

LIFEBREATH[®]

AIR HANDLER

Operation, Sizing and Installation Manual

AIR HANDLER

**MANUFACTURED WITH
AIRCOM ELECTRONICS**

Models

AH-U-S4A-24-P16 (E16)
AH-U-L4A-36-P16 (E16)
AH-U-S2A-30-P16 (E16)
AH-U-L2A-36-P16 (E16)
AH-U-L2B-48-P16 (E16)

*** LEAVE FOR HOMEOWNER**

NOTE: Due to ongoing research and product development, specifications, ratings and dimensions are subject to change without notice.



69-AH

0912

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 **ATTENTION**

The Air Handler hydronic coil is not to be used for chilled water applications where condensation is expected.

 **ATTENTION**

Air Condition coil freezing can damage the hydronic coil of the Air Handler. Install a Freeze Thermostat Kit to your air conditioning coil to prevent coil freeze up. Check with your air conditioner distributor to obtain a Freeze Thermostat Kit.

Introduction

You will notice that the heated air in your home feels more comfortable than air heated by a conventional furnace. One reason for this is that LIFE BREATH's hydronically heated air is uniform and temperate... no short blasts of hot air or hot and cold temperature spikes. In this regard, the air flowing from your hot air vents will not feel as hot to the touch as air from a conventional furnace.

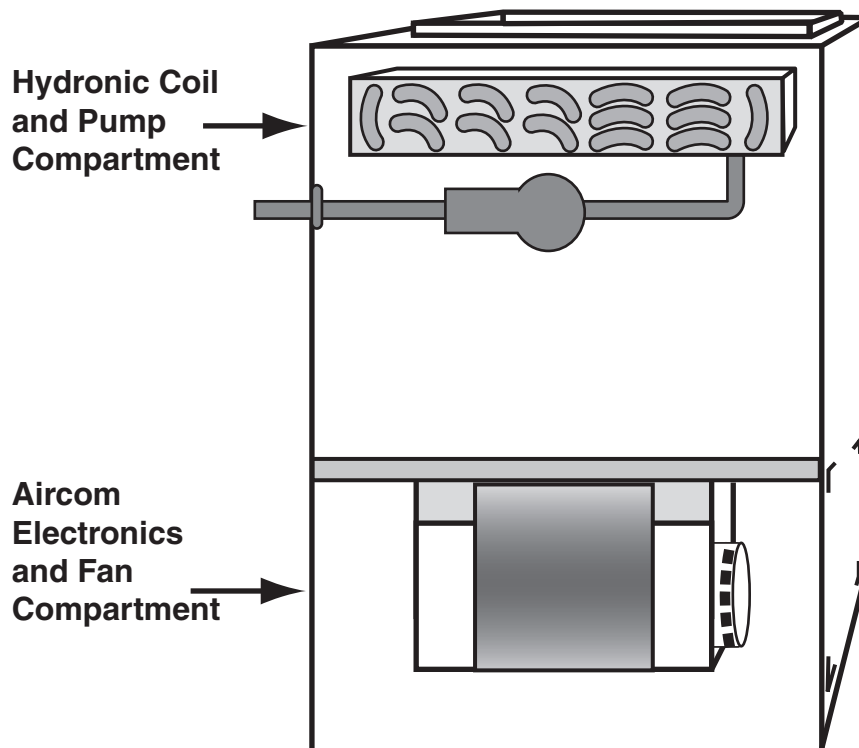
With a high efficiency, **adequately sized** natural gas, propane or oil hot water heater/boiler, you will always have plenty of hot water for showers and baths, washing dishes and clothes, and all other normal domestic hot water needs. If there is an unusually high demand for hot water, such as filling a large hot tub, than all you need to do is allow more time for the task so the water heater/boiler can keep up to its job of providing hot water for the heating system as well as other household uses.

Once it is correctly installed, safety will never be an issue with your LIFE BREATH air handler. No flames, fumes or flue gases to be concerned about. Your domestic hot water heater/boiler now provides the heat source for your furnace.

This Operating and Installation Guide will help you learn about your LIFE BREATH Air Handler quickly and easily. The table of contents will show you where to find information on every feature of this unit along with easy to understand operating instructions. If, however, you do encounter a question that is not covered in this Guide you should call the LIFE BREATH dealer who installed your furnace. Chances are that he will be able to give you a satisfactory answer but if he is unable to do so then we invite you to contact us directly.

Airia Brands Inc.

Overview of the Air Handler



Description and Purpose

IMPORTANT NOTE

The purpose of this manual is to act as an installation guide only for the LIFE BREATH Air Handler. Manufacturers' instructions for other components, such as the water-heater/boiler, must be followed.

All national and local code requirements must be met when installing a LIFE BREATH Air Handler. Be sure to consult the proper authorities.

Note: Temperatures greater than 130°F (54°C) pose a serious risk of scalding individuals running domestic hot water for potable use.

This appliance complies with IAS Canada Inc. Requirement CR95-003, Additional Requirements for Fan Coil Units for use with Potable Water Heaters.

All piping and components connected to this appliance shall be suitable for use with potable water.

Toxic chemicals, such as used for boiler treatment, shall not be introduced into the potable water heater system.

When using this system, and water for space heating is

required to be at a higher temperature than for other uses, an anti-scald valve shall be used to ensure water for other uses is reduced in temperature to minimize a scald hazard potential.

Combining two or more end uses such as space heating and the heating of domestic hot water in a single system has the potential to increase efficiency and reduce overall capital costs. However, the proper design, installation, and commissioning of these systems are critical if these advantages are to be realized.

This manual provides a guideline of good engineering practice in the design, installation and commissioning of Integrated Combo Systems. The guidelines in the manual are designed for residential forced warm air Integrated Combo Systems which utilize domestic water heaters or boilers and the LIFE BREATH furnace. Heating and cooling loads shall be calculated in accordance with recognized Residential Heat Loss and Heat Gain Calculation methods. Duct design shall comply with recognized Residential Air System Design methods.

Operation Heating/Cooling

When the room thermostat calls for heat, it activates a circulation pump located inside the Air Handler. This pump delivers hot water from the water heater, through the furnace coil and back to the water tank. Simultaneously, the furnace blower switches on to high speed and will start circulating air across the coil, which picks up heat and delivers it to the rest of your home.

Once the thermostat's temperature is reached the pump will shut off, and the blower will return to its pre-set speed or off.

Note: When the furnace blower is left running on low speed the air in the home circulates continuously. When the heat is called for the blower will automatically switch to a higher speed. After the required hot air has been delivered the blower will switch back to low speed.

When the thermostat calls for cooling (evaporator coil and condensing unit required), the furnace blower activates to high speed and the outdoor condenser unit is energized. After the thermostat temperature is reached, the condensing unit will shut off and the blower will return to its preset speed or off.

Off Season Circulation Timer

All models are equipped with a circulation timer. It is normal operation for these models to automatically run the circulation pump for a short period of time intermittently.

Combo System Basic Principles

Open and Closed Systems

Open and Closed systems both deliver hot water and space heating.

Water systems that incorporate a pressure tank (i.e. well systems) are normally Open Systems and most municipal water systems are Closed Systems.

Drain Valve

A drain valve is required to allow the heating loop to be drained for service or repair and to remove air from the heating loop when commissioning a system. The drain valve should be near the low point of the return piping system to be near the water heater. Ball, Globe or Gate Valves are suitable for drain valves.

! ATTENTION

Check valves should always be installed in a vertical rise with the flow of water shown.

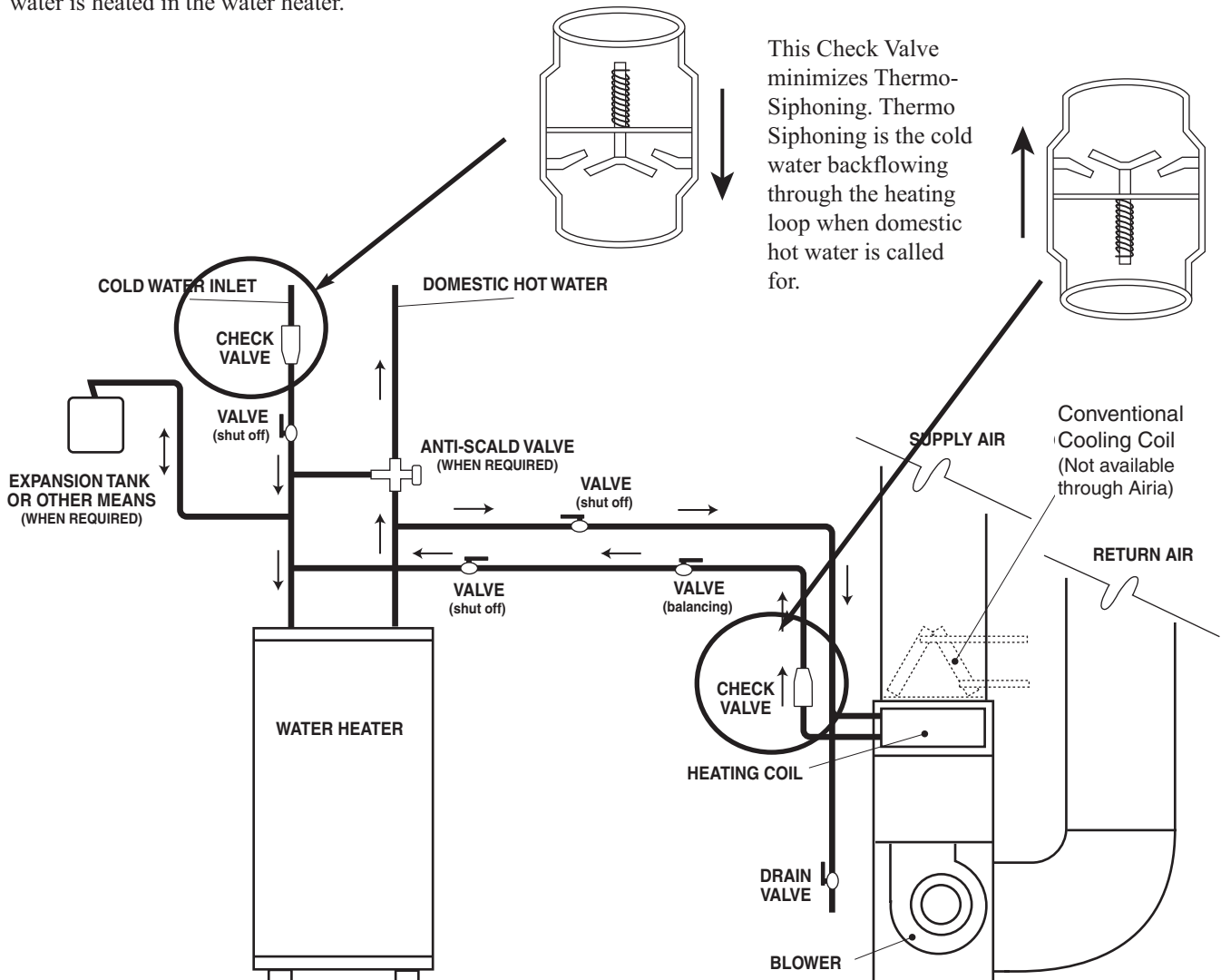
IMPORTANT

Refer to local codes, local bylaws and installation manuals supplied with water heater before starting any installation work.

Closed Loop System

A system becomes closed when a Check Valve or a back-flow prevention valve is installed in the cold water piping upstream of the water heater.

A check valve will prevent water being relieved into the cold water system due to pressure created when water is heated in the water heater.



Plumbing

In order to improve serviceability of our products, the check valve is included with our manual kit for field installation between the air-handler and hot water source.

The check valve should be installed in a vertical run of pipe with the flow of water in an upward direction.

An arrow on the check valve indicates its correct orientation and must match the direction of water flow.

This will allow for ease of service to remove any installation debris or service required due to extended hard water conditions.

Note: Take care during soldering to avoid debris or solder from lodging in the check valve.

Note: It is critical to follow the piping configuration shown. Maintain a minimum distance of 12" above the CAF/AH. This will minimize thermal siphoning in the combo system.

Figure 1

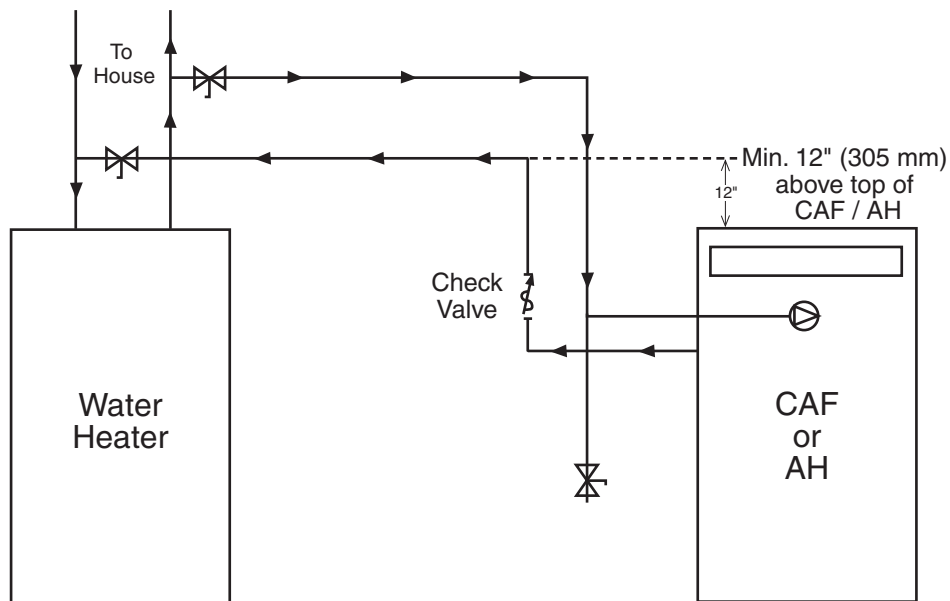
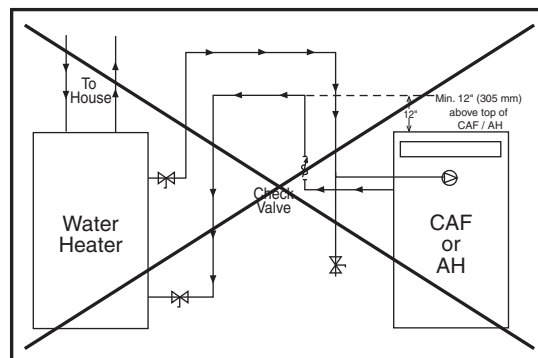


Figure 2



*** It should be noted that problems have been observed when using the side tapplings on certain water heaters; therefore, it is strongly recommended to use the top water tapplings as indicated in Figure 1 to minimize thermal siphoning and related issues.**

Plumbing

Expansion Tanks

Expansion tanks are required in addition to a Check Valve for Closed Systems because pressure is created when water is heated in the water heater.

The expansion tank has an air bladder which will contract to relieve pressure in the system. The tank should always be connected to the cold water piping between the water heater shut off valve and the cold water inlet to the water heater.

Anti-Scald Valve

An anti-scald valve is required when the water heater thermostat is set above 140°F (60°C). Also, an anti-scald valve may be required for all installations by the “authority having jurisdiction”. The valve is placed in the hot water supply piping from the water heater downstream of the heating loop connection and upstream of any domestic hot water connection.

The purpose of the valve is to limit the maximum temperature available for domestic hot water by mixing hot water from the water heater with cold water from the municipal supply.

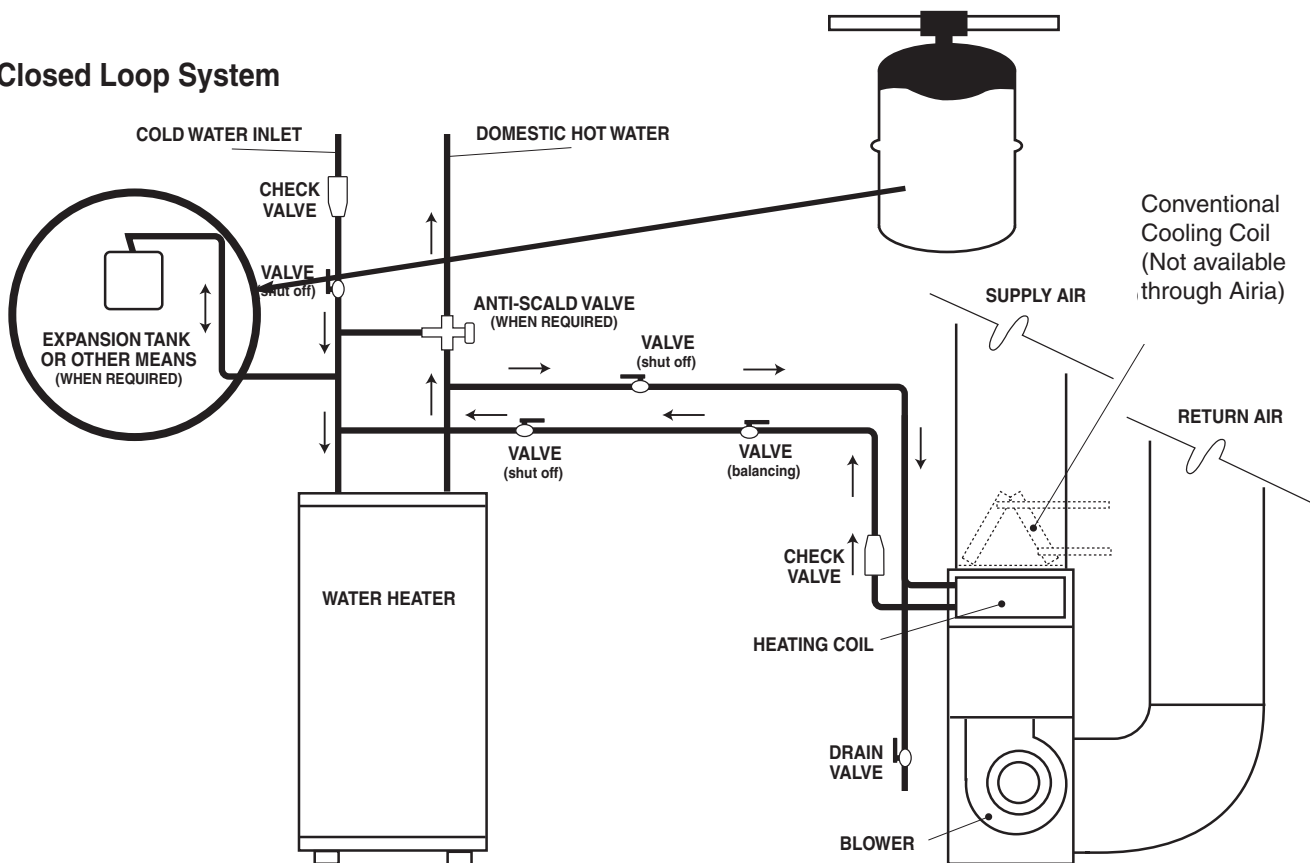
The Anti-Scald valve must be thermostatically controlled and approved to the ASSE standard No. 1016 and 1017 for use as an anti-scald device.

Time to Scald

(1st degree burns)

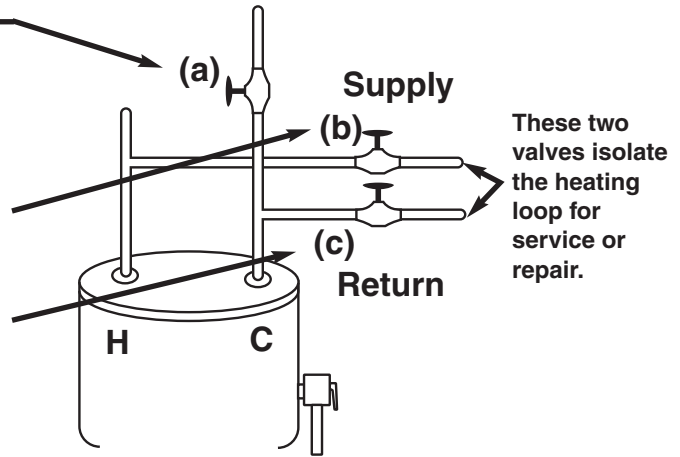
Temperature	Time
120°F (49°C)	8 min.
130°F (54°C)	20 sec.
140°F (60°C)	3 sec.
160°F (71°C)	<1 sec.

Closed Loop System

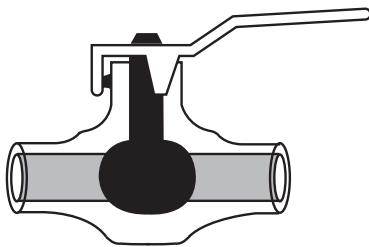


Valves

- (a) Located on the cold water side of the Heater.
This valve has the ability to isolate the hot water (domestic and space heating) from the household cold water supply. Every water heater requires this valve regardless of space heating use.
- (b) Located on the hot water supply side of the heating loop, downstream of its connection to the domestic water.
- (c) Located on the return side of the heating loop upstream of its connection to the domestic cold water.

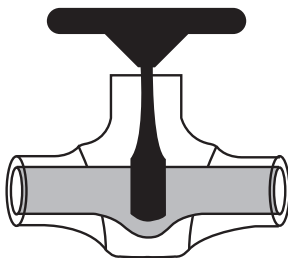


Ball Valve



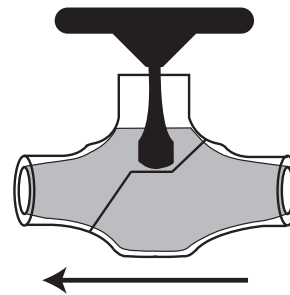
The Ball Valve can be used as a shut off or drain valve. When in the open position, a full bore ball valve has very little resistance to flow, and these valves tend to be both the least expensive and the least susceptible to seizing over time. Do not use reduced bore ball valves as they are very restrictive to water flow.

Gate Valve



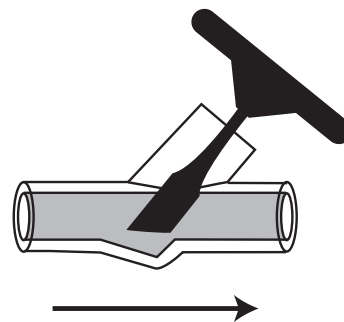
The Gate Valve can be used as a shut off or drain valve. When in the open position, there is very little resistance to flow. Gate valves tend to be less expensive than other types of valves but are susceptible to chatter (noise) and malfunction with age.

Globe Valve



The Globe valve can be used as a shut off, drain or throttling valve. Even in the open position, the valve is fairly restrictive to flow. It has a much greater equivalent length (resistance.) than the other types of valves.

Balancing (Throttling) Valve



The Balancing (Throttling) Valve is used to reduce the water flow rate and thereby increase the water temperature drop. This is done to ensure proper activation of the water heater thermostat.

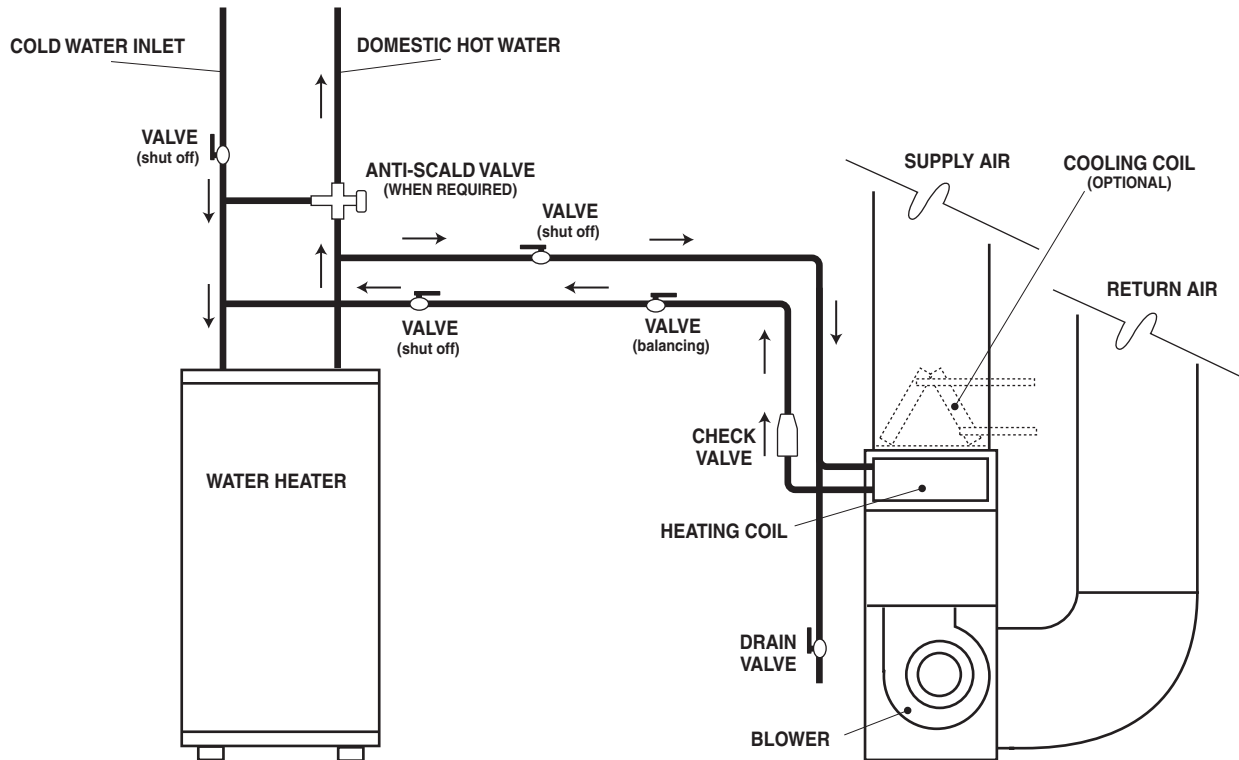
A Globe Valve could also be used for Balancing (Throttling) but has more resistance than the Balancing Valve.

Call for Space Heating

There are two thermostats controlling every combo system, the water heater thermostat (controlling the hot water temperature) and the room thermostat (controlling the room air temperature).

When the room thermostat calls for heat, the circulation pump is activated. Hot water is then drawn from the top of the water heater through the air handler, and then returned to the water heater.

Open Loop System



Hot Water Temperature Drop

The water heater thermostat will initiate the water heater as required as long as there is a 20°F (11°C) temperature drop between the hot water supplied to the air handler and the returning water.

A temperature drop less than 20°F (11°C) can cause the water heater thermostat not to initiate. This will result in a lower hot water supply temperature or poor space heating performance with fluctuating domestic water temperatures.

Call for Domestic Hot Water and Space Heating

When both return water from the space heating loop and new cold water (replacing domestic water being used) enters the water heater, the mixed entering water is cool enough to activate the thermostat quickly. In this situation, the water heater must be capable of satisfying the combined need for domestic hot water and space heating at the same time.

! ATTENTION

Plumbing components and system configuration may vary from diagrams portrayed.

! ATTENTION

Chemicals (such as boiler system additives) cannot be added to a domestic hot water system.

Quick Connect Kit: PART# 99-CAF-PKit 1/2 or 3/4

The pre-assembled, Quick Connect Kit shortens the installation time. It provides an instant, easy assembly of the major plumbing fittings required for a proper CAF/AH installation.

The Quick Connect Kit includes the WATER IN and WATER OUT assemblies. Kits are available in 1/2" and 3/4" sizes. Refer to the CAF/AH specification sheet located in the Operation and Installation Manual to obtain the correct size of water connections for the unit being installed.

Push-fit Fittings instantly make plumbing connections thereby eliminating the need for solder. Be sure to read the Push-fit Fitting Installation Instructions (included with the Quick Connect Fitting Kit) before making any connections.

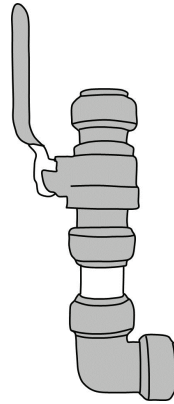
PART #99-CAF-PKit1/2

The 1/2" assembled kit.

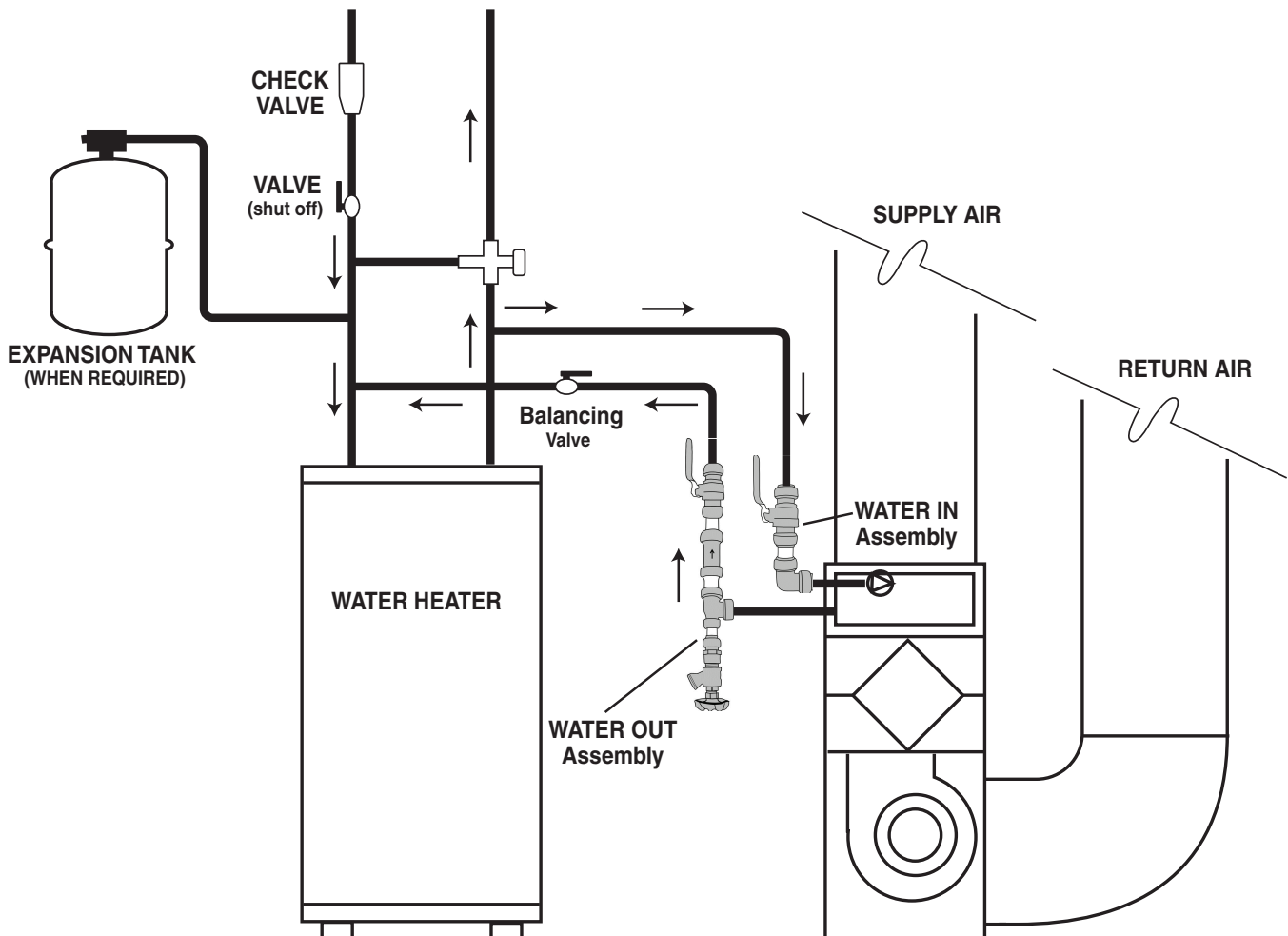
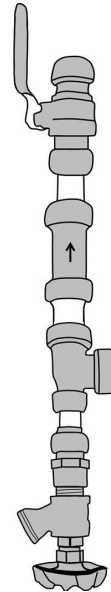
PART #99-CAF-PKit3/4

The 3/4" assembled kit.

KIT CONTENTS



WATER IN Assembly



Air System

A circulation fan draws cool house air at approx. 70°F (21°C) from the return ductwork, forces it through the water coil where it is heated, and then distributes it to the various rooms of the house through the supply ductwork.

Water System Pressures

Within the water system of an Integrated Combo system, there are three terms that the designer/installer must understand. These are:

- Head pressure
- Water flow rate
- Pressure drop

Head Pressure

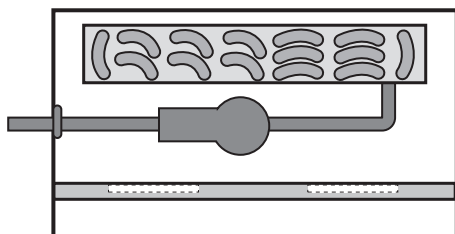
Head pressure is the pressure created by the circulation pump to push water through the piping system. It is this pressure which is used to overcome the resistance to water flow (friction) caused by the water pipe and fittings. It is similar in concept to the external static pressure in an air duct system. Head pressure is measured in feet of water (millimeters of water).

NOTE

The vertical height of the heating loop does not impact on the head pressure as the pressure required to push the water up the vertical height is offset by the weight of the water in the vertical drop on the other side of the heating loop.

Water Flow Rate

Water flow rate is the amount of water flowing in the system. It is directly related to the head pressure and the resistance to flow. Flow rate is measured in gallons per minute (liters per minute).



The circulation pump is factory installed within the air handler. The water flow rate will vary depending on the pumps performance and the head pressure (resistance) of the complete heating loop system.

The piping and fittings used to connect the water heater and air handler must be sized to handle the volume of hot water required by the air handler within the pressure limitations of the circulation pump. All piping, fittings solders, and fluxes must be acceptable for use with domestic hot water.

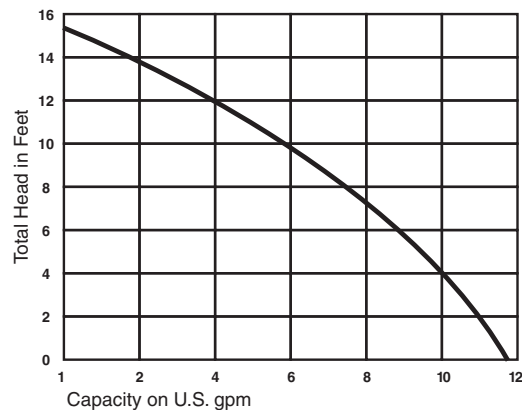
Pressure Drop (PD)

Pressure drop (PD) is the reduction in total pressure caused by components added to a piping system such as coils, valves, and fittings. The measurement of pressure drop is the difference in pressure on the inlet side of the component and the outlet side. Pressure drop is measured in feet of water (millimeters of water).

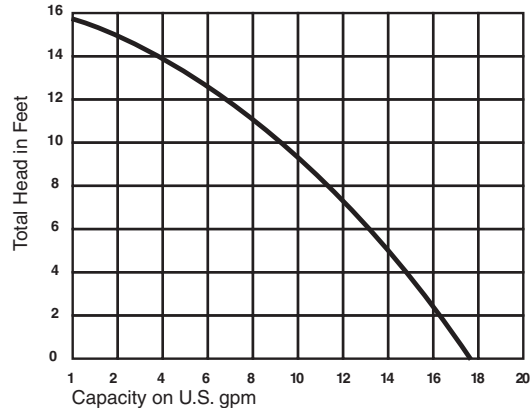
When connecting the water lines for heating loop (air handler) to the domestic water system, the pipes should be connected with a “tee” to the side of a vertical domestic water pipe or the bottom of a horizontal domestic water pipe. This is to help prevent air from entering the heating loop. The connections should be as near as practical to the water heater.

Water Pump Performance Specifications

S2 and S4 Models



L2 and L4 Models



Air Handler Output Capacity

There are four factors that will significantly affect the heating output of the air handler.

They are:

- Hot water supply temperature (EWT)
- Hot water flow rate (GPM)
- Air Handler return air temperature
- Air Handler air flow rate (CFM)

Hot Water Supply Temperature

The hot water supply temperature is controlled by the water heater thermostat. This is set by the installing contractor to provide the required temperature at the hot water outlet of the water heater.

The hot water supply temperature is typically 140°F (60°C). If this temperature must be increased to achieve higher outputs from the furnace an anti-scald valve must be used to prevent domestic hot water temperatures above 140°F (60°C). The manufacturer of the Hot water Tank should be consulted for temperatures higher than 140°F (60°C).

It is important that a warning label be placed near the water heater thermostat telling the homeowner not to change the thermostat setting. The label is included with the furnace.

Hot Water Flow Rate

The hot water entering the water coil is the source of heat to the air handler. The effect of changing the amount of water entering the coil is the same as changing the water temperature. As water flow is reduced, the output of the air handler and the air temperature rise will both be lowered.

Air Handler Return Air Temperature

The return air temperature entering the air handler is approx. 60°F (33°C) below the hot water inlet temperature. If the return air temperature entering the air handler is reduced, more heat transfer will occur and the output of the air handler will increase.

NOTE

Although the water in the combo system is pressurized by the domestic water system the pump is required to create water flow in the heating loop. The domestic water system applies the same pressure to the supply and return sides of heating loop.

Air Handler Air Flow Rate

The air entering the air handler can only be warmed by the temperature difference between the hot water and the cool air. As the volume (CFM (L/s)) of air is reduced, the amount of heat which can be transferred is also reduced.

Air Handler Temperature Rise

In a fuel fired furnace, the combustion gases can be 1000°F (538°C) above the return air temperature. These units typically have a temperature rise from 50°F (10°C) to 90°F (32°C) and therefore delivers air at the diffuser at 120°F (49°C) to 160°F (71°C).

With an Integrated Combo System, the hot water temperature is approx. 130°F (54°C) which is 60°F (15.5°C) above the return air temperature. These units typically have a temperature rise of 35°F (2°C) to 40°F (4°C) and therefore would deliver air at the diffuser at approximately 105°F (40.5°C) to 110°F (43°C).

Room Thermostat

The room thermostat controls both the water circulation pump and the air circulation fan. It should be on a centrally located, inside wall away from any source of heat such as diffusers, appliances and direct sunlight.

Energy Saving Room Thermostat

A set back thermostat or "smart stat" can be used with a combo system, but care must be taken in the timing of the temperature changes. The timing of morning warm up should be early enough that the desired air temperature has been reached before the people begin to use domestic hot water. The highest demand for space heating is during the morning warm up and the highest demand for domestic hot water is during morning showers. Even if the water heater is properly sized, it may not be able to meet this combined load. Therefore, large set backs should be avoided.

Design vs. Field Conditions

The factors discussed between design parameters and actual field conditions can impact greatly on output capacity. Therefore, it is important to do a thorough and complete commissioning of the integrated combo system to ensure the design parameters are met.

Piping

The hot water piping between the hot water tank and the Air Handler should be new copper type, and should not be treated with chemicals, sealant or anything else, that will interfere with the purity of the potable water. Only non-lead, low temperature solder is permitted for sealing copper joints.

Where possible the length of pipe should not exceed 200' total equivalent length. Any piping running through unconditioned space must be insulated to prevent heat loss, and possible freezing of the line.

Look inside the furnace and locate the pump. Attach the "Hot Water In" (Supply) to the pipe running to the pump. Attach the "Hot Water Out" (Return) to the pipe running to the coil. Do not reverse these lines, as this will cause the unit to malfunction.

For piping conventional water heaters, connections to and from the Air Handler to the water tank should be made at the point where the pipes leave the tank vertically. A "T" fitting used in each vertical line, with the Air Handler piping connected to the horizontal side of this fitting, will work best in avoiding air locks in the circulation pump of the furnace.

**Note: Remove shipping block from underneath pump and discard.*

Installation

This manual gives the contractor guidelines for installing the LIFE BREATH Air Handler. All national and local codes relating to this type of equipment must be followed.

Locating The Unit

The Air Handler is designed to be installed vertically, in a conditioned space, **where the surrounding temperature does not fall below 50°F (10°C)**. Attic installations are not recommended. Typically the unit is installed in a mechanical area of the basement, or other partitioned mechanical room, elsewhere in the home.

A location close to an outside wall is recommended, as the ventilation supply and exhaust portion will need to be ducted to the outside air. Sufficient clearance around the unit is required for service of the filter, heat recovery core and components. As a rule this unit should be installed adjacent to the hot water heater. If this is not possible, or if the piping layout is complex, the total head pressure on the pump should be calculated.

Ducting

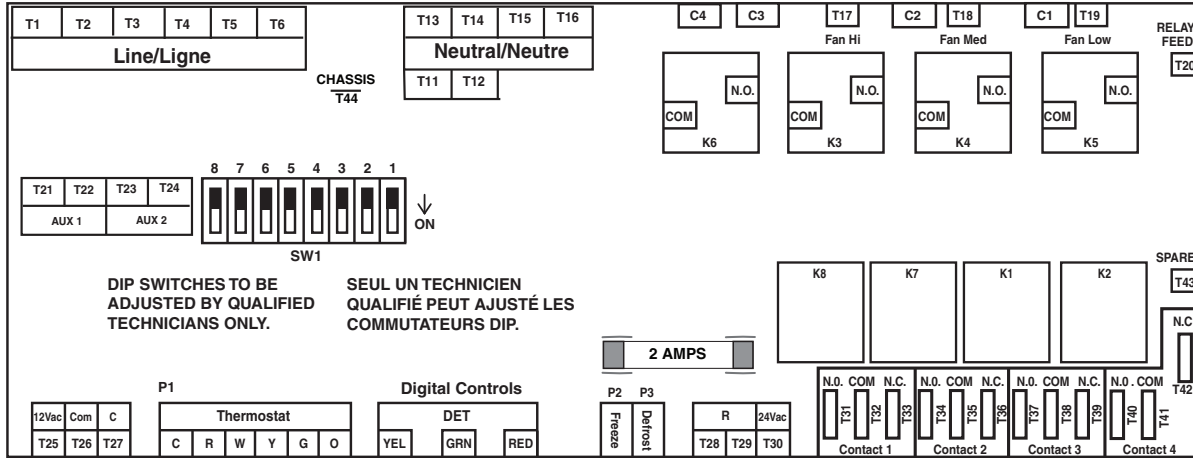
The duct sizing for the furnace section can be determined using HRAI Residential Air System Design Manual, SMACNA, or any other industry-recognized manuals.

Note: "Combo units" normally deliver air at approx. 110°F (43°C), and therefore may require larger than normal ductwork. When installing the Air Handler as a replacement unit on a retrofit application, always calculate the size of duct that is there.

Any ductwork running through unconditioned space must be sealed properly and insulated to prevent heat loss. All local codes must be followed in determining the amount of insulation needed.

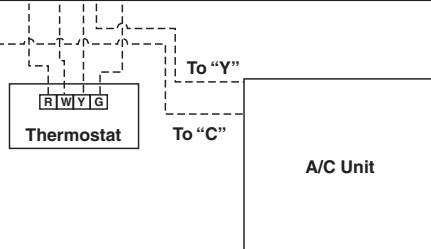
Duct Connections

Penetrations from sheet metal screws used to fasten the ductwork to the cabinet of the unit should only be placed into the duct flange provided. This is to avoid contact and damage of the heating/air conditioning coils and internal wiring.



Standard 24 Volt Thermostat Connection

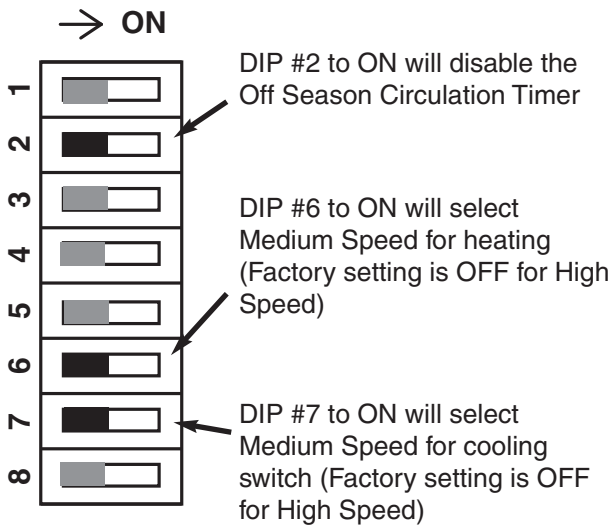
(Thermostats are not available through Airia)



Thermostat Heat Anticipator Settings

Mechanical Thermostats - start at .5 amp and may need to be increased depending upon the residual heat left in the hydronic coil and duct work.
Electronic Thermostats - to be set on electric style heat.

Standard Motor DIP Switch Settings (DIP #1-8 OFF is Factory Setting)



Off Season Circulation Timer

Water is periodically circulated through the space heating loop during the summer and other periods of infrequent use. The concern is that water which remains stationary in the heating loop during the summer may be less than desirable as domestic hot water when it is returned to the water heater at system startup in the fall.

! WARNING

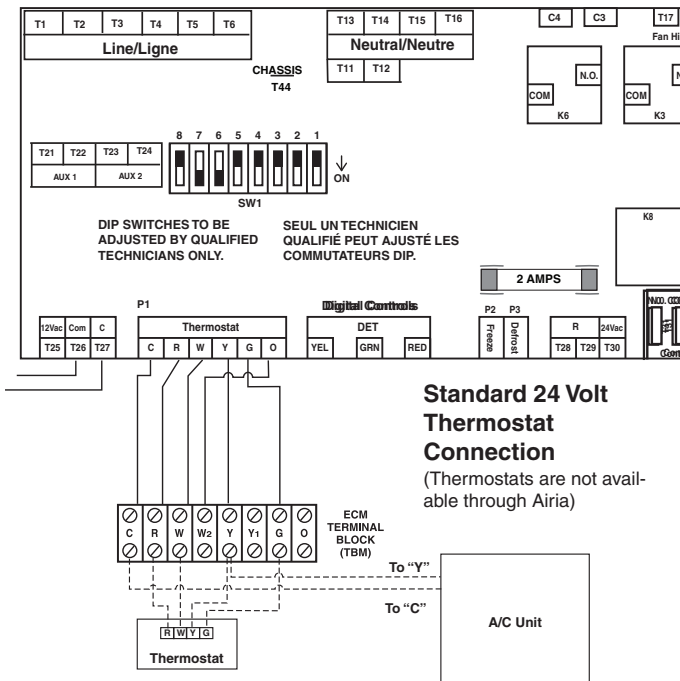
Do not energize the Air Handler until the plumbing is connected and commissioned. Failure to do so will damage the pump.

! WARNING

Do not adjust any other DIP switches than indicated above.

Basic Functions

- C - Common
- R - 24 volt Supply
- W - Medium or High Fan Relay with Circulation Pump (The speed depends on Dip Switch # 6 setting)
- Y&G- Medium or High Fan Relay (The speed depends on Dip Switch # 7 setting)
- G - Low Speed Fan Relay
- O - High Speed Fan Relay with Circulation Pump



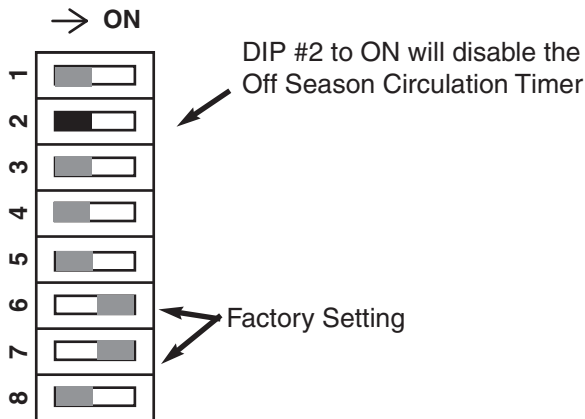
Standard 24 Volt Thermostat Connection
(Thermostats are not available through Airia)

Thermostat Heat Anticipator Settings

Mechanical Thermostats - start at .5 amp and may need to be increased depending upon the residual heat left in the hydronic coil and duct work.

Electronic Thermostats - to be set on electric style heat.

ECM Motor DIP Switch Settings
(DIP 6&7 ON is Factory Setting)



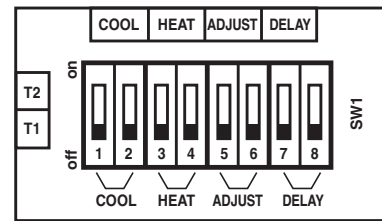
Basic Functions

- Thermostat fan switch will control low speed fan operation
- Call for heating - high speed
- Call for cooling - high speed

! WARNING

Do not adjust any other DIP switches than indicated above.

ECM Motor DIP Switch Settings



Switch Setting	Fan Speeds
Cool Switches	Cool
Both OFF	High
1 ON - 2 OFF	Med High
1 OFF - 2 ON	Med Low
1 ON - 2 ON	Low

Switch Setting	Fan Speeds
Heat Switches	Heat
Both OFF	High
3 ON - 4 OFF	Med High
3 OFF - 4 ON	Med Low
3 ON - 4 ON	Low

Switch Setting	Fan Speeds	
Adjust Switches	Heat	Cool
Both OFF	Normal	Normal
5 ON - 6 OFF	Increase 15%	Increase 15%
5 OFF - 6 ON	Decrease 15%	Decrease 15%
5 ON - 6 ON	Normal	Normal

Delay Switches are for future use - no function at this time

Note: Refer to individual specification pages for Airflow Performance specifications. Above settings correspond to DIP switch settings on the ECM circuit board only. Do not adjust DIP switches on MAIN Circuit Board.

! WARNING

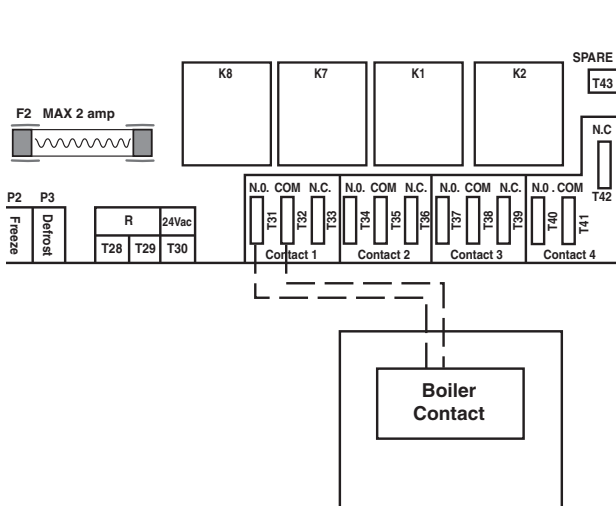
Do not energize the Air Handler until the plumbing is connected and commissioned. Failure to do so will damage the pump.

! ATTENTION

DIP switches #6 & #7 must be ON for the ECM motor to function (factory setting).

Aircom Relays

The Aircom circuit board has three available “dry contact” relays. Contact 3 is not available.



Contact 1

This relay is a dry contact (no power supplied from board). The relay switches upon a call for heat.

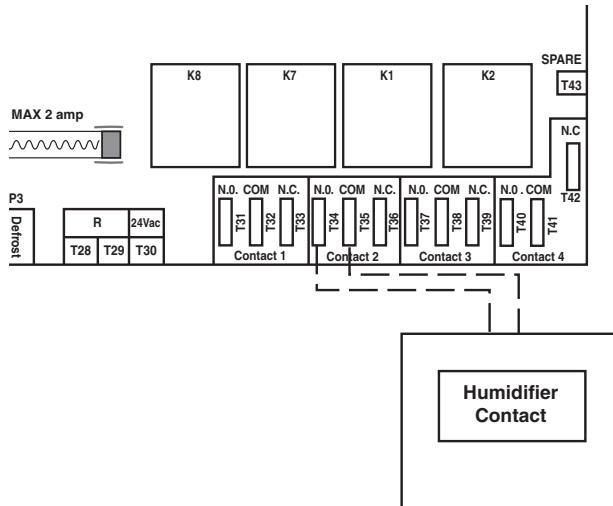
This relay can be used to switch the heat demand signal for boiler operation.

Power (if required) must be supplied to common from an external source.

Max. Voltage - 120 volts

Max. Amperage - 10 amps

Maximum 115V 10 amp resistive load.



Contact 2 and 4

These relays are dry contacts (no power supplied from board). The relays switch whenever the CAF blower motor is operating.

These relays can be used to interlock Humidifiers, Air Cleaning Equipment, etc.

Power (if required) must be supplied to common from an external source.

Max. Voltage - 120 volts

Max. Amperage - 10 amps

Start-Up Procedure

In order for any appliance to work properly it must be set up and tested by a knowledgeable technician.

The following conditions must be met prior to start-up

1. Ensure that connecting water lines are purged and free of debris.
Caution: solder or other debris may cause the furnace pump or check valve to malfunction.
2. Blower wheel rotates freely inside its housing.
3. Wiring connections are tight.
4. All duct and pipe connections are sealed.
5. Check that styrene block is removed from under pump.
6. Front access door is on tight.
7. Fan speed selection:
 - a) **Heating/Cooling** - factory setting is at high speed and can be changed in the electrical box to medium-high or medium if required.

Once the necessary connections have been made, follow the Air Handler Start-Up Procedure:

1. Close shut-off valves separating the Air Handler from the water heater.
2. Set up water heater according to manufacturer's instructions.
3. Purge air from unit. To do so, open the supply shut-off valve to the furnace. Attach a garden hose to drain valve, and drain water until you get a continuous flow. Close the drain valve and purge the pump. To purge the air from the pump, turn the large screw on the face of the pump counterclockwise until water leaks out, then tighten. Open the supply shut-off valve.
4. Turn on power supply to Air Handler. **Caution: blower may start to operate at low speed.**
5. Switch the room thermostat to heat. The thermostat should be set higher than the current room temperature in order to energize the pump and commence the heating cycle. (If the pump does not start, or the Air Handler is not producing heat, refer to the Troubleshooting Section in this manual.
6. Set room thermostat at desired temperature setting.

Troubleshooting

Lack of heat

1. Check that the room thermostat is set to the desired temperature.
2. Confirm the units have power and the shut-off valves are open.
3. Ensure there is power to the unit and that the pump is working. If the pump is not working properly it may be stuck. Disconnect power and remove screw in center face of the pump. Using a screwdriver, turn the pump shaft several times to free it from sticking. Replace center-screw and re-connect power. If pump still fails to start, it may require replacement.
4. Confirm that the hot water heater is working and that hot water is entering the Air Handler.
5. Make sure your water heater is sized large enough for heat load of house and for domestic hot water use.
6. Air may still be in the water lines. If so, re-purge the system according to the start up procedure.
7. Confirm that the inlet and outlet pipe connections are not reversed.
8. Ensure that there are no other restrictions in the water lines, such as faulty valves, or debris.

Pump is noisy

Pumps can become noisy when air remaining in the lines interfere with their operation. If this occurs re-purge the system as indicated in the Start-Up Procedure.

During cooling cycle, hot water circulates through the coil

If the check valve inside the cabinet is stuck in the open position, hot water may infiltrate the heating coil. This occurs when the hot pipes are not capped-off during installation or service and foreign debris enters the piping. This debris can settle under the check valve seat and permit hot water to flow into the coil. The problem can be corrected by repeatedly flushing the heating loop until it is clean.

Example Model Number AH - U - S2A - 24 - P16

Model Configuration

AH - Airhandler (No HRV)
Refer to CAF (Clean Air Furnace) specifications if a built-in HRV is required.

Configuration

U - Upflow - Return Air off Left or Right side
D - Downflow models are unavailable for Air Handlers

Hydronic Coil Size

S2A - Small Coil - 2 Row Coil
S4A - Small Coil - 4 Row Coil
L2A - Large Coil - 2 Row Coil
L4A - Large Coil - 4 Row Coil
L2B - Large Coil - 2 Row Coil

Available Air Handler Models

AH-U-S2A-30-P16(E16)
AH-U-S4A-24-P16(E16)
AH-U-L2A-36-P16(E16)
AH-U-L4A-36-P16(E16)
AH-U-L2B-48-P16(E16)

*** CFM (High Speed) Cooling Capacity**

24 - 2 tons
30 - 2.5 tons
36 - 3.0 tons
48 - 4.0 tons

*Cooling coils not available from Airia

! ATTENTION

Refer to individual specification pages for Hydronic Coil and Blower outputs and configurations.

Motor Configuration

P16 - Standard PSC Motor 120V/60Hz
E16 - Upgrade ECM Motor 120V/60Hz

LIFEBREATH[®]

AIR HANDLER

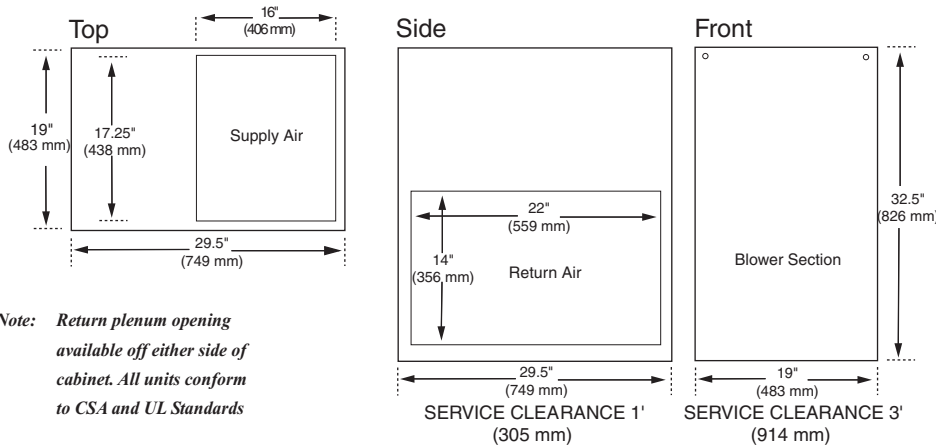
Model AH-U-S4A-24-P16

Filters 1" (25 mm) pleated in return plenum side.
Case Prepainted galvanized steel for superior corrosion resistance.

S4A-24 Coil Output Chart (1000's of BTUH)

CFM @ .25" WG	S4A-24 Coil Output Chart (1000's of BTUH)																	
	3 GPM						4 GPM						5 GPM					
890	40.7	47.7	54.8	61.9	69.0	76.2	43.8	51.3	58.9	66.5	74.1	81.7	45.7	53.6	61.4	69.3	77.2	85.1
790	38.0	44.5	51.0	57.6	64.3	70.9	40.5	47.4	54.4	61.3	68.3	75.4	42.0	49.2	56.4	63.6	70.8	78.0
740	36.5	42.7	49.0	55.3	61.7	68.0	38.7	45.3	51.9	58.6	65.3	72.0	40.0	46.8	53.7	60.5	67.4	74.3
660	33.8	39.6	45.5	51.3	57.2	63.0	35.6	41.7	47.8	53.9	60.0	66.2	36.7	42.9	49.2	55.4	61.7	68.0
1030	44.0	51.7	59.3	67.0	74.8	82.5	48.0	56.2	64.5	72.8	81.2	89.6	50.5	59.1	67.8	76.5	85.3	94.1
900	41.0	48.0	55.1	62.3	69.4	76.6	44.1	51.7	59.3	66.9	74.6	82.3	46.1	54.0	61.9	69.8	77.8	85.8
825	38.9	46.7	52.4	59.2	66.0	72.8	41.7	48.8	56.0	63.2	70.4	77.6	43.5	50.9	58.3	65.8	73.3	80.8
740	36.5	42.7	49.0	55.3	61.7	68.0	38.7	45.5	51.9	58.6	65.3	72.0	40.0	46.9	53.7	60.5	67.4	74.3
Water Temp.	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180

Dimensions & Clearances



Model	AH-U-S4A-24-P16
Voltage	120 VAC 60 Hz
Hp	1/3
Amps (total)	8
Water Connections	1/2" (13 mm) Copper Soldered Connection
Airflow (High)	1030 CFM
.25 in. wg	890 CFM
.5 in. wg	
Net Weight	111 lbs. (50.3 kg)
Shipping Weight	130 lbs. (59 kg)

Warranty

Units carry a five year replacement parts warranty on all components.

Date: _____
 Tag: _____ Qty: _____
 Project: _____
 Engineer: _____

Contractor: _____
 Supplier: _____
 Quote#: _____
 Submitted by: _____



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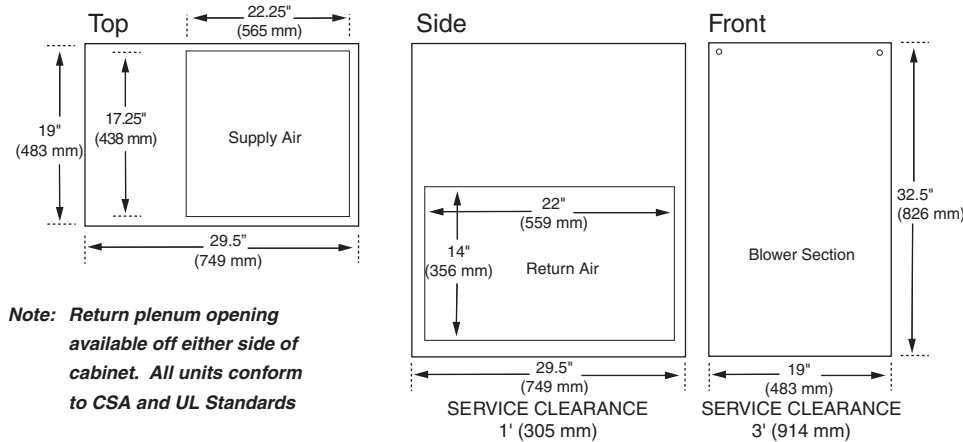
Filters 1" (25 mm) pleated in return plenum side.

Case Prepainted galvanized steel for superior corrosion resistance.

L4A-36 Coil Output Chart (1000's of BTUH)

CFM @ 5" WG	L4A-36 Coil Output Chart (1000's of BTUH)																																																																																																																																																																	
	1180	1120	890	675	1350	1275	940	730	Water Temp.	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180																																																																																																																																							
	51.4	60.2	69.0	77.9	86.8	95.8	56.3	65.9	75.6	85.3	95.0	104.8	59.4	69.5	79.7	89.9	100.1	110.3	50.0	58.7	67.2	75.9	84.5	93.2	54.5	63.9	73.2	82.6	92.0	101.5	57.4	67.1	76.9	86.8	96.6	106.5	43.9	51.4	60.0	66.5	74.1	81.7	46.9	54.9	62.9	70.9	79.0	87.1	48.7	56.9	65.3	73.5	81.8	90.2	36.6	42.8	49.0	55.3	61.5	67.8	38.2	44.7	51.2	57.7	64.2	70.7	37.3	43.7	50.0	56.4	62.8	69.2	54.7	64.2	73.6	83.1	92.6	102.1	60.8	71.2	81.7	92.2	102.7	113.3	64.7	75.8	86.8	98.0	109.2	120.4	53.3	62.5	71.7	80.9	90.2	99.5	58.9	69.0	79.1	89.3	99.5	109.7	62.4	73.1	83.8	94.5	105.3	116.5	45.4	53.2	60.9	68.8	76.6	84.5	48.7	57.0	65.3	73.7	82.1	90.4	50.7	59.3	67.9	76.6	85.3	94.0	38.6	45.2	51.8	58.4	65.0	71.7	40.6	47.5	54.4	61.3	68.3	75.2	41.8	48.8	55.9	63.0	70.1	77.2	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180
	3 GPM						4 GPM						5 GPM																																																																																																																																																					

Dimensions & Clearances



Model	AH-U-L4A-36-PI6
Voltage	120 VAC 60 Hz
Hp	1/2
Amps (total)	10.6
Water Connections	3/4" (19 mm) Copper Soldered Connection
Airflow (High)	.25 in wg 1350 CFM .5 in. wg 1180 CFM
Net Weight	121 lbs. (54.9 kg)
Shipping Weight	140 lbs. (63.6 kg)

Warranty

Units carry a five year replacement parts warranty on all components.

Date: _____
 Tag: _____ Qty: _____
 Project: _____
 Engineer: _____

Contractor: _____
 Supplier: _____
 Quote#: _____
 Submitted by: _____



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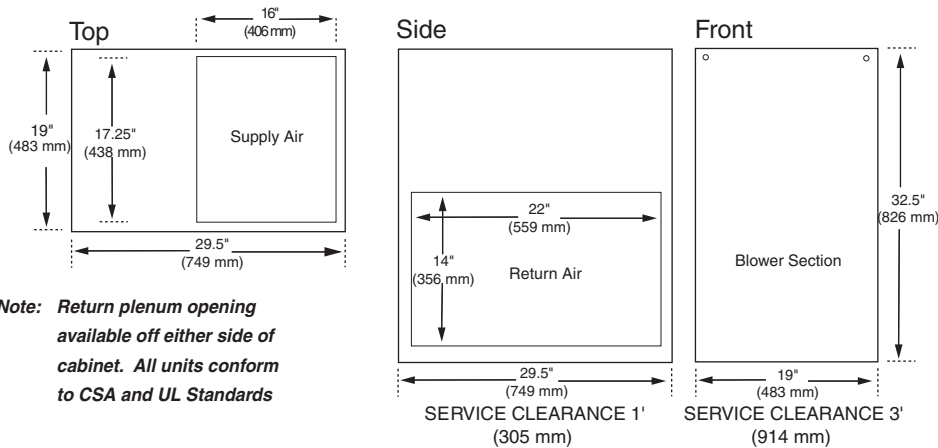
Filters 1" (25 mm) pleated in return plenum side.

Case Prepainted galvanized steel for superior corrosion resistance.

S2A-30 Coil Output Chart (1000's of BTUH)

CFM @ .5" WG	S2A-30 Coil Output Chart (1000's of BTUH)																	
	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180
1075	27.5	32.3	37.0	41.6	46.6	51.1	29.0	34.1	39.1	44.2	49.3	54.2	30.5	35.4	40.8	45.9	51.1	56.5
1040	27.3	31.9	36.4	41.0	45.8	50.4	28.7	33.6	38.4	43.4	48.5	53.3	29.8	35.0	40.1	45.1	50.2	55.2
975	26.3	30.8	35.3	39.8	44.1	48.8	27.7	32.8	37.3	42.0	46.9	51.6	28.8	33.8	38.4	43.5	48.3	53.3
880	25.0	29.2	33.5	38.0	42.2	46.5	26.4	31.0	35.4	39.9	44.5	49.1	27.4	32.0	36.6	41.3	45.9	50.5
1280	29.8	35.0	40.0	45.1	50.3	55.8	31.8	37.3	42.8	48.3	53.9	59.4	33.4	38.9	44.8	50.6	56.2	62.2
1200	28.9	33.9	38.8	43.8	48.9	53.9	30.9	36.1	41.4	46.8	52.1	57.4	32.2	37.7	43.2	48.7	54.2	59.8
1000	26.5	31.1	35.6	40.2	44.8	49.4	28.2	33.0	37.8	42.6	47.4	52.3	29.2	34.2	39.2	44.2	49.2	54.2
1020	26.8	31.4	36.2	40.7	45.3	50.0	28.3	33.1	37.9	42.9	47.8	52.8	29.4	34.6	39.6	44.7	49.8	54.9
Water Temp.	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180
	3 GPM						4 GPM						5 GPM					

Dimensions & Clearances



Model	AH-U-S2A-30-P16
Voltage	120 VAC 60 Hz
Hp	1/3
Amps (total)	8
Water Connections	1/2" (13 mm) Copper Soldered Connection
Airflow (High)	1280 CFM
.25 in wg	1075 CFM
.5 in. wg	
Net Weight	111 lbs. (54.9 kg)
Shipping Weight	130 lbs. (59 kg)

Warranty

Units carry a five year replacement parts warranty on all components.

Date: _____
 Tag: _____ Qty: _____
 Project: _____
 Engineer: _____

Contractor: _____
 Supplier: _____
 Quote#: _____
 Submitted by: _____



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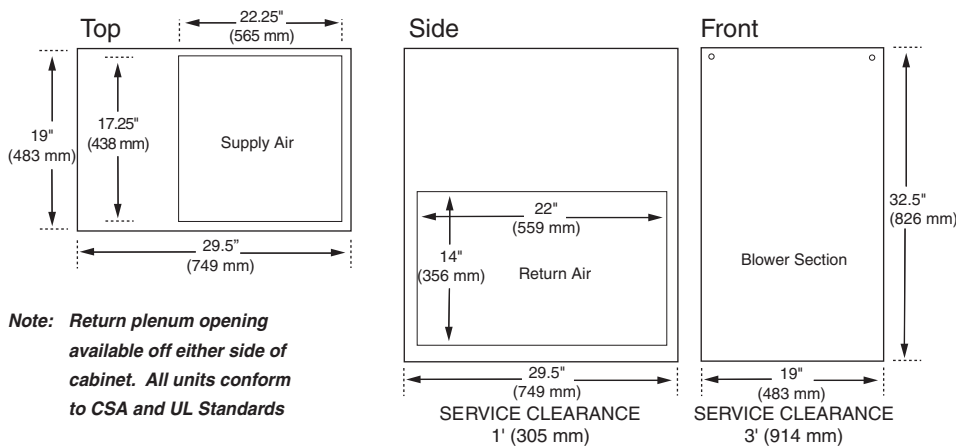
Filters 1" (25 mm) pleated in return plenum side.

Case Prepainted galvanized steel for superior corrosion resistance.

L2A-36 Coil Output Chart (1000's of BTUH)

CFM @ .5" WG	L2A-36 Coil Output Chart (1000's of BTUH)																										
	1220	1175	1022	705	1402	1357	1090	731	Water Temp.	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180
	32.9	38.5	44.2	49.8	55.4	61.1	35.2	41.2	47.2	53.2	59.2	65.3	36.7	43.0	49.2	55.4	61.7	68.0									
	32.8	37.8	43.3	48.9	54.4	60.0	34.5	40.4	46.2	52.1	58.0	63.9	36.0	42.0	48.1	54.3	60.4	66.5									
	30.2	35.3	40.4	45.6	50.8	55.9	32.0	37.5	42.9	48.4	53.8	59.3	33.3	38.9	44.5	50.2	55.8	61.5									
	24.7	28.9	33.1	37.3	41.5	45.7	25.9	30.2	34.6	39.0	43.4	47.8	26.6	31.1	35.6	40.1	44.6	49.1									
	35.1	41.0	47.0	53.1	59.1	65.1	37.7	44.1	50.6	57.0	63.5	70.0	39.5	46.2	52.9	59.7	66.4	73.2									
	34.6	40.4	46.4	52.3	58.2	64.2	37.1	43.4	49.8	56.1	62.5	68.9	38.8	45.4	52.0	58.7	65.3	71.9									
	31.2	36.5	41.8	47.1	52.4	57.8	33.2	38.8	44.4	50.1	55.8	61.4	34.5	40.3	46.2	52.0	57.9	63.8									
	25.5	29.5	33.8	38.1	42.4	46.7	26.4	30.9	35.4	39.9	44.4	48.9	27.2	31.8	36.4	41.0	45.6	50.2									
	3 GPM						4 GPM						5 GPM														

Dimensions & Clearances



Model	AH-U-L2A-36-P16
Voltage	120 VAC 60 Hz
Hp	1/2
Amps (total)	10.6
Water Connections	1/2" (13 mm) Copper Soldered Connection
Airflow (High)	.25 in wg .5 in wg
Net Weight	1402 CFM 1220 CFM
Shipping Weight	121 lbs. (50.3 kg)
	140 lbs. (59 kg)

Warranty

Units carry a five year replacement parts warranty on all components.

Date: _____
 Tag: _____ Qty: _____
 Project: _____
 Engineer: _____

Contractor: _____
 Supplier: _____
 Quote#: _____
 Submitted by: _____



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Filters 1" (25 mm) pleated in return plenum side.

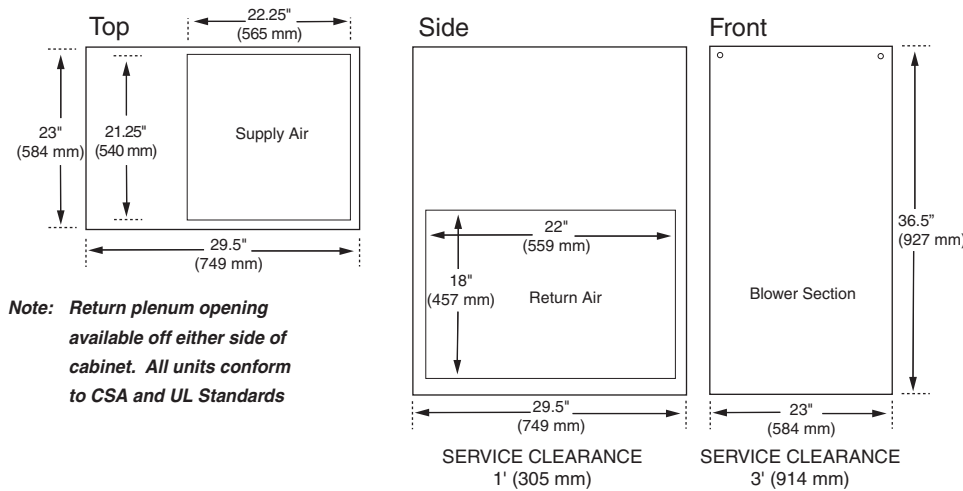
Case Prepainted galvanized steel for superior corrosion resistance.

L2B-48 Coil Output Chart (1000's of BTUH)

CFM @ .5" WG	L2B-48 Coil Output Chart (1000's of BTUH)																		
	1639	1618	1575	1967	1868	1728	130	140	150	160	170	180	130	140	150	160	170	180	
	37.5	43.9	50.3	56.8	63.3	69.7	40.7	47.6	54.5	61.5	68.5	75.5	42.8	50.0	57.3	64.6	71.9	79.3	
	37.3	43.7	50.0	56.5	62.9	69.3	40.4	47.2	54.2	61.1	68.0	75.0	42.5	49.7	56.9	64.2	71.5	78.7	
	36.9	43.2	49.5	55.8	62.2	68.6	39.9	46.7	53.5	60.3	67.2	74.0	41.9	49.0	56.1	63.3	70.5	77.7	
	40.4	47.3	54.2	61.1	68.1	75.1	44.1	51.6	59.2	66.7	74.3	81.9	46.7	54.6	62.5	70.5	78.5	86.6	
	39.6	46.3	53.1	59.9	66.7	73.6	43.1	50.5	55.8	65.2	72.7	80.1	45.5	53.3	61.1	68.8	76.7	84.5	
	38.3	44.9	51.4	58.1	64.7	71.3	41.6	48.7	55.9	63.0	70.2	77.3	43.9	51.3	58.8	66.3	73.8	81.4	
CFM @ .25" WG	Water Temp.	130	140	150	160	170	180	130	140	150	160	170	180	130	140	150	160	170	180

3 GPM
4 GPM
5 GPM

Dimensions & Clearances



Model	AH-U-L2B-48-P16
Voltage	120 VAC 60 Hz
Hp	3/4
Amps (total)	12.2
Water Connections	1/2" (13 mm) Copper Soldered Connection
Airflow (High)	.25 in wg .5 in. wg
	1967 CFM 1639 CFM
Net Weight	135 lbs. (61.2 kg)
Shipping Weight	155 lbs. (70.3 kg)

Warranty

Units carry a five year replacement parts warranty on all components.

Date: _____
 Tag: _____ Qty: _____
 Project: _____
 Engineer: _____

Contractor: _____
 Supplier: _____
 Quote#: _____
 Submitted by: _____



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COMMISSIONING OF INTEGRATED COMBO SYSTEM



*Training Courses and Forms
are available from
HRAI Skill Tech Academy
1-800-267-2231*

Designer/Signature: _____

Phone () _____ Fax () _____ Date: D ____ M ____ Y ____

Submitted For: (Owner)

Name _____

Address _____

City _____ Prov. _____

Postal Code _____

Phone () _____ Fax () _____

By: (Contractor)

Name _____

Address _____

City _____ Prov. _____

Postal Code _____

Phone () _____ Fax () _____

INSTALLED EQUIPMENT

Water Heater make & model as designed		Throttling Valve	
Air Handler make & model as designed		Anti-scalding Valve	
Cooling Unit make & model as designed		Back Flow Prevention Valve	
Filter type and size as designed		Expansion Tank	
2 shut off valves for heating loop		Off Season Circulation Controls	
Check Valve		Other	
Drain Valve			

Part E - SYSTEM START UP

E.1 Fill Water Heater with water <input type="checkbox"/>	E.5 Start Air Handler <input type="checkbox"/>
E.2 Set Water Heater at designed temperature <input type="checkbox"/>	E.6 Check Circulation Pump Operation <input type="checkbox"/>
E.3 Fill Heating Loop with water <input type="checkbox"/>	E.7 Check Circulation Fan Operation <input type="checkbox"/>
E.4 Purge Circulation Pump <input type="checkbox"/>	E.8 Label Water Heater <input type="checkbox"/>

Part F - SYSTEM COMMISSIONING

Design Information: (Information for this section can be found on the " Worksheet for Integrated Combo System Design" part B)

Total Heat Loss _____ Btu/h Air Handler: output _____ Btu/h Eff. Water Heater output _____ Btu/h
 Air Handler ESP: _____ ins. W.C. Air Flow rate: _____ CFM Fan speed _____
 Supply Water temp.: _____ °F Return Water temp.: _____ °F Supply Air temp.: _____ °F Return Air temp.: _____ °F

F.1 Supply Water Temp. _____ °F <i>(measured)</i>	F.6 Required Supply Air Temperature _____ °F <i>(F.4 + F.5)</i>
F.2 Air Handler Output at F.1 Condition _____ Btu/h	F.7 Returned Water Temperature _____ °F <i>(measured)</i>
F.3 Air Handler Operating CFM _____ CFM <i>(from specs)</i>	F.8 Water Temperature Difference _____ °F (min. 20°F) <i>(F.1 - F.7)</i>
F.4 Return Air Temperature _____ °F <i>(measured)</i>	F.9 Actual Supply Air Temperature _____ °F <i>(measured)</i>
F.5 Required Air Temperature Difference _____ °F <i>(F.2 ÷ (F.3 x 1.08))</i>	F.10 Anti-Scald Valve (if present) Outlet Temperature _____ °F <i>(measured)</i>

CAUTION

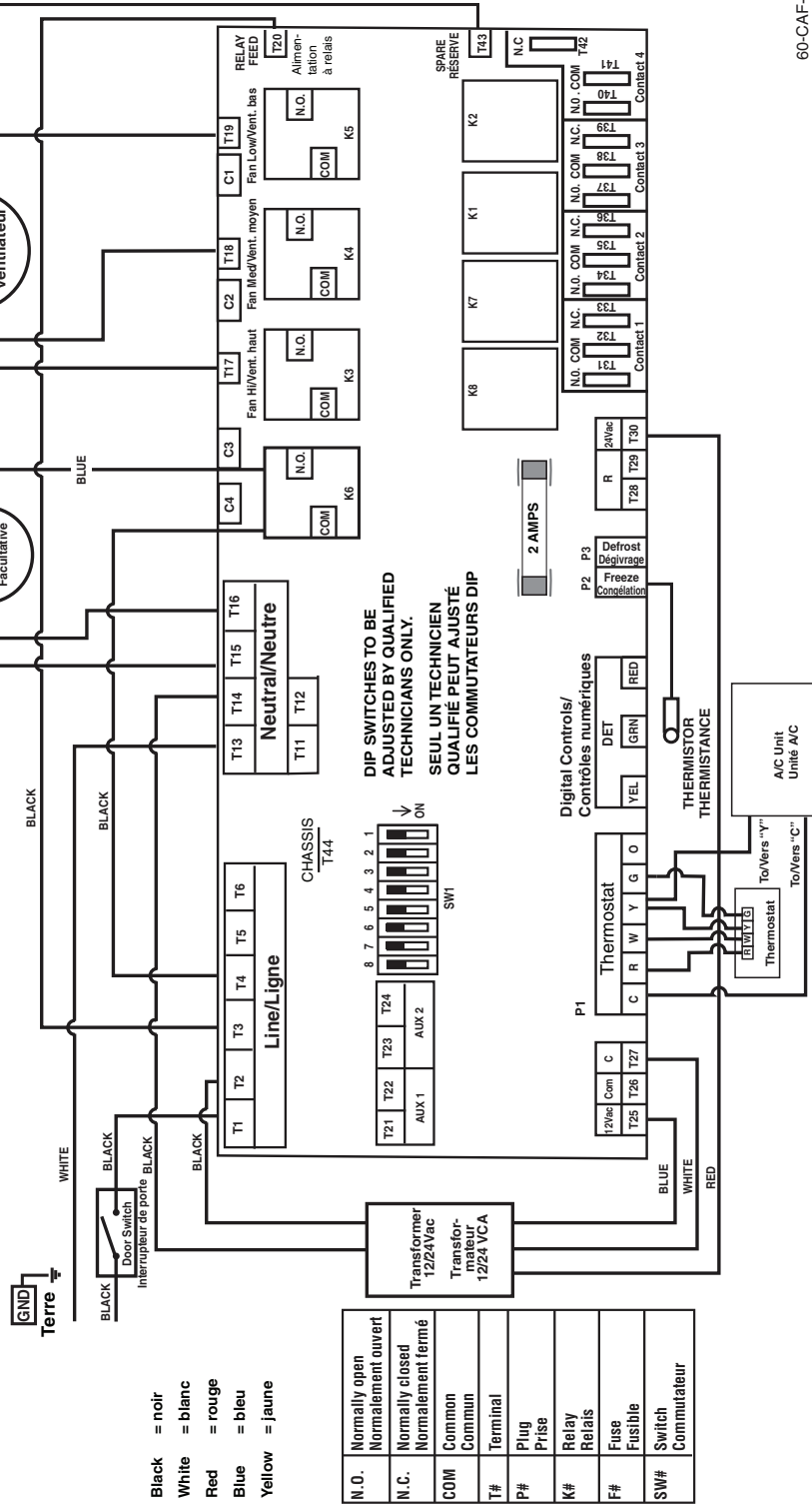
Electrical control panel service by electrician only. Disconnect electrical supply prior to servicing. Improper wiring may result in damage to this unit. Use copper supply wires.

ATTENTION

Entretien du panneau de contrôle électrique par un électricien seulement. Coupez l'alimentation électrique avant de procéder à l'entretien. Un câblage inadéquat pourrait endommager cet appareil. Utilisez des câbles de cuivre

Standard Motor CAF/Air Handler Wiring Diagram

Schéma de câblage d'un moteur de FAP/Appareil de traitement de l'air standard



60-CAF-AH-01

WARNING

Do not initiate power before plumbing is commissioned.

CAUTION

Electrical control panel service by electrician only. Disconnect electrical supply prior to servicing. Improper wiring may result in damage to this unit. Use copper supply wires.

ATTENTION

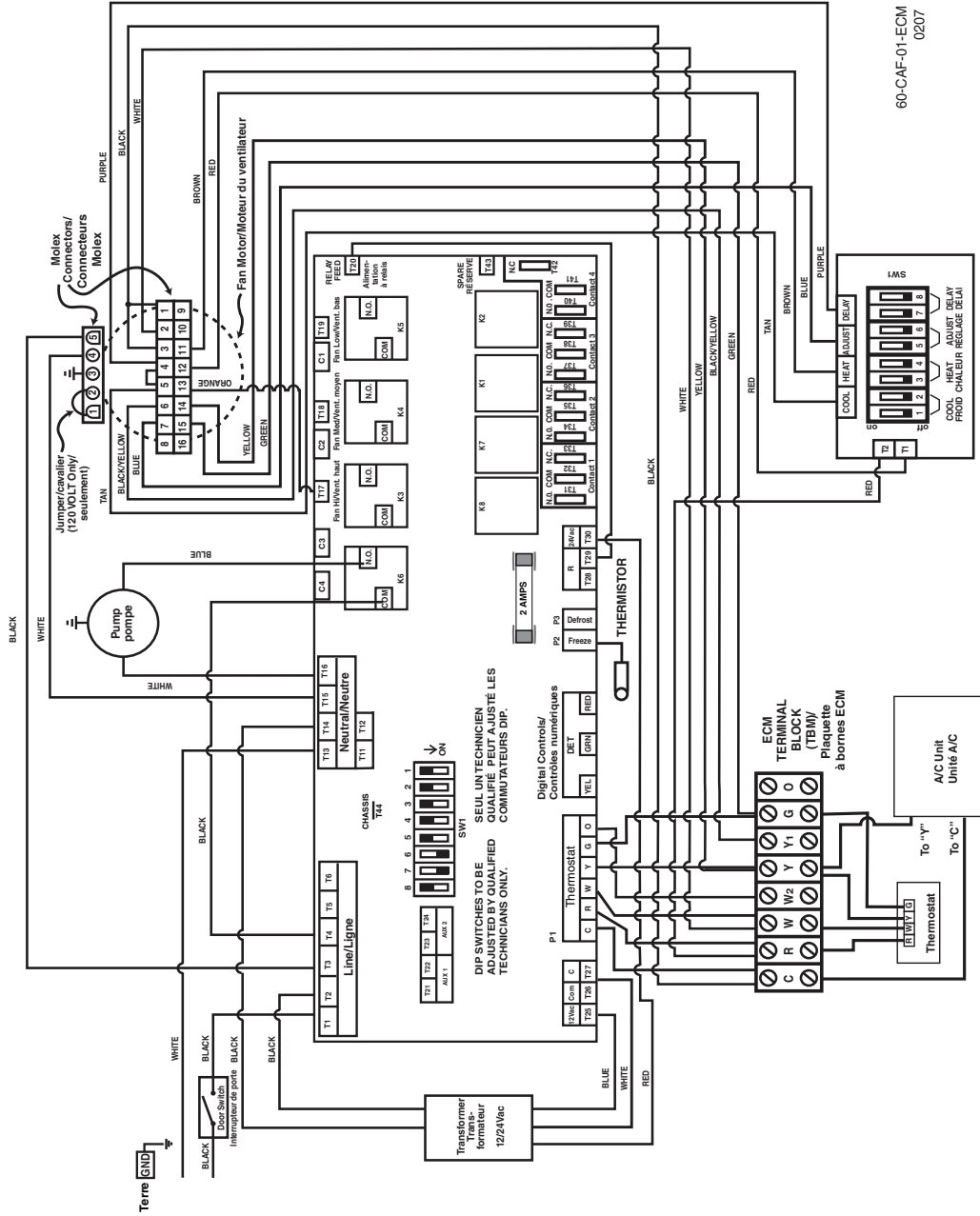
Entretien du panneau de contrôle électrique par un électricien seulement. Coupez l'alimentation électrique avant de procéder à l'entretien. Un câblage inadéquat pourrait endommager cet appareil. Utilisez des câbles de cuivre.

ECM - CAF/Air Handler Wiring Diagram/

Schéma de câblage FAP/Appareil de traitement de l'air - moteur à commutation électronique ECM

- Black = noir
- White = blanc
- Red = rouge
- Blue = bleu
- Yellow = jaune
- Tan = havane
- Purple = pourpre
- Brown = brun

N.O.	Normally open	Normalement ouvert
N.C.	Normally closed	Normalement fermé
COM	Common	Commun
T#	Terminal	Terminal
P#	Plug	Prise
K#	Relay	Relais
F#	Fuse	Fusible
SW#	Switch	Commutateur



60-CAF-01-ECM
0207

WARNING

Do not initiate power before plumbing is commissioned.

TO BE COMPLETED BY CONTRACTOR AFTER INSTALLATION

Installing Contractor

Telephone / Contact

Serial Number

Installation Date

Model

Register for your warranty at www.lifebreath.com

Airia will require the Model and Serial Number to register the unit.



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