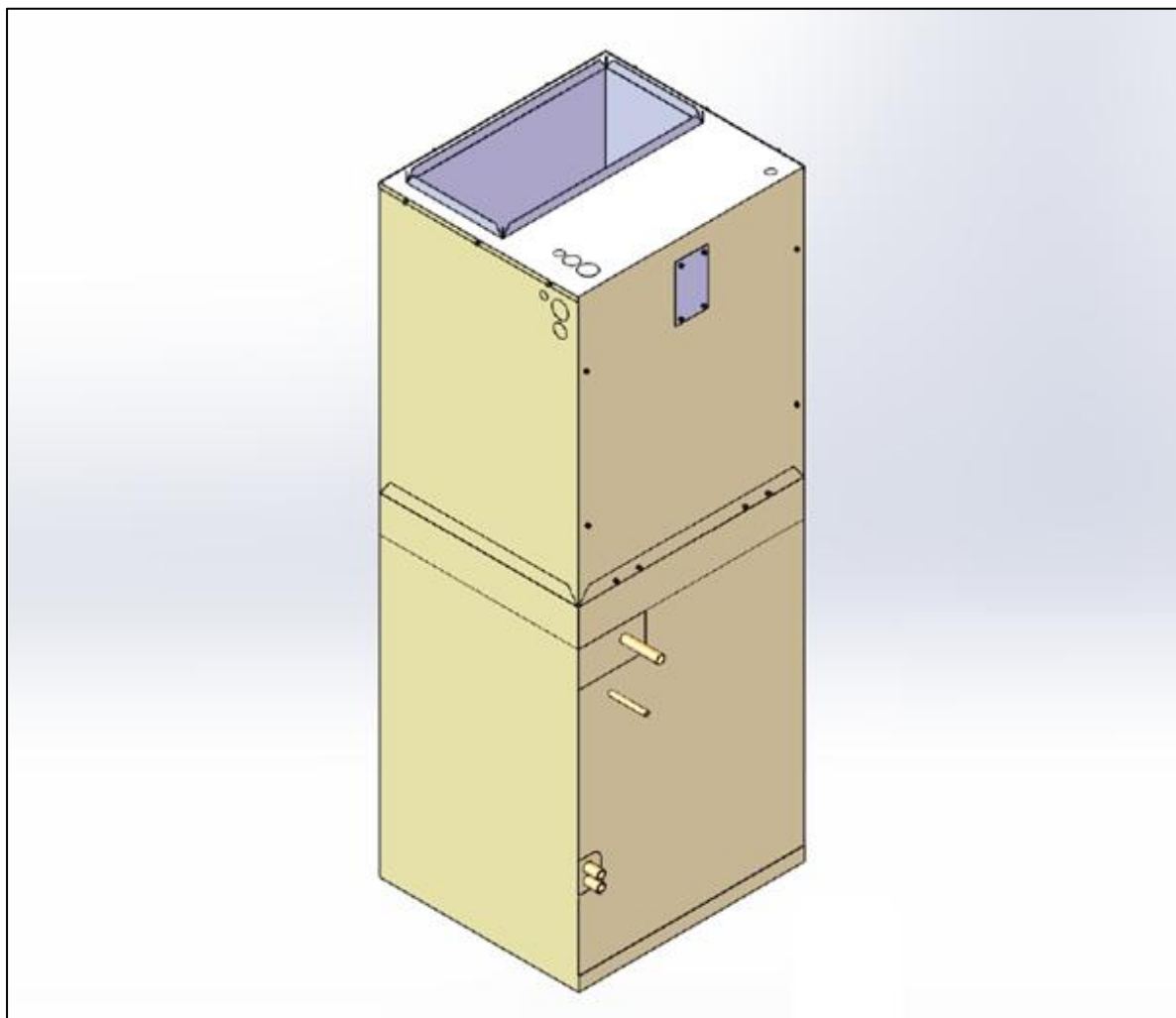




**EARTHLINKED**  
TECHNOLOGIES

# EarthLinked® AVN Series Air Handlers *Installation Manual*



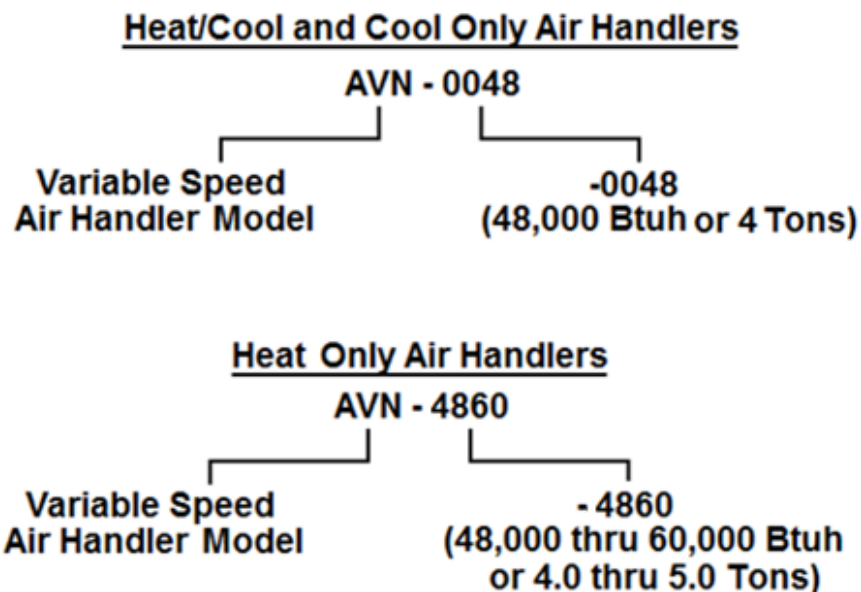
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## Model Nomenclature



### **Disclaimer**

Proper installation and service of EarthLinked® Heating and Cooling System Components is essential to reliable performance. All EarthLinked® components must be installed and serviced by a technician authorized by Earthlinked Technologies. Installation and service must be in accordance with the instructions set forth in this manual. Failure to provide installation and service by an authorized, trained installer in a manner consistent with this manual will void the limited warranty coverage for the system.

Earthlinked Technologies shall not be liable for any defect, unsatisfactory performance, damage or loss, whether direct or consequential, relative to the design, manufacture, construction, application or installation of the field specified components.

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## Safety

**Warning, Caution** and **Important** notices appear throughout the manual. Read these items carefully before attempting installation, servicing or troubleshooting the equipment.



### IMPORTANT!

Notification of installation, operation or maintenance information which is important, but which is not hazardous.



### CAUTION!

Indicates a potentially hazardous situation or an unsafe practice, which if not avoided, may result in injury, or equipment or property damage.



### WARNING!

Indicates a hazardous situation, which if not avoided will result in serious injury or death, or equipment or property damage.

## Equipment Manuals

The following is a listing of the equipment installation manuals that are provided with each component specified for this EarthLinked® system.



### IMPORTANT!

Read and follow all installation instructions in these manuals, appropriate for the EarthLinked® system being installed, **BEFORE** initiating the Start-Up procedure.

*Series SC, SD, HC, HW or CC Quick-Start Instructions (as appropriate)*

*Model TR94, TR97, TE54 Thermostats by manufacturer*

## Installation

### Component Matching

AVN Series variable speed air handlers include factory installed electric heat, and are ready for vertical installation as shipped. Field conversion to horizontal requires no additional components. They are manufactured for two applications.

**Heat/Cool and Cool Only (Model AVN-00XX):** These air handlers are equipped with a distributor designed for providing optimum performance in the cooling mode and the heating mode. In addition, this air handler includes a TXV Kit that is field installed external to the air handler that is required to make the system operational in the cooling mode when matched with the appropriate model EarthLinked® compressor unit as shown in Figure 1.

COMPRESSOR UNIT MODEL/CAPACITY	AIR HANDLER MODEL	HEATER KW*	TXV-KIT MODEL **
-018 (1.5 Tons)	AVN – 0018	5	TXV-018N
-024 (2.0 Tons)	AVN – 0024	5	TXV-024N
-030 (2.5 Tons)	AVN – 0030	5	TXV-030N
-036 (3.0 Tons)	AVN – 0036	5	TXV-036N
-042 (3.5 Tons)	AVN – 0042	5	TXV-042N
-048 (4.0 Tons)	AVN – 0048	5	TXV-048N
-054 (4.5 Tons)	AVN – 0054	5	TXV-054N
-060 (5.0 Tons)	AVN – 0060	5	TXV-060N
*Electric heat is factory installed			
**TXV Kit is included with air handler for field installation			

**Figure 1. Heat/Cool and Cool Only Component Matchup**

**Heat Only (Model AVN-XXXX):** These air handlers are to be matched with the appropriate model EarthLinked® Compressor unit in Figure 2.

COMPRESSOR UNIT MODEL/CAPACITY	AIR HANDLER MODEL	HEATER KW*
-018 (1.5 Tons)	AVN – 1830	5
-024 (2.0 Tons)	AVN – 1830	5
-030 (2.5 Tons)	AVN – 1830	5
-036 (3.0 Tons)	AVN – 3642	5
-042 (3.5 Tons)	AVN – 3642	5
-048 (4.0 Tons)	AVN – 4860	5
-054 (4.5 Tons)	AVN – 4860	5
-060 (5.0 Tons)	AVN – 4860	5
*Electric heat is factory installed		

**Figure 2. Heat Only Component Matchup**

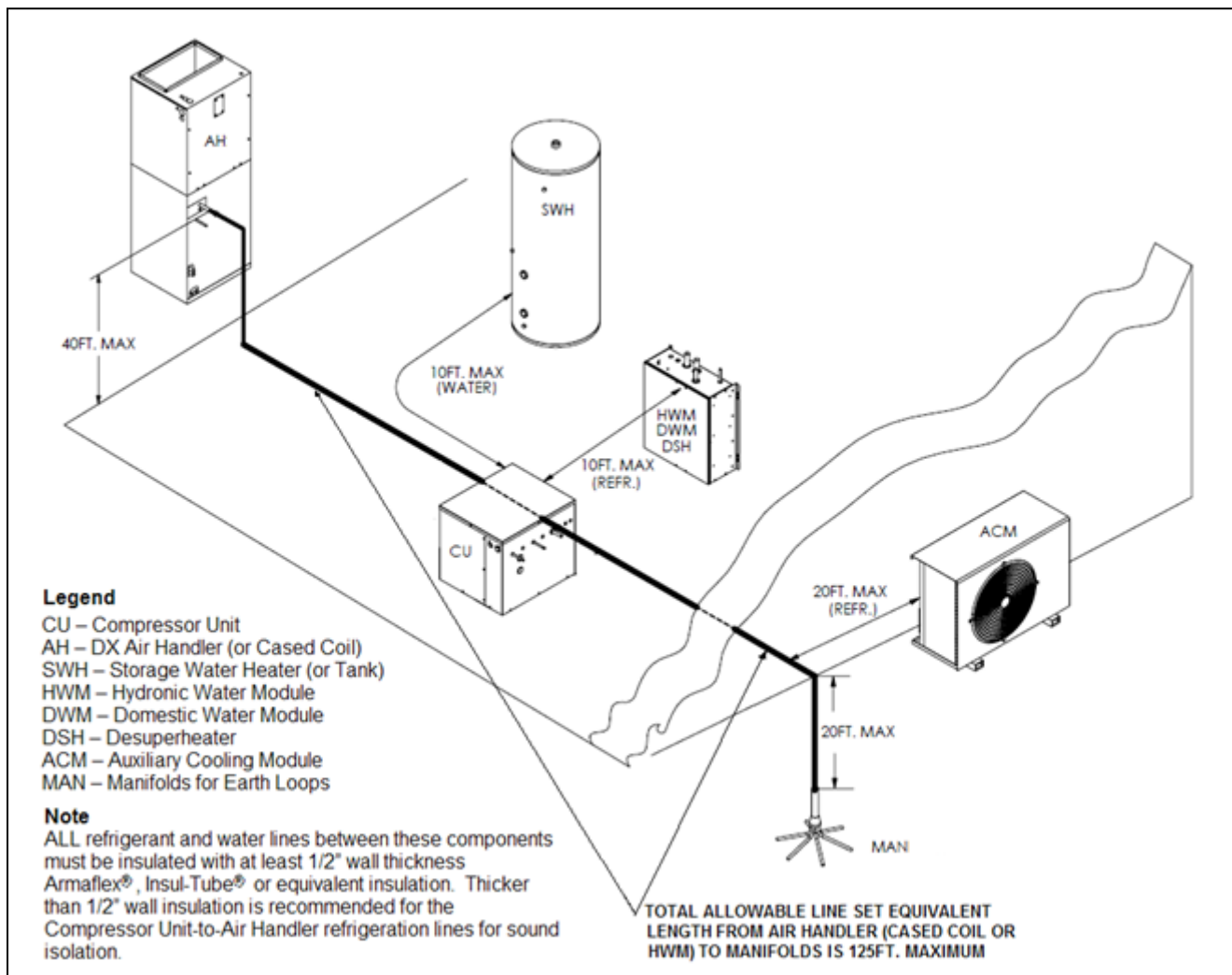
## Air Handler Placement



### WARNING!

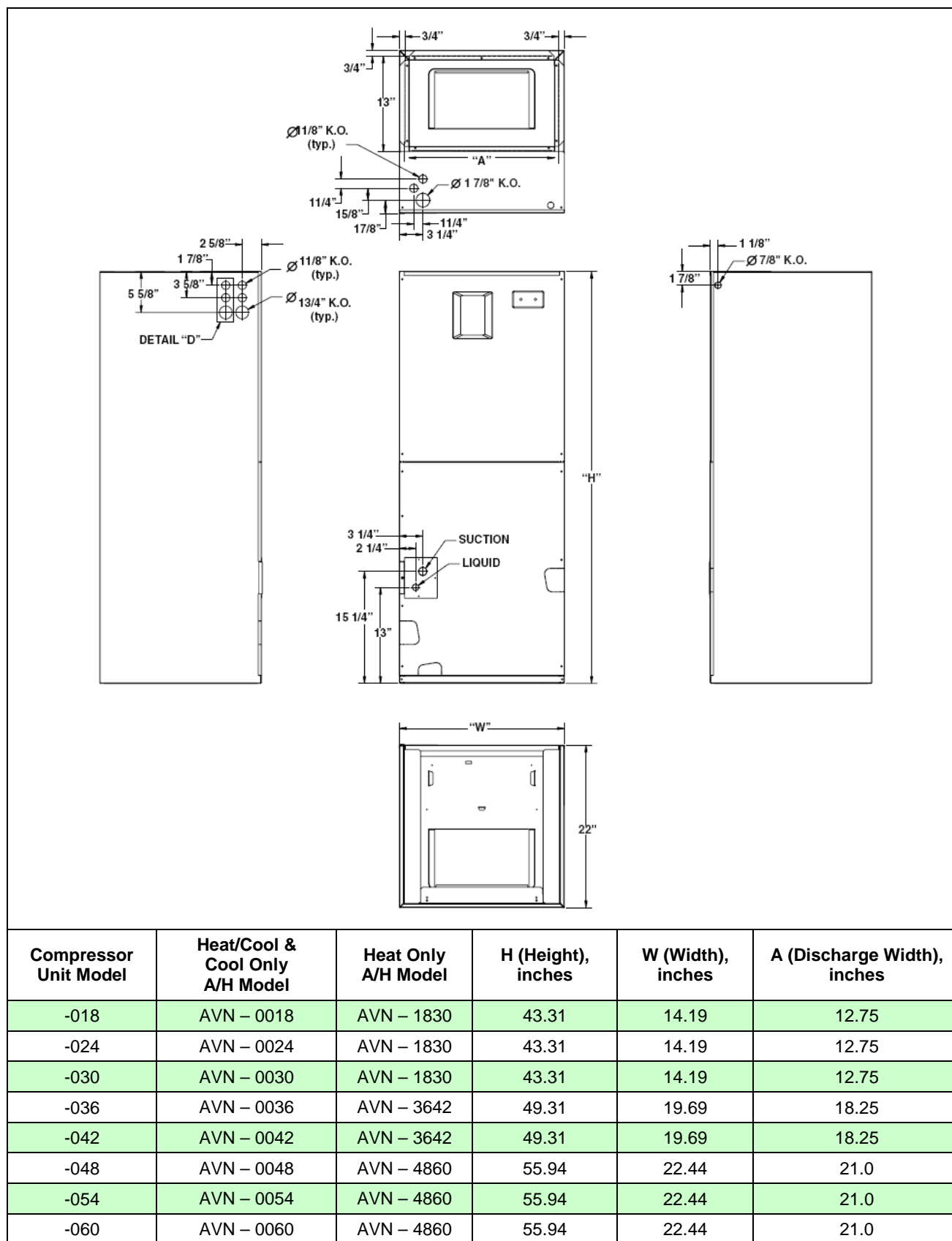
**WEAR ADEQUATE PROTECTIVE CLOTHING AND PRACTICE ALL APPLICABLE SAFETY PRECAUTIONS WHILE INSTALLING THIS EQUIPMENT. FAILURE TO DO SO MAY RESULT IN EQUIPMENT AND/OR PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

Guidelines for the air handler placement relative to the compressor unit and other EarthLinked® system components are shown in Figure 3.



**Figure 3. General Layout of System Components**

Dimensions for the air handlers are illustrated and listed in Figures 4a and 4b.



**Figure 4a. General Air Handler Physical Dimensions (Part 1)**

Compressor Unit Model	Heat/Cool & Cool Only A/H Model	Heat Only A/H Model	Refrigerant Suction OD	Refrigerant Liquid OD	Filter Size	Supply Air Duct
-018	AVN – 0018	AVN – 1830	3/4	3/8	12 x 20 x 1	12-7/8 x 12-3/4
-024	AVN – 0024	AVN – 1830	3/4	3/8	12 x 20 x 1	12-7/8 x 12-3/4
-030	AVN – 0030	AVN – 1830	3/4	3/8	12 x 20 x 1	12-7/8 x 12-3/4
-036	AVN – 0036	AVN – 3642	7/8	3/8	18 x 20 x 1	12-7/8 x 18-1/4
-042	AVN – 0042	AVN – 3642	7/8	3/8	18 x 20 x 1	12-7/8 x 18-1/4
-048	AVN – 0048	AVN – 4860	7/8	3/8	20 x 20 x 1	12-7/8 x 21
-054	AVN – 0054	AVN – 4860	7/8	3/8	20 x 20 x 1	12-7/8 x 21
-060	AVN – 0060	AVN – 4860	7/8	3/8	20 x 20 x 1	12-7/8 x 21

**Figure 4b. General Air Handler Physical Dimensions (Part 2)**

## Refrigeration

### Line Set

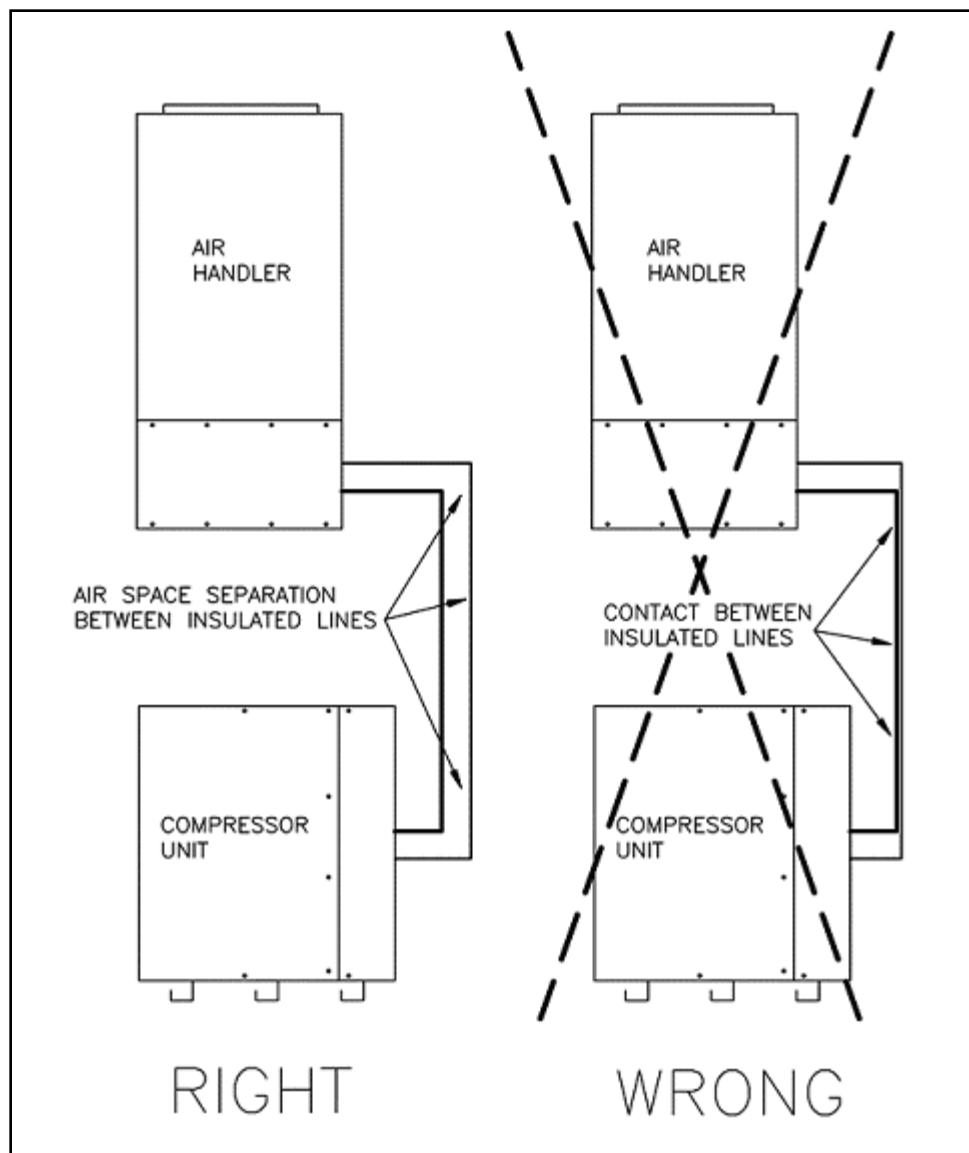
Line set sizes for AVN and AFN Series Air Handlers connecting to the matching compressor units are listed in Figure 5. Line set liquid and vapor lines are to be insulated with Armaflex®, Insul-Lock® or equivalent tubing insulation at least ½” wall thickness. For interior living areas, thicker walled insulation will reduce sound level.

<b>LINE SET ADAPTERS REQUIRED FOR THE AIR HANDLER, CASSED COIL, HYDRONIC WATER MODULE AND DOMESTIC WATER MODULE ARE FIELD SUPPLIED. <u>CHECK ALL APPROPRIATE COMPRESSOR UNIT STUB-OUT TUBING SIZES FOR REQUIRED FIELD SUPPLIED ADAPTERS!</u></b>					
<b>EARTHLOOP, AIR HANDLER, CASSED COIL LINE SETS</b>			<b>HWM LINE SETS</b>		
<b>COMPRESSOR UNIT SIZE</b>	<b>LINE SET O.D., INCHES</b>		<b>HWM MODEL</b>	<b>LINE SET O.D., INCHES</b>	
	<b>LIQUID*</b>	<b>VAPOR*</b>		<b>LIQUID*</b>	<b>VAPOR*</b>
1.5 Tons (-018)	3/8	5/8	-018C/-1836	3/8	1/2
2.0 Tons (-024)	3/8	5/8	-024C/-1836	3/8	1/2
2.5 Tons (-030)	3/8	3/4	-030C/-1836	3/8	1/2
3.0 Tons (-036)	1/2	3/4	-036C/-1836	3/8	1/2
3.5 Tons (-042)	1/2	3/4	-042C/-4248	1/2	5/8
4.0 Tons (-048)	1/2	7/8	-048C/-4248	1/2	5/8
4.5 Tons (-054)	1/2	7/8	-054C/-5472	1/2	3/4
5.0 Tons (-060)	1/2	7/8	-060C/-5472	1/2	3/4

\*Liquid and Vapor lines must BOTH be insulated with Armaflex® or equivalent with at least 1/2” wall thickness for the full length of the line set.

**Figure 5. Line Set Sizes**

Both liquid and vapor lines running between the compressor unit and the air handler must be separated by an air space, as illustrated in Figure 6, to ensure system performance. The lines shall not be “bundled” by tying them together or by running both lines together, in contact with one another, within a single conduit, such as PVC pipe.



**Figure 6. Air Handler Line Set Separation**

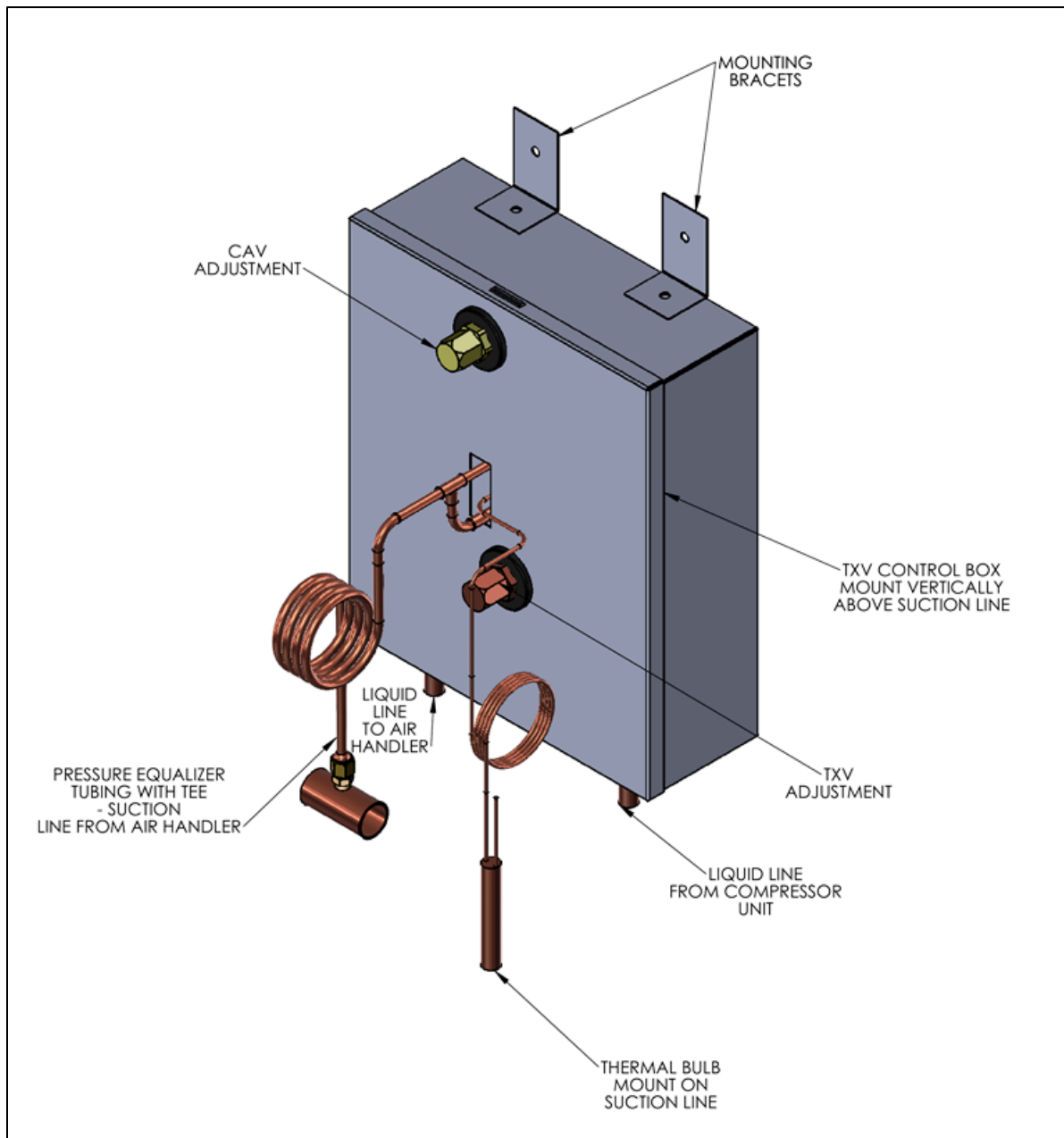
## TXV Kit

AVN Series air handlers that are intended for **HEAT ONLY** application are ready to install and make refrigeration line set connection to the air handler as shipped.

AVN Series air handlers that are intended for **HEAT/COOL** or **COOL ONLY** applications, **are shipped with the matching TXV Kit that must be field installed to enable operation of the system in the cool mode.**

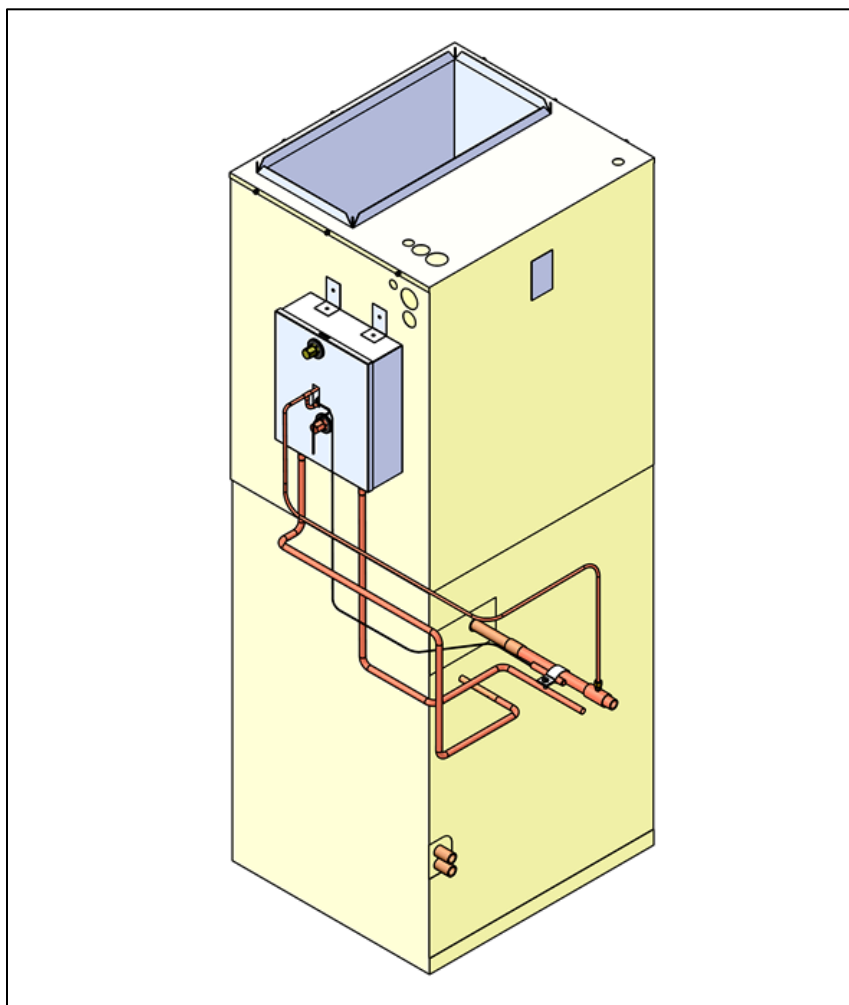
The following procedure is for the installation of the TXV Kit which must be done prior to making the line set connections to the air handler.

Figure 7 illustrates the TXV Kit as shipped with the external parts for field installation identified. The TXV (thermal expansion valve), CAV (cooling assist valve) and interconnecting tubing are located inside the control box and foam insulated to ensure performance.



**Figure 7. TXV Control**

The TXV control box in Figure 8 is positioned external to the air handler, located on (1) the air handler or (2) a vertical mounting surface immediately adjacent to the air handler. The TXV control box is to be mounted in the **vertical position** and **above the air handler tubing stub outs** as shown in Figure 8, whether the air handler is installed in the vertical or horizontal position.



**Figure 8. TXV Control Installed on Air Handler (Vertical Application)**

Mount the TXV Kit on a solid flat surface with space at least 14-1/2 inches high by 10-1/2 inches wide upon which to locate the TXV box. Allow another 4 inches of clearance below the TXV Kit to install and braze liquid line fittings. Allow 12 inches clearance in front of the TXV box to access the superheat adjustment.

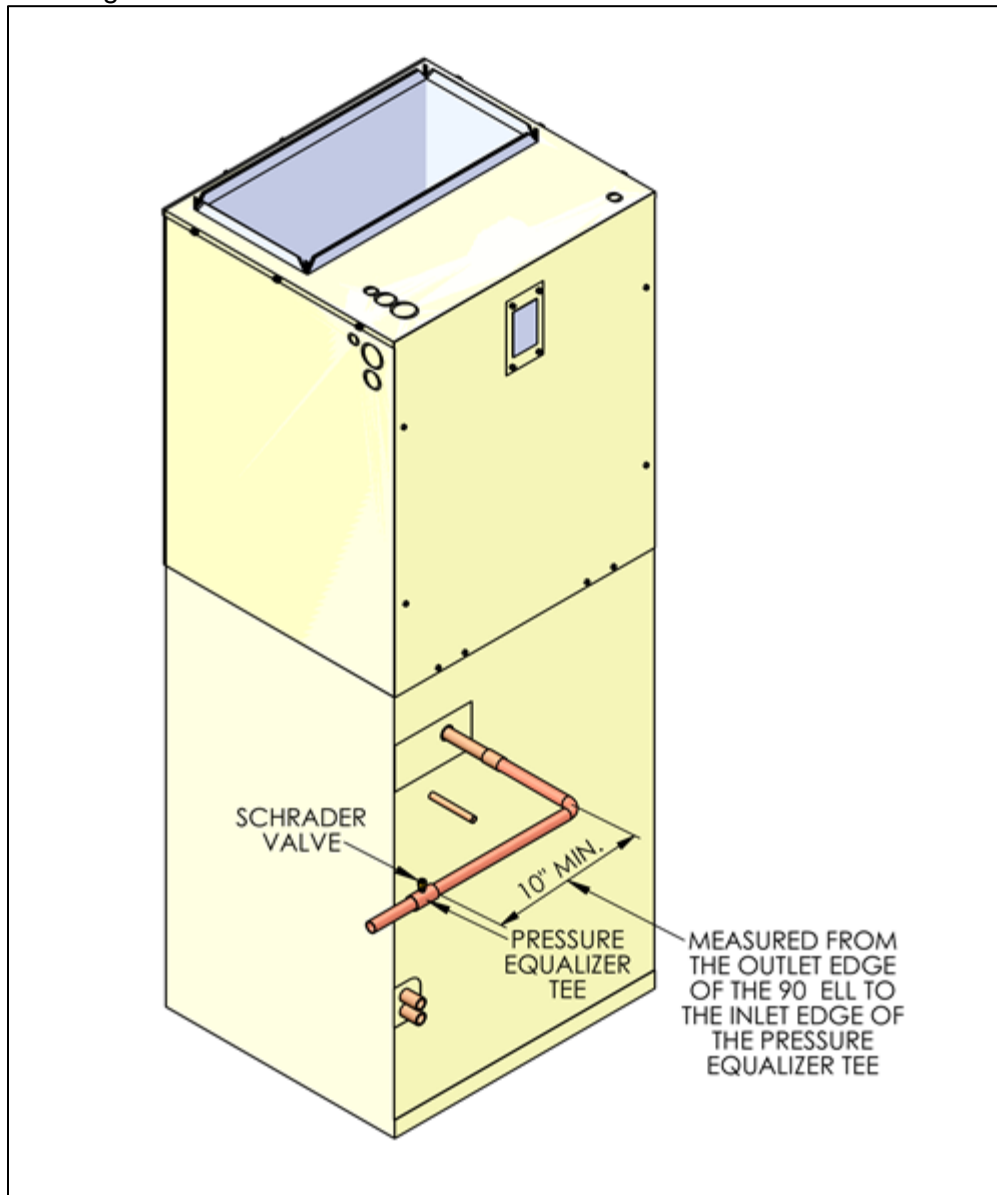
**For horizontal applications** of the air handler, it is recommend that the TXV control box be mounted on a field fabricated metal bracket fastened firmly to the top side of the air handler cabinet, ensuring that the **TXV control is in the vertical position and above the air handler tubing stub outs**.

The steps for installing the TXV Kit are as follows:

**Step 1:** Relieve the nitrogen holding charge on the air handler using the valve on the liquid line stub out. Locate the TXV Control box within the 3-1/2 feet of the suction line stub out on the air handler. If the TXV control box is to be fastened to the air handler, be sure not to drill into the air handler internal components. **Fasten the TXV control box in the vertical position, located above the suction line stub out.**



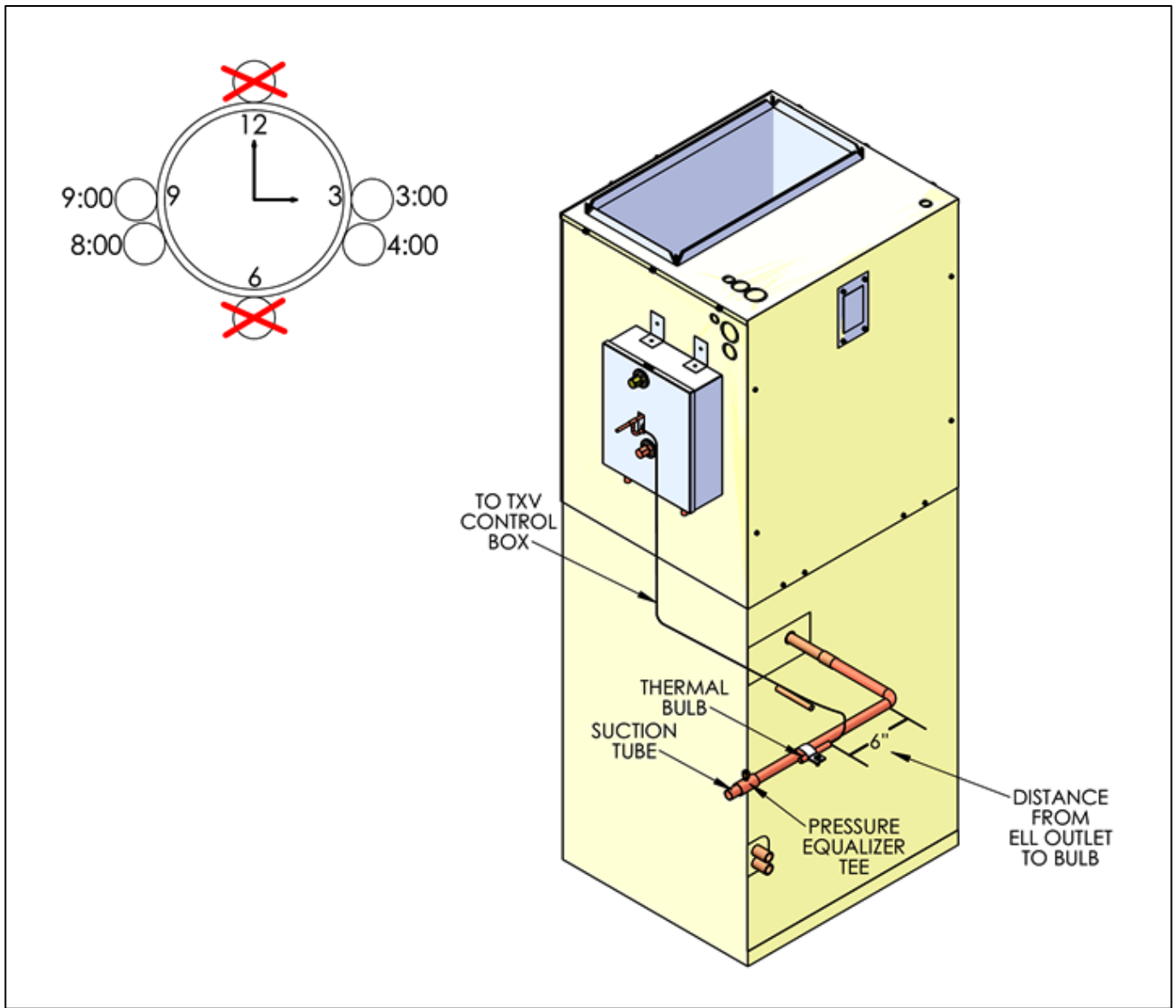
**Step 2:** After removing the plug from the suction stub out and cutting the valve off the liquid line, **position the Pressure Equalizer Tee** on the suction tube at least 10 inches downstream from the 90°ell, as shown in Figure 9. Remove the core from Schrader valve on the Tee.



**Figure 9. Positioning the Pressure Equalizer Tee**

**Step 3:** The **Thermal Bulb must be positioned and clamped to the** suction tube 6 inches downstream from the 90° elbow as shown in the example illustrated in Figure 10. The **Thermal Bulb and suction tube must be horizontal** regardless of the air handler application (vertical or horizontal).

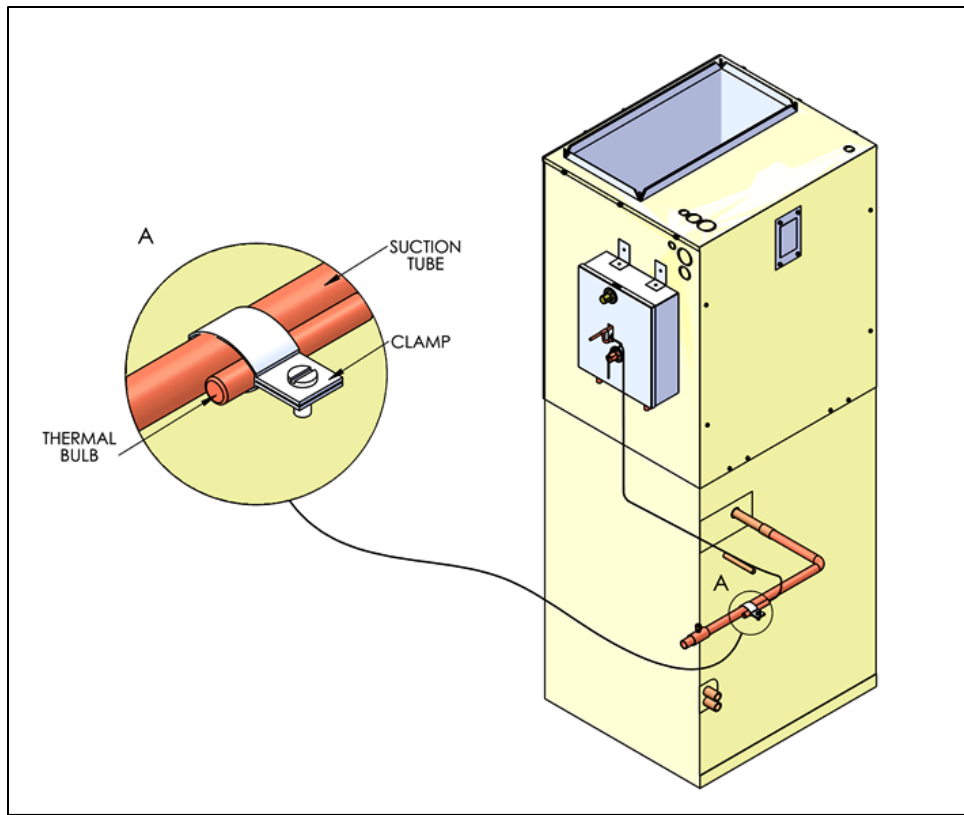
The Thermal Bulb must be positioned at the 3:00, 4:00, 8:00 or 9:00 positions on the suction tube as illustrated in Figure 10.



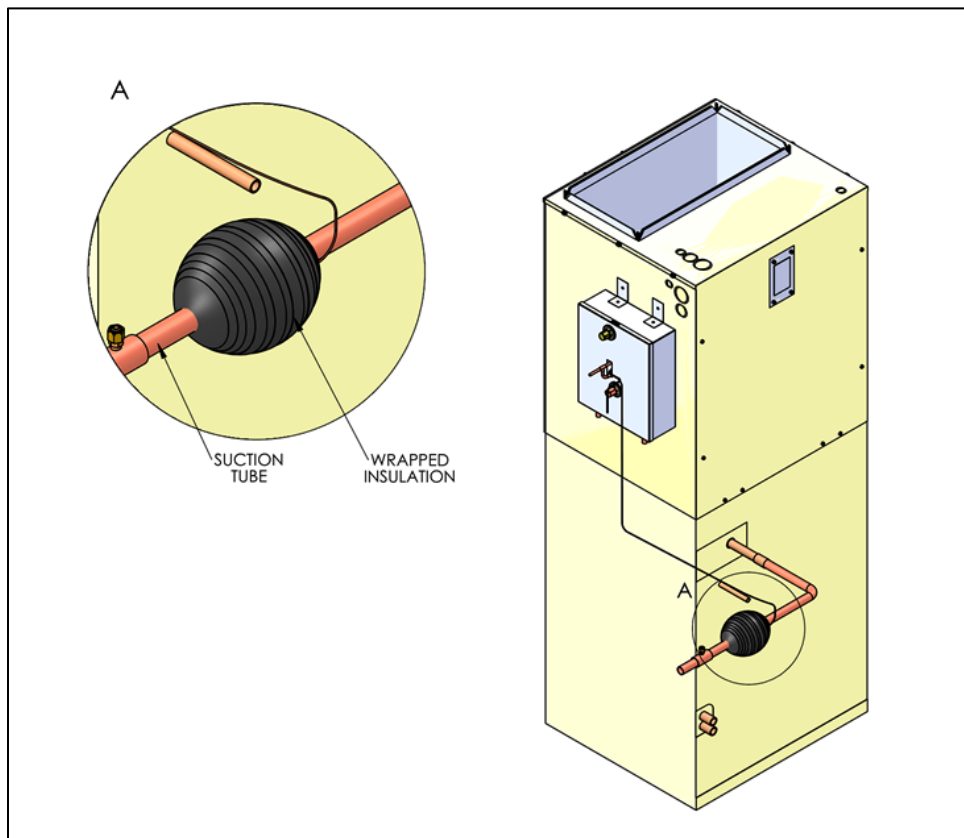
**Figure 10. Thermal Bulb Positioning**

**Step 4:** Clamp the thermal bulb firmly against the **clean suction tube** and parallel to it, as shown in Figure 11.

Isolate the Thermal Bulb from with a cold wet cloth while Nitrogen brazing the joints on the suction line. After the suction line has cooled, apply the supplied cork tape insulation around the Thermal Bulb to completely isolate it from the surrounding air, as shown in Figure 12.



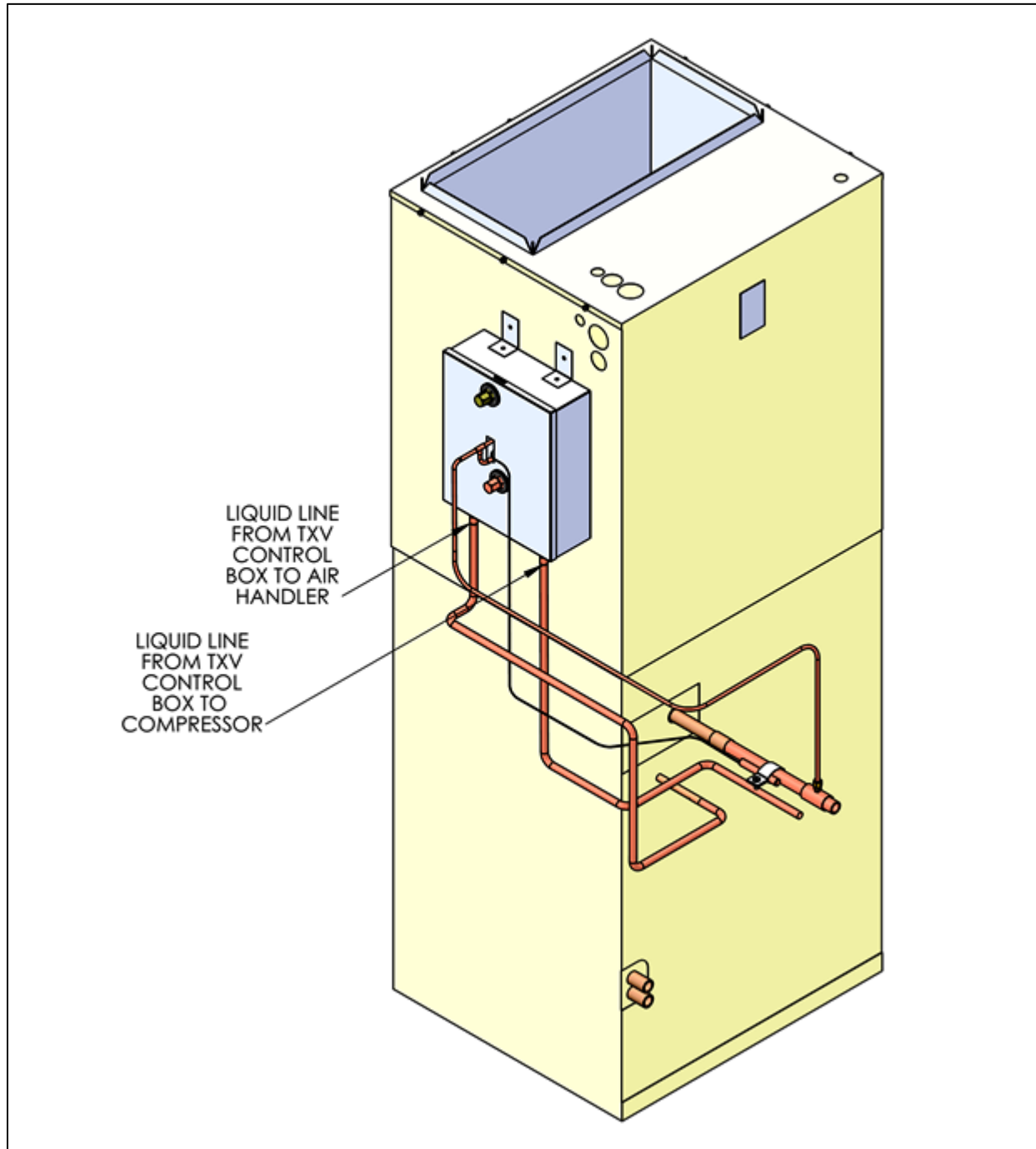
**Figure 11. Clamping the Thermal Bulb**



**Figure 12. Insulating the Thermal Bulb**

**Step 5:** Measure and cut copper tubing to connect the liquid line from the TXV control box to the liquid line stub out on the air handler as shown in Figures 7 and 13. Run the other liquid line from the connection on the TXV control box to the compressor unit, also shown in Figures 7 and 13. Nitrogen braze the joints.

**Step 6:** Connect the pressure equalizer tube to the Schrader valve. Do not install the core. Tighten the flare connection firmly. **Wrap the liquid and vapor tubing including the liquid line tubing to the TXV control box, with Armaflex®, Insul-Tube® or equivalent insulation of at least ½" wall thickness, between the air handler and compressor unit.**



**Figure 13. TXV Liquid Line Connections**

## Electrical

Details concerning electrical connections and thermostat wiring are detailed in Figure 15.

### Electrical Data

Electrical data is illustrated in Figure 14 for all AVN Series Air Handlers for **Heat/Cool, Cool Only and Heat Only** applications. Electric strip heat is factory installed at the factory and is to be activated upon installation in all Heating applications.

### Thermostat Connections

These connections are shown for typical SC compressor unit applications in Figure 15.

### Wiring Diagram

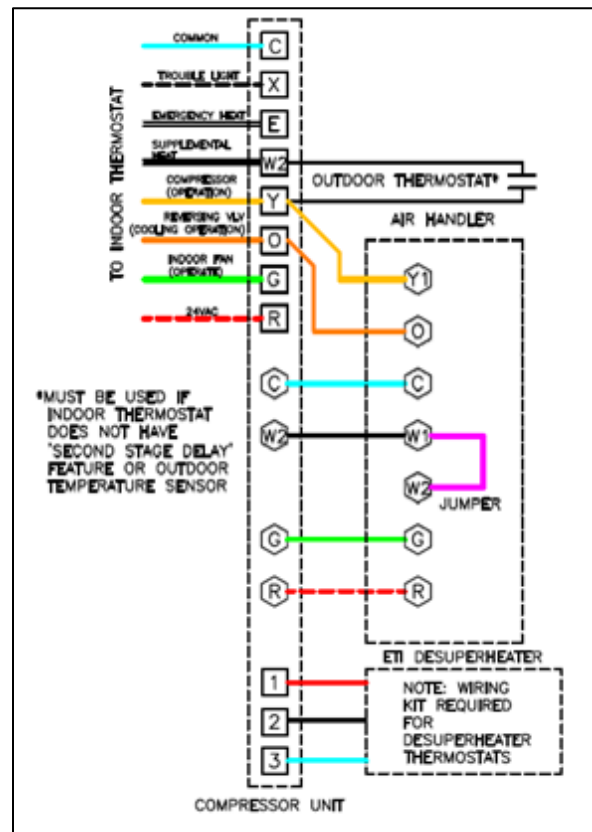
The AVN Series Air Handler Wiring Diagram is illustrated in Figure 16. A detailed view of the control board is illustrated in Figure 17, which includes fan speed switch settings necessary to set for the appropriate air flow.

Air Handler Models	Electric Heat** kW (240V)	MCA* @ 240V	OCP @ 240V
AVN-0018 & AVN-1830	5	29.5	30
AVN-0024 & AVN-1830	5	29.5	30
AVN-0030 & AVN-1830	5	29.5	30
AVN-0036 & AVN-3642	5	31.3	35
AVN-0042 & AVN-3642	5	31.3	35
AVN-0048 & AVN-4860	5	31.3	35
AVN-0054 & AVN-4860	5	31.3	35
AVN-0060 & AVN-4860	5	31.3	35

\*MCA = Minimum Circuit Ampacity. OCP = Overcurrent Protection Device, must be HACR type circuit or time delay fuse.

\*\*For 208 Volt, use .75 correction factor for kW.

**Figure 14. AVN Electrical Data**



**Figure 15. AVN Thermostat Connections (SC Compressor Unit)**

# WIRING DIAGRAM

## Air Handler with Variable Speed High Efficiency Motor

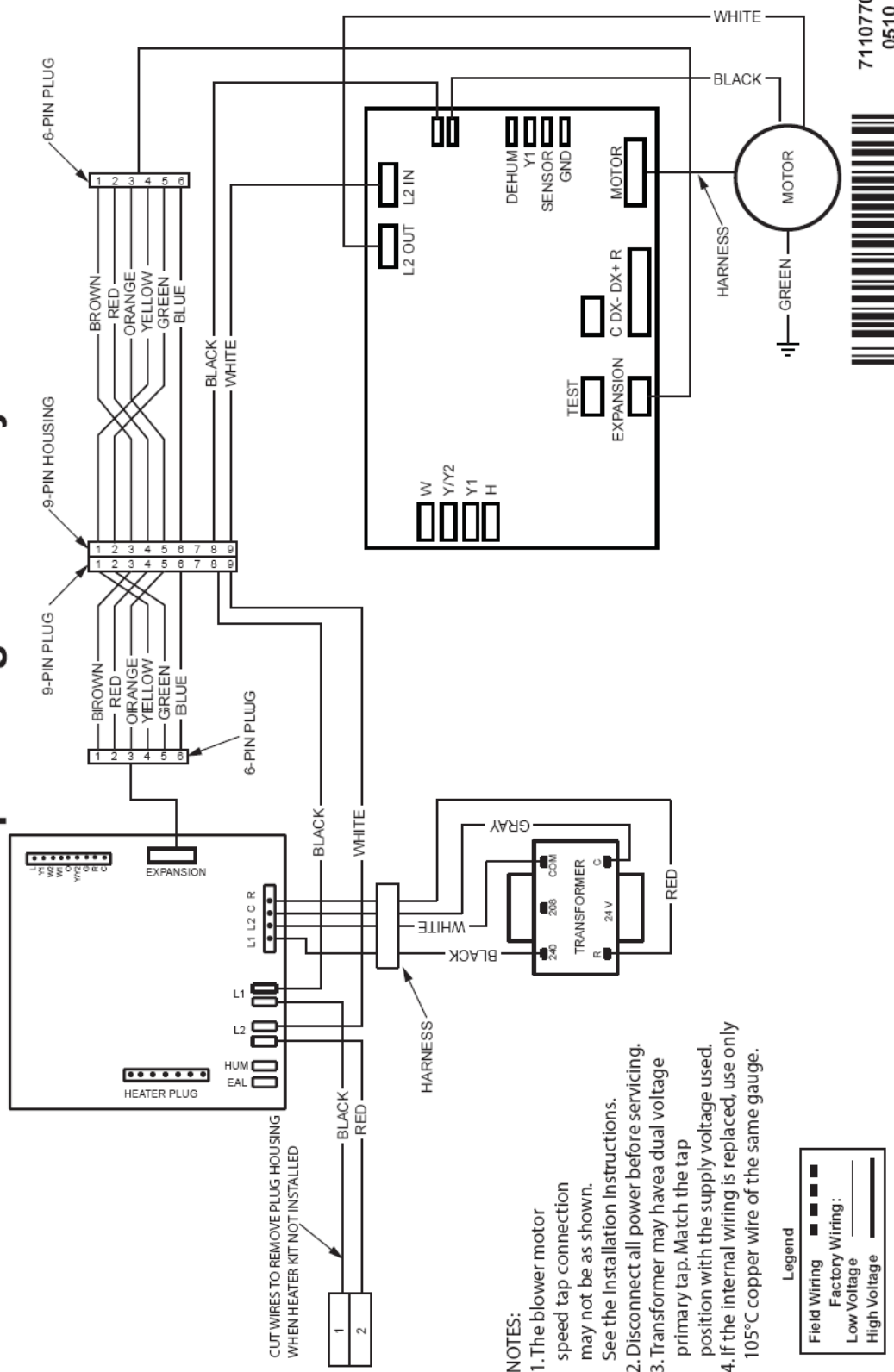
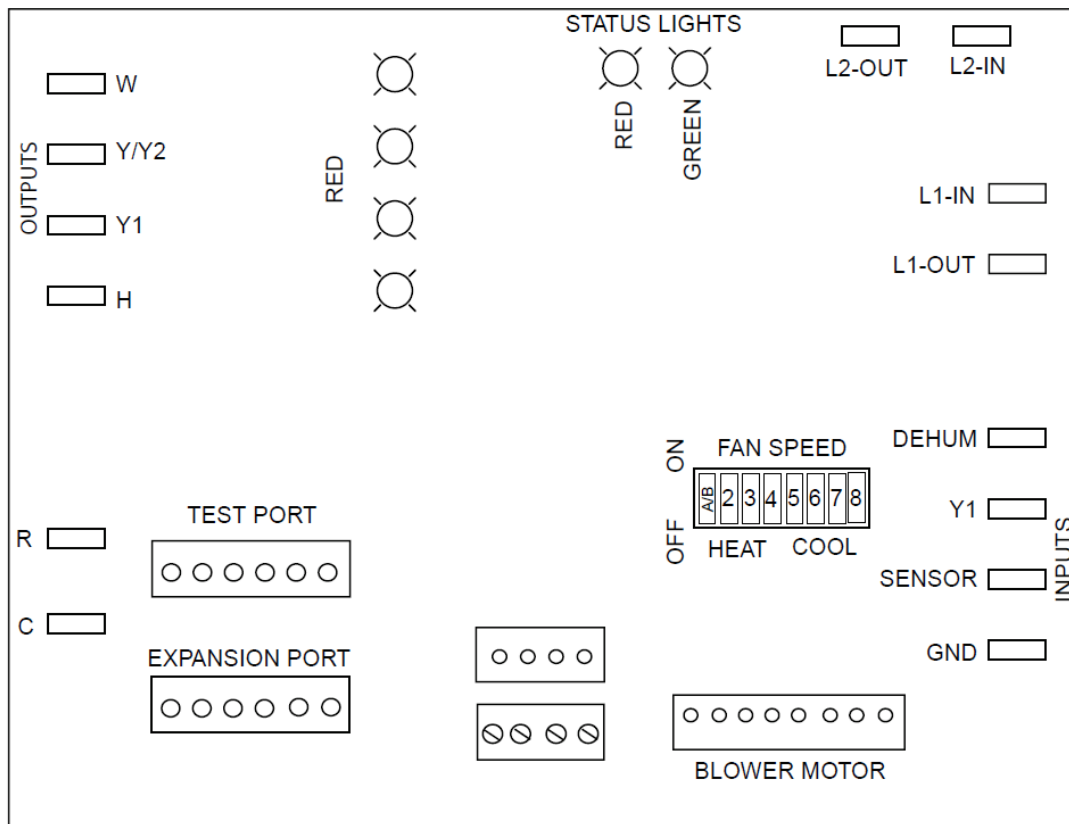


Figure 16. AVN Wiring Diagram



**Figure 17. AVN Control Board**



## Airflow

### Airflow Selection

The airflow selection is based on providing 400 cfm/Ton of nominal capacity. The airflow selection for cooling and heating modes is listed in Figure 18 for the corresponding AVN Air Handler sizes. Reference Figure 17 Control Board for the airflow switch locations.

# AIRFLOW SELECTION FOR VARIABLE SPEED MODELS

	Cooling Airflow					
	A/B Switch Setting 0 = OFF, 1 = ON	COOL Switch Setting 0 = OFF, 1 = ON				Airflow (CFM)
		5	6	7	8	
AVN -0018 -0024 -0030 -1830	0	0	0	0	0	525
	0	0	0	0	1	560
	0	0	0	1	0	600
	0	0	0	1	1	625
	0	0	1	0	0	700
	0	0	1	0	1	750
	0	0	1	1	0	800
	0	0	1	1	1	850
	0	1	0	0	0	875
	0	1	0	0	1	890
	0	1	0	1	0	930
	0	1	0	1	1	950
	0	1	1	0	0	1000
	0	1	1	0	1	1050
	0	1	1	1	0	1125
	0	1	1	1	1	1200

Heating Airflow		
A/B Switch Setting 0 = OFF, 1 = ON	Heater Kit Installed (KW)	Airflow (CFM)
0	0	600
0	5	800
0	8	1000
0	10	1000
0	15	1300
0	20	n/a
0	25	n/a
0	30	n/a

	Cooling Airflow					
	A/B Switch Setting 0 = OFF, 1 = ON	COOL Switch Setting 0 = OFF, 1 = ON				Airflow (CFM)
		5	6	7	8	
AVN -0036 -0042 -3642	1	0	0	0	0	525
	1	0	0	0	1	560
	1	0	0	1	0	600
	1	0	0	1	1	650
	1	0	1	0	0	700
	1	0	1	0	1	750
	1	0	1	1	0	800
	1	0	1	1	1	850
	1	1	0	0	0	875
	1	1	0	0	1	950
	1	1	0	1	0	1050
	1	1	0	1	1	1150
	1	1	1	0	0	1250
	1	1	1	0	1	1350
	1	1	1	1	0	1400
	1	1	1	1	1	1600

Heating Airflow		
A/B Switch Setting 0 = OFF, 1 = ON	Heater Kit Installed (KW)	Airflow (CFM)
1	0	700
1	5	900
1	8	1100
1	10	1100
1	15	1300
1	20	1500
1	25	n/a
1	30	n/a

	Cooling Airflow					
	A/B Switch Setting (* = either 0 or 1)	COOL Switch Setting 0 = OFF, 1 = ON				Airflow (CFM)
		5	6	7	8	
AVN -0048 -0054 -0060 -4860	*	0	0	0	0	1100
	*	0	0	0	1	1200
	*	0	0	1	0	1250
	*	0	0	1	1	1300
	*	0	1	0	0	1350
	*	0	1	0	1	1400
	*	0	1	1	0	1450
	*	0	1	1	1	1500
	*	1	0	0	0	1550
	*	1	0	0	1	1600
	*	1	0	1	0	1650
	*	1	0	1	1	1700
	*	1	1	0	0	1750
	*	1	1	0	1	1800
	*	1	1	1	0	1900
	*	1	1	1	1	2000

Heating Airflow		
A/B Switch Setting (* = either 0 or 1)	Heater Kit Installed (KW)	Airflow (CFM)
*	0	800
*	5	1000
*	8	1200
*	10	1200
*	15	1400
*	20	1600
*	25	1800
*	30	2000

## NOTES:

- Airflow values listed are for 240V operation. For 208V operation, multiply A & B cabinet values by .95; for C-cabinet values multiply by .90
- When matched with two-stage outdoor units the airflow on low (Y1 or W1) input only will be 70% of the values shown in this table.

#### NOTES:

- Airflow values listed are for 240V operation. For 208V operation, multiply A & B cabinet values by .95; for C-cabinet values multiply by .90
- When matched with two-stage outdoor units the airflow on low (Y1 or W1) input only will be 70% of the values shown in this table.

Figure 18. AVN Airflow Selection

## Troubleshooting

If the air handler fails to operate, check the following:

- Is the electric power turned on?
- Is the thermostat operating properly?
- Are the blower compartment door(s) in place?
- Is the air handler disconnect closed?
- Has the circuit breaker tripped or the control board fuse burned open?
- Are any manual reset switches open?
- Is the filter dirty or plugged?
- Is the LED on both control boards constantly ON? If not, refer to Figures 19 or 20 to determine the fault condition.

RED LED (AN2)	DIAGNOSTIC
OFF	Control Fault (No Power)
Flash	Blower Fault
ON	Normal Operation

**Figure 19. Air handler Control Board Fault Conditions**

	DIAGNOSTIC	GREEN LED	RED LED
<b>Fixed Speed Furnaces</b>	Control Fault (No Power)	Off	Off
	Normal Operation	On	On
	Motor Fault	On	Flash
	Twin Fault (no motor fault)	Flash	On
	Communications Fault	Flash	Flash
<b>Variable Speed Furnaces</b>	Control Fault (No Power)	Off	Off
	Normal Operation	On	On
	Motor Fault	On	Flash
	Communications Fault	Flash	Flash

**Figure 20. Motor Control Board Fault Conditions**

## Service Parts

Service Parts for the AVN Series Air Handlers are illustrated in Figure 21 and listed in Figure 22.

Service parts for these air handlers can be purchased from HVAC distributors handling the following name brands of Nordyne Air Handler Model Series B6VMAX. To find your nearest distributor, call 1-800-422-4328, option 2.

## Frigidaire

Nordyne

Gibson

Nutone

Intertherm

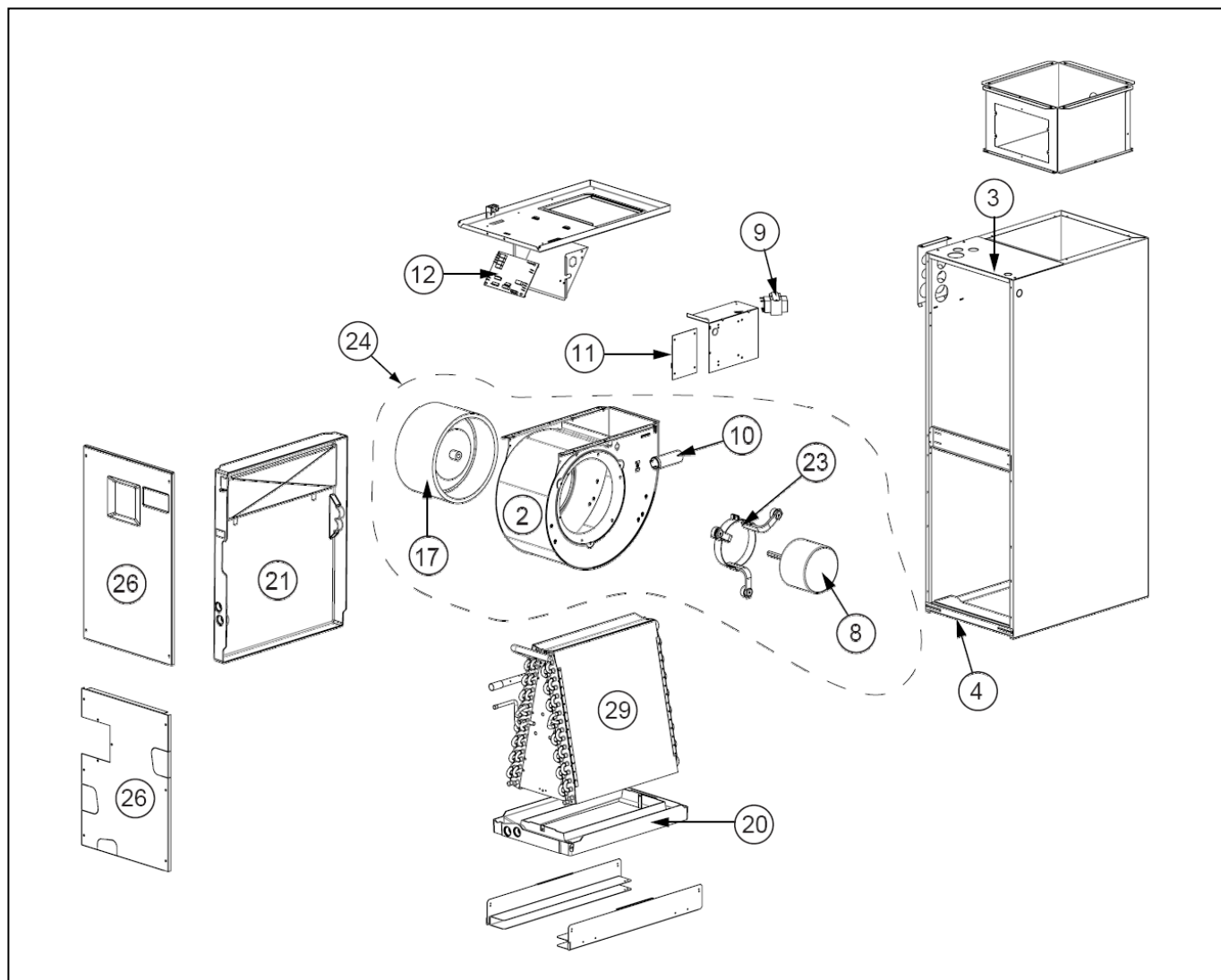
Philco

Kelvinator

## Tappan

Maytag

## Westinghouse



**Figure 21. AVN Air Handler Parts Illustration**

ITEM	DESCRIPTION	A/H MODELS		
		AVN-0018 AVN-0024 AVN-0030 AVN-1830	AVN-0036 AVN-0042 AVN-3642	AVN-0048 AVN-0054 AVN-0060 AVN-4860
		921166	921169	921172
1	PLATE, CLOSE-OFF (Not Shown)	226420R	226420R	226420R
2	BLOWER HOUSING	297210R	297217R	297219R
3	PANEL, TOP	921877	921878	921879
4	DOOR, FILTER	921874	921875	921876
5	PLATE, TUBE CLOSE-OFF (NOT SHOWN)	921880	921880	921880
6	HARNESS, FSHE / VSHE, UPPER (NOT SHOWN)	2C0251R	2C0251R	2C0251R
7	HARNESS, FSHE, LOWER, (NOT SHOWN)	2C0253R	2C0253R	2C0253R
8	MOTOR, BLOWER	622500R	622500R	622501R
9	TRANSFORMER	621709R	621709R	621709R
10	CAPACITOR	—	—	—
11	BOARD, CONTROL	624736R	624736R	624736R
12	BOARD, MOTOR CONTROL	624757R	624757R	624757R
13	DUAL GROUNDING LUG (NOT SHOWN)	632235R	632235R	632235R
14	PLUG, DRAIN PAN (NOT SHOWN)	663351R	663351R	663351R
15	DIST, ASSY (NOT SHOWN)	664257R	664219R	663586R
16	PLUG, CIRCULAR, PLASTIC, 1-3/4 (NOT SHOWN)	663710R	663710R	663710R
17	WHEEL, BLOWER	667251R	667258R	667280R
18	ROD, COIL SUPPORT (NOT SHOWN)	669100R	669100R	669100R
19	VALVE, TXV (NOT SHOWN)	669565R	669567R	669578R
20	DRAINPAN, HORIZONTAL	669919R	669920R	669921R
21	DRAINPAN, VERTICAL	669855R	669856R	669857R
22	PAINT, SPRAY, GRAY (NOT SHOWN)	903598	903598	903598
23	BELLY-BAND	913871	903489	903489
24	BLOWER, ASSEMBLY	921851	921855	921929
25	ELECTRICAL ASSEMBLY (NOT SHOWN)	M0063803R	M0063803R	M0063803R
26	DOORS	921867	921869	921870
27	SET OF WIRES, (NOT SHOWN)	921884	921884	921884
28	FUSE, 3 AMP (NOT SHOWN)	632261R	632261R	632261R
29	COIL, REPLACEMENT	921951	921953	921955
	TUBE KIT (FOR REPLACEMENT COIL)	921287	921289	921291

**Figure 22. AVN Air Handler Parts Listing**

## Appendix A

### Air Handler – Mechanical Installation Information\*

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\*AVN and AFN Series Air Handlers are referred to as “B6” air handlers in this appendix.

## GENERAL INFORMATION

This appliance has been tested for capacity and efficiency in accordance with AHRI Standards and will provide many years of safe and dependable comfort, providing it is properly installed and maintained. Abuse, improper use, and/or improper maintenance can shorten the life of the appliance and create unsafe hazards. Please read all instructions before installing the unit.

### Before You Install this Unit

- ✓ This equipment is securely packaged at the time of shipment and upon arrival should be carefully inspected for damage prior to installing the equipment at the job site. Claims for damage (apparent or concealed) should be filed immediately with the carrier.
- ✓ It is recommended that the cooling load of the area to be conditioned should be calculated and a system of the proper capacity selected.
- ✓ Check the electrical supply and verify the power supply is adequate for unit operation. The system must be wired and provided with circuit protection in accordance with local building codes. If there is any question concerning the power supply, contact the local power company.
- ✓ Verify the duct system is appropriate for the air handler being installed. Please note that when replacing an existing system with lower air-flow, the duct system may require modification.

### Locating the Air Handler

- Survey the job site to determine the best location for mounting the unit. Consideration should be given to availability of electric power, service access, and noise.
- The dimensions of the room or alcove must be able to accommodate the overall size of the unit and the installation clearances listed in Table 1.
- The air handler should be set into position before routing the refrigerant tubing.

### Minimum Clearances

- This appliance must be installed in accordance with clearances listed in Table 1. The air handler must be installed with ample clearance for easy access to the air filter, blower assembly, heater assembly, controls, and vent connections. Applicable building codes may require additional clearance to equipment. Refer to applicable building codes for details.
- Static pressure drop through louvered openings and through return air plenums should be considered in the overall duct design in the determination of the total external static pressure.

## Operation of Air Handler During Construction

### ⚠ CAUTION:

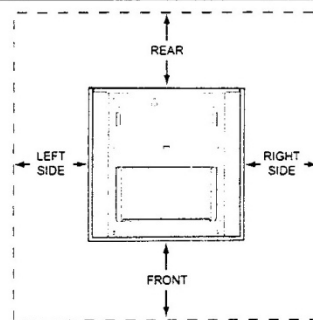
**Failure to follow these instructions will void the factory warranty and may significantly reduce the life or the performance of the air handler, and/or result in other unsafe conditions. It is the responsibility of the installing contractor to insure these provisions are met.**

Operating an air handler in a construction environment can cause the appliance a variety of problems. Proper use of commercial portable space heating equipment during construction is recommended. This air handler may be used during construction if it is not in violation of any applicable codes and the following criteria are met:

- The installation must meet all applicable codes and be permanently installed according to the instructions supplied with the air handler including electrical supply and duct work.
- The air handler must be controlled by a properly installed thermostat that complies with the current provisions of the NEC (ANSI/NFPA 70) and all applicable codes having jurisdiction. Thermostat connections must be made in accordance with instructions supplied with the air handler and thermostat.
- The installation must include a properly installed filter in the return air system with no by-pass air. The filter must be inspected frequently and replaced when necessary.
- Return air must be supplied unrestricted and located such that dust and gases from construction activity are not introduced into the circulating air system.
- Before occupying the structure: The filter must be replaced or cleaned, the duct work must be inspected

### INSTALLATION CLEARANCES

Left Side..... 0 Inches	Right Side ..... 0 Inches
Back..... 0 Inches	Front..... †See Notes



#### †NOTES:

Alcove Installations - Allow 24 in. minimum clearance from front of unit to nearest wall or partition for servicing. Recommended clearance is 36 in.

Table 1. Minimum Unit Clearances

and cleaned of any construction debris, and the air handler must be cleaned and/or repaired if found to be dirty, damaged, or malfunctioning in any way by a qualified HVAC technician. The air handler shall be inspected and approved by applicable local authority even if this requires redundant inspections.

- The serial number for the air handler used during construction must be submitted in writing (fax and email also acceptable). This information will be used to track the long-term affects of air handler usage during construction. Proof of this submittal shall be available for the final inspection of the air handler prior to occupancy.

#### Installation in a Garage

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### **WARNING:**

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**Do not place combustible materials on or against the cabinet. Do not place flammable materials, (gasoline, paint thinners, etc.) or any other flammable vapors and liquids, in the vicinity of the air handler.**

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The B6 Series air handler may be installed in a residential garage with the provision that the unit must be located or protected to prevent physical damage by vehicles.

#### Plenums & Air Ducts

- Plenums and air ducts should be installed in accordance with the standards of the National Fire Protection Association Standard for Installation of Air Conditioning Systems (NFPA 90A), Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems (NFPA 90B), and all applicable local codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, ME 02269 or visit [www.NFPA.org](http://www.NFPA.org) online.

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### **WARNING:**

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**All return ducts must be secured to the air handler using appropriate methods. All return ducts must be adequately sealed. When return air is provided through the bottom of the unit, the joint between the air handler and the return air plenum must be air tight.**

**Return air and circulating air ducts must not be connected to any other heat producing device such as a fireplace insert, stove, etc. This may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.**

---

- Design the duct work according to methods described by the Air Conditioning Contractors of America (ACCA).
- This unit is designed only for use with a return and supply duct. The return air duct must have the same free area

as the opening provided on the air handler. The ducts should be appropriately sized to the capacity of the air handler to ensure its proper airflow rating.

- Use transition fittings if the supply and/or return air openings of the unit do not match the duct openings. These transitions should be dimensioned in accordance with standard practice as specified in the ASHRAE recommendations for duct transitions.
- Flexible connectors may be used between the unit and the ductwork to prevent transmission of vibration from the unit to the structure. If electric heater kits are installed, heat resistant material must be used for the flexible connector at the supply air end of the unit.
- It is good practice to seal all connections and joints with industrial grade sealing tape or liquid sealant. Requirements for sealing ducts vary from region to region. Consult with local codes for requirements specific to your area.

#### *Unconditioned Spaces*

All duct work passing through unconditioned space must be properly insulated to minimize duct losses and prevent condensation. Use insulation with an outer vapor barrier. Refer to local codes for insulation material requirements.

#### *Air Filters*

B6 Series Air Handlers are not supplied with an air filter when shipped from the factory. The installer must provide a high velocity filter that is appropriately sized to the return air duct opening or filter rack located in the bottom of the unit. Accessing the filter does not require tools and can be removed from the front of the unit by removing the filter door.

---

### **WARNING:**

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**Never operate the air handler without a filter or with doors removed. Dust and lint can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire.**

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#### *Acoustical Duct Work*

- Certain installations may require the use of acoustical lining inside the supply duct work. Acoustical insulation must be in accordance with the current revision of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) application standard for duct liners. Duct lining must be UL classified batts or blankets with a fire hazard classification of FHC-25/50 or less.
- Fiber duct work may be used in place of internal duct liners if the fiber duct work is in accordance with the current revision of the SMACNA construction standard on fibrous glass ducts. Fibrous duct work and internal acoustical lining must be NFPA Class 1 air ducts when tested per UL Standard 181 for Class 1 ducts.
- Damping ducts, flexible vibration isolators, or pleated media-style filters on the return air inlet of the air



handler may be used to reduce the transmission of equipment noise emanating from the air handler. These treatments can produce a quieter installation, particularly in the heated space. However, they can increase the pressure drop in the duct system. Care must be taken to maintain the proper maximum pressure rise across the air handler, temperature rise and flow rate. This may mean increasing the duct size and/or reducing the blower speed. These treatments must be constructed and installed in accordance with NFPA and SMACNA construction standards. Consult with local codes for special requirements. For best sound performance, be sure to install all the needed gaskets and grommets around penetrations into the air handler, such as for electrical wiring.

## AIR HANDLER INSTALLATION

The B6 Series Air Handler is shipped ready for vertical upflow installation and is approved for attic, basement, alcove/closet or crawlspace installation with zero clearance to combustibles. See Table 1 for required installation clearances. **This appliance is approved only for indoor use.**

- The unit must be leveled at installation and attached to a properly installed duct system.
- The surface that the air handler is mounted on must provide sound physical support of the unit.
- The air handler must be installed so that all electrical components are protected from water.
- If a louvered door is installed across the front of this unit, the appliance must be mounted flush or behind front edge of finished wall.
- Always reinstall the doors on the air handler after servicing or cleaning/changing the filters. **Do not operate the air handler without all doors and covers in place.**

### Packaging Removal

Remove the shipping crate and User's Manual from the equipment. When removing the crate, use extra care so tubing connections are not damaged. Do not pull on the coils upper tubes.

### Mounting Applications

Vertical only air handlers are factory ready for upflow applications. These units may be applied in downflow applications when applied with the appropriate field kit.

Factory ready horizontal air handlers may be applied in upflow or horizontal-left and -right discharge applications. These units may also be applied in downflow discharge when applied with the appropriate field kit as specified in the units Technical Specifications.

Through-the-floor installations require a 1/4" thick noncombustible resilient gasket to be used whenever the supply or return air ducts pass through the floor. The gasket should be positioned between the duct, unit, and floor.

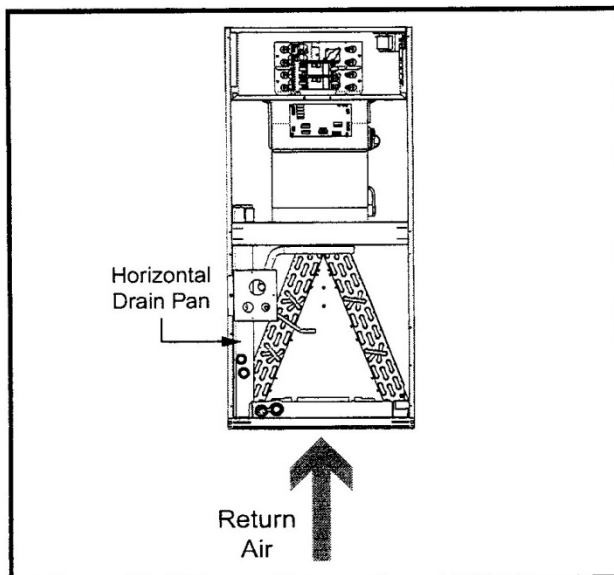


Figure 1. Upflow Installation

### Upflow Installations

All air handlers are factory shipped, ready for upflow installation. The horizontal drain pan may be removed from the air handler when installing the unit in an upflow configuration. All return air must enter from the bottom of the unit. A typical upflow unit is shown in Figure 1.

### Downflow Installations

The downflow accessory kit is required for downflow applications. Instructions for installing the downflow accessory kit are included with the kit. It is recommended that the accessory be installed prior to installing the unit. All return air in downflow applications must enter through the top of the unit. A typical installation of the unit in a downflow application is shown in Figure 2.

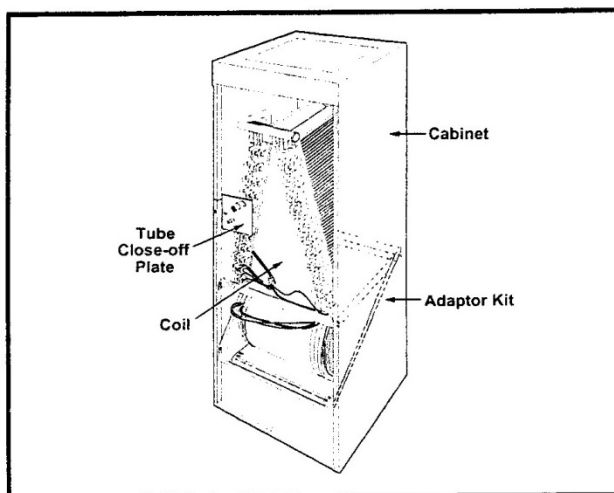


Figure 2. Downflow Installation



### Horizontal Installations

The B6 Series air handler can be installed horizontally in an attic, basement, crawl space or alcove. It can also be suspended from a ceiling in a basement or utility room in either a right to left airflow or left to right airflow as shown in Figure 3. Air handlers may or may not be shipped from the factory with all the parts required for horizontal left applications and horizontal right applications. If your unit does not have parts for a horizontal application, a kit may be available.

**NOTE:** In all horizontal applications in which the unit is installed above a finished ceiling and/or living space, a secondary drain pan must be installed under the entire unit to avoid damage to the ceiling in the event of condensate overflow. Additionally, it is recommended that an approved water level indicator or float switch device be used to shut down the unit in the event water is detected in the auxiliary drain pan.

If suspending the air handler from the ceiling, assemble a support frame (Figure 4) using slotted iron channel and full threaded rod. Fasten the frame together with nuts, washers, and lockwashers. Secure the support frame

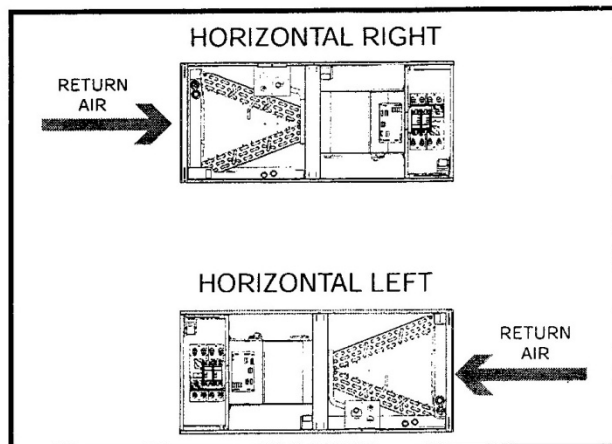


Figure 3. Horizontal Configurations

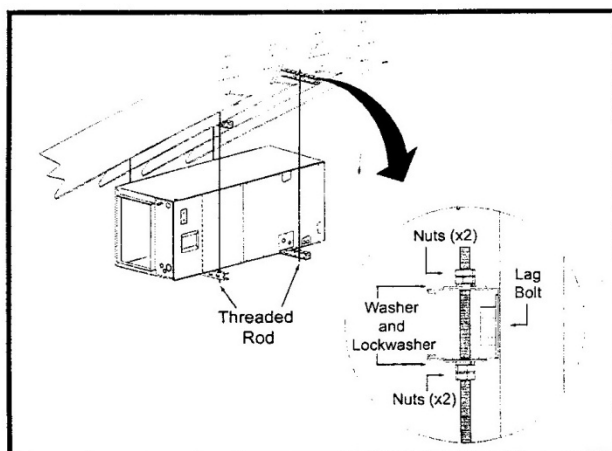


Figure 4. Unit Horizontally Suspended

to the rafters with lag bolts. The air handler can also be suspended using steel straps around each end of the unit. The straps should be attached to the air handler with sheet metal screws and to the rafters with bolts.

#### Horizontal Left Installations:

1. Remove the coil access door.
2. Remove the plug from one of the threaded holes in the horizontal drain pan. Completely remove the webbing located in the threaded holes of the horizontal drain pan. **IMPORTANT:** If the webbing is not removed, the condensate will not drain properly and ceiling damage may occur.
3. Insert the plug (from horizontal drain pan) into the open and unused drain hole in the drain pan at the bottom of the unit to block bypass air.
4. Remove the corresponding drain line knockout from the coil access door to allow access to the horizontal drain.
5. Replace the door and attach the drain line.

#### Horizontal Right Installations:

1. Remove the coil access door. Unscrew the line-set tube close-off plate from the front left cabinet rail.
2. Slide the coil and drain pan assembly out of the unit.
3. Remove the sheet metal hairpin covers (if supplied) from the back of the coil and discard.
4. Place the horizontal drain pan on the opposite side of the coil. On units with 2 sets of knockouts, remove the other set of knockouts in the coil spacing plates and insert support rod.
5. Slide the coil and the horizontal drain pan assembly back into the unit. Re-attach the tube close off plate.

**NOTE:** For A-size cabinet applications, it may be preferable to remove the blower assembly prior to installing the coil & drainpan. In this case follow instructions 1-4 as listed above but also remove the blower access door and blower assembly. The blower assembly is secured with two screws on either side near the front. With these removed the blower assembly can slide out of the front of the unit. Install the coil and drain pan as described in step 5 and then replace the blower assembly. Take care to ensure that the flanges on the sides of the blower assembly are captured by the pockets in the blower deck. It may be necessary to lift the blower assembly during insertion to allow the lower blower leg to clear the side of the drain pan. The blower will stop against the back of the blower deck. Replace the two screws and the blower access door and proceed with steps 6-9.

6. Remove the plug from one of the threaded holes in the horizontal drain pan. Completely remove the webbing located in the threaded holes of the drain pan. **IMPORTANT:** If the webbing is not removed, the condensate will not drain properly and ceiling damage may occur.

**NOTE:** It is recommended that the suction line be insulated up to the coil inside of the cabinet.

7. Insert the plug (from horizontal drain pan) into the open and unused drain hole in the drain pan at the bottom of the unit to block bypass air.
8. Remove the corresponding drain line knockout from the coil access door to allow access to the horizontal drain.
9. Replace the door and attach the drain line

## Condensate Drainage

### **CAUTION:**

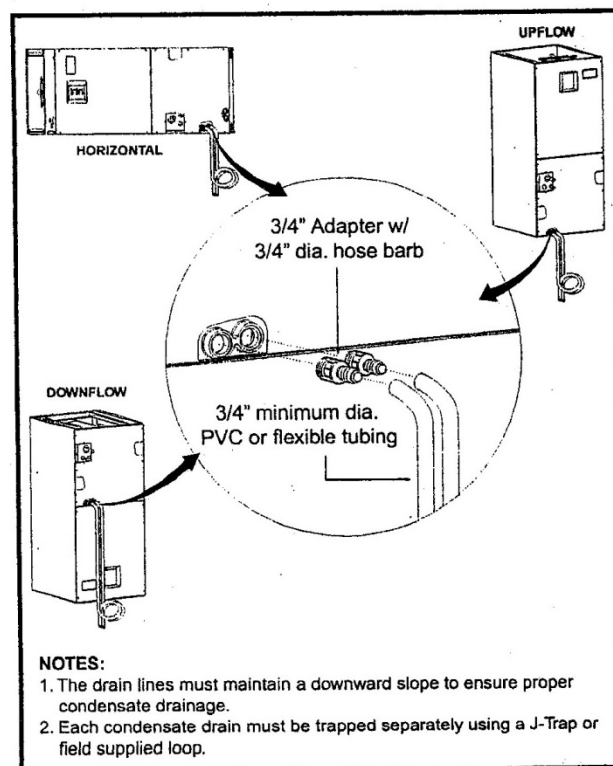
**The air handler must be level to ensure proper condensate drainage. An unlevel installation may result in structural damage, premature equipment failure, or possible personal injury.**

- Methods for disposing of condensate vary according to local codes. Refer to local codes or authority having jurisdiction for restrictions and proper condensate disposal requirements.
- The drain pan that is supplied with this air handler contains a primary and secondary drain fitting. The condensate is drained from the unit through two 3/4" female pipe fittings located on the front side of the unit as shown in Figure 8.
- The drain pan must be drained with field supplied tubing or pvc pipe and adequately trapped. Both drain tubes must have a minimum diameter of 3/4" and be trapped separately.

**IMPORTANT:** Failure to install a trap may result in condensation overflowing the drain pan, resulting in substantial water damage to surrounding area.

- Route both lines to a suitable drain, avoiding sharp bends and pinching of the lines. The drain should maintain a minimum horizontal slope in the direction of discharge of not less than 1" vertical for every 10 ft of horizontal run.

- If the air handler is located in or above a living space where damage may result from condensate overflow, an auxiliary drain pan shall be installed under the unit. A separate drain line should extend from the pan to a conspicuous point and serve as an alarm indicating that the primary drain is restricted. As an alternative to a separate drain line, an approved water level indicator or float switch device may be used to shut down the unit in the event water is detected in the auxiliary pan.
- Install a single 5 inch trap in the condensate drain line as close to the coil as possible. Make sure that the top of the trap is below the bottom of the drain pan to prevent the condensate from overflowing the drain pan. **NOTE:** There must be only one trap in the drain line. Using more than one trap may prevent drainage.
- Prime the trap with water. Insulate the drain if it is located in an unconditioned space, and test the condensate line for leaks. Consult local codes for additional restrictions or precautions.
- During system checkout, inspect the drain line and connections to verify proper condensate drainage.



**Figure 8. Condensate Drainage Example**

## Appendix B

### Electrical Connections

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## ELECTRICAL CONNECTIONS

### **WARNING:**

#### **ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD**

**Failure to follow safety warnings exactly could result in serious injury or property damage.**

**Improper servicing could result in dangerous operation, serious injury, death or property damage.**

- **Before servicing, disconnect all electrical power to the air handler.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.**
- **Verify proper operation after servicing.**

- Electrical connections must be in compliance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70).
- For Canadian installations, the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

#### **Pre-Electrical Checklist:**

- ✓ Verify the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.
- ✓ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment.
- ✓ Verify factory wiring is in accordance with the unit wiring diagram

#### **Line Voltage**

- **An electrical disconnect must be located within sight of and readily accessible to the unit.** This switch shall be capable of electrically de-energizing the outdoor unit. See unit data label for proper incoming field wiring. Any other wiring methods must be acceptable to authority having jurisdiction.
- It is recommended that the line voltage to the unit be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit.
- Overcurrent protection must be provided at the branch circuit distribution panel and sized as shown on the unit rating label and according to applicable local codes
- The installer should become familiar with the wiring diagram/schematic before making any electrical connections to the unit.

- Use only copper wire for the line voltage power supply to this unit. Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit. Aluminum supply wire may be used if a heater kit is installed.
- If replacing any of the original wires supplied with the unit, the replacement wire must be copper wire consisting of the same gauge and temperature rating.
- Provide power supply for the unit in accordance with the unit wiring diagram, and the unit rating plate. Use UL listed conduit and conduit connectors for connecting the supply wires to the unit and for proper grounding. Field supplied bushings for the power supply cables must be added to support and protect the power supply cables.
- All 208/230 Volt units are shipped from the factory wired for 240 volt operation. For 208V operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V.

#### **Grounding**

### **WARNING:**

**The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. Do not use gas piping as an electrical ground!**

This unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code (ANSI/NFPA 70) or the CSA C22.1 Electrical Code. Use the grounding lug provided in the control box for grounding the unit.

#### **Thermostat Connections**

- Thermostat connections shall be in accordance with the instructions supplied with the thermostat. The thermostat used with this equipment must operate in conjunction with any installed accessories.

### **CAUTION:**

**Isolation must be maintained from the external Class 2 output of any transformer in a cooling circuit. Use a thermostat with isolating contacts to prevent inter-connection of Class 2 outputs.**

- Where local codes require that the thermostat wiring must be routed through a conduit or raceway, splices can be made inside the unit; however, all wiring must be NEC Class 1 and separated from incoming power leads.
- The thermostat should be mounted about 5 feet above the floor on an inside wall. **DO NOT** install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from

fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting and installation information.

- Install the grommet, which is packed with the unit, in the hole for low-voltage wires. Properly connect the low-voltage wiring between the thermostat, outdoor unit, and control board. **NOTE:** When the low voltage wires are positioned in this grommet, the grommet will prevent chafing and/or shorting of the low voltage leads.

### Control Board

The control board in the air handler controls the timing sequence of the elements. The board is equipped with a 3 second blower on delay and a 15 second blower off delay in heating and a 40 second blower off delay in cooling.

### Electronic Air Cleaner (EAC)

The unit has an output to power an electronic air cleaner when the blower is running. This output is rated to 1.0 amp at 208/240V.

### Humidifier

The unit has an output to power a humidifier when the blower is running. This output is rated to 1.0 amp at 208/240V.

### Optional Humidistat

The optional humidistat may be installed in the return air duct to provide excellent humidity control when needed and maximum system capacity and energy efficiency when humidity levels are normal. The humidistat senses when humidity in the return air stream is above a preset level (field adjustable) and sends a signal to the motor to reduce the airflow so that more moisture may be removed until the humidity level drops. The air handler is pre-programmed for humidistat operation.

Install the humidistat in the return air duct as directed in the installation instructions included with the kit. Wire the humidistat through the low-voltage wire entrance in the air handler to the control board terminal marked **DEHUM**. Wire the humidistat to open on rise in humidity.

Both motor control boards have a **DHUM** connection that allows the system to increase the amount of humidity that is removed from the circulating air. This is accomplished by reducing the CFM and allowing the cooling coil to become colder. This will only occur when there is a call for cooling. There are many ways that this can be electrically wired.

1. If the room thermostat incorporates a humidity sensor and **DHUM** output, connect the **DHUM** on the thermostat to the **DHUM** terminal on the motor control board.
2. If using a separate humidistat, connect the **DHUM** & **R** terminals on the humidistat to the **DHUM** & **R** terminals on the motor control board of the air handler. In this option, the **DHUM** output of the humidistat must be set to be normally open and closed when there is a call for humidification. See Figure.

3. If a humidistat is not available, it is an acceptable option to connect the **R** & **DHUM** terminals on the motor control board together with a field supplied wire. This option causes the blower to run at a reduced CFM for 10 minutes after a call for cooling. **NOTE:** If outdoor unit is a heat pump, connect the **O** terminal to **DHUM**.

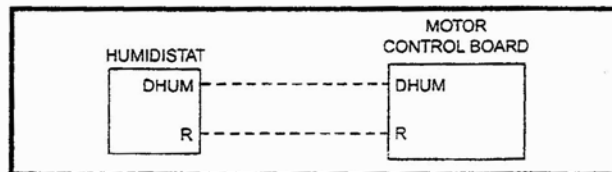


Figure DHUM Wiring Configuration