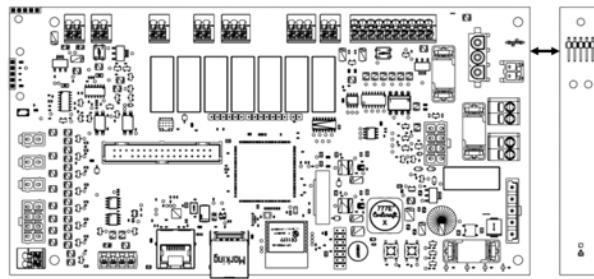


### 6.3.3 Replacing the control board

After you replace the control board in the appliance, you will need to program some settings using the IBCconnect app.

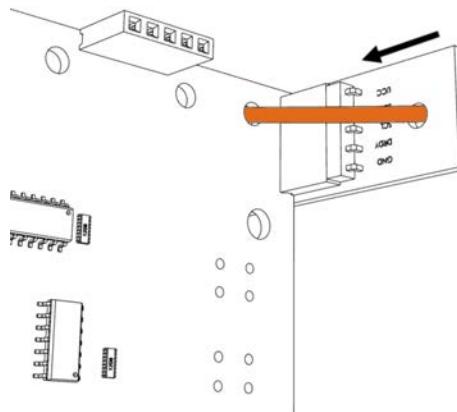
#### To replace the control board:

1. Unplug all the connectors from the control board.
2. Remove the four screws securing the control board to the appliance, and set them aside for the replacement board.
3. Place the replacement board on a flat surface, and using a scoring knife, score a straight line between the main board and the humidity sensor strip. The strip should snap off by hand, without force.



*Figure 53 Separating the humidity sensor strip from the main replacement board*

4. Insert the humidity sensor strip into the board's 5-pin connector (see below), and secure the strip with a plastic zip tie.



*Figure 54 Inserting the humidity sensor strip and securing with a cable tie*

5. Guide the humidity sensor through the heat exchanger gasket and insert the sensor and board into place. Secure the replacement board with the four screws.

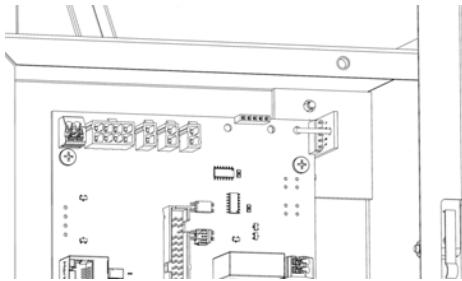
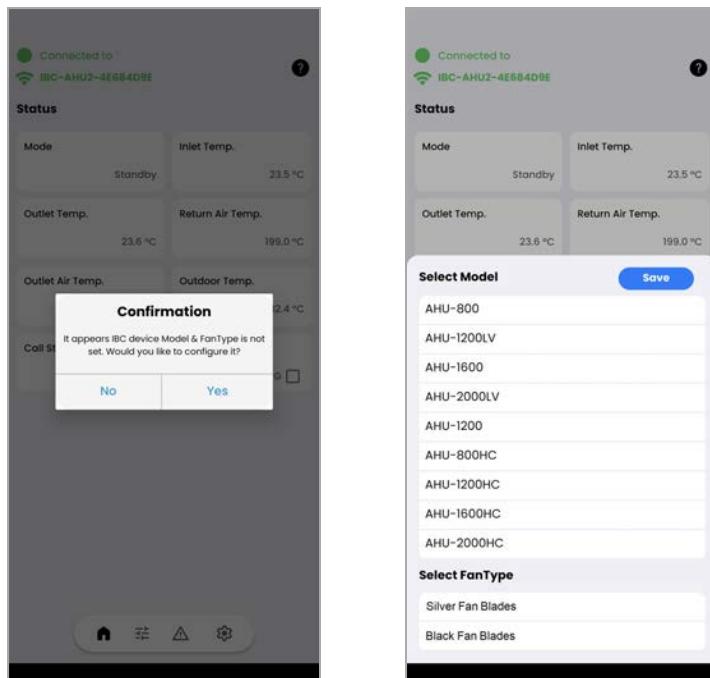


Figure 55 Putting the replacement board into place

6. Plug in all connectors (temperature sensor from the coil, connector for the transformer, connector for fan power, connector for fan control, connector to the door switch, and the ground wire connector).

Now you must use the air handler app to program the model name, mode, and change default settings (if desired).

7. To set the model, mode, and to configure settings:
  - Open the app on your phone.



- b. The app will ask whether you're ready to configure. Respond **Yes**.

- c. From the **AHU** dropdown, select the model.
- d. Select the **Fan Type** by colour, **Black Fan Blades** or **Silver Fan Blades** (metallic).
- e. Select **SAVE**.

After saving, the controller will restart.

- f. Close the app, and then open it again.

For information on setting the cooling and heating mode and other settings, see [\*Programming the air handler on page 67\*](#).

## 6.4 Temperature sensors

The resistance of the temperature sensors varies inversely with temperature. You need to measure the temperature of the sensed environment compared with the value from the measurement of the resistance (obtained by connecting a good quality test meter capable of measuring up to 100 kΩ at the controller end of the sensor lead).

To obtain a resistance reading, remove power to the boiler. Remove the wire leads by disconnecting their respective Molex connectors from the sensor(s) in question. Place multi-meter probes into the sensor's female Molex connector socket. Do not apply voltage to the sensor - damage may result.

Temp. °F/°C	Resist. Ω – Ohm	Temp. °F/°C	Resist. Ω – Ohm
0 / -18	85,362	100 / 38	5,828
5 / -15	72,918	105 / 41	5,210
10 / -12	62,465	110 / 43	4,665
15 / -9	53,658	115 / 46	4,184
20 / -7	42,218	120 / 49	3,760
25 / -4	39,913	125 / 52	3,383
30 / -1	34,558	130 / 54	3,050
35 / 2	29,996	135 / 57	2,754
40 / 4	26,099	140 / 60	2,490
45 / 7	22,763	145 / 63	2,255
50 / 10	19,900	150 / 66	2,045
55 / 13	17,436	155 / 68	1,857
60 / 16	15,311	160 / 71	1,689
65 / 18	13,474	165 / 74	1,538
70 / 21	11,883	170 / 77	1,403
75 / 24	10,501	175 / 79	1,281
80 / 27	9,299	180 / 82	1,172
85 / 29	8,250	185 / 85	1,073
90 / 32	7,334	190 / 88	983
95 / 35	6,532	195 / 91	903

**Table 16** 10K Ω Temperature sensor resistance values

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# 7.0 Troubleshooting

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This section includes a table of warning and error messages that may appear on the appliance as well as faults that may appear on the air handling appliance app. A problem that does not prevent the operation of the air handler is declared as a "warning". A problem that prevents the appliance from operating is declared as an "error" and the appliance is shut down.

## 7.1 Using the IBCconnect app to troubleshoot the AHU

When connected to the AHU appliance, the IBCconnect app will display real-time warnings, error messages, and faults.

**To view currently active warnings, error messages, or faults:**

1. Ensure your AHU appliance is connected to the app. See [Downloading the IBCconnect app on page 59](#).
2. If a warning, error, or fault is active, the **Faults** tab will become selectable.
3. Tap **Faults** and compare active codes with [Table 17](#) for troubleshooting information.

## 7.2 Warning / fault codes

Fault Code/Error Message	Description	Possible Fix
Inlet Temperature Sensor	Sensor not connected or faulty.	Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
Outlet Temperature Sensor	Sensor not connected or faulty.	Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
Air Out Temperature Sensor	Sensor not connected or faulty.	Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
A/C Temperature Sensor	Sensor not connected or faulty.	Accessory sensor affixed to an air conditioner coil. Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
Dehumidifier Temperature Sensor	Sensor not connected or faulty.	Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
Outdoor Temperature Sensor	Sensor not connected or faulty.	Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
Air In Temp Sensor (Probe)	Sensor not connected or faulty.	Check the sensor. For resistance reading, see <a href="#">Table 16</a> .
Humidistat	Probe not connected or device is faulty.	Check the probe, inserted in airstream on right side of control board.
Door Open / No Fan Signal	Service door is open or fan fault.	<ul style="list-style-type: none"><li>» Check door or if door switch is faulty.</li><li>» Check if harness is</li></ul>

Fault Code/Error Message	Description	Possible Fix
No Fan RPM	No rotation of the fan is detected.	<p>disconnected.</p> <ul style="list-style-type: none"> <li>» Check if fan is turning.</li> </ul>
A/C Freeze	Freezing detected in the A/C coil.	Check if the AHU door is correctly installed. Check the door switch. Check for power to the unit.
Dehumidifier Freeze	Freezing detected in the dehumidifier appliance.	Check if fan is turning or disconnected. Check the fuse.
Thermostat Fault	Simultaneous heating and cooling calls detected	<ul style="list-style-type: none"> <li>» Simultaneous heating and cooling call</li> <li>» Check thermostat wiring.</li> <li>» Test by disconnecting from AHU the t-stat wires that should be inactive.</li> </ul>
RTOS Fault 1	Software fault	Contact IBC Technical Support for software upgrade.
RTOS Fault 2	Software fault	Contact IBC Technical Support for software upgrade.

**Table 17** Warnings and error messages shown on the air handler unit app

## 7.3 Measuring voltage on AHU boards

The control voltage transformer is not bonded to the AHU cabinet. When measuring the voltage supplied to the individual control circuit, you must reference the common post of the circuit. If you measure to ground or to another common terminal, misleading readings of approximately 14V will occur.

To test for nominal 24V, reference the adjacent COM connection. For example, to test voltage at Compressor S1 terminal, measure for VAC between Compressor COM and Compressor S1 and do *not* reference the Thermostat COM terminal.

## 7.4 Pump not energized

If the pump is not energizing:

- » In the IBCconnect app, go to **Advanced Settings**, and check that **Pump Enabled** is set to "on".
- » In the IBCconnect app, go to **Basic Settings**, and check that **Heat Mode** is not set to "Heat Pump": During Stage 1 heat pump heating, the AHU pump is not energized by design, to avoid interfering with circulation through the heat pump. AHU pump is energized at Stage 2 call for heat.
- » Check the AHU board for blown pump fuse—the only fuse rated for 10A. See [Figure 36](#).

## 7.5 Troubleshooting the IBCconnect app

### 7.5.1 Unstable WiFi connection

If the IBCconnect app is unable to maintain a connection to the IBC AHU WiFi, the IBCConnect app footer will show an "X" icon above WiFi. It is likely the device is attempting to perform uploads in the background. To prevent cell phone data and WiFi conflict:

1. Remove the IBC AHU WiFi connection from the device.
2. Go to the device's **WiFi Setting**.
3. Press and hold the IBC-AHU-xxxx entry.
4. Tap **Forget Network**.
5. Place the device in "Airplane Mode".
6. Reconnect the device to the IBC AHU WiFi by selecting the "IBC-AHU-xxxx" from the list of access points. Ensure that the WiFi reconnect option is disabled.
7. Start the IBCconnect app again.



#### Note

While your device is connected to the air handler WiFi, you will not have internet access.

### 7.5.2 WiFi Password

The WiFi password for all air handlers is '1234567890'.

### 7.5.3 IBCconnect unable to find air handler on the network

The IBCconnect app needs to detect the air handler on the WiFi network via its network ID (SSID - Service Set Identifier). Check that the location access for the IBCconnect app is enabled in the device's 'App Settings' menu, set to 'Allow only while using the app'. Other permissions may be required depending on the device and the operating system used.

## 7.6 Using built-in diagnostics

If required by Technical Support, information on settings, faults, and errors can be exported onto a USB stick as part of the appliance's built-in diagnostic feature.

**To view diagnostics:**

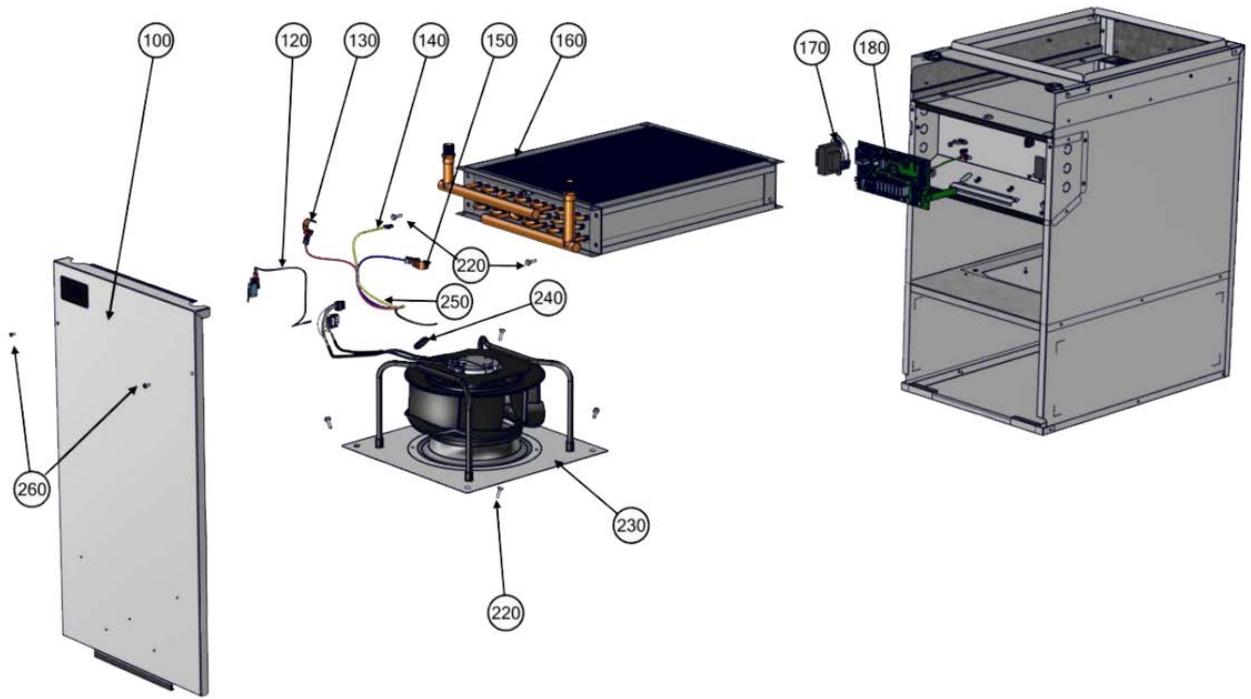
1. Insert a USB stick into the controller, wait approximately 10 seconds, and then remove the USB stick.

The controller generates a text file that contains all the settings and any faults or warnings that are present on the appliance.

2. To view the text file, insert the USB stick into any computer, and open the generated text file with "Wordpad" or a similar program.

The file name will be: "AHUxxxxx.TXT", where "xxxxx" is the serial number of the controller.

## 8 Air handling appliance - parts diagram



Item Number	P-Kit Number	Description
100	<a href="#">P-1000</a>	Door assembly - AHU 800
100	<a href="#">P-1019</a>	Door assembly - AHU 1200
	<a href="#">P-1020</a>	Door assembly - AHU 1600, AHU 2000
120	<a href="#">P-1008</a>	Door switch, SPST-NO. 15A 125V
		Wiring harness
130	<a href="#">P-1011</a>	Supply water temperature sensor
140	<a href="#">P-1012</a>	Temperature sensor and grommet
150	<a href="#">P-1011</a>	Return water temperature sensor
	<a href="#">P-1003</a>	Hot water coil 2-ton appliance - AHU 800
160	<a href="#">P-1021</a>	Hot water coil 3-ton appliance - AHU 1200
	<a href="#">P-1022</a>	Hot water coil 4-ton / 5-ton appliance - AHU 1600, AHU 2000 low velocity
170	<a href="#">P-1005</a>	Transformer 40VA 120V
180	<a href="#">P-1001B</a>	Control board

Item Number	P-Kit Number	Description
220	<i>P-1017</i>	Coil hex bolts, hex nut, washer x 2 Fan plate hex bolts, washer x 2
230	P-1042	Fan and motor assembly - AHU 800, AHU 1200 low velocity, AHU 1200
	P-1043	Fan and motor assembly - AHU 1600, AHU 2000 low velocity
240	<i>P-1009</i>	Fan wiring grommet
250	<i>P-1009</i>	Sensor wiring harness
260	<i>P-1017</i>	Door thumb screws x 2
[not shown]	P-1002	Ground lug replacement kit
[not shown]	P-1006	Line voltage conduit replacement kit
[not shown]	P-1013	Fuse kit
[not shown]	<i>P-1015</i>	A/C Freeze sensor kit

\* P-1017 = Part of the hardware kit

## 9 Appendix: Wiring diagram

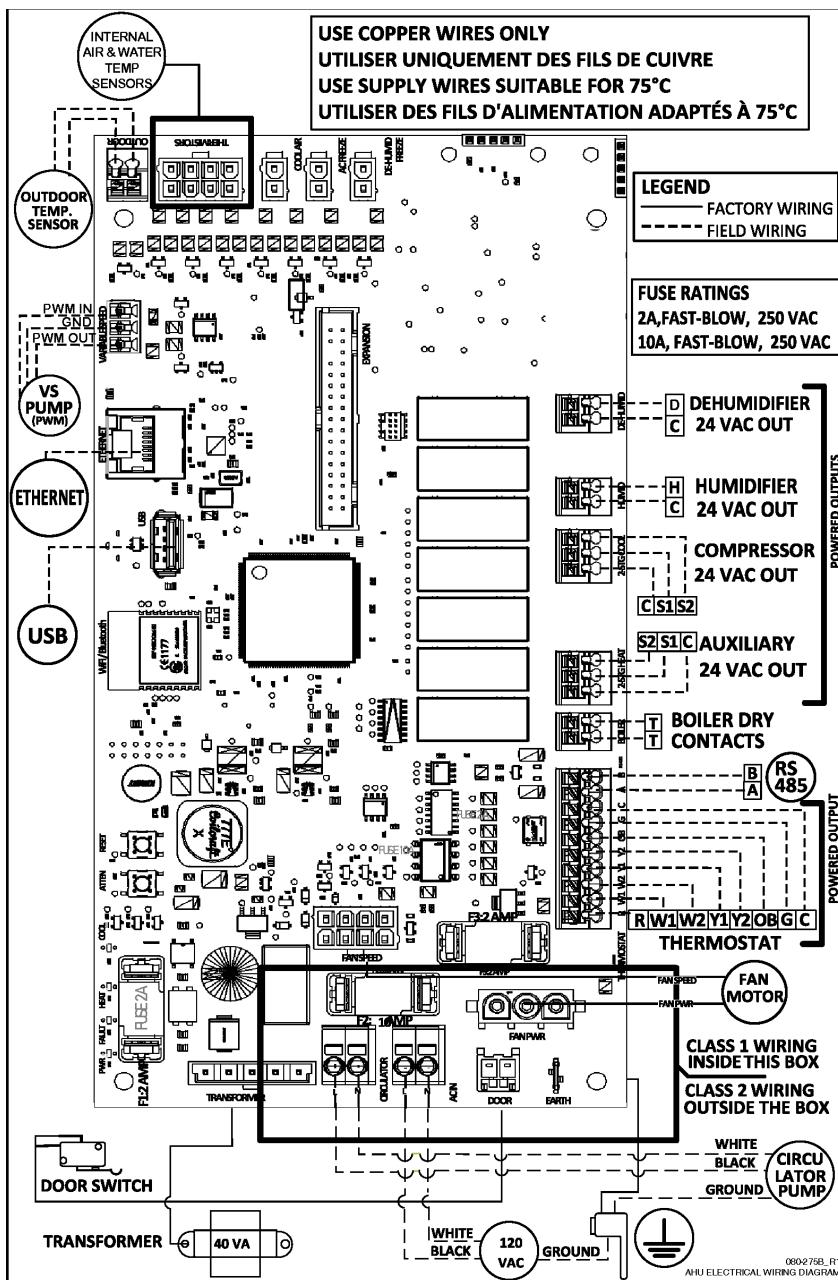


Figure 56 : AHU Air handler internal wiring diagram

For Tech Support, call toll-free **1-844-432-8422**. For Technical Information online, scan:



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