SunTherm™ HEATING PRODUCTS

INSTALLATION MANUAL

Intertek

Vertical Wall Mount Installation – Models With DX Cooling and Electric or Hot Water Heat
AHW1 and AHW2 SERIES

LIST OF SECTIONS

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SECTION 1: GENERAL

The following list includes important facts and information regarding this air handler.

1. Models with electric heat and not heat are rated for 208/240 VAC, 60 Hz, 1-Phase.
2. Models with hydronic heat are rated for 115 VAC, 60 Hz, 1-Phase.
3. Air handler control circuit is rated at 24 VAC, 60 Hz.
4. Air handler size varies by model.
5. Four-wire thermostat operation for heat/cool applications.
6. Seven wire thermostat operating for heat pump applications.
7. Air handler is designed for both cooling only and heat pump applications.
8. Air handler is designed for upflow applications only.
9. Air handler must not be operated without the access door installed.
10. Air handler is listed by ETL for the United States and Canada.

⚠ WARNING

This air handler shall only be connected to an outdoor unit suitable for the same refrigerant.

This air handler (Model Series AHW) is a partial unit air conditioner, complying with partial unit requirements of Standard UL 60335-2-40 / CSA C22.2 No. 60335-2-40, and must only be connected to other units that have been confirmed as complying to corresponding partial unit requirements of Standard UL 60335-2-40 / CSA C22.2 No. 60335-2-40.

SAVE THIS MANUAL FOR FUTURE REFERENCE

AHW DX Cooling With or Without Electric Heat

AHW DX Cooling With or Without Hot Water Heat

This is a safety alert symbol. When you see this symbol on labels or in manuals, be alert to the potential for personal injury. Understand and pay particular attention to the signal words **DANGER, WARNING, or CAUTION.**

DANGER: Indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury.**
WARNING: Indicates a potentially hazardous situation, which if not avoided, **could result in death or serious injury.**
CAUTION: Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury.** It is also used to alert against unsafe practices and hazards involving property damage.

⚠ IMPORTANT

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

⚠ WARNING

Improper installation may create a condition where the operation of the product could cause personal injury or property damage.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual for assistance; or for additional information consult a qualified contractor, installer, or service agency.

⚠ CAUTION

This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes including, but not limited to; building, electrical, and mechanical codes.

⚠ WARNING

FIRE OR ELECTRICAL HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death, or property damage.

A fire or electrical hazard may result causing property damage, personal injury or loss of life.

⚠ WARNING

RISK OF FIRE

This unit is equipped with a refrigerant leak detection system for safety and with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ WARNING

RISK OF FIRE

Refer to Tables 20 and 21 for the minimum floor area of the conditioned space served by this air-handler due to the use of an A2L class flammable refrigerant.

⚠ WARNING

RISK OF FIRE

This air handler shall only be connected to an outdoor unit suitable for the same refrigerant.

⚠ WARNING

RISK OF FIRE

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (e.g.: open flames, an operating gas appliance, or an operating electric heater.

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

Safety Requirements

This air handler should be installed in accordance with all national and local building/safety codes and requirements, local plumbing or waste water codes, and other applicable codes. In the absence of local codes, install in accordance with the following codes.

- Standard for the Installation of Air Conditioning and Ventilating Systems (NFPA 90A)
- Standard for the Installation of Warm Air Heating and Air Conditioning Systems (NFPA 90B)
- National Electrical Code (NFPA 70)
- Canadian Electrical Code, Part I (CSA C22.2) or ANSI/NFPA No. 70
- All local codes (State, City, and Township)

NOTE: All applicable codes take precedence over any recommendation made in these instructions. Mortex Products, Inc. assumes no responsibility for units installed in violation of any code or regulation.

1. Refer to the Figure 6 of this manual for the bottom return air opening dimensions for installations with the return air entering the bottom of the air handler. The plenum must be installed according to the above listed codes or the instructions in this manual.
2. Refer to Figure 1, Figure 4, and Table 2 of this manual for the outlet duct flange dimensions on top of the air handler. The outlet duct must be installed according to the instructions in' this manual.
3. These models are not ETL listed or approved for installation into a manufactured (mobile) home.
4. Provide clearances from combustible materials as show in **Table 5: Clearances to Combustibles and Figure 3: Closet Clearances**.
5. Provide clearances for servicing ensuring service access is allowed for the control box, electric elements, hot water coil and the blower **(See Figure 2: Clearance - Access for Service)**.
6. Confirm that the power supply complies with the electrical characteristics listed on the air handler rating plate.
7. Failure to carefully read and follow all instructions in this manual can result in malfunction of the air handler, death, personal injury, and/or property damage.
8. The air handler must be installed so the electrical components are protected from water.
9. Installing and servicing heating/cooling equipment can be hazardous due to electrical components.
10. Only trained and qualified personnel should install, repair, and service heating/cooling equipment. Untrained service personnel can perform basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters. Observe all precautions listed in this manual and on the labels when installing and servicing this air handler.
11. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some cases, these instructions exceed certain local codes and ordinances, especially those who have not kept up with changing home and/or HUD construction practices. These instructions are to be followed and are the minimum requirement for a safe installation.
12. The size of the heating and cooling system should be based on an acceptable heat/heat gain loss calculation for the structure. ACCA Manual J or other approved methods may be used.
13. Models with electric heat use a nominal 208 or 240 VAC, 1-Phase, 60-Hz power supply.
14. Models with hydronic heat use a nominal 115 VAC 1- Phase, 60 Hz power supply.
    NOTE: DO NOT CONNECT THIS AIR HANDLETO A 50 HZ POWER SUPPLY OR A VOLTAGE ABOVE 250 VOLTS FOR ELECTRIC HEAT MODELS OR ABOVE 132 VOLTS FOR HYDRONIC HEAT MODELS.
15. Ground connections must be securely fastened to the ground lug located inside the control box.
16. This air handler is for use at elevations of 10,000 ft (3,048m) or less.
17. This air handler is not to be used 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 this air handler by a person responsible for their safety. Children must not be allowed to play with this air handler.
18. 208/240V air handlers are shipped from the factory for 240VAC applications. The transformer must be reconfigured for 208VAC applications using the following steps to assure adequate control voltage (24VAC).
    a) Remove the zip tie from the transformer wire bundle that secures the BLACK, ORANGE and WHITE wires together.
    b) Disconnect the WHITE (240VAC) transformer primary wire with an insulated terminal from the load side of the circuit breaker and connect the ORANGE (208VAC) transformer primary wire with an insulated terminal to the same terminal on the circuit breaker.
    c) Secure the loose BLACK, ORANGE and WHITE wires to the transformer wire bundle with a zip tie.
    d) If the main electrical panel supplying electrical power to the air handler utilizes circuit breakers, the circuit breakers must be HACR type.
    e) A means of disconnecting all poles of the incoming line voltage power to the air handler must be provided in the fixed field wiring within sight of the air handler unless the air handler is equipped with integral circuit breaker(s) with their ON/OFF lever(s) located on the outside of the air handler which can be used to disconnect line voltage electrical power to the air handler.
19. Ground connections must be securely fastened to the control box and ground wires must be secure.
20. Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse

environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

21. Installation, servicing and maintenance must only be performed by qualified service personnel that are licensed by the state to install, service, and repair HVAC equipment and those who have successfully completed a course in handling, installing, commissioning, maintenance, servicing, repairing, decommissioning, and disposing of equipment using a flammable refrigerant offered by an accredited national training organization or the manufacturer of the equipment.
22. Non-duct connected appliances containing A2L refrigerants with the supply and return air openings in the conditioned space may have the body of the appliance installed in open areas such as false ceilings not being used as return air plenums, as long as the conditioned air does not directly communicate with the air of the false ceiling.
23. The use of dropped ceilings for return air is not permitted for this air handler.
24. **Safely Commissioning of the System**
    - Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
    - Connect the pipes and carry out a leak test before charging with refrigerant.
    - Check safety equipment before putting into service.

Proper Safe Working Procedures for Equipment Using Flammable Refrigerants

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following steps must be completed prior to conducting work on the system.

1) Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapour being present while the work is being performed.

2) All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

3) The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants (i.e.: non-sparking, adequately sealed or intrinsically safe).

4) If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

5) No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

6) Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

7) Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

8) The following checks shall be applied to installations using flammable refrigerants:
   - the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;
   - marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
   - refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

9) **Detection of Flammable Refrigerants**

   Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

   The following leak detection methods are deemed acceptable for all refrigerant systems.

   Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

   Leak detection fluids are also suitable for use with most refrigerants, but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

   NOTE: Examples of leak detection fluids are:
   - bubble method,
   - fluorescent method agents.

   If a leak is suspected, all naked flames shall be removed/ extinguished.

   If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Step 10 below.

10) **Removal and Evacuation**

When breaking into the refrigerant circuit to make repairs or

for any other purpose conventional procedures shall be used. However, for flammable refrigerants, it is important that best practice be followed since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

11) **Charging Procedures**

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

12) **Refrigerant Recovery Requirements**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e: special cylinders for the recovery of refrigerant).

Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

⚠ WARNING

FIRE HAZARD

For air handlers using A2L refrigerants connected via an air duct system to one or more rooms, auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding 1290°F (700°C) and electric switching devices.

⚠ WARNING

Always shut off electricity at the disconnect switch or turn off the circuit breakers in the main electrical panel before performing any service to this air handler.

⚠ WARNING

For air handlers using A2L refrigerants connected via an air duct system to one or more rooms, only auxiliary devices approved by the air handler manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

⚠ WARNING

RISK OF FIRE – FLAMMABLE REFRIGERANT APPLICATIONS

If any refrigerating circuit contains more than 62.6 oz (1.776 kg) of R-454B refrigerant or more than 64.6 oz (1.836 kg) of R-32 refrigerant, an unventilated area where the air-handler using a flammable refrigerant is installed shall be so constructed that should any refrigerant leak, it will not stagnate and create a fire or explosion hazard.

If the air duct system connected to one or more rooms with an area less than the minimum conditioned space floor area shown in Tables 20 and 21 based on the total system refrigerant charge, that room shall be without continuously operating open flames (e.g.: an operating gas appliance) or other potential ignition sources (e.g.: an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

⚠ WARNING

RISK OF FIRE – FLAMMABLE REFRIGERANT APPLICATIONS

The ductwork connected to this air-handler shall not contain an ignition source.

Auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding 1292°F (700°C and electric switching devices.

Only auxiliary devices approved by the air-handler manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

⚠ WARNING

Hot water from a boiler used to satisfy heating requirements can be heated to temperatures of 180°F. Parts containing water this hot can quickly scald. Use extreme caution when servicing or performing maintenance on any parts containing hot water.

GENERAL INFORMATION

This air handler provides the flexibility for installation in most upflow or vertical wall mount applications and can be configured with or without electric heat or with hydronic heat. The constant torque motor provides a selection of air volume to match most applications. The air handler may be positioned for bottom air return or front return.

Maximum Operating Temperature for Heat Pump Applications

For heat pump applications, the maximum outdoor temperature recommended by the manufacturer while the system is operating in the heating mode is 70°F/23.9°C.

Inspection

As soon as the air handler is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. Before installing the air handler, check the cabinet for screws or bolts which may have loosened in transit. There are no shipping or spacer brackets that need to be removed before installation.

Check to be sure all accessories such as heater kits and coils are available. Installation of these accessories should be accomplished before the air handler is set in place or the connecting of the wiring, ductwork, or piping.

See local distributor for more information. Mortex Products, Inc assumes no liability for freight damage.

Model No.	Nominal Tons	Blower Code	Blower Motor HP	Cooling Blower Speed Tap	Blower Size	Nominal Cooling CFM @ 0.30 inwc ESP With Coil	Nominal Heating Speed (CFM) @ 0.30 inwc ESP / Speed Tap	Electric Heater Kw	Voltage / PH / HZ	Thermostat Circuit Voltage / PH / HZ	Max. External Static Duct Pressure (in. W.C.)
AHW1	1.5 - 2.0	LM	1/3	5	10 x 7T	850	600 / 2 *	0 - 8	208-240 / 1 / 60	24 / 1 / 60	0.30
AHW1	2.5	LG	1/3	5	10 x 7T	1000	750 / 1	0 - 8	208-240 / 1 / 60	24 / 1 / 60	0.30
AHW1	3	LI	1/2	5	10 x 8T	1250	975 / 1	0 - 10	208-240 / 1 / 60	24 / 1 / 60	0.30
AHW2	1.5 - 2.0	LK	1/2	5	10 x 8T	1100	830 / 1	N/A	115 / 1 / 60	24 / 1 / 60	0.30
AHW2	2.5 - 3.0	LL	1/2	5	12 x 8T	1235	796 / 1	N/A	115 / 1 / 60	24 / 1 / 60	0.30

Table 1: Air Handler Specifications

*Indicates minimum heating speed tap for that blower motor code. Do not use a lower speed tap for the heating speed as it will result in insufficient airflow and possible safety limit tripping.

Available Blower Motors

1. Blower Motor – 1/3 HP 5 Speed Constant Torque
2. Blower Motor – 1/2 HP 5 Speed Constant Torque

	Cabinet Dimensional Data in inches				
Model	A	B	C	D	E
AHW1	22	18.75	14	11	36
AHW2	22	18.75	20	10	39

Table 2: Air Handler Dimensional Data

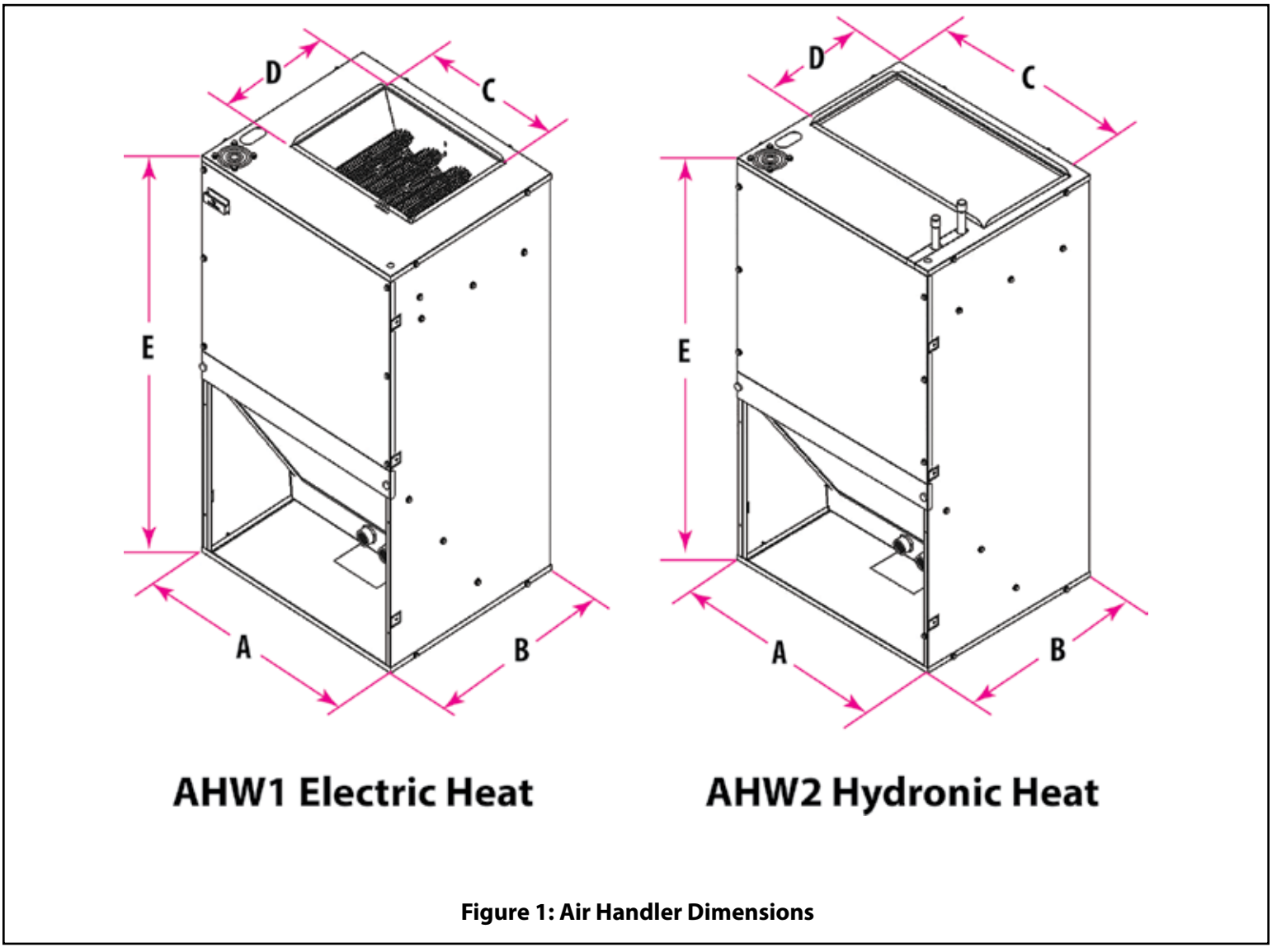
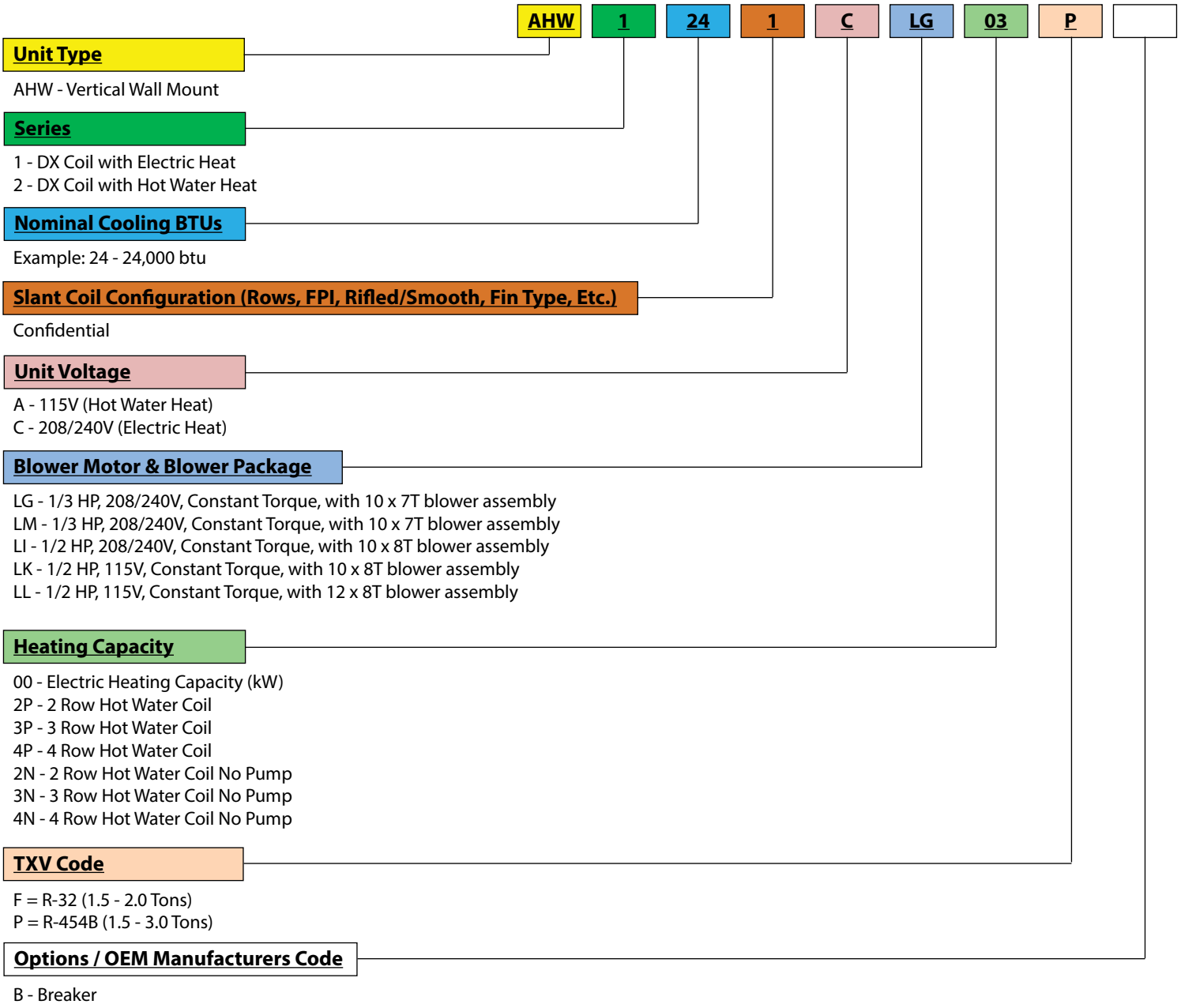


Figure 1: Air Handler Dimensions

AHW Vertical Wall Mounted Air Handler

DX Cooling / Electric Heat / Hot Water Air Handler



Standard Features:
Factory Installed TXV
Factory Installed Disconnect
Front "Return Air" Application

Optional Features:
BR - Solid Front Panel (Bottom "Return Air" Application)

Table 3: Model Number Nomenclature

SECTION 3: AIR HANDLER INSTALLATION

The air handler can be installed in a closet, an alcove, a framed in wall mount, or in a basement. The air handler must be level to allow for proper condensate drainage.

⚠ WARNING

RISK OF FIRE

Refer to Tables 20 and 21 for the minimum floor area of the conditioned space served by this air-handler due to the use of an A2L class flammable refrigerant.

⚠ WARNING

RISK OF FIRE – FLAMMABLE REFRIGERANT APPLICATIONS

If any refrigerating circuit contains more than 62.6 oz (1.776 kg) of R-454B refrigerant or more than 64.6 oz (1.836 kg) of R-32 refrigerant, an unventilated area where the air-handler using a flammable refrigerant is installed shall be so constructed that should any refrigerant leak, it will not stagnate and create a fire or explosion hazard.

If the air duct system connected to one or more rooms with an area less than the minimum conditioned space floor area shown in Tables 20 and 21 based on the total system refrigerant charge, that room shall be without continuously operating open flames (e.g.: an operating gas appliance) or other potential ignition sources (e.g.: an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

When flammable A2L class refrigerants are used, the minimum floor area of the conditioned space the air handler serves must comply with Tables 20 and 21 to allow a refrigerant leak to disperse and be diluted with air to eliminate the risk of the refrigerant igniting and causing an explosion and/or fire. The minimum floor area must be corrected by an altitude adjustment factor based on the building site ground level altitude. See Table 4 for the altitude adjustment factor for various altitudes and refer to the example below for how to apply the altitude adjustment factor.

Example:
Total System Charge = 2.6 kg of R-454B
Altitude = 2400 m
Min. Conditioned Floor Area (MCFA) from Table 20 = 7.97 m^2
Altitude Adjustment Factor (AF) from Table 4 = 1.24
Adjusted MCFA = MCFA x AF
Adjusted MCFA (@ 2400 m altitude) = 7.97 m^2 x 1.24 = 9.88 m^2

Altitude Correction Factors									
Altitude (m)	0	100	200	300	400	500	600	700	800
Altitude (ft)	0	328	656	984	1312	1640	1969	2297	2625
AF	1.00	1.01	1.02	1.02	1.03	1.04	1.05	1.06	1.07
Altitude (m)	900	1000	1100	1200	1300	1400	1500	1600	1700
Altitude (ft)	2953	3281	3609	3937	4265	4593	4921	5249	5577
AF	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15	1.16
Altitude (m)	1800	1900	2000	2100	2200	2300	2400	2500	2600
Altitude (ft)	5906	6234	6562	6890	7218	7546	7874	8202	8530
AF	1.17	1.18	1.19	1.20	1.21	1.22	1.24	1.25	1.26
Altitude (m)	2700	2800	2900	3000	3100	3200	3400	3600	3700
Altitude (ft)	8858	9186	9514	9842	10171	10499	11155	11811	12139
AF	1.27	1.29	1.30	1.31	1.33	1.34	1.37	1.40	1.42

Table 4: Altitude Adjustment Factors

Air Handler Orientation (Upflow Only):
This air handler is designed to be installed in an upflow air flow position only. It must not be installed in horizontal or downflow applications.

Location
Access for servicing is an important factor in the location of any air handler. Provide a minimum of 30 inches in front of the air handler for access to the control box, heating elements, hot water coil, blower and air filters. This access may be provided by a closet door or by locating the air handler so that a wall or partition is not less than 30 inches from the front access panel.

Location is usually predetermined. Check with owner's or dealer's installation plans before installation. If a location has not been determined, consider the following in choosing a suitable location.

1. Select a location with adequate structural support, space for service access, clearance for return and supply duct connections.
2. Normal operating sound levels may be objectionable if the air handler is placed directly over or under some rooms such as bedrooms, study, etc.
3. Caution should be taken to locate the air handler so that supply ducts are about the same length to achieve even air distribution of supply air to the living spaces.
4. Locate the air handler where electrical supply wiring can be easily routed to main electrical panel and where electrical wiring will not be damaged.
5. Locate the air handler where the thermostat wiring can be easily routed to the thermostat and where the wiring will not ben damaged.
6. Locate the air handler where the refrigerant lines can be easily routed to the outdoor unit.
7. Locate the air handler where the condensate lines can be easily routed to an available drain or to the exterior of the building. Route condensate drain piping so it does not obstruct access to the air filter or servicing of the air handler.
8. When the indoor coil is installed in a draw-through application as is the case with this air handler, a negative pressure will be created in the condensate drain system. To assure proper condensate drainage and to prevent condensate from being drawn into the air handler, the primary and secondary (overflow) condensate drains must be trapped as described in **Section 3: Air Handler Installation** and Figure 23 in these instructions. If the secondary drain is not used, it must be capped.
9. The exterior surface of air handler cabinet will likely sweat when it is installed in a non-conditioned space such as an attic or garage. The installer must install an auxiliary drain pan under

all air handlers installed in a non-conditioned space to prevent damage from condensation runoff.

10. Itis recommended that air handlers installed in non conditioned spaces be insulated on the exterior of the entire cabinet, including the front access panel with one (1) inch thick fiberglass with the vapor barrier on the outside. Some states, cities and counties require additional insulation to be \ installed on the exterior casing of the air handler installed in an unconditioned space to prevent sweating. Refer to the state, city, county or local code for insulation requirement to be sure the installation is in compliance.

Clearances

This air handler is approved for zero (0) inches clearance to combustible material on any part of the air handler exterior casing and the inlet or outlet ducts providing no electric heater is being used. There is a one (1) inch clearance requirement on the supply air duct or plenum when an electric heater is installed in the air handler. Refer to Table 5 and Figure 3 for clearance to combustibles information.

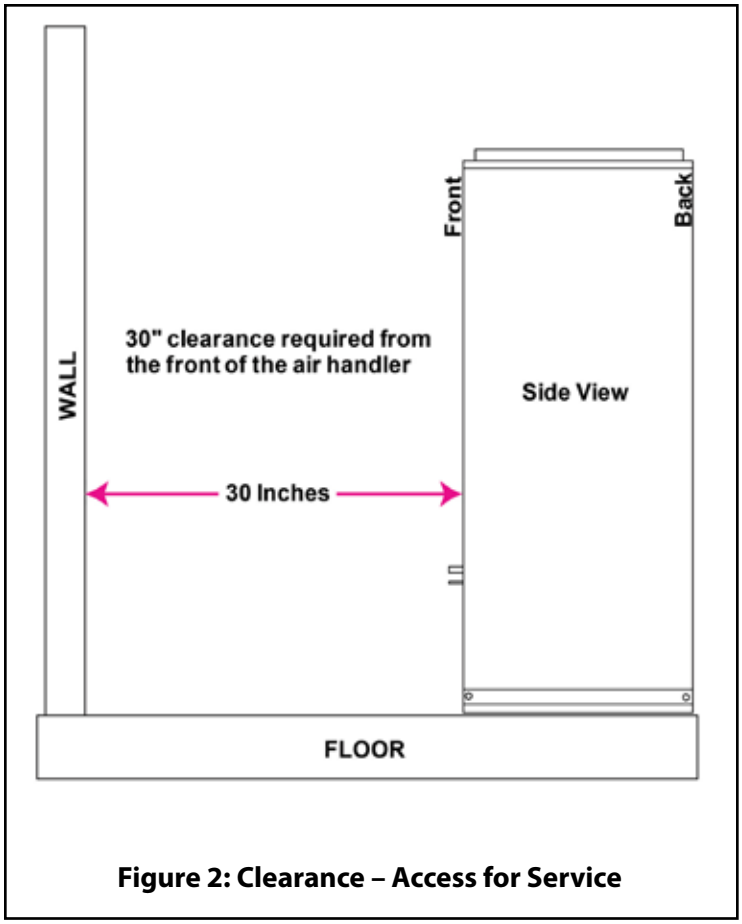


Figure 2: Clearance – Access for Service

					FRONT OF FURNACE		
Model	Top (in)	Back (in)	Sides (in)	Wall Panel Door (in)	Alcove (in)	Closet Door (in)	Duct (in)
AHW	0	0	0	6	30	6	1

Table 4: Clearances to Combustibles

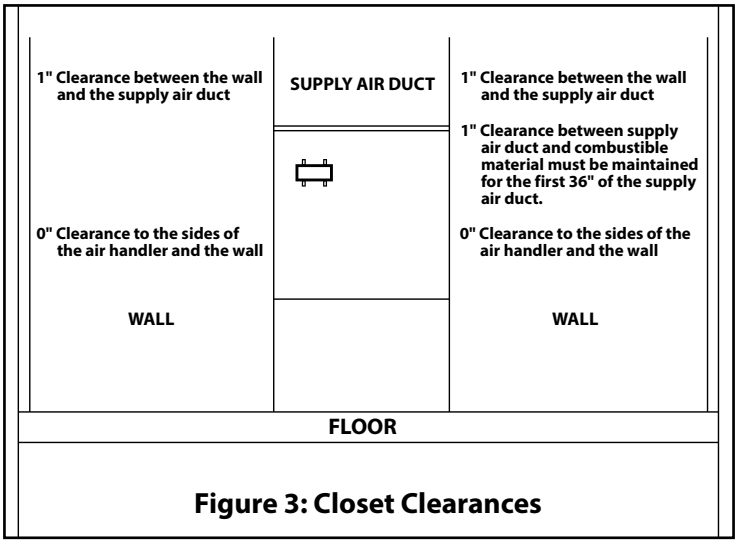


Figure 3: Closet Clearances

Return Air and Filter Requirements

Provisions must be provided for the air in the living spaces to return to the air handler. Failure to comply may cause a reduction in the amount of return air available to the blower, causing reduced air flow and improper heating or cooling of the living space. The reduced air flow may also cause the air handler to cycle on the heating over-temperature limit and premature heating element failure.

NOTE: Utilizing the space above a dropped ceiling for return air is not permissible for this air handler.

For wall mount installations, the front return air opening and internal return air filter is utilized. For closet installations, the front return air opening and internal return air filter may also be utilized if the closet door has a sufficiently sized return air grille with at least 6 inches of clearance between the closet door and the front of the air handler to allow the free flow of return air into the air handler. The closet door grille must have a minimum amount of total free area opening for the return air to pass through unrestricted.

For B/S/H-02 Air Handlers With 1/3 HP Blower Motor

- Minimum 200 in^2 free return air grille area opening

For B/S/H-03 Air Handlers With 1/2 HP Blower Motors

- Minimum 250 in^2 free area return air grille opening

Recommended Closet Door Return Grille Size

800 CFM – 20 X 20 Grille – 324 in^2
1000 CFM – 20 X 25 Grille - 414 in^2
1200 CFM – 25 X 25 Grille - 414 in^2

NOTE: Installation codes may limit the installation to a single level residence when no return air duct is used.

Closet installations may also utilize the bottom return air opening with a return duct located in the floor or platform under the air handler. Basement installations require the air handler to be installed on a return air base or enclosed platform for the return air duct to connect to.

Bottom return applications require the bottom return opening block-off panel to be removed and the installation of a field fabricated sheet metal block-off panel to cover the front return opening. The bottom return opening block-off panel can be removed by cutting the tabs that attach it to the air handler. For bottom return applications, a return air filter grille attached to the return duct may be used instead of the factory installed internal air filter.

NOTE: If a return air filter grille or return air base with an integral filter is utilized, remove the factory internal filter when the air handler is installed.

If a return air filter grille or return air base with integral filter is utilized, follow the minimum filter sizing requirements below.

Standard Disposable Air Filter @ 300 ft/min or less

800 CFM = 20 x 20 x 1
1000 CFM = 20 x 25 x 1
1200 CFM = 20 x 30 x 1

Pleated Disposable Air Filter @ 500 ft/min or less

800 CFM = 16 x 16 x 1
1000 CFM = 18 x 20 x 1
1200 CFM = 20 x 20 x 1

Supply Air Duct

The supply air outlet is located on the top of the air handler. Connect a supply air duct/plenum system to the supply air outlet flanges around the supply air outlet. See Figure 1, Figure 4, and Table 2 for the supply air opening dimensions. Use a non-tape sealant such as mastic or an aerosol sealant to prevent duct leakage.

⚠ WARNING

RISK OF FIRE – FLAMMABLE REFRIGERANT APPLICATIONS

The following requirements are necessary to allow the flammable refrigerant mitigation system to properly dilute the refrigerant with air in the event of a refrigerant leak.

The supply and return air shall be directly ducted to the space. Open areas such as false ceilings shall not be used as a return air duct.

Keep all supply and return registers for this air handler clear of obstructions.

Wall Mount Installations

This air handler is designed for recessed mounting in a wall or for hanging on the wall in a closet. Recessed mounted air handlers must be supported by 2x4 header between 2x4 studs as shown in Figure 7 below. Use the factory provided nail holes in the front edge of the air handler to attach cabinet to the framed opening. Be careful to locate the air handler so the drywall surface will be flush with edges of cabinet, permitting the wall panel accessory to be attached to cover the opening and edges of the drywall. Consider the routing of the electrical wiring, refrigerant lines, condensate lines, and hot water piping when framing the opening and cut the necessary holes prior to installing the air handler.

Closet Installations With Bottom Return Air

For closet installations that utilize the air handler bottom return air opening, the air handler may be installed directly on the floor or on a platform framed within the closet with a return air opening cut in the floor or platform for the return air plenum or duct. Cut the holes in the floor or ceiling for the refrigerant tubing, electrical wiring, thermostat wiring, and outdoor unit control wiring and cut the hole(s) for the condensate drain line(s) in the floor or wall prior to installing the air handler. Bottom return installations require the use of a non-tape sealant such as mastic or an aerosol sealant to seal between the air handler and the floor or platform to prevent air leakage.

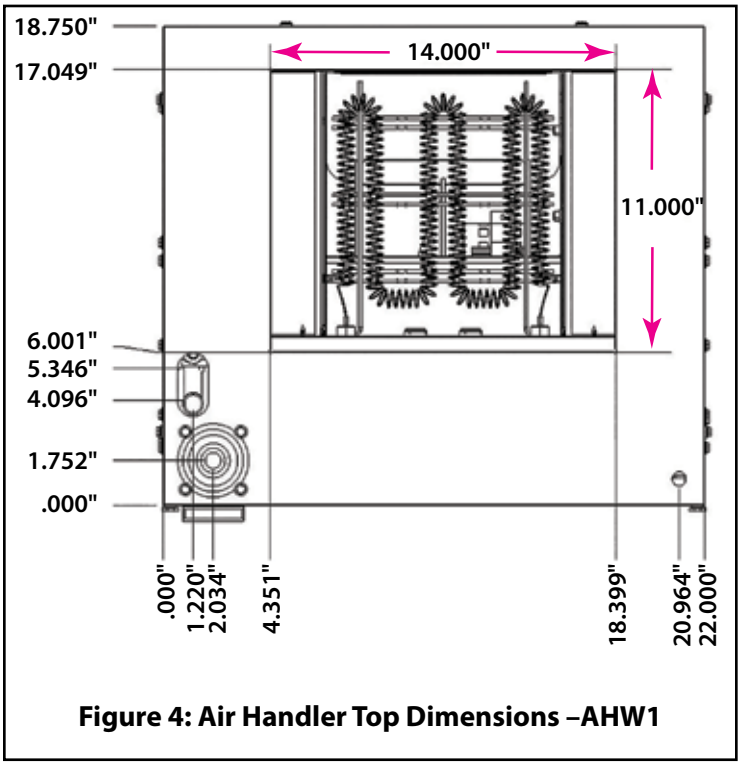


Figure 4: Air Handler Top Dimensions –AHW1

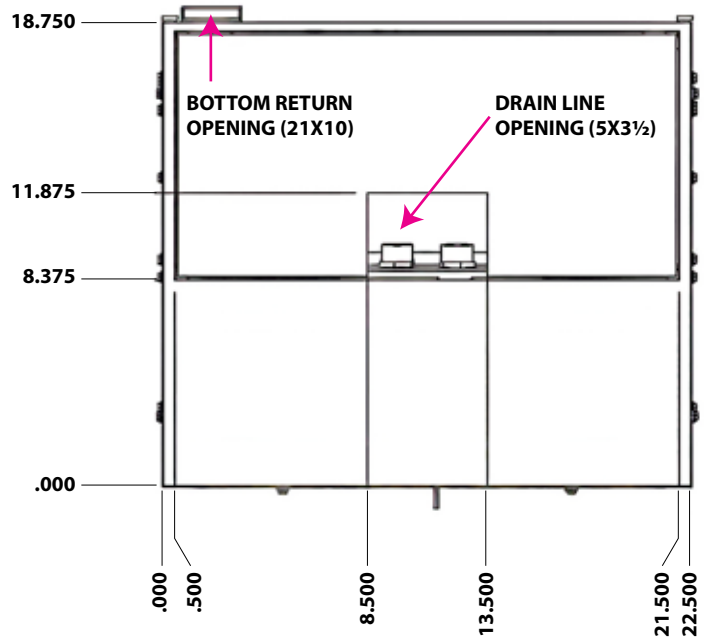


Figure 6: Air Handler Base Dimensions

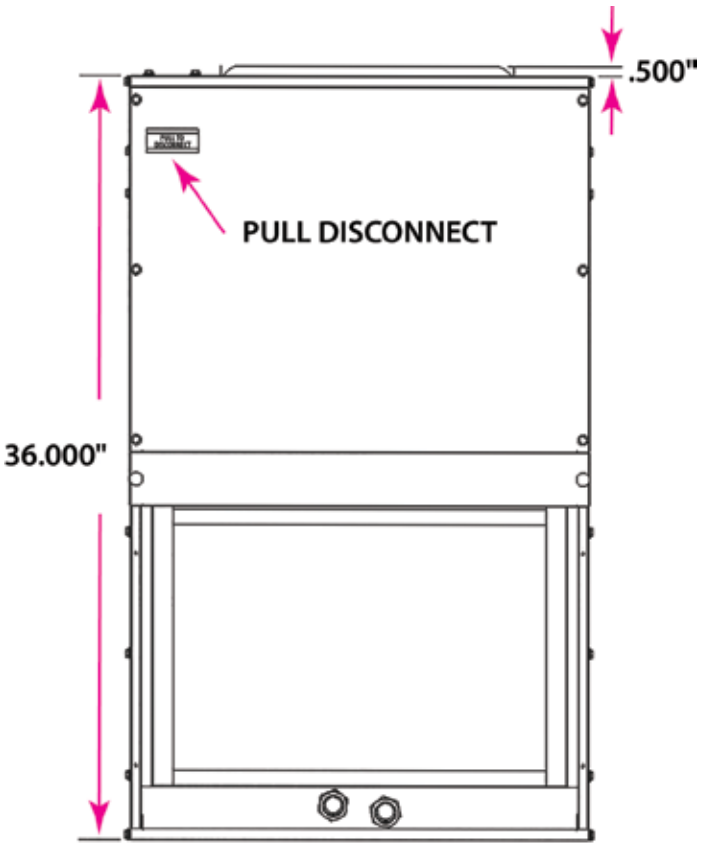


Figure 5: Air Handler Duct Mounting Flange Height

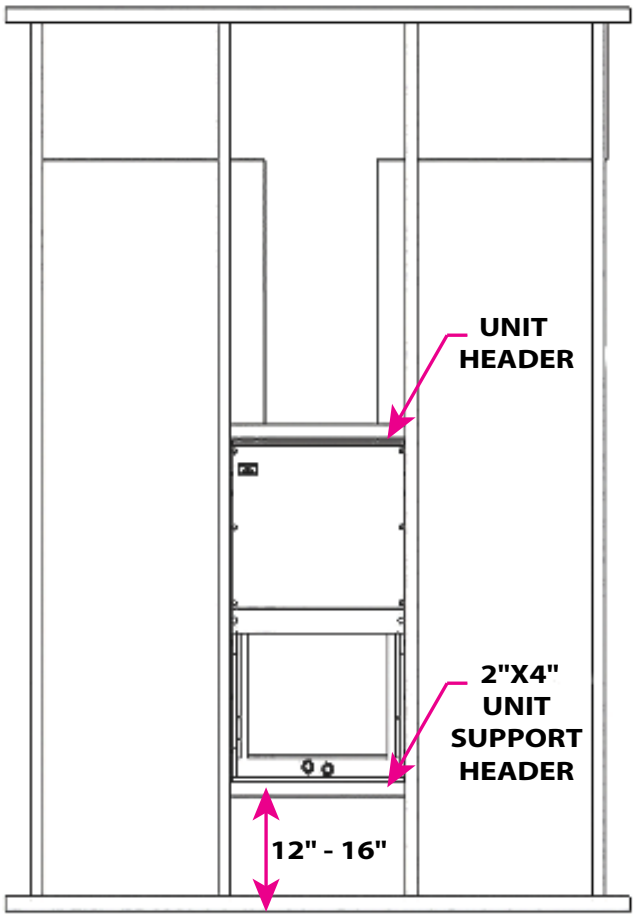


Figure 7: Typical Wall Mount Installation

Figure 8: Wall Panel Door

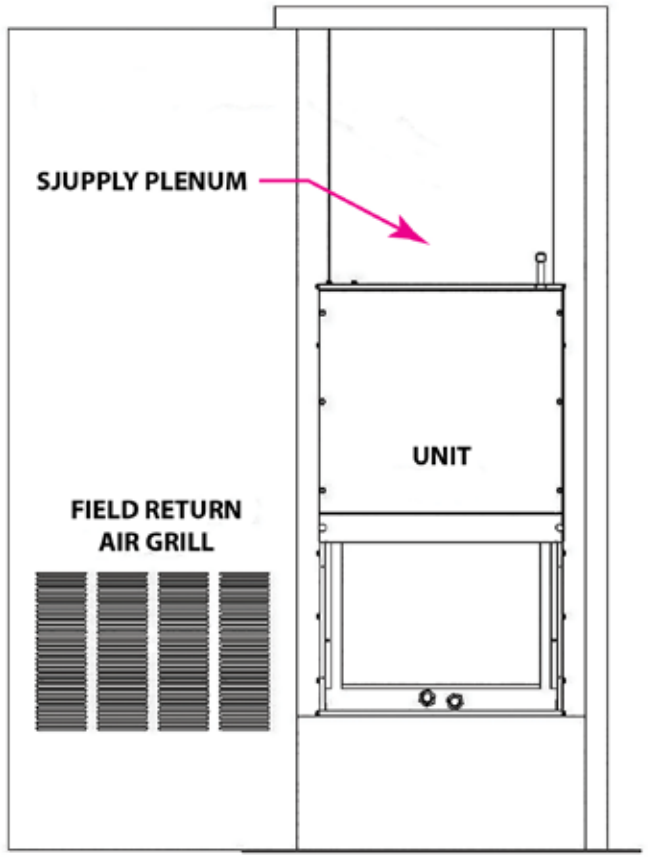


Figure 10: Wall Mount Installation With Wall Panel Door - AHW2

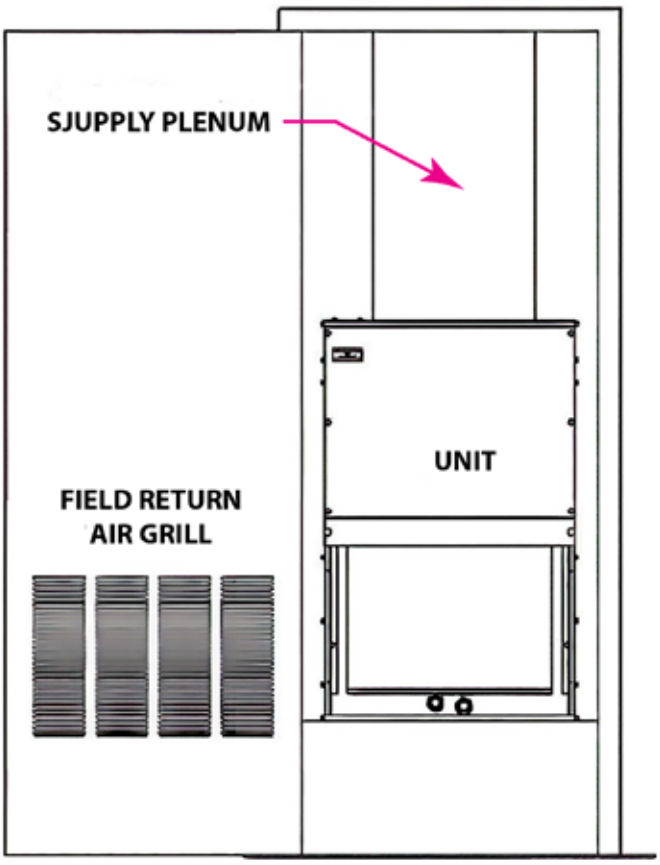


Figure 9: Wall Mount Installation With Wall Panel Door - AHW1

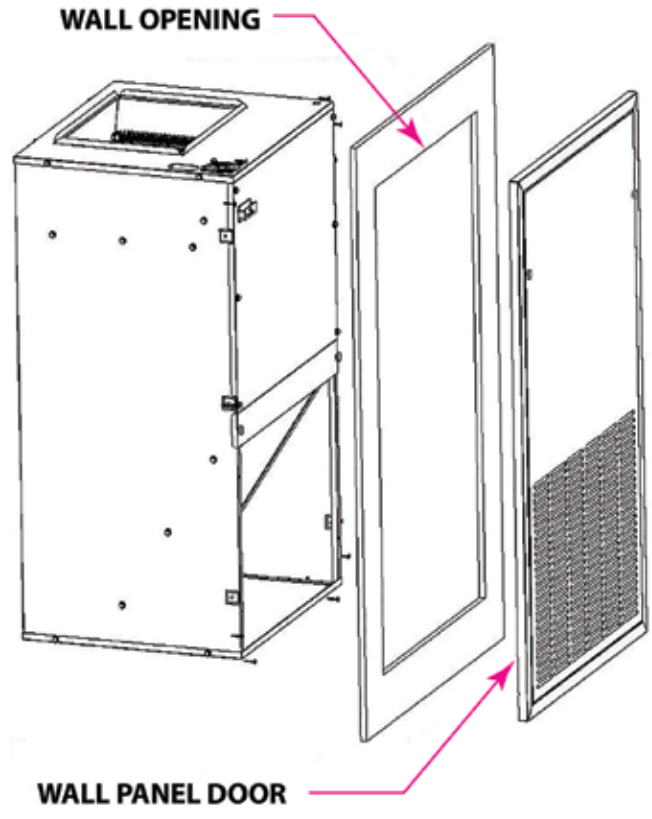


Figure 11: Side View For Typical Wall Mount Installation With Wall Panel Door - AHW1

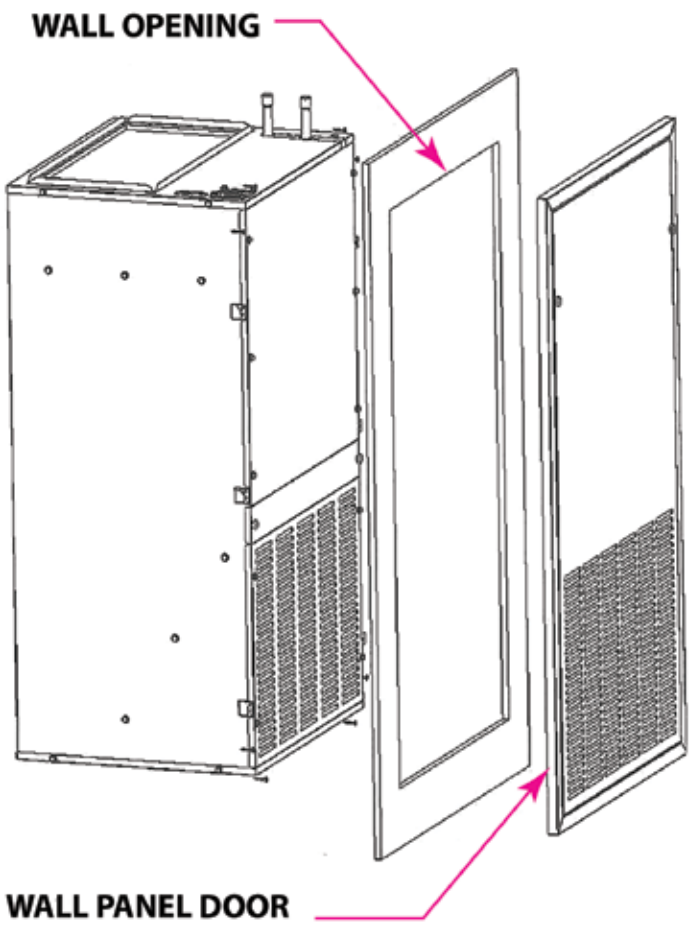


Figure 12: Side View For Typical Wall Mount Installation With Wall Panel Door - AHW2

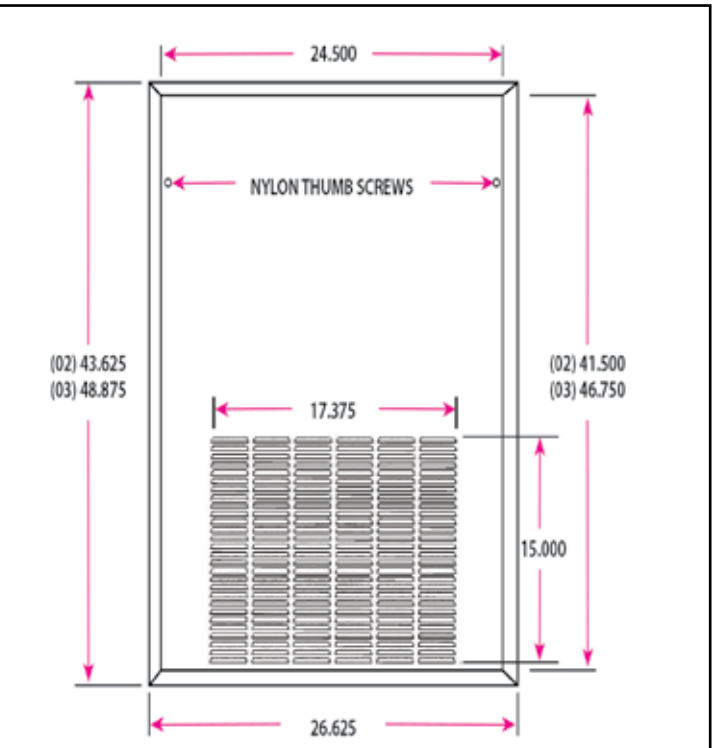


Figure 13: Wall Panel Door Dimensions

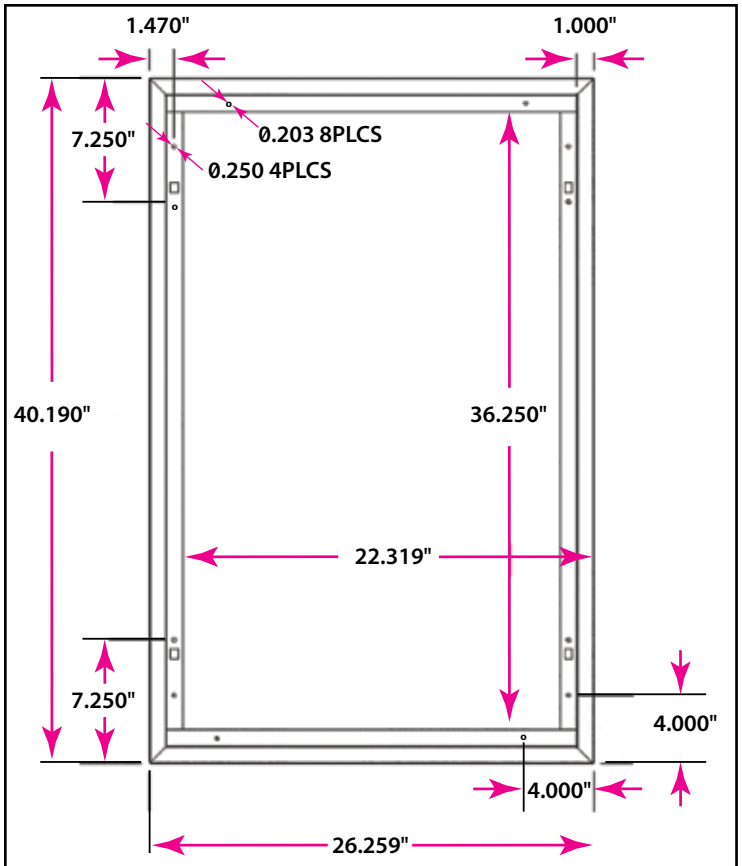


Figure 14: Wall Panel Frame Dimensions

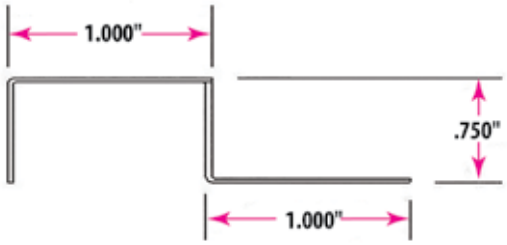


Figure 15: Wall Panel Door Frame Depth

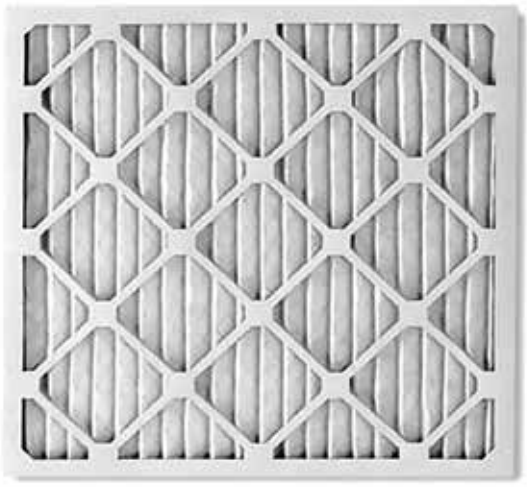


Figure 16: Typical 1" Pleated Air Filter

SECTION 4: TXV, FLOWRATOR DISTRIBUTOR, AND REFRIGERANT LINES

DX Refrigerant Piping:
Air handlers with DX type indoor coils require liquid and suction lines sized in accordance with outdoor unit manufacturer's instructions. The refrigerant lines enter the air handler through the slot located on the left side of the air handler top behind the electrical power entrance and connect to the suction and liquid line stubs located to the left of the blower. The ends of the copper stubs must be cut off with a tubing cutter and deburred prior to connecting the refrigerant lines.

NOTE: The air handler is shipped with a pressurized nitrogen holding charge. Remove the cap from the pressure port located on the suction line stub and depress the Schrader valve to release the pressure before cutting the ends off of the stubs.

Refrigerant lines should be soldered with silver solder or high temperature brazing alloy. The suction line must be insulated to avoid condensate from forming and dripping off. Armaflex (or equivalent) with 3/8" (1 cm) minimum wall thickness is recommended. Suction line insulation in applications with severe conditions such as hot and/or high humidity require 1/2" (1.3 cm) minimum wall thickness. If outdoor unit is installed above air handler coil, oil traps are required at equal intervals along suction line (See Figure 17). Horizontal suction lines should slope downward 1 inch for every 20 feet toward outdoor unit. Dry nitrogen must be flowed through refrigerant lines during soldering operation to prevent copper oxide from forming inside the tubing which can plug TXV inlet screens and filter driers.

- Install 1 oil trap for a height difference of 15 ft to 25 ft (4.6 m to 7.6 m) between indoor and outdoor units.
- Install 2 oil trap for a height difference of 26 ft to 50 ft (7.9 m to 15.2 m) between indoor and outdoor units.
- Install 3 oil trap for a height difference of 51 ft to 100 ft (15.5 m to 30.5 m) between indoor and outdoor units.
- Install 4 oil trap for a height difference of 101 ft to 150 ft (30.8 m to 45.7 m) between indoor and outdoor units.

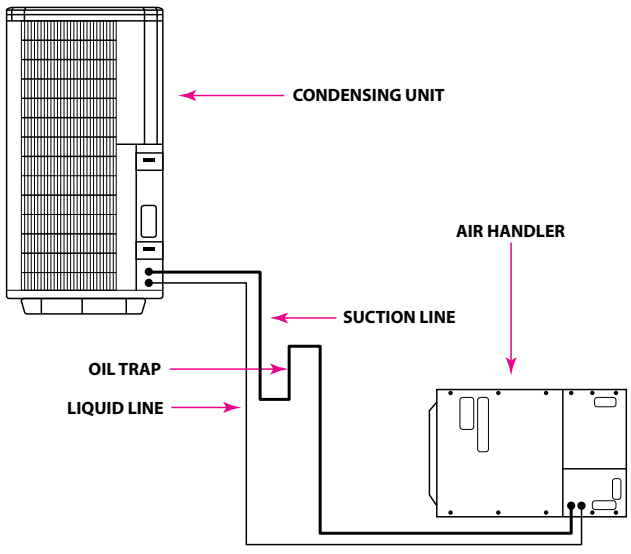


Figure 17: Refrigerant Lines For Air Handler Below Outdoor Unit

SPECIAL PIPING INSTRUCTIONS DUE TO THE USE OF AN A2L CLASS FLAMMABLE REFRIGERANT

⚠ WARNING

This following precautions must be taken for the refrigerant piping due to this air-handler being used with an A2L class flammable refrigerant.

Piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and shall be in compliance with national and local codes and standards, such as ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

The installation of pipe-work shall be kept to a minimum.

Due to this air-handler being used with an A2L class flammable refrigerant, the refrigerant pipe-work shall not be installed in an unventilated space if that space is smaller than the minimum floor area shown in Tables 20 and 21 unless there are no joints in the pipe-work in that space (e.g.: pipework that is run in walls or between floors).

Since refrigerant line length affects the final refrigerant charge, the final refrigerant charge after field charging of the system must be noted and used when determining the minimum floor area of the conditioned space from Tables 20 and 21.

Mechanical connections shall be accessible for maintenance purposes.

For appliances using flammable refrigerants, all joints made in the installation between parts of the refrigerating system, with at least one part charged, shall be made in accordance with the following:

- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe or any uncharged refrigerating part.
- Mechanical connectors used indoors shall comply with ISO 14903 or UL 207 Annex A (USA only). When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
- Refrigerant tubing shall be protected or enclosed to avoid damage.
- Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operation shall be protected against mechanical damage.

For installations with field applied joints that are exposed in the occupied space, these joints shall be at least one of the following:

- mechanical joints in compliance with ISO 14903 or UL 207 Annex A (USA only)
- welded or brazed joints; or
- joints in enclosures that vent to the unit or to the outside.

Provision shall be made for expansion and contraction of long runs of piping.

Protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.

Piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system.

After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:

- The minimum test pressure for the low side of the system shall be the low side design pressure as stated on the air handler rating plate and the minimum test pressure for the high side of the system shall be the high side design pressure as stated on the air handler rating plate, unless the high side of the system cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
- The test pressure after removal of pressure source shall be maintained for at least 1 hour with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.
- During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 1500 microns within 10 min. The vacuum pressure level shall be the lesser of 500 microns or the value required for compliance with national and local codes and standards, which may vary between residential, commercial, and industrial buildings.

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

SPECIAL INSTRUCTIONS FOR COILS WITH THERMAL EXPANSION VALVES (TXV)

The thermal expansion valve (TXV) used in this air handler has a built-in check valve making it heat pump capable. The external equalizer line attached to the TXV has a female flare nut with built in Schrader valve depressor that attaches to the Schrader valve port located on the indoor coil suction manifold.

A TXV has a thermostatic element separated from the valve body by a diaphragm and is designed to regulate the rate at which refrigerant flows into the indoor coil.

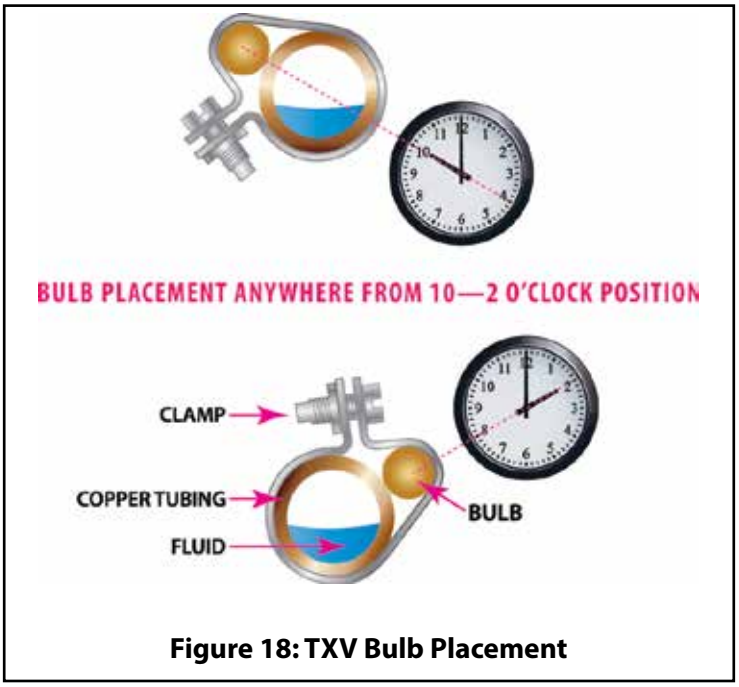


Figure 18: TXV Bulb Placement

The best location for the TXV sensing bulb is on a horizontal section of the suction line tube and positioned between 10 o'clock and 2 o'clock on the tube. (See Figure 18).

NOTE: The sensing bulb must never be located at the bottom of the suction line due to the possibility of oil and refrigerant laying in the bottom of the pipe causing false signals.

The sensing bulb must be able to sense the temperature of the superheated suction vapor and must therefore not be located in a position that will expose it to extraneous heat/cold. The sensing bulb must be insulated to isolate it from the surrounding air. The TXV must be the proper size and type to achieve the performance ratings of the system.

NOTE: If a non-bleed type TXV is used, the outdoor unit may require a hard start kit to allow the compressor to start under load.

How the TXV Controls Superheat

The TXV is a precision device designed to regulate the rate at the ideal location for the TXV sensing bulb is on a horizontal section of the suction line tube and positioned between 10 o'clock and 2 o'clock on the tube. (See Figure 18) .

NOTE: The sensing bulb must be able to sense the temperature of the superheated suction vapor and must therefore not be located in a position that will expose it to extraneous heat/cold. The sensing bulb must be insulated to isolate it from the surrounding air. The TXV must be the proper size and type for the applications to achieve the performance ratings of the system.

NOTE: If a non-bleed type TXV is used, the outdoor unit may require a hard start kit to allow the compressor to start under load.

How the TXV Controls Superheat

The TXV is a precision device designed to regulate the rate at which liquid refrigerant flows into the evaporator. This controlled flow is necessary to provide optimum performance and to prevent the return of liquid refrigerant to the compressor.

The TXV separates the high pressure and low-pressure sides of a refrigeration or air conditioning system. Liquid refrigerant enters the TXV under high pressure, but the pressure is reduced when the

flow of the refrigerant is restricted by an internal moving pin and port.

It is important to remember that the TXV only controls the level of superheat of the refrigerant in the suction line. The TXV is not designed to control air temperature, head pressure, capacity, suction pressure, or humidity. Attempts to adjust the TXV to control any of these system variables will lead to poor system performance and possible compressor failure.

The TXV responds to the temperature of refrigerant gas as it leaves the evaporator. This temperature is detected by the sensing bulb which is located near the evaporator outlet. The TXV also responds to the refrigerant pressure within the evaporator, which is transmitted to the TXV by an equalizer tube connected to the coil suction manifold. By responding to these variables, the TXV maintains a predetermined superheat level exiting the evaporator which maintains proper system stability, performance, and reliability.

TXV TROUBLESHOOTING

The thermostatic expansion valve (TXV) is like the carburetor in a car engine. It opens and closes to allow the correct amount of refrigerant flow through the system. When the TXV isn't working properly, the capacity and efficiency of the system is reduced. If a faulty TXV is suspected, perform the following tests:

Connect refrigerant gauges to the system and check that the refrigerant pressures, liquid subcooling and suction superheat levels are correct according to the outdoor unit charging chart. Subcooling at the outdoor unit liquid service valve is normally around 10°F and superheat at the outdoor unit suction service valve is normally between 8-12°F, but these can vary depending on the manufacturer and model of the outdoor unit.

Check to see if the indoor airflow through the system is correct. Check to see if the indoor and outdoor coils and indoor air filters are dirty. Clean dirty coils and clean/replace dirty air-filters as necessary before measuring air-flow and checking pressures, superheat, and subcooling.

Make sure the refrigerant charge in the system is correct. This step may require weighing the refrigerant in the system. Once refrigerant charge weight has been adjusted as necessary, recheck the pressures, subcooling and superheat. If these values are still not correct, the TXV may be defective or the TXV inlet strainer or the liquid line filter dryer is plugged with debris.

A good way to determine if the TXV is defective is to remove the TXV's sensing bulb from the suction line and check the pressures, subcooling, superheat again. No change in the pressures, subcooling, and superheat levels is an indication the TXV is defective. Another test that can be performed is to place the sensing bulb in ice water and recheck the pressures, superheat, and subcooling levels. If these values don't change, the TXV is likely defective.

Additional TXV Troubleshooting Information

Low Suction Pressure – High Superheat

POSSIBLE CAUSES:

1. Undersized TXV
2. TXV superheat adjustment too high
3. High indoor coil pressure drop due to internal restriction
4. TXV sensing bulb installed on bottom of suction line
5. Restricted or capped TXV external equalizer tube
6. Improper TXV external equalizer location (must be located on suction manifold after the last feeder tube)
7. Low refrigerant charge
8. Plugged liquid line filter dryer
9. Plugged TXV inlet strainer
10. Low outdoor ambient temperature

High Suction Pressure – Low Superheat

POSSIBLE CAUSES:

1. Oversized TXV
2. TXV seat leakage
3. TXV superheat adjustment too low
4. Improper TXV sensing bulb installation
   a. Poor thermal contact with suction line (loose clamp)
   b. Uninsulated sensing bulb
   c. Warm location
5. Bad compressor (low capacity)
6. Incorrectly located external equalizer line (must be located on suction manifold after the last feeder tube)

Low Suction Pressure – Low Superheat

POSSIBLE CAUSES:

1. Low system load:
   a. Insufficient indoor airflow
   b. Dirty indoor air filters
   c. Return air too cold
   d. Indoor coil icing or frosting
2. Poor air distribution over indoor coil.
3. Improper indoor/outdoor coil internal volume balance on heat pump systems (improper air handler/outdoor unit match up; indoor coil too big or too small causing incorrect refrigerant charge balance between cooling and heating modes)
4. Oil trapped in indoor coil

Things to Check Before Replacing TXV

1. Slowly loosen the flare nut on the TXV external equalizer connected to the suction line port with a flare nut. If there is a large pressure release when the nut has been loosened, tighten the nut. If this results in a slight pressure release or no pressure release; the Schrader valve stem is not being depressed. Install an anti-blow back fitting to the external equalizer line of the TXV to depress the Schrader valve stem and check for proper operation of the TXV.
2. Remove the sensing bulb from the suction line and hold in a warm hand. The high side pressure should drop and low side pressure should increase as the TXV opens. Place the sensing bulb in ice water. The high side pressure should increase and the low side pressure should decrease as the TXV closes. If the pressures do not change, the TXV is faulty.

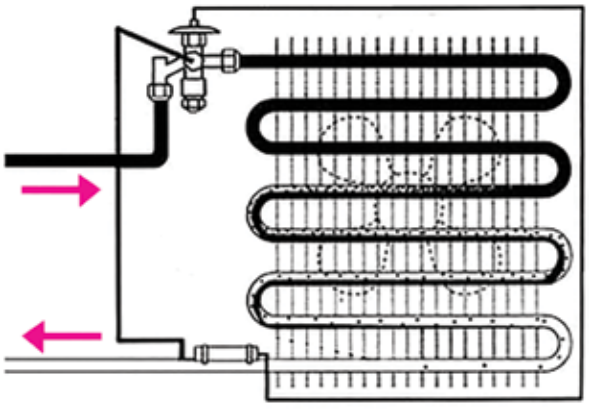


Figure 19: TXV Sensing Bulb Location

FLOWRATOR TO TXV CONVERSION:
While thermal expansion valves can be factory installed, they are normally available in kit form for field installation. For kit version, follow the installation instructions provided with the kit. Normally these can be field installed before system is charges without requiring cutting and brazing. **BE SURE FLOWRATER PISTON HAS BEEN REMOVED FROM THE FLOWRATER DISTRIBUTOR BODY PRIOR TO INSTALLATION OF EXPANSION VALVE.**

FIELD INSTALLED TXV KIT INFORMATION

R72DB0101DF: R-32, 1.5 – 3.0 Ton, 15% Bleed,
Inlet: Male Rotolock, Outlet: Female Swivel Nut

R72DB0103DF: R-454B, 1.5 – 3.0 Ton, 15% Bleed,
Inlet: Male Rotolock, Outlet: Female Swivel Nut

⚠ WARNING

Coil is pressurized with nitrogen. Relieve pressure before installing TXV by depressing Schrader valve on coil suction manifold.

Field Installed TXV Installation Procedure

1. Remove the cap on Schrader valve port on coil suction manifold.
2. Depress the Schrader valve to relieve the pressure inside the coil.
3. Only after coil pressure has been relieved, turn the female swivel nut counter-clockwise to separate it from the distributor.
4. Remove the piston orifice from the flowrator distributor assembly using a small diameter wire or paper clip.
5. As shown in Figure 20, the TXV assembly must be installed between the distributor and the liquid line connector.
6. Attach the TXV by connecting the female swivel nut on TXV outlet to the flowrator distributor (aligning Teflon seal first) and ***torque swivel nut to 10-30 ft. lbs.***
7. Attach the liquid line connector with female swivel nut to male rotalock fitting on TXV inlet (aligning Teflon seal first) and ***torque swivel nut to 10-30 ft. lbs.***
8. Attach equalizer tubing with 1/4" female flare nut that includes depressor to the male Schrader port on the coil suction manifold and ***torque nut to 10-30 ft. lbs.*** 9. Install the TXV bulb to the suction line using the two bulb clamps furnished with kit.
   a) The sensing bulb should be installed on a horizontal run of the suction line if possible and should be positioned between 10 o'clock and 2 o'clock as shown in Figure 18.
   b) If the sensing bulb is installed on a vertical run of the suction line, the bulb should be located at least 6 inches away from any bend and on the side of the tube that is above the inside of the bend. On vertical run bulb installations, the bulb should be positioned with the bulb capillary tube at the top.
   c) The bulb should be insulated using thermal insulation to protect it from the effect of the surrounding ambient temperature.
9. After completing the TXV installation, leak check all TXV fittings and thoroughly evacuate the coil through the service access fittings on the outdoor unit liquid and suction service valves prior to charging the system with refrigerant.

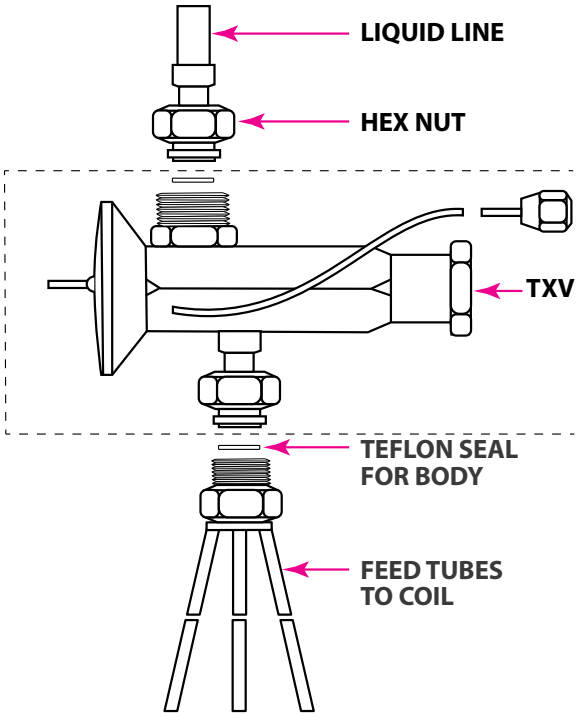


Figure 20: Typical TXV Connections

SPECIAL INSTRUCTIONS FOR COILS WITH FLOWRATOR DISTRIBUTOR ASSEMBLIES
The sizing of the orifice piston should be based on the rated capacity of the outdoor unit and air handler match-up.

Summit provides capacity performance ratings that match both same size and upsized air handlers with specific manufacturer's outdoor units. Consult the local Summit distributor for the proper size orifice piston to be used for a specific outdoor unit model number. The factory installed orifice piston size is marked on the flowrator distributor assembly and the air handler carton.

Failure to install the proper size orifice piston can lead to poor system performance and possible compressor damage. A variation of one piston size smaller or larger is not normally critical. Mortex/ Summit reserves the right to substitute a factory installed piston one size smaller or greater if the piston size ordered is out of stock. A selection of replacement orifice pistons is available from the local Summit distributor.

ORIFICE PISTON REPLACEMENT

If the flowrator is being used instead of a TXV, the piston must be installed oriented as shown in Figure 24 in the distributor body and the existing liquid line attached to the flowrator distributor.

1. Remove the cap on Schrader valve port on coil manifold.
2. Depress the Schrader valve to relieve the pressure inside the coil.
3. Only after coil pressure has been relieved, turn the female swivel nut counter-clockwise to separate it from the distributor.
4. Replace the orifice piston with the correct size piston for the application. Make sure the tapered end of the piston is facing the feeder tubes on the distributor body.
5. Turn the female swivel nut on clockwise the flowrator distributor (aligning Teflon seal first) and torque swivel nut to 10-30 ft. lbs.
6. After completing the installation of the correct size orifice piston, leak check the flowrator distributor fitting and thoroughly evacuate the system through the service fittings on the outdoor unit liquid and suction service valves.

Figure 21: TXV Installed In Air Handler

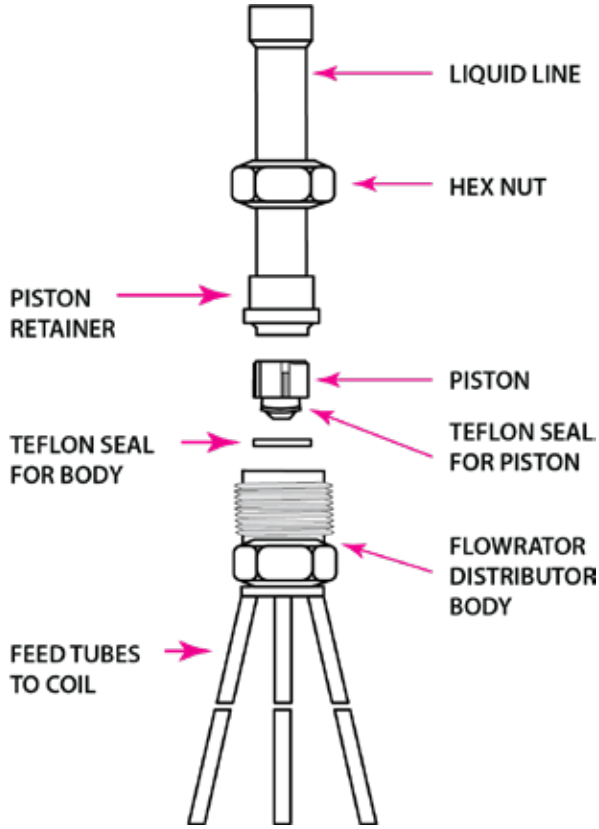


Figure 22: Flowrator Distributor

CONDENSATE DRAIN PIPING:

The air handler coil drain pan has one ¾" NPT female connection and one ¾" NPT female secondary connection located in the return air compartment. Piping from each fitting used is to have 2" minimum trap (See Figure 23) and each run in such a manner as to provide enough slope for adequate drainage to a visible area. Do not pipe these two fittings together into a common drain. If a secondary drain is not installed, the secondary drain connection must be capped.

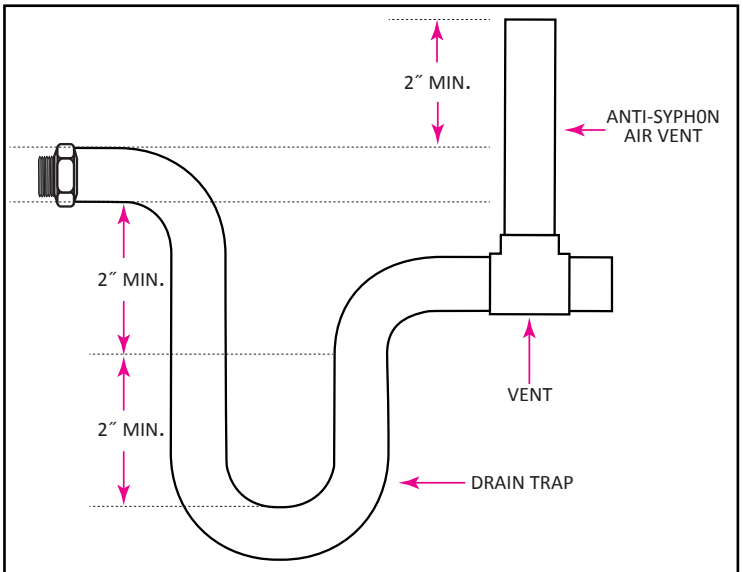


Figure 23: Typical Condensate Trap

⚠ WARNING

This air handler must not be located where water can cause damage to the adjacent area if the condensate drain pan should overflow or if any condensate drain connections should leak.

When such locations can't be avoided, a suitable auxiliary drain pan must be installed under the air handler and connected to an adequate drain. The auxiliary drain pan should be at least 2" greater in length and width than the air handler dimensions and should be at least 1.5" deep.

The manufacturer of this air handler is not liable for any water damage related to the air handler.

SECTION 5: HYDRONIC (HOT WATER) HEAT

CHILLED AND HOT WATER PIPING

All water pipes must be supported independent of coils to prevent vibration and stress on coil headers. Swing joints or flexible fittings must be provided to absorb expansion and contraction strains. Rigid piping reduces the effectiveness of vibration isolators. Coil water pipes must be adequately vented in order to prevent air binding. Air handlers are provided with manual air vents mounted through the manifold panel.

Chilled Water Piping

Supply and return chilled water piping to the coil should be ¾" ID up to 42,000 BTU/Hr, 1" on air handlers greater than 42,000 BTU/ Hr. Water piping must always be connected so that the entering water is on the leaving air side of the coil.

Hot Water Piping

If a residential water heater is used for space heating water, do not exceed a distance of 70 feet between the air handler and the water heater. The water heater should be the quick recovery type. Air handler and water heater must be located indoors and not subject to freezing temperatures.

Total hot water piping should not exceed 140 feet. All hot water piping to the coil should be copper and ¾" ID and 7/8" OD. CPVC or PEX piping may be used in applications where the water temperature does not exceed 150°F. It is recommended that a water isolation valve and a union be placed in the water lines to and from the coil that is near the coil for serviceability, repair or replacement of the coil.

A thermal expansion tank is recommended on any closed loop system to relieve thermal expansion due to pressure increase.

NOTE: Refer to **Filling Hydronic Heating System With Water, Purging Air From System, and System Startup** in **SECTION 10: FINAL SYSTEM CHECK-OUT AND START-UP** for instructions on filling the system with water, purging the air from the system, and checking for leaks once the air handler installation has been completed.

⚠ WARNING

Toxic chemicals used for treatment of boilers or non- potable water heating appliances must never be introduced into a potable water space heating system.

"Massachusetts requires an electronically controlled pump timer that activates the pump every 6 hour for 60 seconds and limits the distance between th water heater and the air handler to 50 feet max."

⚠ WARNING

When system requires water at temperatures higher than required for other uses, a means such as a mixing valve shall be installed to temper the water for those uses in order to reduce the potential for a scald hazard.

⚠ WARNING

Do not use Methanol water or Ethanol in any systems operating above 40°F as the flash point specified for these chemicals is only 54°F.

⚠ WARNING

Minimum Allowable Operating Temperatures – Water/Brine:
Water = 36°F (2.22°C)
Brine Solution = 3.2°F (-16°C)
Maximum Allowable Operating Temperatures – Water/Brine:
Water = 180°F (82.22°C)
Brine Solution = 40°F (4.44°C)

Performance Data - Hot Water Slab Coils

HEATING PERFORMANCE DATA:

HOT WATER WALL MOUNT MODEL NO.	HOT WATER CAPACITIES @ 70°F ENTERING AIR TEMPERATURE ENTERING WATER TEMPERATURE											PRESS. DROP WATER	PRESS. DROP AIR
	100°F	110°F	120°F	130°F	140°F	150°F	160°F	170°F	180°F	CFM	GPM	(FT-WTR)	(IN-WC)
AHW 2-18/24-2N LI 1/2HP, 10x8T, 20" FH x 10" FL, 2 Row, 4 Circuit, 10 FPI	9,071	12,188	15,342	18,528	21,741	24,979	28,238	31,516	34,809	840	2.0	0.68	0.208
	10,069	13,590	16,983	20,486	24,014	27,564	31,132	34,717	38,317		3.0*	1.39	
	10,660	14,291	17,951	21,637	25,344	29,071	32,815	36,573	40,344		4.0	2.32	
	11,055	14,811	18,593	22,397	26,221	30,063	33,920	37,790	41,671		5.0	3.45	
	11,338	15,183	19,051	22,940	26,846	30,768	34,704	38,652	42,610		6.0	4.76	
	8,826	11,857	14,923	18,018	21,141	24,286	27,451	30,634	33,831	785	2.0	0.68	0.185
	9,763	13,097	16,462	19,854	23,270	26,706	30,160	33,630	37,112		3.0*	1.39	
	10,315	13,827	17,365	20,926	24,509	28,110	31,726	35,356	38,998		4.0	2.32	
	10,682	14,310	17,961	21,633	25,324	29,031	32,752	36,485	40,229		5.0	3.45	
	10,945	14,654	18,386	22,136	25,903	29,684	33,478	37,283	41,098		6.0	4.76	
	8,309	11,158	14,037	16,943	19,873	22,822	25,790	28,773	31,769	680	2.0	0.68	0.146
	9,124	12,234	15,373	18,534	21,716	24,915	28,130	31,358	34,599		3.0*	1.39	
	9,598	12,861	16,146	19,452	22,776	26,116	29,468	32,833	36,208		4.0	2.32	
	9,911	13,272	16,654	20,054	23,469	26,898	30,339	33,791	37,252		5.0	3.45	
	10,135	13,565	17,014	20,480	23,959	27,451	30,953	34,465	37,985		6.0	4.76	
	7,801	10,471	13,168	15,888	18,630	21,389	24,163	26,950	29,750	590	2.0	0.68	0.116
	8,505	11,400	14,319	17,258	20,215	23,187	26,173	29,170	32,176		3.0*	1.39	
	8,910	11,935	14,979	18,041	21,118	24,208	27,310	30,422	33,542		4.0	2.32	
	9,176	12,283	15,409	18,550	21,704	24,869	28,045	31,230	34,422		5.0	3.45	
	9,365	12,503	15,713	18,909	22,113	25,334	28,562	31,797	35,039		6.0	4.76	
	6,850	9,186	11,544	13,919	16,310	17,715	21,131	23,558	25,994	450	2.0	0.68	0.074
	7,370	9,873	12,392	14,927	17,474	20,033	22,602	25,179	27,763		3.0*	1.39	
	7,664	10,259	12,869	15,497	18,124	20,767	23,418	26,076	28,741		4.0	2.32	
	7,855	10,508	13,176	15,854	18,541	21,237	23,940	26,649	29,364		5.0	3.45	
	7,989	10,684	13,390	16,107	18,833	21,565	24,304	27,048	29,798		6.0	4.76	
AHW 2-18/24-3N LI 1/2HP, 10x8T, 20" FH x 10" FL, 3 Row, 5 Circuit, 10 FPI	11,453	15,387	19,368	23,388	27,433	31,528	35,639	39,773	43,925	840	2.0	0.55	0.311
	12,860	17,256	21,693	26,168	30,675	35,209	39,767	44,347	48,944		3.0*	1.14	
	13,693	18,356	23,057	27,791	32,554	37,341	42,151	46,979	51,823		4.0	1.89	
	14,244	19,083	23,955	28,857	33,785	38,736	43,705	48,692	53,694		5.0	2.81	
	14,637	19,600	24,593	29,612	34,656	39,720	44,801	49,898	55,009		6.0	3.89	
	11,139	14,963	18,830	22,735	26,674	30,640	34,631	38,643	42,674	785	2.0	0.55	0.278
	12,452	16,704	20,996	25,322	29,679	34,061	38,465	42,890	47,331		3.0*	1.14	
	13,222	17,721	22,255	26,821	31,413	36,028	40,663	45,315	49,983		4.0	1.89	
	13,729	18,389	23,081	27,800	32,543	37,307	42,089	46,886	51,698		5.0	2.81	
	14,090	18,865	23,666	28,493	33,341	38,209	43,092	47,990	52,900		6.0	3.89	
	10,469	14,058	17,684	21,343	25,032	28,747	32,482	36,237	40,008	680	2.0	0.55	0.219
	11,592	15,543	19,530	23,546	27,587	31,651	35,735	39,834	43,949		3.0*	1.14	
	12,240	16,398	20,586	24,801	29,038	33,295	37,568	41,857	46,159		4.0	1.89	
	12,662	16,954	21,273	25,614	29,976	34,354	38,749	43,156	47,575		5.0	2.81	
	12,961	17,347	21,756	26,185	30,633	35,096	39,573	44,062	48,562		6.0	3.89	
	9,804	13,159	16,547	19,964	23,407	26,872	30,355	33,855	37,369	590	2.0	0.55	0.173
	10,755	14,416	18,106	21,821	25,558	29,314	33,087	36,874	40,673		3.0*	1.14	
	11,295	15,127	18,984	22,863	26,762	30,676	34,605	38,546	42,498		4.0	1.89	
	11,644	15,587	19,550	23,533	27,532	31,546	35,573	39,611	43,658		5.0	2.81	
	11,890	15,908	19,946	24,000	28,070	32,152	36,246	40,350	44,462		6.0	3.89	
	8,544	11,457	14,396	17,356	20,335	23,331	26,341	29,364	32,397	450	2.0	0.55	0.111
	9,215	12,342	15,489	18,654	21,836	25,031	28,237	31,455	34,680		3.0*	1.14	
	9,585	12,828	16,088	19,364	22,653	25,953	29,263	32,582	35,909		4.0	1.89	
	9,821	13,137	16,468	19,812	23,168	26,533	29,907	33,289	36,678		5.0	2.81	
	9,985	13,351	16,731	20,122	23,523	26,934	30,351	33,776	37,206		6.0	3.89	

Note: "3*" = Optional factory installed hot water circulating pump flow rate.

Table 6: AHW2-18, 24-2N and AHW2-18, 24-3N Hot Water Heating Capacities

Performance Data - Hot Water Slab Coils

HEATING PERFORMANCE DATA:

HOT WATER WALL MOUNT MODEL NO.	HOT WATER CAPACITIES @ 70°F ENTERING AIR TEMPERATURE ENTERING WATER TEMPERATURE											PRESS. DROP WATER	PRESS. DROP AIR
	100°F	110°F	120°F	130°F	140°F	150°F	160°F	170°F	180°F	CFM	GPM	(FT-WTR)	(IN-WC)
AHW2-18/24-4N LI 1/2HP, 10x8T, 20" FH x 10" FL, 4 Row, 5 Circuit, 10 FPI	13,458	18,060	22,709	27,397	32,117	36,867	41,641	46,434	51,246	840	2.0	0.75	0.415
	15,168	20,334	25,543	30,788	36,064	41,368	46,694	52,042	57,405		3.0*	1.54	
	16,158	21,644	27,168	32,725	38,310	43,920	49,550	55,199	60,862		4.0	2.56	
	16,803	22,494	28,220	33,975	39,756	45,559	51,380	57,218	63,070		5.0	3.80	
	17,256	23,091	28,957	34,850	40,765	46,700	52,653	58,620	64,601		6.0	5.24	
	13,073	17,542	22,053	26,602	31,182	35,789	40,420	45,069	49,735	785	2.0	0.75	0.371
	14,655	19,642	24,669	29,730	34,821	39,937	45,074	50,229	55,399		3.0*	1.54	
	15,561	20,840	26,155	31,500	36,871	42,265	47,678	53,106	58,550		4.0	2.56	
	16,148	21,614	27,111	32,635	38,184	43,751	49,337	54,937	60,550		5.0	3.80	
	16,559	22,155	27,779	33,427	39,096	44,784	50,487	56,204	61,932		6.0	5.24	
	12,248	16,429	20,646	24,897	29,175	33,478	37,801	42,140	46,495	680	2.0	0.75	0.292
	13,574	18,185	22,832	27,506	32,206	36,927	41,667	46,422	51,190		3.0*	1.54	
	14,318	19,168	24,048	28,952	33,879	38,825	43,786	48,761	53,749		4.0	2.56	
	14,794	19,795	24,821	29,870	34,938	40,023	45,122	50,233	55,356		5.0	3.80	
	15,125	20,230	25,357	30,505	35,669	40,849	46,042	51,245	56,458		6.0	5.24	
	11,424	15,317	19,242	23,197	27,175	31,174	35,191	39,222	43,267	590	2.0	0.75	0.231
	12,522	16,769	21,045	25,346	29,667	34,006	38,361	42,728	47,108		3.0*	1.54	
	13,126	17,565	22,029	26,514	31,017	35,535	40,067	44,610	49,163		4.0	2.56	
	13,508	18,068	22,649	27,247	31,862	36,490	41,130	45,781	50,439		5.0	3.80	
	13,771	18,414	23,075	27,751	32,442	37,144	41,858	46,580	51,310		6.0	5.24	
	9,855	13,203	16,574	19,966	23,376	26,801	30,239	33,689	37,147	450	2.0	0.75	0.147
	10,590	14,171	17,117	21,389	25,021	28,665	32,320	35,984	39,655		3.0*	1.54	
	10,980	14,683	18,403	22,136	25,882	29,638	33,402	37,175	40,954		4.0	2.56	
	11,221	15,001	18,793	22,597	26,411	30,235	34,066	37,903	41,747		5.0	3.80	
	11,386	15,216	19,058	22,909	26,770	30,639	34,514	38,395	42,281		6.0	5.24	
AHW2-30/36-2N LL 1/2HP, 12x8T, 20" FH x 10" FL, 2 Row, 4 Circuit, 10 FPI	10,072	13,544	17,061	20,617	24,209	27,830	31,477	35,146	38,836	1,110	2.0	0.68	0.329
	11,344	15,233	19,164	23,132	27,132	31,160	35,212	39,284	43,376		3.0*	1.39	
	12,119	16,257	20,433	24,643	28,882	33,146	37,433	41,738	46,060		4.0	2.32	
	12,641	16,947	21,287	25,657	30,053	34,472	38,912	43,369	47,841		5.0	3.45	
	13,020	17,446	21,903	26,387	30,895	35,424	39,971	44,535	49,112		6.0	4.76	
	9,805	13,181	16,601	20,258	23,548	27,067	30,609	34,173	37,757	1,030	2.0	0.68	0.291
	11,000	14,767	18,575	22,416	26,288	30,186	34,106	38,047	42,004		3.0*	1.39	
	11,722	15,722	19,758	23,824	27,918	32,036	36,173	40,329	44,501		4.0	2.32	
	12,207	16,364	20,550	24,765	29,005	33,266	37,545	41,841	46,150		5.0	3.45	
	12,559	16,825	21,121	25,441	29,783	34,146	38,525	42,919	47,326		6.0	4.76	
	9,514	12,788	16,102	19,452	22,833	26,240	29,670	33,121	36,588	950	2.0	0.68	0.255
	10,629	14,266	17,940	21,646	25,381	29,140	32,900	36,718	40,532		3.0*	1.39	
	11,297	15,150	19,034	22,948	26,887	30,848	34,828	38,824	42,835		4.0	2.32	
	11,745	15,741	19,765	23,815	27,887	31,979	36,089	40,214	44,351		5.0	3.45	
	12,068	16,165	20,289	24,435	28,602	32,787	36,987	41,202	45,428		6.0	4.76	
	9,218	12,387	15,594	18,834	22,103	25,397	28,713	32,048	35,399	875	2.0	0.68	0.222
	10,254	13,759	17,299	20,869	24,466	28,084	31,722	35,378	39,049		3.0*	1.39	
	10,870	14,574	18,308	22,069	25,852	29,656	33,478	37,314	41,165		4.0	2.32	
	11,282	15,117	18,978	22,863	26,769	30,693	34,633	38,586	42,552		5.0	3.45	
	11,578	15,505	19,458	23,431	27,423	31,431	35,454	39,489	43,536		6.0	4.76	
	8,872	11,919	15,001	18,114	21,253	24,416	27,598	30,799	34,014	795	2.0	0.68	0.189
	9,820	13,174	16,559	19,972	23,408	26,866	30,341	33,832	37,336		3.0*	1.39	
	10,379	13,913	17,474	21,058	24,664	28,288	31,929	35,582	39,248		4.0	2.32	
	10,751	14,403	18,078	21,775	25,491	29,223	32,969	36,727	40,497		5.0	3.45	
	11,018	14,752	18,510	22,285	26,078	29,885	33,706	37,537	41,379		6.0	4.76	

Note: "3*" = Optional factory installed hot water circulating pump flow rate.

Table 7: AHW2-18, 24-4N and AHW2-30, 36-2N Hot Water Heating Capacities

Performance Data - Hot Water Slab Coils

HEATING PERFORMANCE DATA:

HOT WATER WALL MOUNT MODEL NO.	HOT WATER CAPACITIES @ 70°F ENTERING AIR TEMPERATURE ENTERING WATER TEMPERATURE									CFM	GPM	PRESS. DROP WATER (FT-WTR)	PRESS. DROP AIR (IN-WC)
	100°F	110°F	120°F	130°F	140°F	150°F	160°F	170°F	180°F				
AHW 2-30/36-3N LL 1/2HP, 12x8T, 20" FH x 10" FL, 3 Row, 5 Circuit, 10 FPI	12,718	17,099	21,537	26,024	30,552	35,118	39,714	44,339	48,986	1,110	2.0	0.55	0.494
	14,552	19,541	24,585	29,675	34,808	39,975	45,174	50,398	55,647		3.0*	1.14	
	15,672	21,026	26,429	31,876	37,362	42,880	48,428	53,999	59,592		4.0	1.89	
	16,429	22,025	27,668	33,351	39,068	44,816	50,590	56,388	62,204		5.0	2.81	
	16,977	22,747	28,560	34,409	40,291	46,201	52,136	58,090	64,064		6.0	3.89	
	12,383	16,647	20,963	25,326	29,729	34,167	38,635	43,129	47,646	1,030	2.0	0.55	0.437
	14,097	18,927	23,807	28,732	33,696	38,693	43,719	48,770	53,843		3.0*	1.14	
	15,136	20,301	25,514	30,768	36,057	41,377	46,723	52,093	57,482		4.0	1.89	
	15,834	21,223	26,655	32,124	37,626	43,156	48,710	54,285	59,878		5.0	2.81	
	16,336	21,886	27,473	33,095	38,747	44,424	50,123	55,843	61,578		6.0	3.89	
	12,017	16,151	20,335	24,563	28,829	33,128	37,456	41,808	46,181	950	2.0	0.55	0.382
	13,607	18,263	22,968	27,714	32,495	37,309	42,148	47,012	51,894		3.0*	1.14	
	14,560	19,525	24,533	29,579	34,657	39,764	44,896	50,048	55,219		4.0	1.89	
	15,198	20,365	25,573	30,815	36,086	41,383	46,702	52,041	57,397		5.0	2.81	
	15,654	20,967	26,316	31,696	37,103	42,533	47,984	53,452	58,936		6.0	3.89	
	11,641	15,642	19,690	23,779	27,905	32,061	36,244	40,450	44,677	875	2.0	0.55	0.333
	13,108	17,589	22,116	26,680	31,278	35,904	40,555	45,229	49,920		3.0*	1.14	
	13,979	18,741	23,544	28,381	33,248	38,140	43,056	47,991	52,943		4.0	1.89	
	14,558	19,505	24,487	29,501	34,542	39,607	44,691	49,794	54,911		5.0	2.81	
	14,971	20,050	25,159	30,297	35,459	40,644	45,846	51,065	56,298		6.0	3.89	
	11,198	15,043	18,931	22,858	26,817	30,807	34,820	38,855	42,909	795	2.0	0.55	0.284
	12,528	16,807	21,126	25,480	29,864	34,275	38,709	43,162	47,631		3.0*	1.14	
	13,310	17,839	22,404	27,001	31,625	36,272	40,940	45,624	50,325		4.0	1.89	
	13,825	18,518	23,244	27,997	32,774	37,573	42,389	47,222	52,068		5.0	2.81	
	14,191	19,001	23,838	28,701	33,586	38,489	43,410	48,344	53,291		6.0	3.89	
AHW 2-30/36-4N LL 1/2HP, 12x8T, 20" FH x 10" FL, 4 Row, 5 Circuit, 10 FPI	14,991	20,131	23,187	29,145	35,151	41,198	47,280	53,393	59,530	1,110	2.0	0.75	0.659
	17,283	23,187	29,145	35,151	41,198	47,280	53,393	59,530	65,688		3.0*	1.54	
	18,644	25,018	31,425	37,877	44,366	50,888	57,439	64,013	70,608		4.0	2.56	
	19,586	26,238	32,938	39,679	46,455	53,262	60,095	66,950	73,825		5.0	3.80	
	20,245	27,108	34,015	40,960	47,937	54,942	61,972	69,022	76,090		6.0	5.24	
	14,588	19,588	24,639	29,736	34,870	40,039	45,235	50,455	55,693	1,030	2.0	0.75	0.582
	16,717	22,423	28,181	33,983	39,823	45,696	51,598	57,522	63,468		3.0*	1.54	
	17,986	24,105	30,272	36,481	42,725	48,999	55,299	61,622	67,965		4.0	2.56	
	18,827	25,217	31,651	38,122	44,626	51,158	57,714	64,291	70,885		5.0	3.80	
	19,426	26,007	32,628	39,283	45,969	52,680	59,413	66,165	72,933		6.0	5.24	
	14,145	18,989	23,883	28,818	33,792	38,796	43,826	48,880	53,950	950	2.0	0.75	0.509
	16,103	21,595	27,135	32,716	38,333	43,979	49,652	55,348	61,062		3.0*	1.54	
	17,257	23,123	29,033	34,981	40,962	46,971	53,003	59,056	65,127		4.0	2.56	
	18,016	24,126	30,275	36,459	42,673	48,912	55,173	61,452	67,748		5.0	3.80	
	18,554	24,835	31,152	37,500	43,875	50,274	56,693	63,129	69,579		6.0	5.24	
	13,688	18,371	23,101	27,871	32,676	37,511	42,371	47,251	52,149	875	2.0	0.75	0.444
	15,479	20,753	26,071	31,427	36,816	42,234	47,675	53,137	58,615		3.0*	1.54	
	16,521	22,132	27,783	33,469	39,185	44,926	50,689	56,471	62,268		4.0	2.56	
	17,202	23,031	28,896	34,792	40,715	46,661	52,627	58,610	64,607		5.0	3.80	
	17,683	23,664	29,678	35,719	41,786	47,873	53,979	60,100	66,234		6.0	5.24	
	13,145	17,640	22,176	26,751	31,357	35,991	40,649	45,325	50,018	795	2.0	0.75	0.379
	14,751	19,771	24,833	29,928	35,053	40,204	45,376	50,567	55,774		3.0*	1.54	
	15,672	20,990	26,343	31,728	37,139	42,572	48,026	53,496	58,980		4.0	2.56	
	16,270	21,778	27,317	32,884	38,475	44,087	49,716	55,361	61,018		5.0	3.80	
	16,689	22,329	27,997	33,691	39,406	45,140	50,889	56,652	62,427		6.0	5.24	

Note: "3*" = Optional factory installed hot water circulating pump flow rate.

Table 8: AHW2-30, 36-3N and AHW2-30, 36-4N Hot Water Heating Capacities

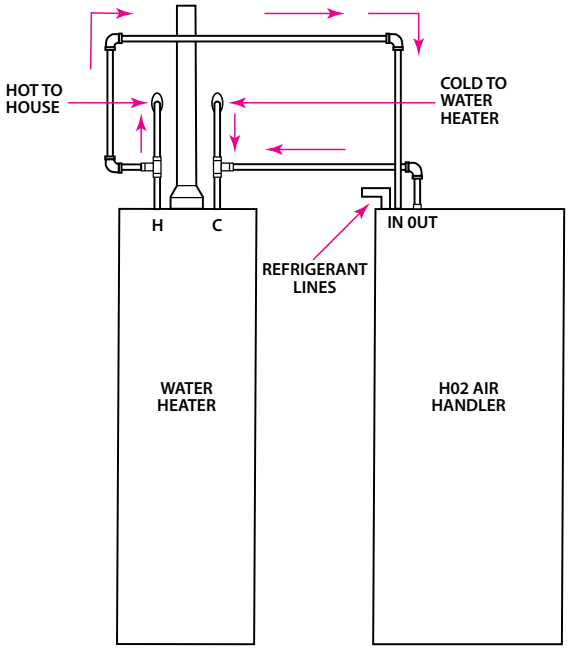


Figure 24: Typical Hot Water Tank and Refrigerant Line Connections

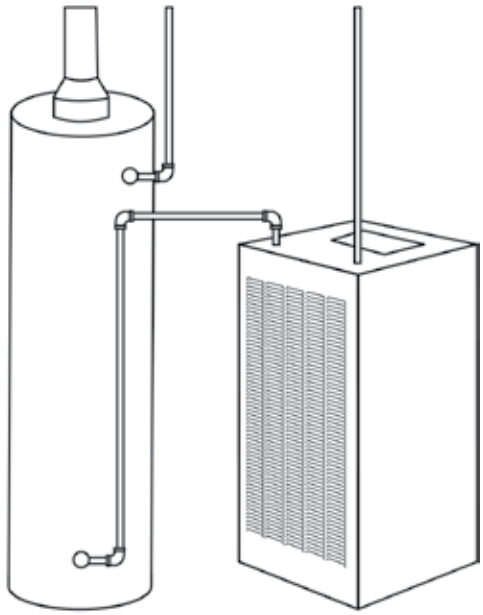


Figure 25: Typical Hot Water Tank Connections

SECTION 6: REFRIGERANT LEAK DETECTION SYSTEM OPERATION AND SENSOR INSTALLATION

This air handler is equipped with a factory installed refrigerant leak detection system consisting of a refrigerant sensor with integral relays to perform the necessary leak mitigation if a refrigerant leak if detected by the sensor. Should a refrigerant leak occur in the indoor coil, the refrigerant leak detection system will energize the indoor blower and will open the 24VAC circuit to the outdoor unit compressor contactor. The circulation of air will disperse the leaked flammable refrigerant into the conditioned space where it will be diluted to point where it can no longer be ignited by an ignition source. The indoor blower will continue to operate until 5 minutes after the concentration of the refrigerant at the sensor drops below the sensor's setpoint. Should the concentration of the refrigerant rise above the setpoint of the sensor, the mitigation cycle will repeat until the refrigerant concentration stays below the setpoint of the sensor. The sensor pigtail marked "ALARM" will normally be energized with 24VAC when no leak is detected and will be de-energized when a leak is detected for the purpose of notifying a building management system to issue a refrigerant leak alarm.

Should the sensor fail or if the sensor wiring is damaged or disconnected, the sensor will automatically enter the mitigation mode until the sensor is replaced or the wiring is reconnected or repaired.

IMPORTANT NOTE: The outdoor unit control wiring must be connected to the refrigerant sensor "Y-CC" pigtail and the "COM" on the air handler low voltage terminal strip for the refrigerant detection system to de-energize the compressor during the leak mitigation mode of operation.

IMPORTANT: Only refrigerant leak detection system sensors specified by Mortex Products, Inc. may be installed or used as a replacement for a failed sensor to assure the proper operation of the refrigerant leak detection system. Mortex may source sensors from various manufacturers that could have different wiring connections requiring a wiring adapter to mate to the existing sensor wiring harness which will be provided with the Mortex approved replacement sensor.

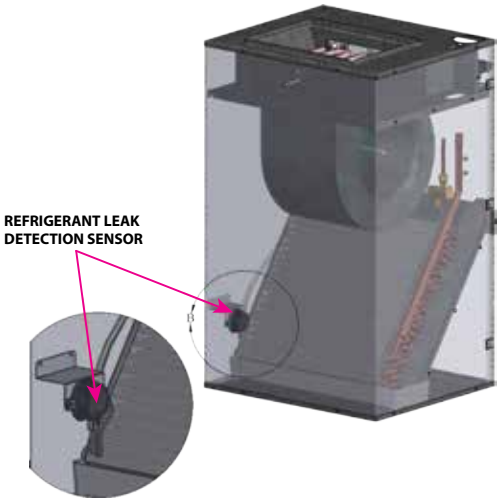


Figure 26: Refrigerant Leak Detection Sensor Location

Verifying Proper Functioning of Refrigerant Leak Mitigation System

Follow the steps below to verify the proper functioning of the Refrigerant Leak Mitigation System.

1. Remove the blower/control box access panel from the front of the air handler.
2. Locate the black refrigerant sensor located near the bottom right side of the coil assembly below the blower (See Figure 26).

Leak Detected During Cooling Cycle

3. Set the thermostat to "COOL" and the fan switch to "AUTO" and lower the temperature setpoint below the indoor temperature so the system enters the cooling mode.
4. Confirm the outdoor unit compressor is operating.
5. Within 30 seconds of the compressor starting, release a small amount of refrigerant on the refrigerant sensor to activate the leak mitigation mode.
6. Confirm the outdoor unit compressor and fan motor shut down and the indoor blower continues to operate.
7. Confirm the indoor blower is energized and 24V is not present at the air handler pigtail marked "ALARM".
8. Confirm the outdoor unit compressor and fan motor are re-energized approximately 5 minutes after the flow of refrigerant near the sensor has ended and that the indoor blower continues to operate.

Leak Detected During the OFF Cycle

9. Set the thermostat to the "OFF" position and wait until the outdoor unit compressor and fan motor stop and indoor blower stops.
10. Release a small amount of refrigerant on the refrigerant sensor to activate the leak mitigation mode.
11. Confirm the indoor blower is energized and 24V is not present at the air handler pigtail marked "ALARM".
12. Confirm the indoor blower shuts down after approximately 5 minutes after the flow of refrigerant on the refrigerant sensor has ended.
13. If the Refrigerant Leak Mitigation System does not operate as stated above, check for loose wiring connections or replace the refrigerant sensor.
14. Reinstall the blower/control box access panel on the air handler.
15. Set the thermostat to the desired operating mode and temperature.

If the leak detection system does not function properly when subjected to the above procedure, check for miswiring of the system. If the wiring connections are found to be correct per the air handler wiring diagram, replace the sensor with an approved replacement from the manufacturer.

Leak Detection Sensor Replacement

When the refrigerant leak detection system sensor fails or reaches the end of its life, the leak detection system will enter and remain in the leak mitigation mode even though there is no refrigerant leak present. If the leak detection system continues to operate in the mitigation mode even when a refrigerant leak isn't indicated by a portable refrigerant leak detector, replace the sensor with an approved replacement from the air handler manufacturer. Disconnect the wiring harness connector from the failed sensor and remove the sensor mounting screws. Discard the failed sensor. Mount the replacement sensor in the same location as the failed sensor that was removed and connect the sensor wiring harness connector to the sensor.

IMPORTANT: Mortex may source sensors from various manufacturers tthat could have different wiring connections requiring a wiring adapter to mate to the existing sensor wiring harness which will be provided with the Mortex approved replacement sensor. Only refrigerant leak detection system sensors specified by Mortex Products, Inc. may be used as a replacement for a failed sensor to assure the proper operation of the refrigerant leak detection system.

Only the following refrigerant sensors may be used for Mortex products:

R-32 Refrigerant: R68ALL001
R-454B Refrigerant: R68ALL002

IMPORTANT: The sensor wiring harness plug must be pointing down or horizontal. If the plug is pointing up, water could collect in the plug and result in operational issues.

Minimum Circulating Airflow for Refrigerant Leak Mitigation

There is a minimum circulating airflow required when the refrigerant leak detection system is operating in the leak mitigation mode. This minimum depends on the total system refrigerant charge and can be found listed in Tables 20 and 21. The refrigerant mitigation system energizes the continuous fan speed on the air handler. The continuous fan CFM (l/s) may need to be increased to achieve the minimum leak mitigation circulating airflow level by changing to a different indoor blower motor speed tap or ECM motor setting that delivers the minimum mitigation airflow level. Refer to the blower performance tables and wiring diagrams in this manual to determine if this adjustment is necessary and if it is determined to be necessary to increase the continuous fan airflow level, follow the instructions in **SECTION 9: MOTOR SPEED SELECTION AND AIR HANDLER STARTUP** in this manual to make the necessary adjustment.

Refrigerant Leak Alarm Output

The coil's refrigerant leak sensor has an alarm output signal that can be used as an input to a building management system or smart thermostat to alert the homeowner or user that the refrigerant detection system has detected a refrigerant leak and is in the leak mitigation mode. There is an ORANGE low voltage pigtail wire in the sensor harness labeled "ALARM". When the sensor is powered and no refrigerant leak is detected, the ORANGE "ALARM" pigtail wire is energized with 24 VAC indicating normal operation. When the refrigerant leak detection system detects a refrigerant leak and enters the leak mitigation mode (indoor blower energized and outdoor unit disabled), the ORANGE "ALARM" pigtail wire will be de-energized (0 VAC). The ORANGE "ALARM" pigtail wire is capped with a wire nut from the factory. Remove this wire nut and connect it to the building management system or smart thermostat as required if a refrigerant leak alert is desired. The building management system or smart thermostat shall be programmed to accept the reverse logic alarm signal (24 VAC – Normal; 0 VAC – Refrigerant Leak).

If a 24 VAC output when a refrigerant leak is detected is required to activate a warning light or audible alarm, the ORANGE "ALARM" pigtail wire shall be connected to the coil of a field supplied relay with normally closed contacts and a 24 VAC coil. An 18 AWG minimum wire from the furnace 24 VAC common circuit shall be connected to the other side of the relay coil. An 18 AWG minimum wire from the furnace 24 VAC "R" transformer circuit shall be connected to the terminal for one side of the normally closed relay contacts and an 18 AWG minimum wire to the warning light or audible alarm shall be connected to terminal for the other side of the normally closed relay contacts. All field supplied wiring shall be protected from damage. When no refrigerant leak is detected, the relay will be energized and the relay contacts will be open, disconnecting the 24 VAC signal to the warning light or audible alarm. When a refrigerant leak is detected, the relay will be de-energized and the contacts will close sending a 24 VAC signal to the warning light or audible alarm.

Power Supply Wiring

The air handler internal wiring is complete except for the power supply and the thermostat wires. See wiring diagram and/or Tables 9, 10, and 12 for wire size, fuse/circuit breaker size, and ground wire sizes. The use of a cable connector (strain relief) on incoming power supply wires to relieve any strain on wiring is required. Follow the steps below to connect the power supply wires.

1. Remove the blower/control box access panel.
2. Remove the appropriate size knockout in the electrical entrance located on the left side of the air handler top.
3. Install a cable connector (strain relief) in the electrical entrance hole.
4. Strip ½" of the insulation from the end of each wire.
5. Insert the supply voltage wires through the cable connector.
6. Insert the black wire into the L1 screw terminal on the circuit breaker, pull-out disconnect, or terminal block from the top and tighten the set screw to clamp down on the wire. For models with line voltage pigtails, connect the black wire to the black pigtail wire and tighten the wire nut.
7. Insert the white or red wire into the L2 screw terminal on the circuit breaker, pull-out disconnect, or terminal block
8. from the top and tighten the set screw to clamp down on the wire. For models with line voltage pigtails, connect the white or red wire to the red pigtail wire and tighten the wire nut.
9. Insert the green wire into the ground lug and tighten the set screw.

NOTE: This air handler may be equipped with a pull-out disconnect device. The pull-out disconnect device provides a means of disconnecting the power to the air handler. The pull-out disconnect device is not meant to protect the wiring in the air handler and between the air handler and the main electrical panel (breaker box). To protect the electrical supply wiring and the wiring inside of the air handler in the event of a short circuit, a circuit breaker in the main electric panel (breaker box) is required. Electrical data for the air handler is shown in Tables 8-11. If sheathed cable is used, refer to NEC National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) and local codes for additional requirements concerning supply circuit wiring.

NOTE: A means of disconnecting all poles of the line voltage power to the air handler must be provided in the field wiring within sight of the air handler unless the air handler is equipped with integral circuit breaker(s) with their ON/OFF lever(s) located on the outside of the air handler which can be used to disconnect line voltage electrical power to the air handler.

⚠ WARNING

This air handler is not equipped with a shield that covers the line voltage electrical supply wires the terminal block connections or the circuit breaker connections. For personal safety, turn the electrical power "OFF" at the main electrical panel (breaker box) and at the air handler control box the pull-out disconnect device before attempting any service or maintenance operations. Homeowners should never attempt to perform any maintenance which requires opening the air handler control box cover.

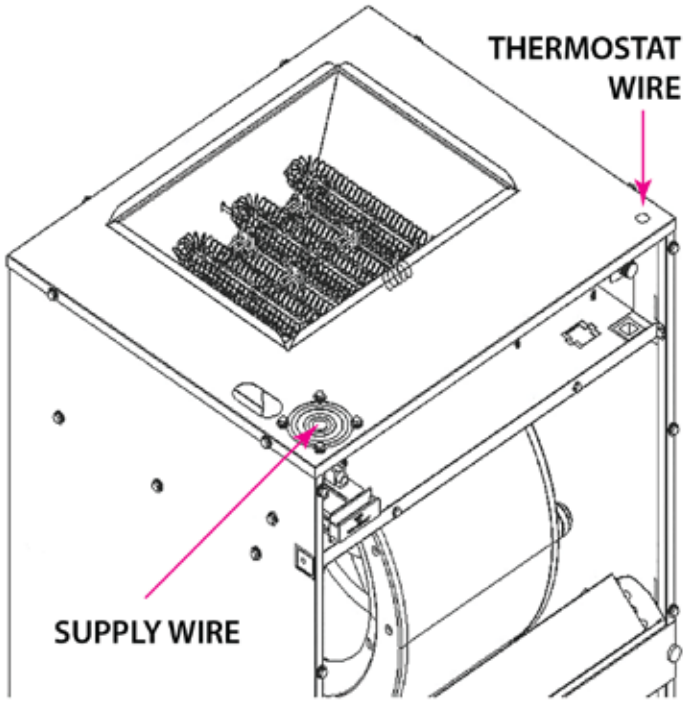


Figure 27: Line Voltage Wire Knockout and Thermostat Wire Entrance Locations - AHW1

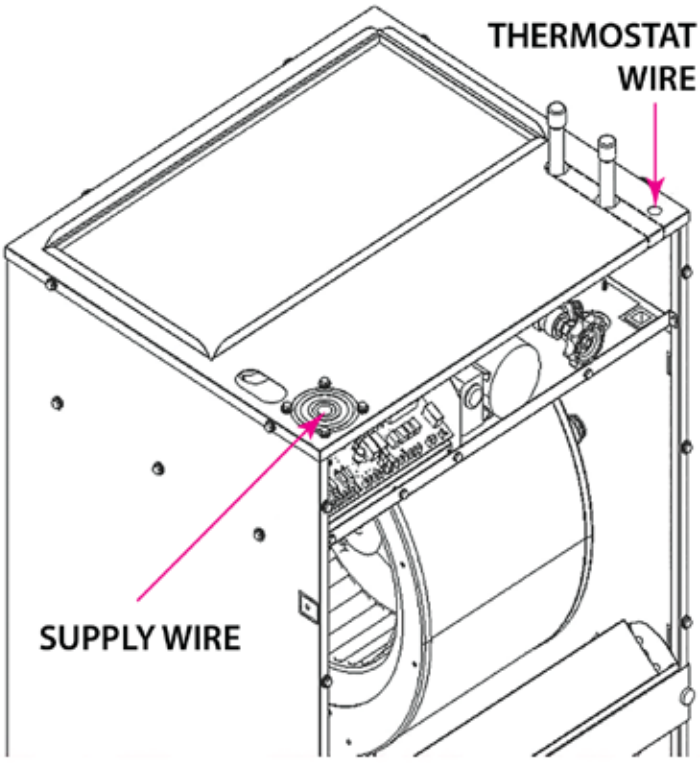


Figure 28: Line Voltage Wire Knockout and Thermostat Wire Entrance Locations - AHW2

Figure 29: Pull-Out Disconnect Location - AHW1

	AIR HANDLER MODELS		
Indoor Blower Type	AHW1 Constant Torque	AHW1 AHW1 Constant Torque	AHW1 AHW1 Constant Torque
Indoor Blower Motor Code	LM	LG	LI
Indoor Blower HP	1/3	1/3	1/2
Indoor Blower Size	10 x 7T	10 x 7T	10 x 8T
Indoor Blower Amps - 208/240 VAC	0.77 / 0.74	1.66 / 1.58	2.52 / 2.40
Min. Wire Size (90°C)	#14	#14	#14
Minimum Wire Size (75°C)	#14	#14	#14
Minimum Wire Size (60°C)	#14	#14	#14
Ground Wire Size	#14	#14	#14
Max Overcurrent Protection Amps**	15	15	15

Table 9: Wiring Requirements – 208/240 VAC No Electric Heat

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

* Ground conductor must be the same size and temperature rating as the other conductors listed in Table 9.

** Circuit breakers must be HACR type.

	AIR HANDLER MODELS												
	AHW1				AHW1				AHW1				
3 kW Heater Amps - 208/240 VAC	10.8/12.5				10.8/12.5				10.8/12.5				
5 kW Heater Amps - 208/240 VAC	18.0/20.8				18.0/20.8				18.0/20.8				
6 kW Heater Amps - 208/240 VAC	21.6/25.0				21.6/25.0				21.6/25.0				
8 kW Heater Amps - 208/240 VAC	28.8/33.3				28.8/33.3				28.8/33.3				
10 kW Heater Amps - 208/240 VAC	36.1/41.7				36.1/41.7				36.1/41.7				
Indoor Blower Type	Constant Torque				Constant Torque				Constant Torque				
Indoor Blower Size	10 x 7T				10 x 7T				10 x 8T				
Indoor Blower HP	1/3				1/3				1/2				
Indoor Blower Amps - 240 VAC	0.74				1.58				2.40				
Indoor Blower Amps - 208 VAC	0.77				1.66				2.52				
Indoor Blower Code	LM				LG				LI				
Heater - kW	3	5	6	8	3	5	6	8	3	5	6	8	10
Minimum Circuit Ampacity	16.5	27.0	32.2	42.6	17.6	28.0	33.2	43.6	18.6	29.0	34.3	44.7	55.1
Minimum Copper Wire Size (90°C)	#14	#12	#10	#8	#14	#12	#10	#8	#14	#12	#10	#8	#6
Minimum Copper Wire Size (75°C)	#14	#10	#10	#8	#14	#10	#10	#8	#14	#10	#10	#8	#6
Minimum Copper Wire Size (60°C)	#14	#10	#8	#6	#14	#10	#8	#6	#14	#10	#8	#6	#4
Ground Wire Size	*	*	*	*	*	*	*	*	*	*	*	*	*
Maximum Overcurrent Protection Amps**	20	30	35	45	20	30	35	45	20	30	35	45	60

Table 10: Wiring Requirements – 208/240 VAC Electric Heat - Single Branch Circuit

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

* Ground conductor must be the same size and temperature rating as the other conductors listed in Table 10.

** Circuit breakers must be HACR type.

		3 kW	4 kW	5 kW	6 kW	7 kW	8 kW	9 kW	10 kW
	BRANCH CIRCUIT	1	1	1	1	1	1	1	1
240 VAC, 60 HZ, 1 PH	BTU	10,236	13,649	17,061	20,473	23,885	27,297	30,709	34,121
	kW	3	4	5	6	7	8	9	10
230 VAC, 60 HZ, 1 PH	BTU	9,554	12,727	15,901	19,074	22,247	25,420	28,628	31,801
	kW	2.8	3.73	4.66	5.59	6.52	7.45	8.39	9.32
220 VAC, 60 HZ, 1 PH	BTU	8,872	11,806	14,775	17,709	20,678	23,612	26,581	29,515
	kW	2.6	3.46	4.33	5.19	6.06	6.92	7.79	8.65

Table 11: Electric Heat Heating Capacities

	AIR HANDLER MODELS	
	AHW2	AHW2
Indoor Blower Type	Constant Torque	Constant Torque
Indoor Blower Motor Code	LK	LL
Indoor Blower HP	1/2	1/2
Indoor Blower Size	10 x 8T	12 x 8T
Indoor Blower Amps	1.91	2.70
Water Pump Amps	0.52	0.52
Minimum Circuit Ampacity	3.04	4.03
Minimum Copper Wire Size (90˚C)	#14	#14
Minimum Copper Wire Size (75°C)	#14	#14
Minimum Copper Wire Size (60°C)	#14	#14
Ground Wire Size	#14	#14
Maximum Overcurrent Protection Amps**	15	15

Table 12: Wiring Requirements – 115 VAC Hydronic Heat

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

* Ground conductor must be the same size and temperature rating as the other conductors listed in Table 12.

** Circuit breakers must be HACR type.

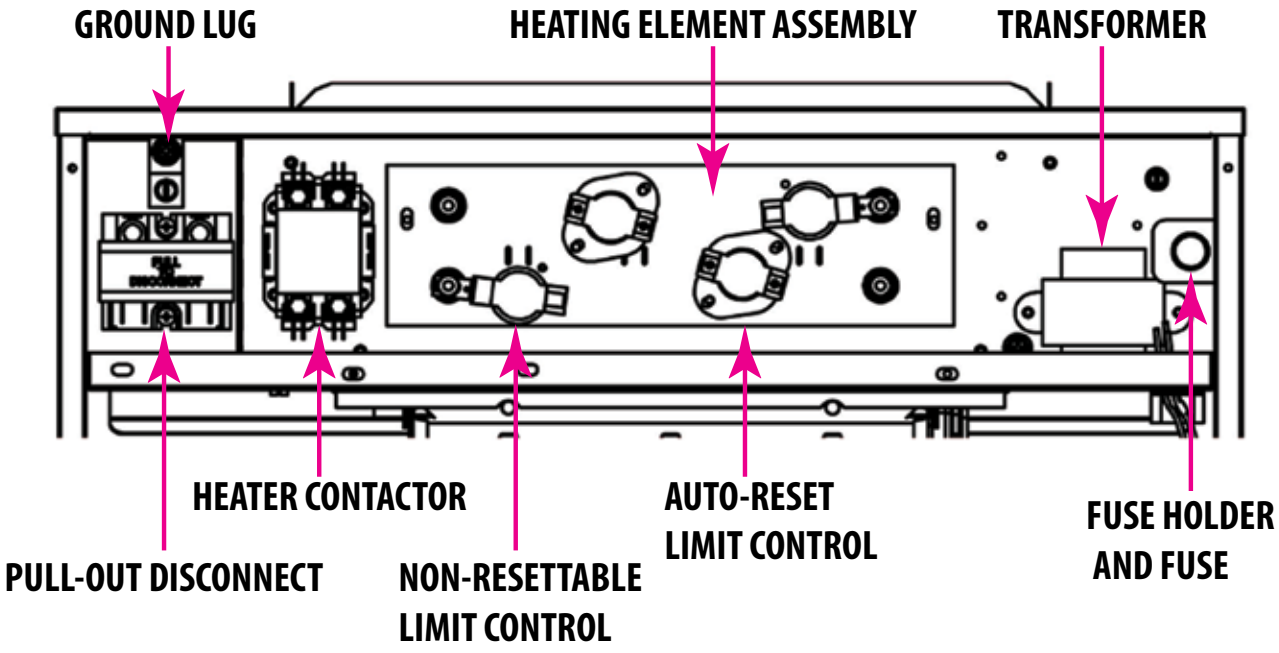


Figure 30: Component Locations – Electric Heat Control Box

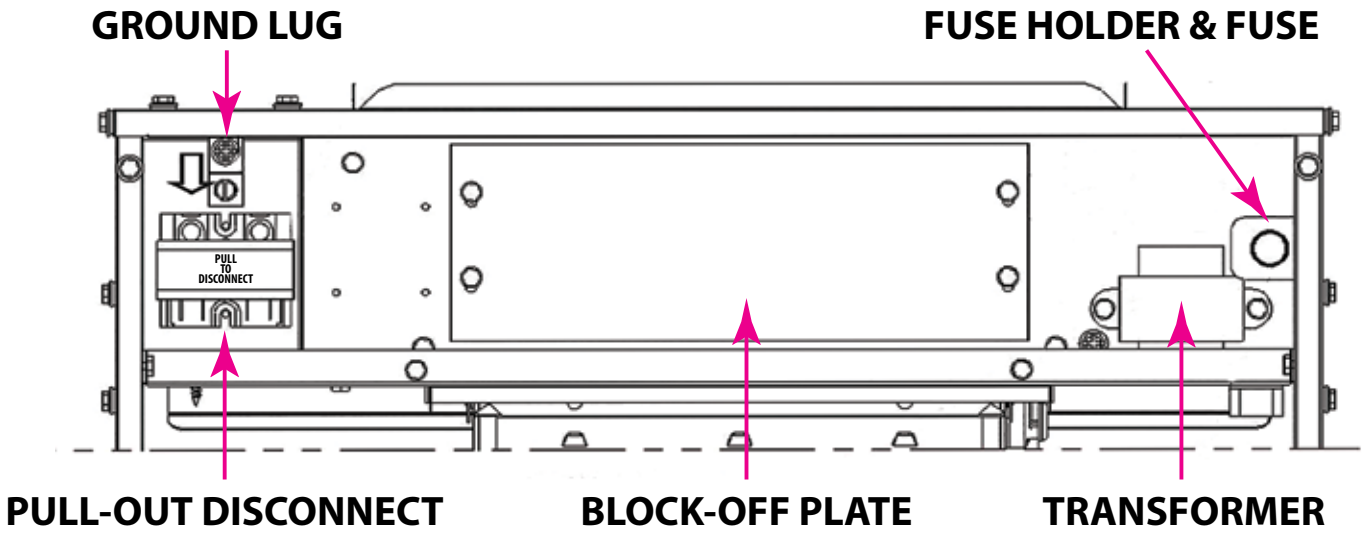


Figure 31: Component Locations – No Electric Heat Control Box

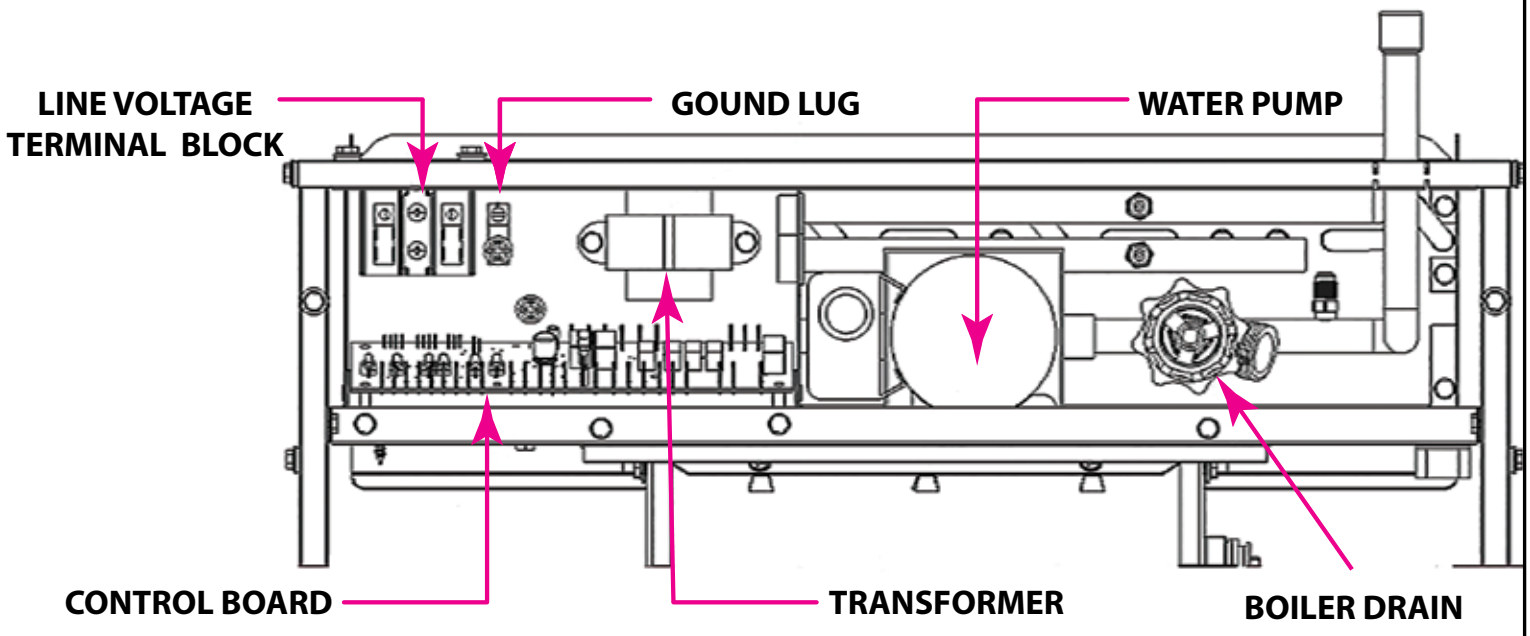


Figure 32: Component Locations – Hydronic Heat Control Box

Thermostat Wiring

Thermostat wires enter the air handler through a ½" diameter hole located on the right front corner of air handler top. A cable connector (strain relief) must be installed to hold wiring in place and to relieve any strain on the wiring. The thermostat wiring must be no smaller than 22 gauge. Refer to Table 13 for recommended wire gauge, lengths and maximum current for each wire gauge.

Max. Thermostat Wire Length	Thermostat Wire Gauge	Thermostat Wire Maximum Current
0 - 100 Feet	22	3.0 Amps
0 - 125 Feet	20	3.0 amps
0 - 250 Feet	18	3.0 amps

Table 13: Low Voltage Wire Gauge and Max Lengths

The use of a five-conductor cable from the thermostat to the air handler is recommended for typical heating or heating/cooling applications with a two or three-conductor cable from the air handler to the outdoor unit. A seven-conductor cable from the thermostat to the air handler is recommended for a typical heat pump installation with a five-conductor cable from the air handler to the outdoor unit. Typical thermostat wire colors and heating/cooling connections are listed in Tables 14 - 16.

Thermostat Installation

The thermostat should be located on an inside wall in an open area to more closely regulate average room air, preferably where there is air movement back to air handler. Locating height of thermostat is important. If possible, the thermostat should be located in a hallway upstream from the air handler return airflow, not within 3 feet of from any windows and 52 to 66 inches above the floor. Do not place the thermostat within three feet of any of the air-distribution supply air registers.

Maintenance, operating and/ or programming instructions are in the envelope accompanying the thermostat. Give the envelope to the homeowner.

Air Handler and Outdoor Unit With Separate Transformers

If the air-hander and the outdoor unit have separate transformers, it is important to use a thermostat with isolated heating and cooling contacts "RC" and "RH" to prevent interconnection of Class II 24 Volt Systems. Most modern thermostats have separate heating and cooling contacts for use with homes that have an air handler and outdoor unit that are completely separate and each have a 24 VAC transformer for system control. These thermostats have a "RC" terminal for cooling and a "RH" terminal for heating. Connect the outdoor unit RED wire from the "R" terminal on the outdoor unit to the "RC" terminal on the thermostat and the RED air handler pigtail wire to the "RH" terminal on the thermostat. If the air handler and outdoor unit using separate transformers are both connected to the thermostat "R" terminal, a transformer burnout can occur or either the air handler or outdoor unit control system could go into lockout mode. If an air handler and outdoor unit with separate transformers are being installed and the thermostat does not have the "RC" and "RH" terminals, a new thermostat with "RC" and "RH" terminals must be purchased and installed.

IMPORTANT: Cycle the air handler and outdoor unit separately to make sure both operate correctly.

Thermostat Heat Anticipator

Some thermostats have a heat anticipator setting that must be set to the settings shown below in order to function correctly. If the heat anticipator setting is too low, the system will short cycle. If the heat anticipator setting is too high, the system will run long heat cycles thus causing the temperature to overrun the temperature setting. This will cause the homeowner or user to feel too warm by the time the blower completes its cycle and too cold by the time the system cycles on again. The heat anticipator should be set to 0.4 for all heating kW's.

The thermostat may be a "self-setting" type in which no heat anticipator will be found on the thermostat, eliminating the need for field adjustment.

⚠ CAUTION

When using separate thermostats, a thermostat interlock system must be provided to prevent simultaneous operation of the heating and cooling modes. Simultaneous operation can result in equipment overheating, equipment damage, and wasted energy.

Do not connect the YELLOW wire to the thermostat unless an outdoor unit is installed.

⚠ CAUTION

Do not locate thermostat within three feet of any of the following items:

1. **Supply air registers**
2. **Lights or heat lamps**
3. **Aquariums**
4. **Televisions, stereo, amplifiers, surround sound systems**
5. **Stoves or any cooking appliance**
6. **Refrigerator**
7. **Washer and/or dryer**
8. **Hot water tank**
9. **Sink or near any hot water**
10. **Within 15 feet of any electric space heater**
11. **Within two feet of any sunlight**

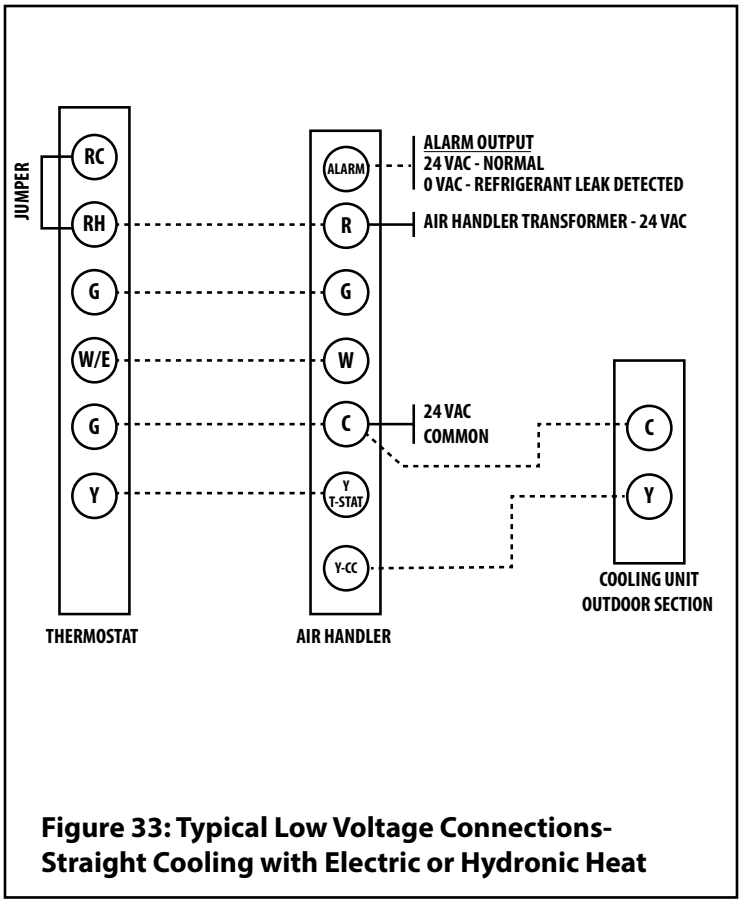


Figure 33: Typical Low Voltage Connections- Straight Cooling with Electric or Hydronic Heat

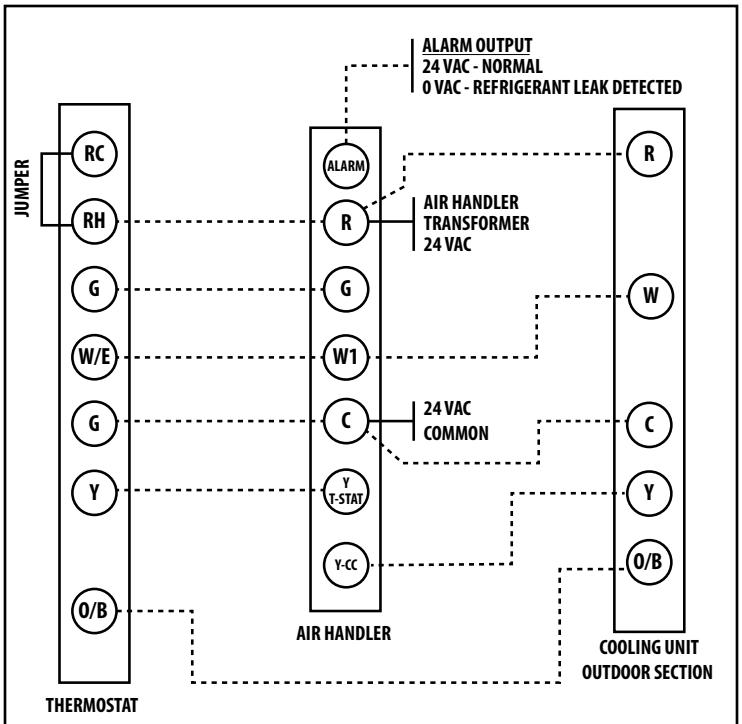


Figure 34: Typical Low Voltage Connections- Heat Pump with Electric or Hydronic Heat

Wire Color	Description	Letter Code	Thermostat Connection
RED	24 VAC	RED / R	R
WHITE	Heat	WHT / W	W or W1
GREEN	Indoor Fan	GRN / G	G
BLACK	24 VAC Common (Hydronic Heat Models)	BLK / C	C
WHITE	Y-CC (Compressor Contactor Output)	WHT / Y-CC	N/A – Connects to Outdoor Unit CC
ORANGE	Refrigerant Leak Alarm - 24VAC = NO LEAK 0 VAC = LEAK	ORN / BK	Special Thermostats With Alarm Feature Only – Read Thermostat Instructions for More Information

Table 14: Air Handler Low Voltage Pigtail Wire Colors and Thermostat Connections

Wire Color	Description	Letter Code	Thermostat Connection
RED	24 VAC	RED / R	R
WHITE	Heat (1st Stage Heat)	WHT / W	W or W1
GREEN	Indoor Fan	GRN / G	G
YELLOW	Cooling	YEL / Y	Y or Y1
BROWN	24 VAC Common	BRN / C	C

Table 15: Typical Heat / Cool Thermostat Wire Color Codes and Connections

Wire Color	Description	Letter Code	Thermostat Connection
RED	24 VAC	RED / R	R
WHITE	Heat (1st Stage Heat)	WHT / W	E
GREEN	Indoor Fan	GRN / G	G
YELLOW	Cooling	YEL / Y	Y or Y1
BROWN	24 VAC Common	BRN / C	C
ORANGE	Heat Pump Reversing Valve Solenoid (Most Brands)	ORN / O	O
BLUE	Heat Pump Reversing Valve Solenoid (Some Brands)	BLU / B	B

Table 16: Typical Heat Pump Thermostat Wire Color Codes and Connections

Typical Heating/Cooling Thermostat Wiring Connections (check wire colors)

1. Remove blower / control box access panel.
2. Insert the wire cables from the thermostat and outdoor unit and into the control box through the ½" diameter hole located on the right side of the air handler top panel. Place the thermostat wire cable next to the air handler low voltage terminal block (LVTB) or low voltage pigtails. Secure the thermostat and outdoor unit wire cables with a strain relief in the ½" diameter hole to prevent wire connections from being pulled apart.
3. Strip 1/2" of the insulation on the end of each wire.
4. Connect the RED (24 VAC) wire from the thermostat "R" terminal to the "R" terminal on the LVTB or to the RED air handler low voltage pigtail wire with a wire nut.
5. Connect the WHITE (heat) wire from the thermostat "W" terminal to the "W" terminal on the LVTB or to the WHITE air handler low voltage pigtail wire with a wire nut.
6. Connect the GREEN (indoor fan) wire from the thermostat "G" terminal to the "G" terminal on the LVTB or to the GREEN air handler low voltage pigtail wire with a wire nut.
7. Connect the YELLOW (cooling) wire from the thermostat "Y" terminal to the YELLOW air handler pigtail wire labelled Y-Tstat with a wire nut.
8. Connect the WHITE air handler pigtail labelled "Y-CC" to the wire from the outdoor unit compressor contactor coil with a wire nut.
9. Connect the 24 VAC common wire (typically BROWN) from the thermostat "C" terminal to the "C" terminal on the LVTB or to the BROWN or BLUE 24 VAC common air handler low voltage pigtail wire and the 24 VAC common wire (typically BROWN) from the outdoor unit compressor contactor coil with a wire nut. For models with a LVTB, also connect the 24VAC common wire from the outdoor unit compressor contactor coil common to the "C" terminal on the LVTB.
10. If a refrigerant leak alert is desired and a building management system or smart thermostat capable of providing that alert is being used, removed the wire nut from the end of the ORANGE pigtail wire labeled "ALARM" and connect it to the appropriate building management system or smart thermostat connections. See "Refrigerant Leak Alarm Output" on page 25 for additional information.

Typical Heat Pump - Heating/Cooling Thermostat Wiring Connections

1. Remove blower / control box access panel.
2. Insert the wire cables from the thermostat and outdoor unit and into the control box through the ½" diameter hole
3. located on the right side of the air handler top panel. Place the thermostat wire cable next to the air handler low voltage terminal block (LVTB) or low voltage pigtails. Secure the thermostat and outdoor unit wire cables with a strain relief in the ½" diameter hole to prevent wire connections from being pulled apart.
4. Connect the RED (24 VAC) wire from the thermostat "R" terminal to the "R" terminal on the LVTB or to the RED air handler low voltage pigtail wire with a wire nut.
5. Connect the WHITE (emergency heat) wire from the thermostat "E" terminal to the "W" terminal on the air handler LVTB or to the WHITE air handler low voltage pigtail wire with a wire nut. If applicable, also connect the wire from the outdoor control board that calls for supplemental heat during the defros cycle to the "W" terminal on the air handler LVTB or to the WHITE air handler pigtail wire. Refer to the outdoor unit installation instructions for additional information on supplemental heat during the defrost cycle.
6. Connect the GREEN (indoor fan) wire from the thermosta "G" terminal to the "G" terminal on the LVTB or to the GREEN air handler low voltage pigtail wire with a wire nut.
7. Connect the YELLOW (cooling) wire from the thermostat "Y" terminal to the YELLOW air handler pigtail wire labelled "Y-Tstat with a wire nut.
8. Connect the WHITE air handler pigtail labelled "Y-CC" to the

wire from the outdoor unit compressor contactor coil with a wire nut.

9. Connect the 24 VAC common wire (typically BROWN) from the thermostat "C" terminal to the "C" terminal on the LVTB or to the BROWN or BLUE 24 VAC common air handler low voltage pigtail wire and the 24 VAC common wire (typically BROWN) from the outdoor unit compressor contactor coil with a wire nut. For models with a LVTB, also connect the 24VAC common wire from the outdoor unit compressor contactor coil common to the "C" terminal on the LVTB.
10. Connect the wire from the thermostat "O" or "B" terminal with the wire from the "O" or "B" terminal on the outdoor unit with a wire nut. Refer to the outdoor unit installation instructions to determine if "O" or "B" is correct for the application.
11. If a refrigerant leak alert is desired and a building management system or smart thermostat capable of providing that alert is being used, removed the wire nut from the end of the ORANGE pigtail wire labeled "ALARM" and connect it to the appropriate building management system or smart thermostat connections. See "Refrigerant Leak Alarm Output" on page 25 for additional information.

IMPORTANT NOTES FOR HYDRONIC AIR HANDLERS

1) The YELLOW wire from the thermostat "Y" terminal must connect to the "Y" terminal on the electronic hydronic control board and the "Y" signal wire (typically YELLOW) from the outdoor unit compressor contactor must connect to the "CC" terminal on the control board. The thermostat "Y" signal is passed from the "CLin" terminal to the "CLout" terminal with a factory installed jumper wire. The CLout terminal is connected to the "CC" terminal internally in the control board. The jumper between the CLin and CLout terminals allows the "Y" signal to reach the CC terminal on applications without a compressor lockout switch. For applications where a compressor lock-out switch has been installed, this jumper is replaced with the two wires from the lock-out switch.
2) If the YELLOW wire from the thermostat "Y" terminal on a hydronic air handler is not connected to the hydronic control board Y terminal, the indoor blower motor will not operate in the cooling or heat pump heating mode which will result in no cooling and frosting up of the indoor coil in the cooling mode or no heating and excessive compressor head pressures in the heat pump heating mode.

SECTION 9: BLOWER MOTOR SPEED SELECTION

⚠ WARNING

To avoid personal injury or property damage, make certain that the motor leads cannot come into contact with non-insulated metal components of the air handler.

The constant torque motor in this air handler operates on either 208/240 VAC (electric heat and no heat models) or 115 VAC (hydronic heat models) and the motor speed taps are controlled by 24 VAC. The speed taps can be changed by moving the wires connected to terminals 1 – 5 on the motor terminal block (See Figure 38). Tables 17 and 18 show the constant torque motor lead connection labeling and the connection definitions.

⚠ WARNING

This air handler is equipped with a refrigerant leak mitigation system that energizes the blower motor to deliver at least the required minimum airflow when the refrigerant leak detection system detects a leak (See Tables 20 and 21). This will dilute the flammable A2L class refrigerant to a point that it no longer poses a risk of an explosion or fire. Follow the procedure in Section 10: System Startup and Check-Out to confirm the refrigerant mitigation system is functioning as it should.

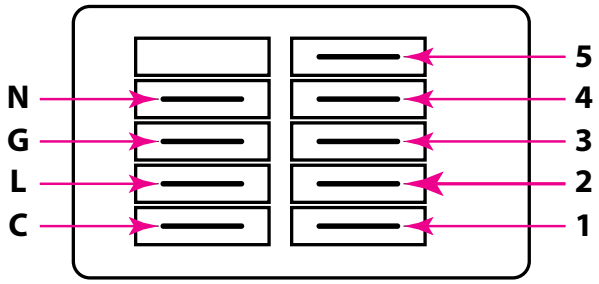


Figure 35: Constant Torque Motor Terminals

TERMINAL	CONNECTION
C	Speed Tap Common - 24 VAC Common
L	Supply Voltage - 115 VAC
G	Ground Connection
N	Supply Voltage - Neutral
1	Low Speed Tap - 24 VAC Input
2	Medium - Low Speed Tap - 24 VAC Input
3	Medium Speed Tap - 24 VAC Input
4	Medium - High Speed Tap - 24 VAC Input
5	High Speed Tap - 24 VAC Input

Table 17: Constant Torque Motor Terminal Connections – Hydronic Heat Models

TERMINAL	CONNECTION
C	Speed Tap Common - 24 VAC Common
L	Supply Voltage – 208/240 VAC – Line 1
G	Ground Connection
N	Supply Voltage – 208/240 VAC – Line 2
1	Low Speed Tap - 24 VAC Input
2	Medium - Low Speed Tap - 24 VAC Input
3	Medium Speed Tap - 24 VAC Input
4	Medium - High Speed Tap - 24 VAC Input
5	High Speed Tap - 24 VAC Input

Table 18: Constant Torque Motor Terminals – Hydronic Heat Models

Changing Motor Speeds

1. Turn off all electrical supply circuits to the air handler at the main electrical panel.
2. Switch the air handler circuit breaker(s) to "OFF".
3. Remove the control box/blower access panel.
4. Move the wires connected to terminals 1-5 on the motor terminal block (See Figure 35) so they energize the desired motor speed taps for the cooling, dehumidification (hydronic heat models only), heating, and continuous fan modes. See Tables 17 and 18 for the speed tap descriptions and Figures 39 – 42 for air handler wiring diagrams.

   Motor speed tap wire colors are as follows:
   a) Electric Heat Models
   - Cooling: YELLOW
   - Heating: WHITE
   - Continuous Fan: GREEN
   - BLUE & ORANGE wires are unused

   b) Hydronic Heat Models
   - Cooling: YELLOW
   - Cooling Dehumidification: WHITE
   - Heating: ORANGE
   - Continuous Fan: GREEN
   - BLUE wire is unused

5. Reinstall the control box/blower access panel.
6. Turn the air handler circuit breakers to "ON".
7. Turn on all electrical supply circuits to the air handler at the main electrical panel.
8. Set the thermostat to the desired operating mode and temperature.

SECTION 10: FINAL SYSTEM CHECKOUT AND START-UP

1. Refer to appropriate wiring diagram and recheck all wiring connections. Ensure that all wiring connections are secure.
2. Check blower motor connectors to make sure they are not damaged or loose.
3. If the blower/control box cover was removed, reinstall it.
4. Switch the air handler circuit breakers in the main electrical panel (breaker box) to the ON position.
5. Insert the **Pull-Out Disconnect** handle into the body of the disconnect (electric heat and no heat models) or switch the air handler service disconnect switch to the ON position (hydronic heat models).
6. Set the thermostat FAN Switch to the ON position to enable the continuous fan mode.
7. Check for air leaks at all duct connections and seal any leaks that are found.
8. Set the thermostat FAN switch to the AUTO position.
9. Set the thermostat HEAT/COOL switch to the COOL position and adjust the set point below the room temperature to enable the cooling mode.
10. Check for proper cooling operation per the outdoor unit installation and operating instructions.
11. No Heat Models Only: Set the thermostat to the desired operating mode and adjust the temperature setting for comfort conditions.
12. **Electric Heat Models Only:** Switch the thermostat HEAT COOL switch to the HEAT position and adjust the set point above the room temperature to enable the heating mode.
    a) Check for proper heating operation.
    b) Set the thermostat to the desired operating mode and adjust the temperature setting for comfort conditions.
13. **Hydronic Heat Models Only:** Switch the thermostat HEAT COOL switch to the OFF position. The heating mode in models with hydronic heating system should not be switched on until system is filled and air is purged from hot water coil using the following procedure.

Filling Hydronic Heating System With Water, Purging Air From System, and System Startup

1. Fill and pressurize the water heater and water coil.
2. Check for water leaks and seal any leaks that are found.
3. Turn the water heater on and set water temperature at 130°F for now.
4. Vent air from the water tank by opening a hot water spigot or faucet.
5. Vent and flush the supply and return water lines by attaching a hose to the volume purge valve and running purge water to safe location. Run approximately 5 gallons of water at a high flow rate to purge.
6. Switch the air handler power disconnect switch to the "ON" position.
7. Switch the air handler circuit breakers in the main electrical panel to the ON position.
8. Set the thermostat HEAT/COOL switch to the HEAT position and adjust the set point above the room temperature to call for heat. The fan and water pump (provided a water pump is present) should start simultaneously. The water coil should be warm after a few minutes of operation.
9. The air handler is rated for water temperatures of 130°-180°F. Set water heater temperature at design temperature and take proper safeguards for water usage at supply points per local codes and safety considerations.

   NOTE: If CPVC or PEX hot water tubing is used, do not set the water temperature above 150°F.

10. Set thermostat HEAT/COOL switch to the desired operating mode and adjust the temperature setting for comfort conditions.

Verifying Proper Functioning of Refrigerant Leak Mitigation System

A test to confirm the proper functioning of the refrigerant leak mitigation system must be performed at the final system check-out. Follow the procedure below to perform that test.

1. Remove the blower/control box access panel from the front of the air handler.
2. Locate the black refrigerant sensor located near the bottom right side of the coil assembly below below the blower (See Figure 26).

Leak Detected During Cooling Cycle

3. Set the thermostat to "COOL" and the fan switch to "AUTO" and lower the temperature setpoint below the indoor temperature so the system enters the cooling mode.
4. Confirm the outdoor unit compressor is operating.
5. Within 30 seconds of the compressor starting, release a small amount of refrigerant on the refrigerant sensor to activate the leak mitigation mode.
6. Confirm the outdoor unit compressor and fan motor shut down and the indoor blower continues to operate.
7. Confirm the indoor blower is energized and 24V is not present at the air handler pigtail marked "ALARM".
8. Confirm the outdoor unit compressor and fan motor are re-energized approximately 5 minutes after the flow of refrigerant near the sensor has ended and that the indoor blower continues to operate.

Leak Detected During the OFF Cycle

9. Set the thermostat to the "OFF" position and wait until the outdoor unit compressor and fan motor stop and indoor blower stops.
10. Release a small amount of refrigerant on the refrigerant sensor to activate the leak mitigation mode.
11. Confirm the indoor blower is energized and 24V is not present at the air handler pigtail marked "ALARM".
12. Confirm the indoor blower shuts down after approximately 5 minutes after the flow of refrigerant on the refrigerant sensor has ended.
13. If the Refrigerant Leak Mitigation System does not operate as stated above, check for loose wiring connections or replace the refrigerant sensor.
14. Reinstall the blower/control box access panel on the air handler.
15. Set the thermostat to the desired operating mode and temperature.

If the leak detection system does not function properly when subjected to the above procedure, check for miswiring of the system. If the wiring connections are found to be correct per the air handler wiring diagram, replace the sensor with an approved replacement from the manufacturer using the following procedure.

Leak Detection Sensor Replacement

When the refrigerant leak detection sensor fails or reaches the end of its life, the leak detection sensor will enter and remain in the leak mitigation mode even though there is no refrigerant leak present. If the leak detection system continues to operate in the mitigation mode even when a refrigerant leak isn't indicated by a portable refrigerant leak detector, replace the sensor with an approved replacement from the air coil manufacturer. Disconnect the wiring harness connector from the failed sensor and remove the sensor mounting screws. Discard the failed sensor. Mount the replacement sensor in the same location as the failed sensor that was removed and connect the sensor wiring harness connector to the sensor. Verify the proper function of the refrigerant leak mitigation system using the "Verifying Proper Functioning of Refrigerant Leak Mitigation System" above.

IMPORTANT: Mortex may source sensors from various manufacturers that have a different wiring harness connection. A wiring adapter may be necessary to allow the replacement sensor to connect the sensor wiring harness. The wiring adapter will be provided with the replacement sensor. Alternate mounting holes are provided in the sensor bracket to accommodate the various approved sensors. Only use a replacement sensor approved by and provided by Mortex to assure proper operating and compatibility. Only the following refrigerant sensors may be used for Mortex products:

R-32 Refrigerant: R68ALL001
R-454B Refrigerant: R68ALL002

IMPORTANT: The sensor wiring harness plug must be pointing down or horizontal. If the plug is pointing up, water could collect in the plug and result in operational issues.

Vertical : Wall/Closet" Mount Air Handler "Constant Torque" Motor - Fan Data																				
Cabinet Size	Blower Housing	Motor HP	Blower Code	Motor Volts	Evap. CoilFHxFL	Motor Tap	CFM @ External Pressure In-WC (Watts/1000cfm)													
							0.10		0.20		0.30		0.40		0.50	
22"Wx18 ¾"Dx36"H (Electric Heat)	10x7T	1/3	LM	240	18.194x17.75 (4R, .827x.625, 5/16")	5	957 [185]	{198}	899 [192]	{213}	842 [195]	{231}	781 [208]	{266}	722 [212]	{293}
						4	898 [158]	{176}	839 [165]	{196}	778 [176]	{226}	765 [181]	{236}	717 [186]	{259}
						3	779 [114]	{146}	734 [120]	{163}	680 [126]	{185}	618 [131]	{211}	545 [136]	{249}
						2	713 [92]	{129}	663 [100]	{150}	600 [104]	{173}	523 [109]	{208}	484 [114]	{235}
						1	585 [61]	{104}	545 [67]	{123}	460 [72]	{156}	385 [75]	{194}	308 [79]	{263}
22"Wx18 ¾"Dx36"H (Electric Heat)	10x7T	1/3	LG	240	18.194x17.75 (4R, .827x.625, 5/16")	5	1248 [343]	{275}	1218 [348]	{286}	1213 [354]	{292}	1183 [355]	{300}	1129 [338]	{299}
						4	1079 [221]	{205}	1062 [223]	{210}	1045 [234]	{224}	1003 [239]	{238}	966 [251]	{260}
						3	1007 [177]	{176}	993 [186]	{187}	969 [190]	{196}	930 [200]	{215}	878 [208]	{237}
						2	878 [120]	{137}	851 [124]	{146}	811 [134]	{165}	757 [139]	{184}	706 [150]	{213}
						1	825 [103]	{125}	784 [110]	{140}	748 [117]	{157}	689 [123]	{178}	640 [132]	{206}
22"Wx18 ¾"Dx36"H (Electric Heat)	10x8T	1/2	LI	240	21.50x17.75 (4R, .827x.625, 5/16")	5	1396 [419]	{300}	1340 [398]	{297}	1288 [383]	{297}	1288 [387]	{300}	1206 [360]	{298}
						4	1340 [370]	{276}	1307 [369]	{282}	1288 [371]	{288}	1254 [365]	{291}	1177 [346]	{294}
						3	1250 [307]	{246}	1219 [315]	{258}	1204 [314]	{261}	1181 [322]	{273}	1112 [323]	{291}
						2	1086 [212]	{195}	1065 [213]	{200}	1034 [219]	{212}	978 [230]	{235}	930 [242]	{260}
						1	1025 [180]	{176}	1002 [182]	{182}	974 [192]	{197}	909 [205]	{225}	846 [210]	{248}
22"Wx18 ¾"Dx36"H (Hydronic Heat)	10x8T	1/2	LK	120	21.50x17.75 (4R, .827x.625, 5/16")	5	947 [253]	{267}	888 [259]	{292}	860 [267]	{310}	787 [276]	{351}	724 [280]	{387}
						4	911 [223]	{245}	859 [230]	{268}	802 [236]	{294}	732 [241]	{329}	656 [249]	{380}
						3	820 [172]	{210}	763 [180]	{236}	690 [189]	{274}	609 [191]	{314}	535 [197]	{368}
						2	733 [140]	{191}	661 [151]	{228}	588 [153]	{260}	564 [157]	{278}	502 [161]	{321}
						1	613 [91]	{148}	542 [96]	{177}	471 [102]	{217}	400 [105]	{262}	327 [109]	{334}
22"Wx18 ¾"Dx36"H (Hydronic Heat)	12x8T	1/2	LL	120	21.50x17.75 (4R, .827x.625, 5/16")	5	1224 [371]	{303}	1169 [377]	{323}	1111 [383]	{345}	1050 [390]	{371}	985 [395]	{400}
						4	1154 [321]	{278}	1098 [323]	{294}	1036 [334]	{323}	973 [340]	{350}	903 [342]	{379}
						3	1081 [272]	{252}	1015 [280]	{276}	951 [283]	{298}	886 [289]	{326}	812 [293]	{361}
						2	1026 [238]	{232}	956 [237]	{248}	887 [243]	{274}	812 [250]	{308}	730 [255]	{350}
						1	950 [195]	{206}	876 [204]	{233}	801 [207]	{259}	717 [259]	{293}	627 [935]	{345}

Table 19: Blower Performance – Without Air Filters

Minimum CFM for Electric Heat: 3kW = 195 CFM; 5kW = 325 CFM; 6kW = 390 CFM; 8kW = 520 CFM; 10kW = 650 CFM

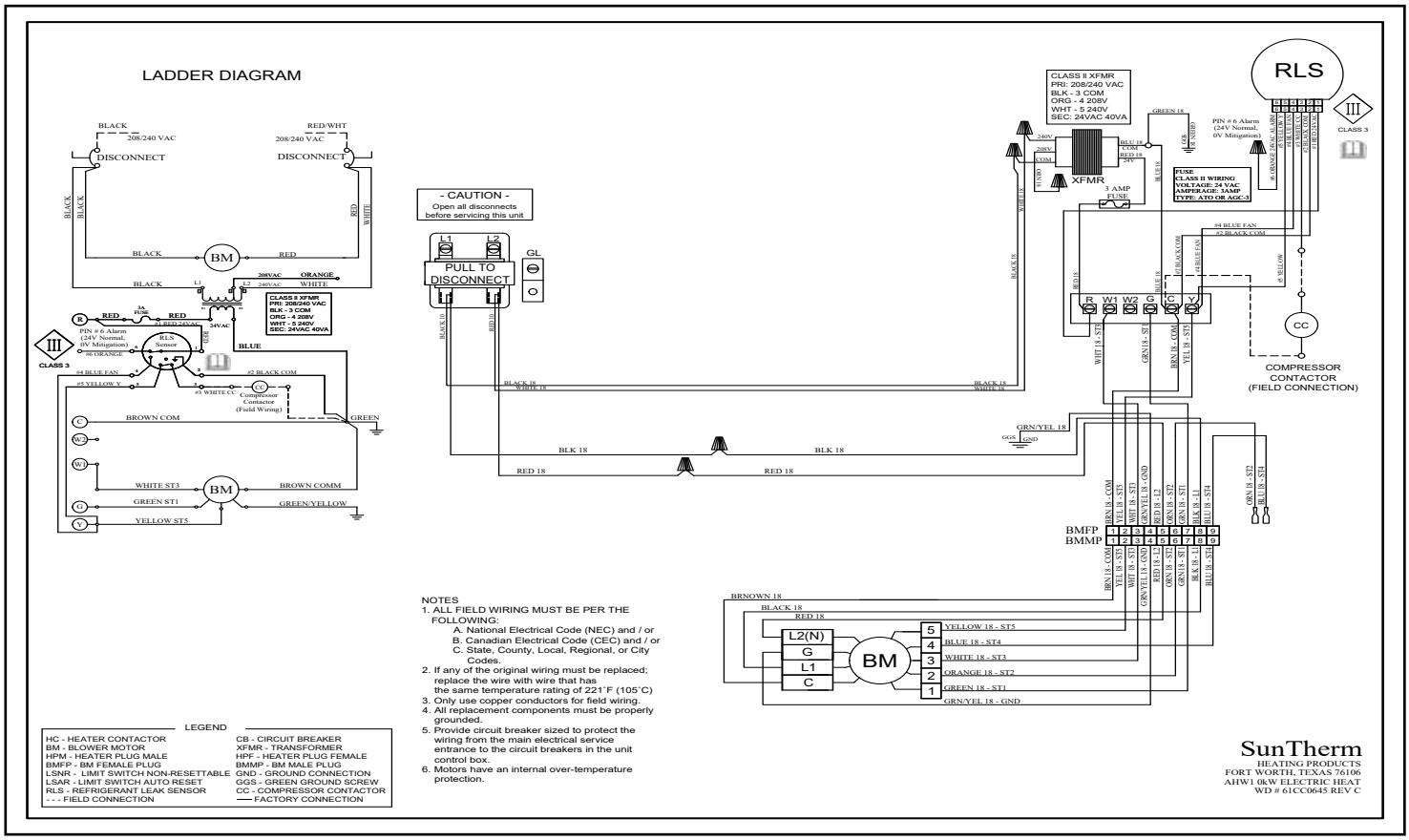


Figure 36: No Electric Heat Wiring Diagram

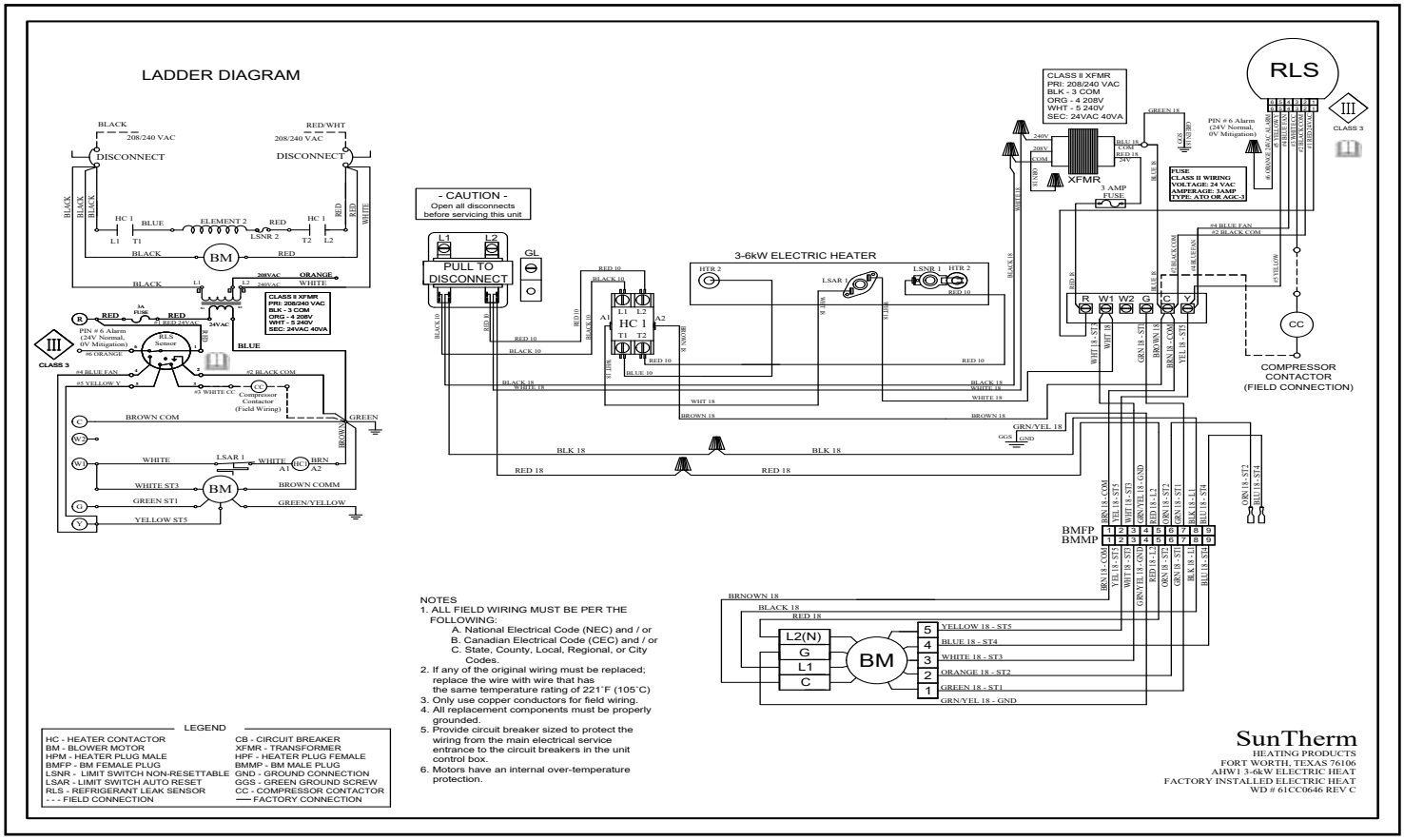


Figure 37: 3 kW, 5 kW and 6 kW Electric Heat Wiring Diagram

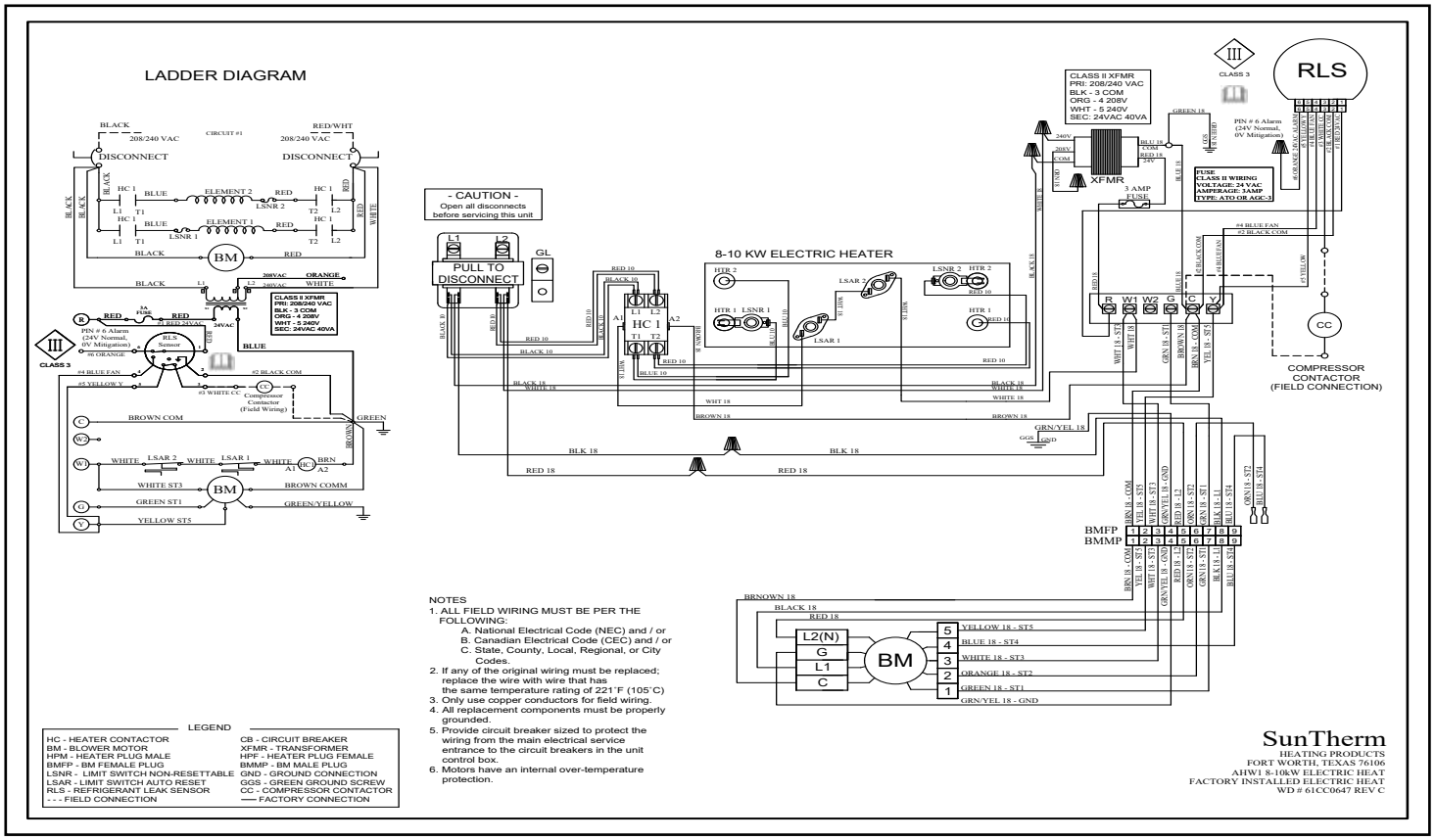


Figure 38: 8 kW and 10 kW Electric Heat Wiring Diagram

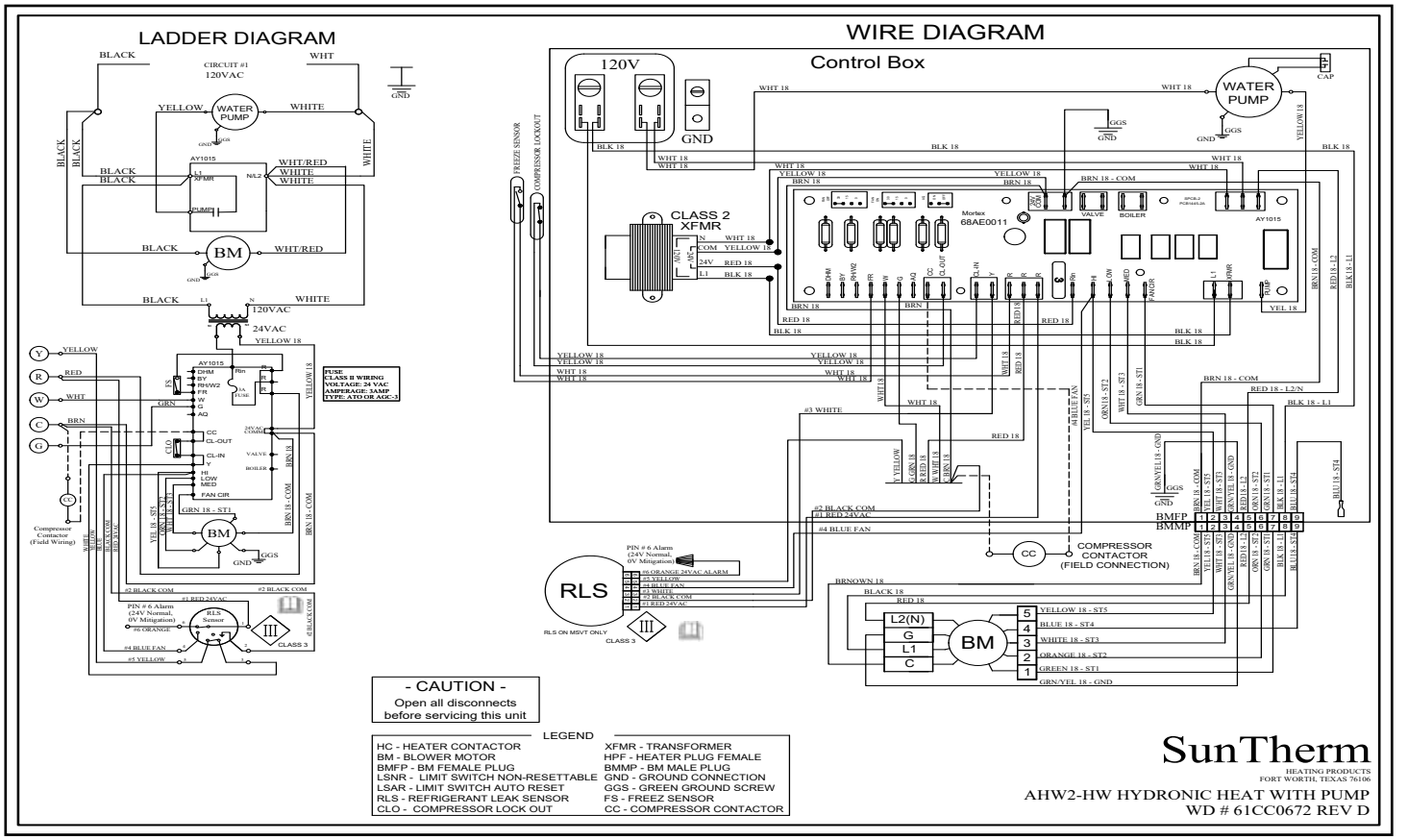


Figure 39: Hydronic Heat Wiring Diagram

SECTION 15: MINIMUM CONDITIONED SPACE AND AIR FLOW TABLES

Total System Refrigerant Charge (kg)	Total System Refrigerant Charge (oz)	Total System Refrigerant Charge (lb)	Min. Area of Conditioned Space (m^2)	Min. Area of Conditioned Space (ft^2)	Min. Air-Flow ($meter^3/hr$)	Min. Air-Flow (liter/s)	Min. Air-Flow (CFM)
1.776 kg or less	62.6 oz or less	3.91 lb or less	No Minimum	No Minimum	No Minimum	No Minimum	No Minimum
1.78	63	3.92	5.47	59	180	50	106
1.92	68	4.22	5.88	63	194	54	114
2.05	72	4.52	6.30	68	208	58	122
2.19	77	4.82	6.72	72	222	62	131
2.32	82	5.12	7.14	77	236	65	139
2.46	87	5.42	7.56	81	249	69	147
2.60	92	5.72	7.97	86	263	73	155
2.73	96	6.02	8.39	90	277	77	163
2.87	101	6.32	8.81	95	291	81	171
3.00	106	6.62	9.23	99	305	85	179
3.14	111	6.92	9.65	104	318	88	187
3.28	116	7.22	10.06	108	332	92	195
3.41	120	7.52	10.48	113	346	96	204
3.55	125	7.82	10.90	117	360	100	212
3.69	130	8.12	11.32	122	374	104	220
3.82	135	8.42	11.74	126	387	108	228
3.96	140	8.73	12.15	131	401	111	236
4.09	144	9.03	12.57	135	415	115	244
4.23	149	9.33	12.99	140	429	119	252
4.37	154	9.63	13.41	144	442	123	260
4.50	159	9.93	13.83	149	456	127	269
4.64	164	10.23	14.24	153	470	131	277
4.77	168	10.53	14.66	158	484	134	285
4.91	173	10.83	15.08	162	498	138	293
5.05	178	11.13	15.50	167	511	142	301
5.18	183	11.43	15.92	171	525	146	309
5.32	188	11.73	16.33	176	539	150	317
5.45	192	12.03	16.75	180	553	154	325
5.59	197	12.33	17.17	185	567	157	333
5.73	202	12.63	17.59	189	580	161	342
5.86	207	12.93	18.01	194	594	165	350
6.00	212	13.23	18.42	198	608	169	358
6.14	216	13.53	18.84	203	622	173	366
6.27	221	13.83	19.26	207	636	177	374
6.41	226	14.13	19.68	212	649	180	382
6.54	231	14.43	20.10	216	663	184	390
6.68	236	14.73	20.51	221	677	188	398
6.82	240	15.03	20.93	225	691	192	407
6.95	245	15.33	21.35	230	705	196	415
7.09	250	15.63	21.77	234	718	200	423
7.22	255	15.93	22.19	239	732	203	431
7.36	260	16.23	22.60	243	746	207	439
7.50	264	16.53	23.02	248	760	211	447
7.63	269	16.83	23.44	252	774	215	455
7.77	274	17.13	23.86	257	787	219	463
7.90	279	17.43	24.28	261	801	223	471
8.04	284	17.73	24.69	266	815	226	480
8.18	288	18.03	25.11	270	829	230	488
8.31	293	18.33	25.53	275	843	234	496
8.45	298	18.63	25.95	279	856	238	504
8.59	303	18.93	26.37	284	870	242	512
8.72	308	19.23	26.78	288	884	246	520
8.86	312	19.53	27.20	293	898	249	528
8.99	317	19.83	27.62	297	911	253	536

TABLE 20: MINIMUM CONDITIONED SPACE AREA & AIR-FLOW FOR R-454B REFRIGERANT INSTALLATIONS

NOTES: 1. Applies to fixed ducted systems with continuous air-flow or refrigerant detection systems only.
2. Based on LFL of 0.296 kg/m^3

Total System Refrigerant Charge (kg)	Total System Refrigerant Charge (oz)	Total System Refrigerant Charge (lb)	Min. Area of Conditioned Space (m^2)	Min. Area of Conditioned Space (ft^2)	Min. Air-Flow ($meter^3/hr$)	Min. Air-Flow (liter/s)	Min. Air-Flow (CFM)
1.836 kg or less	64.6 oz or less	4.04 lb or less	No Minimum	No Minimum	No Minimum	No Minimum	No Minimum
1.84	65	4.06	5.47	59	180	50	106
1.98	70	4.36	5.87	63	194	54	114
2.11	75	4.66	6.28	68	207	58	122
2.25	79	4.96	6.68	72	220	61	130
2.38	84	5.26	7.08	76	234	65	138
2.52	89	5.56	7.49	81	247	69	145
2.66	94	5.86	7.89	85	260	72	153
2.79	99	6.16	8.30	89	274	76	161
2.93	103	6.46	8.70	94	287	80	169
3.06	108	6.76	9.11	98	300	83	177
3.20	113	7.06	9.51	102	314	87	185
3.34	118	7.36	9.91	107	327	91	193
3.47	123	7.66	10.32	111	341	95	200
3.61	127	7.96	10.72	115	354	98	208
3.75	~~132~~	8.26	11.13	120	367	102	216
3.88	137	8.56	11.53	124	381	106	224
4.02	142	8.86	11.94	128	394	109	232
4.15	147	9.16	12.34	133	407	113	240
4.29	151	9.46	12.74	137	421	117	248
4.43	156	9.76	13.15	142	434	121	255
4.56	161	10.06	13.55	146	447	124	263
4.70	166	10.36	13.96	150	461	128	271
4.83	171	10.66	14.36	155	474	132	279
4.97	175	10.96	14.77	159	487	135	287
5.11	180	11.26	15.17	163	501	139	295
5.24	185	11.56	15.57	168	514	143	302
5.38	190	11.86	15.98	172	527	146	310
5.51	195	12.16	16.38	176	541	150	318
5.65	199	12.46	16.79	181	554	154	326
5.79	204	12.76	17.19	185	567	158	334
5.92	209	13.06	17.60	189	581	161	342
6.06	214	13.36	18.00	194	594	165	350
6.20	219	13.66	18.41	198	607	169	357
6.33	223	13.96	18.81	202	621	172	365
6.47	228	14.26	19.21	207	634	176	373
6.60	233	14.56	19.62	211	647	180	381
6.74	238	14.86	20.02	216	661	184	389
6.88	243	15.16	20.43	220	674	187	397
7.01	247	15.46	20.83	224	687	191	405
7.15	252	15.76	21.24	229	701	195	412
7.28	257	16.06	21.64	233	714	198	420
7.42	262	16.36	22.04	237	727	202	428
7.56	267	16.66	22.45	242	741	206	436
7.69	271	16.96	22.85	246	754	209	444
7.83	276	17.26	23.26	250	767	213	452
7.96	281	17.56	23.66	255	781	217	460
8.10	286	17.86	24.07	259	794	221	467
8.24	291	18.16	24.47	263	808	224	475
8.37	295	18.46	24.87	268	821	228	483
8.51	300	18.76	25.28	272	834	232	491
8.65	305	19.06	25.68	276	848	235	499
8.78	310	19.36	26.09	281	861	239	507
8.92	315	19.66	26.49	285	874	243	514
9.05	319	19.96	26.90	290	888	247	522

TABLE 21: MINIMUM CONDITIONED SPACE AREA & AIR-FLOW FOR R-32 REFRIGERANT

NOTES: 1. Applies to fixed ducted systems with continuous air-flow or refrigerant detection systems
2. Based on LFL of 0.306 kg/m^3