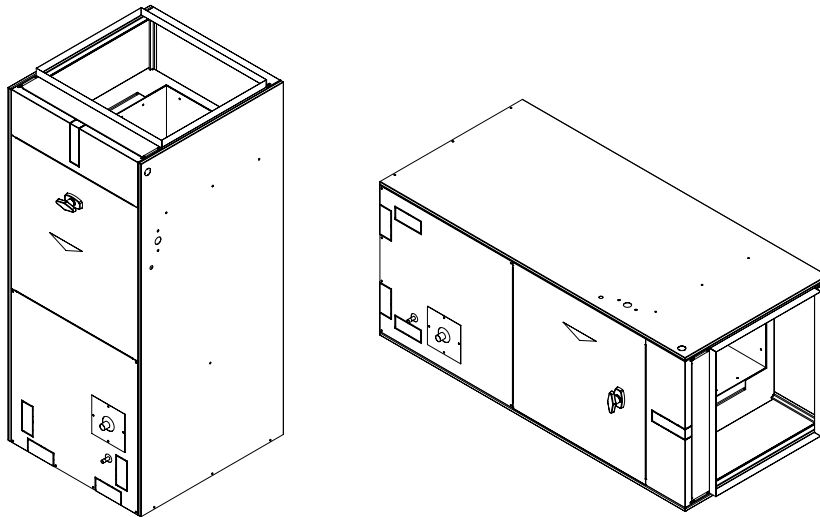




# 13 & 14 SEER AIR HANDLER

## INSTALLATION & SERVICE MANUAL

**MODELS: AH2436E1, AH4260E1**



**PLEASE READ THESE INSTRUCTIONS PRIOR TO INSTALLATION AND BEFORE PERFORMING ANY SERVICE OR MAINTENANCE. THESE INSTRUCTIONS MUST BE LEFT WITH THE USER AND SHOULD BE RETAINED FOR FUTURE REFERENCE BY QUALIFIED SERVICE PERSONNEL.**

**⚠WARNING:** *Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency, or manufacturer listed below.*

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MADE IN USA

**MAC-183**  
ECN 4849-MA

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All installations and services must be performed by qualified personnel.

## **SAFETY SECTION**

This page contains various warnings and cautions found throughout this Service and Installation Manual. Please read and comply with the statements on the cover and the statements below.

**⚠WARNING:** *Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency, or manufacturer listed below.*

**⚠CAUTION:** If drilling or screwing into panel or plate is necessary, make certain drill or screw does not penetrate into any part of evaporator coil or hot water coil and cause damage. Personal injury and/or property damage may result.

**⚠WARNING:** Do not use this system if any part has been under water. Immediately call a qualified service agency to inspect the system and to replace any part of the electrical or control system which has been under water.

**⚠WARNING:** The cooling and heating coils must be cleaned by a qualified service person.

**⚠WARNING:** This air handler is not to be used to condition during construction.

**⚠CAUTION:** When testing electrical equipment, always follow standard electrical procedures and precautions.

**⚠CAUTION:** DO NOT wet electronic components during hydronic testing. Wetting electronic components may damage circuitry and cause a hazardous situation. Dry moisture from all leads and terminals if wetting occurs. Wait at least 24 hours for the circuit to fully dry before energizing the system.

**⚠WARNING:** Personal injury or property damage could result from major repair or service of this system by anyone other than a qualified contractor.

**⚠WARNING:** If you do not follow these instructions exactly an unsafe condition may result causing personal injury, loss of life or property damage. Installation and service personnel are required by some states to be licensed. Persons not qualified shall not install this equipment nor interpret these instructions.

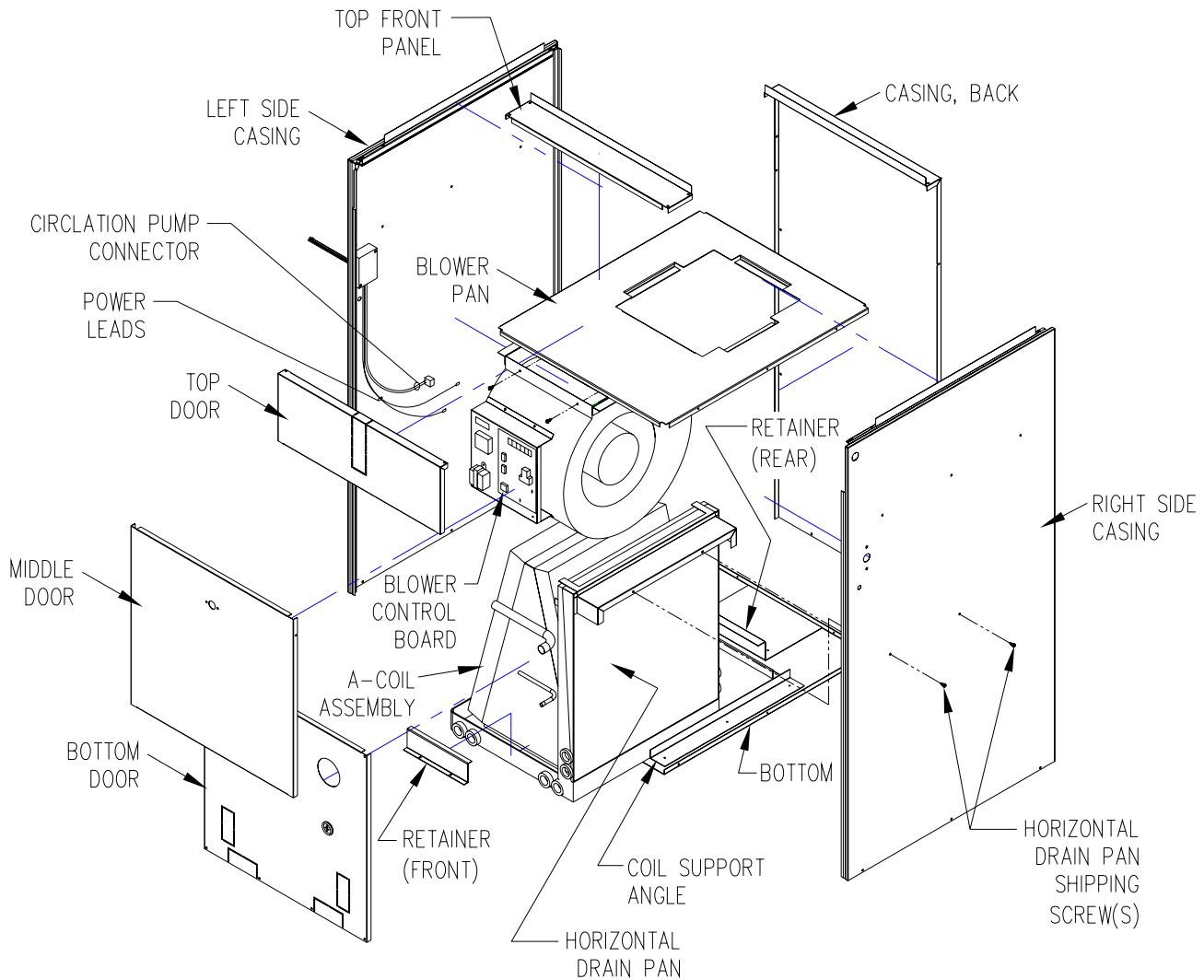
All local codes and regulations take precedence over the instructions in this manual and should be followed accordingly. In the absence of local codes, installation must conform with these instructions, regulations of the National Fire Protection Association and provisions of the National Electric Code.

All installations and services must be performed by qualified personnel.

## **AIR HANDLER**

Each air handler is shipped with an evaporator preinstalled. The AH2435E1 is shipped with a 12U2430AG15 evaporator coil for 2 to 3 ton operation. The AH4260E1 is shipped with a 12U3648AG17 evaporator coil for 3 to 5 ton operation.

The construction of the air handler permits easy knockdown and reassembly. See Figure A.



**Figure A.**

### **FOLLOW THESE STEPS FOR KNOCKDOWN OF AIR HANDLER:**

1. Start with unit setting in a vertical position (Figure A).
2. Remove middle door.
3. Remove screws from bottom door, top door, and top front panel. Remove doors and top panel of air handler.
4. Remove the retention clip from in front of the A-coil drain pan and the horizontal drain pan shipping screw(s) from the right side casing.
5. Remove the A-coil assembly.
6. Disconnect power leads and unplug circulation pump connector from the blower control board.

**All installations and services must be performed by qualified personnel.**

7. Remove the screws that secure the blower assembly to the blower pan and pull blower sub-assembly out the front of the unit.
8. Remove screws that secure the blower pan to the side & back casings.
9. Push the front edges of the side casings slightly apart and remove the blower pan.
10. Remove screws from the bottom and the casing back.
11. Remove casing back and side casings from the bottom.

## **REASSEMBLY OF AIR HANDLER**

To reassemble the air handler, reverse steps above starting with number 10.

## **SETTING UP THE A-COIL FOR AIR CONDITIONING**

The AH2436E1 & AH4260E1 come with the A-coil pre-installed for vertical and left to right horizontal airflow.

**IMPORTANT:** When air handler is installed in attic above a finished ceiling, it is recommended that a safety overflow pan with its own separate drain be installed under the entire unit.

For a right to left horizontal air flow the following steps 1-8 must be followed.  
Otherwise skip to step 9.

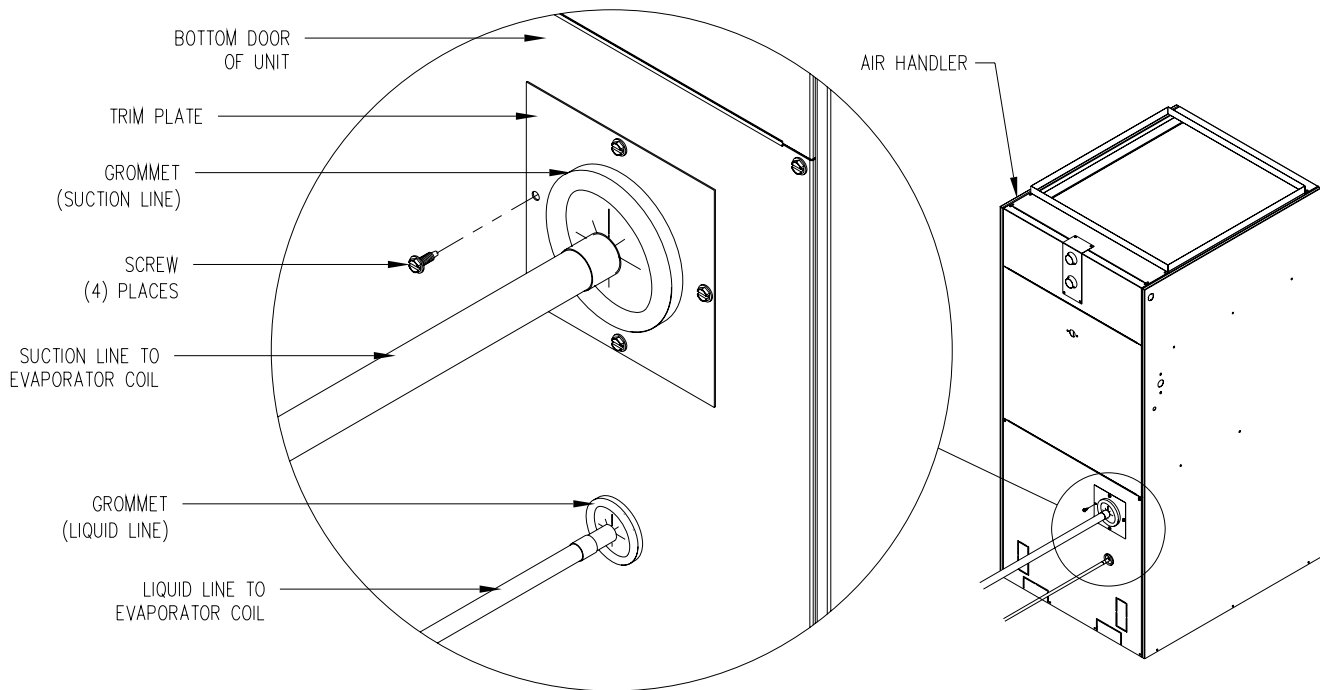
### **Reversing the horizontal orientation**

1. Remove the middle door of the air handler.
2. Remove the bottom door of the air handler.
3. Remove the retention clip from in front of the A-coil drain pan.
4. Remove the horizontal drain pan shipping screw(s) from the right side casing.
5. Remove the A-coil assembly and slip the horizontal drain pan assembly off of the right side of the A-coil.
- 5a. Remove the bottom right side support L-bracket and remount in the left hand position using the pre-punched holes for a guide.
6. Slip the horizontal drain pan assembly onto the left side of the A-coil.
7. Replace the A-coil assembly into the air handler. The A-coil drain pan should slide under the rear retention clip. The horizontal drain pan assemble should rest against the right panel insulation and the bottom side support.
8. Replace the retention clip for the front of the evaporator drain pan.

### **For all orientations**

9. Cut open the appropriate drain pan drain access hole in the bottom door.
10. Slip the Suction line grommet panel over the suction line up to the bottom door surface.

**All installations and services must be performed by qualified personnel.**



**Figure B**

11. Make appropriate liquid and suction line connections to coil and braze connections.

**NOTE:** A wet rag makes an excellent heat sink for tubing and grommets.

**CAUTION:** If drilling or screwing into panel of plate is necessary, make certain drill does not penetrate into any part of evaporator coil or hot water coil to avoid personal injury and/or property damage.

13. Position grommet panel on bottom door surface and secure in place with screws. Refer to Figure B.

14. Make appropriate condensate drain connections and seal the access opening.

### **INSTALLATION OF THE HOT WATER COIL:**

1. Remove top door of air handler.

2. Slide hot water coil's side hanger brackets into coil channel(retaining channel) in the air handler. See Figure C.

3. Push coil into unit until the coil is stopped by the back casing.

4. Cut out appropriate holes in insulation, realign top door and secure into place.

5. Make appropriate hydronic connections to inlet(blower side) and outlet(duct side) of coil and braze into place.

6. Seal connections through panel with duct sealer or equivalent.

All installations and services must be performed by qualified personnel.

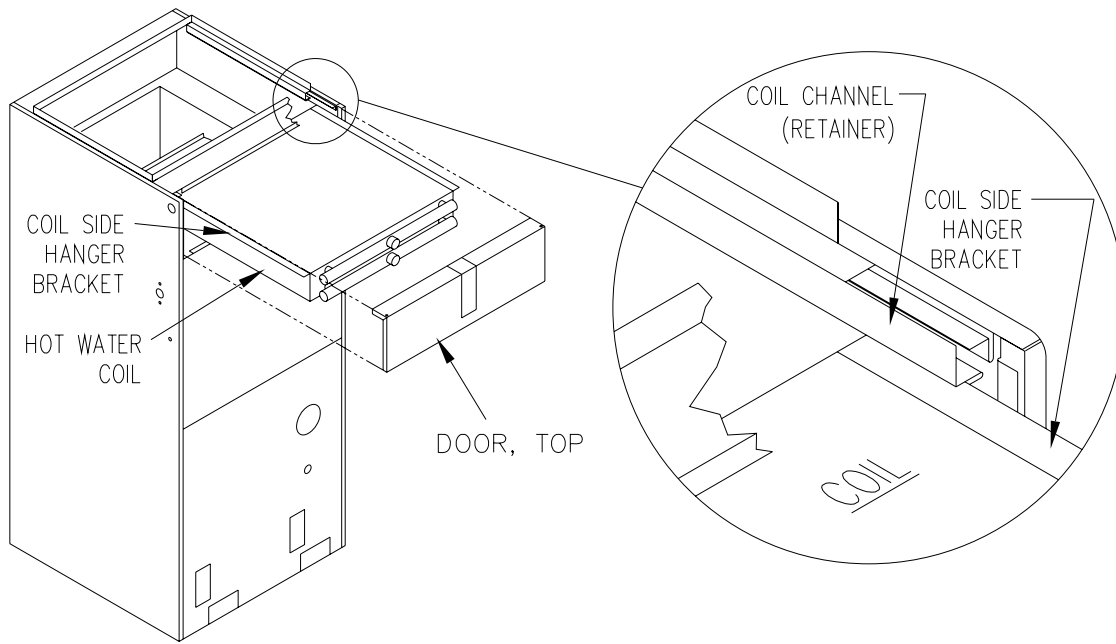


Figure C

**⚠ CAUTION:** If drilling or screwing into panel or plate is necessary, make certain drill does not penetrate into any part of evaporator coil or hot water coil. Personal injury and/or property damage may result.

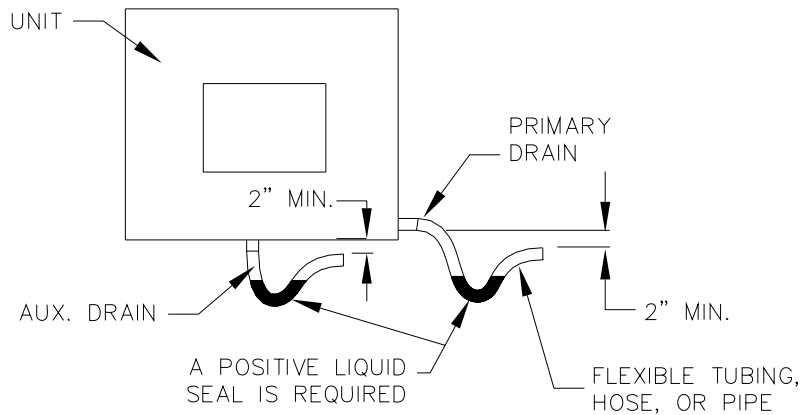


Figure D

**NOTE:** Drain lines must be pitched no less than 1/4" per foot away from the air handler.

All installations and services must be performed by qualified personnel.

## **BLOWER AIR ADJUSTMENT**

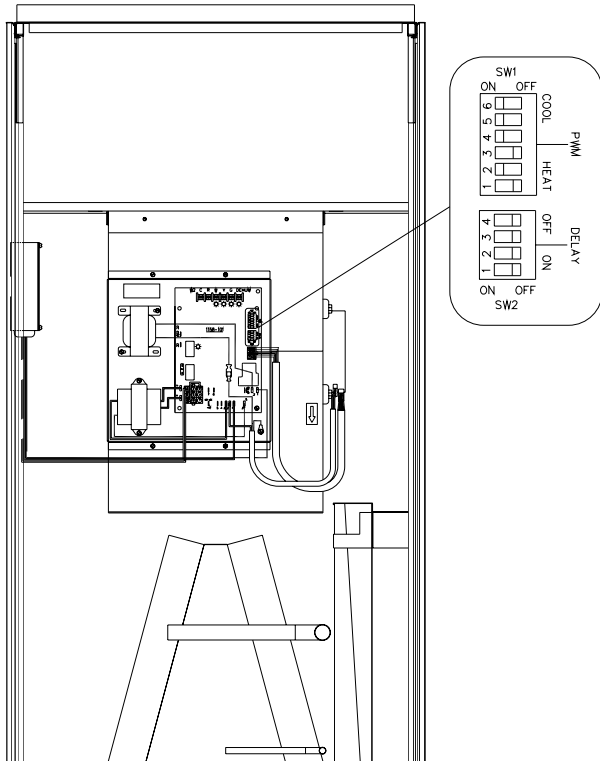


Figure E

**The ECM blower control must be set in order to establish proper air movement. Use the following steps to do this:**

1. Identify to tonnage of the condensing unit that will be used.
2. If Hydronic heat is to be used, identify your BTU heat requirements, preferred supply air temperature, water temperature and water flow through the coil in gallons per minute.
3. Locate the blower control board mounted to the front of the blower assembly.
4. Locate the red switch block labeled SW1 for adjusting the Heating and Cooling blower speed.
5. Locate SW2, just below SW1, for adjusting Blower delays.

## **BLOWER COOLING SPEEDS**

Refer Table C1 for setting switches 4, 5 & 6 for the A/C sizing.

Table C1 COOLING SWITCH SETTINGS

A/C TONS	CFM	AH2436E1 COOL Settings (SW1)			AH4260E1 COOL Settings (SW1)		
		4	5	6	4	5	6
2	800	OFF	OFF	OFF			
2-1/2	1000	ON	OFF	OFF			
3	1200	OFF	ON	OFF	OFF	ON	OFF
3-1/2	1400				ON	ON	OFF
4	1600				OFF	OFF	ON
5	1800				ON	OFF	ON
	2000				OFF	ON	ON
	2200				ON	ON	ON

Shaded cells represent the factory settings

## **BLOWER HEATING SPEEDS**

In the next two pages:

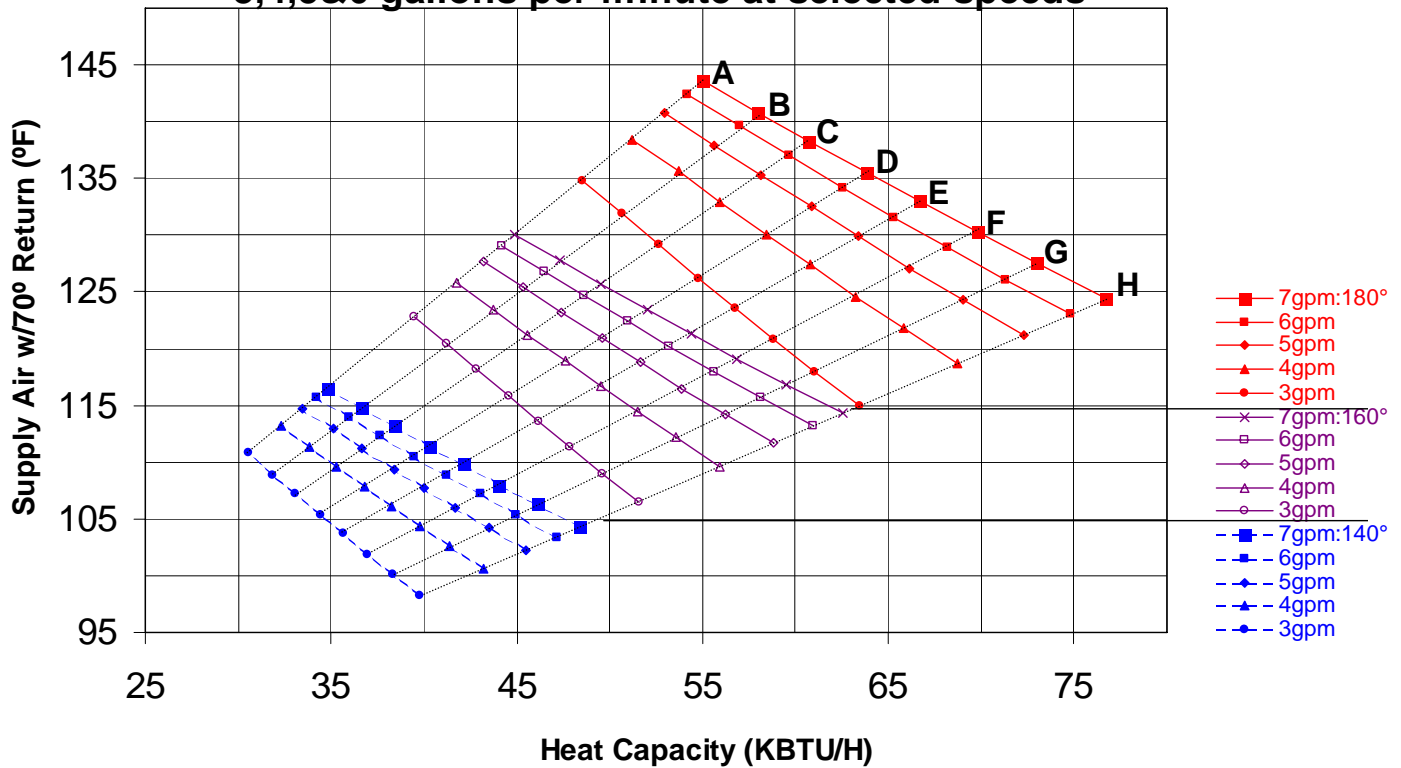
1. Locate the page that refers to the Air Handler to be set up.
2. Find the line(s) on the chart that best represents the water temperature and gallons per minute available.
3. Find the point along the curve that best fits the BTU and Supply Air temperature desired.
4. Read the letter associated with that point and use it to find the switch settings in the table below the chart.

**(The table below the switch settings represent the actual numbers represented by the chart.)**



All installations and services must be performed by qualified personnel.

## AH2436E1 Temperature & Heat Values at 140,160&180°F and 3,4,5&6 gallons per minute at selected speeds

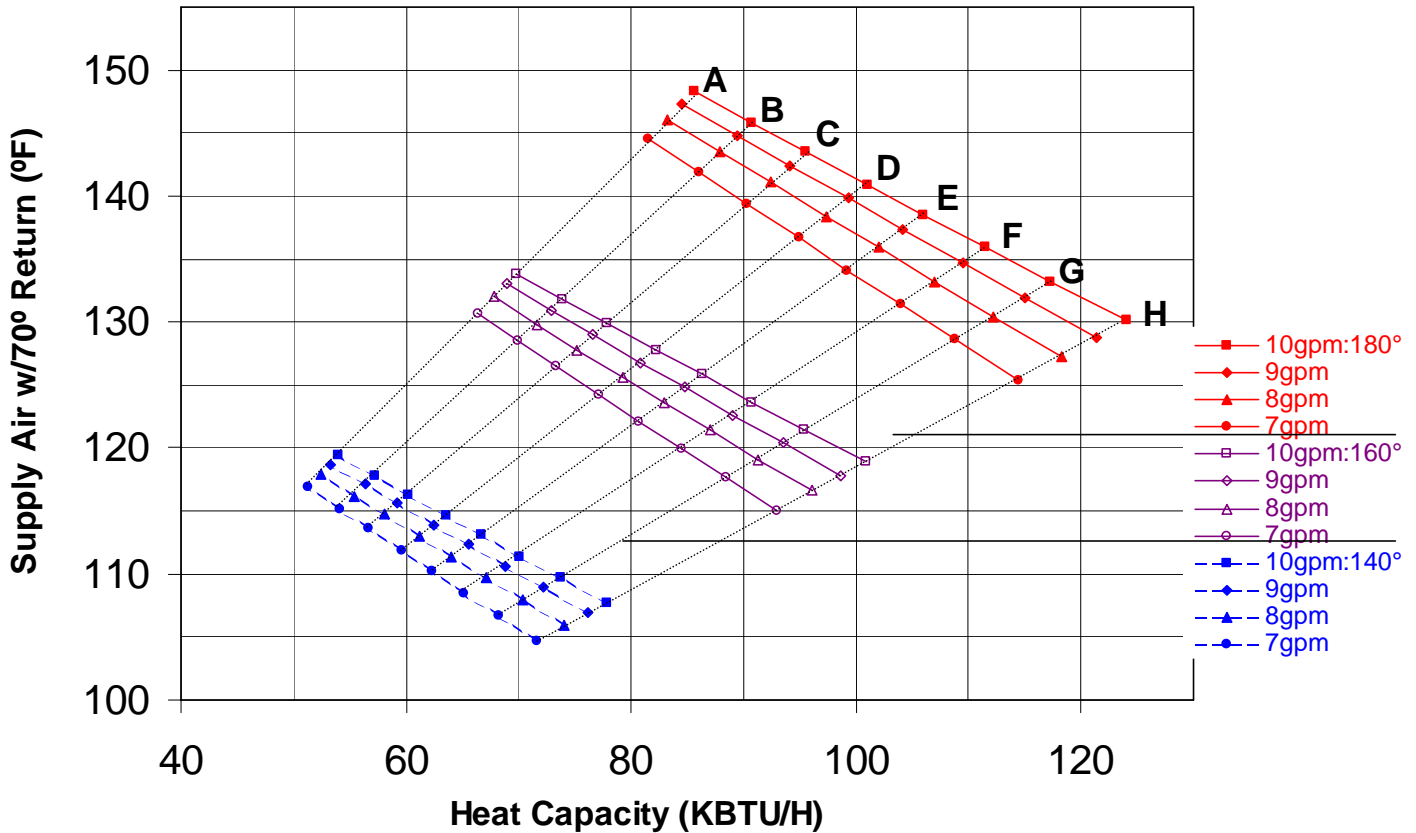


SPEED	CFM	HEAT Settings (SW1)		
		1	2	3
A	689	OFF	OFF	OFF
B	754	ON	OFF	OFF
C	819	OFF	ON	OFF
D	897	ON	ON	OFF
E	975	OFF	OFF	ON
F	1066	ON	OFF	ON
G	1170	OFF	ON	ON
H	1300	ON	ON	ON

Water Temperature	Flow	CFM	689 (A)	754 (B)	819 (C)	897 (D)	975 (E)	1066 (F)	1170 (G)	1300 (H)
180°F H <sub>2</sub> O	7gpm	Supply Air (°F)	144°	141°	138°	136°	133°	130°	128°	124°
		Heat (Kbtu/H)	55	58	61	64	67	70	73	77
	6gpm	Supply Air (°F)	142°	140°	137°	134°	132°	129°	126°	123°
		Heat (Kbtu/H)	54	57	60	63	65	68	71	75
	5gpm	Supply Air (°F)	141°	138°	135°	133°	130°	127°	124°	121°
		Heat (Kbtu/H)	53	56	58	61	63	66	69	72
	4gpm	Supply Air (°F)	138°	136°	133°	130°	127°	125°	122°	119°
		Heat (Kbtu/H)	51	54	56	58	61	63	66	69
	3gpm	Supply Air (°F)	135°	132°	129°	126°	124°	121°	118°	115°
		Heat (Kbtu/H)	49	51	53	55	57	59	61	63
160°F H <sub>2</sub> O	7gpm	Supply Air (°F)	130°	128°	126°	123°	121°	119°	117°	114°
		Heat (Kbtu/H)	45	47	50	52	54	57	60	63
	6gpm	Supply Air (°F)	129°	127°	125°	122°	120°	118°	116°	113°
		Heat (Kbtu/H)	44	46	49	51	53	56	58	61
	5gpm	Supply Air (°F)	128°	125°	123°	121°	119°	117°	114°	112°
		Heat (Kbtu/H)	43	45	47	50	52	54	56	59
	4gpm	Supply Air (°F)	126°	123°	121°	119°	117°	115°	112°	110°
		Heat (Kbtu/H)	42	44	46	48	49	51	54	56
	3gpm	Supply Air (°F)	123°	120°	118°	116°	114°	111°	109°	107°
		Heat (Kbtu/H)	40	41	43	45	46	48	50	52
140°F H <sub>2</sub> O	7gpm	Supply Air (°F)	117°	115°	113°	111°	110°	108°	106°	104°
		Heat (Kbtu/H)	35	37	38	40	42	44	46	48
	6gpm	Supply Air (°F)	116°	114°	112°	111°	109°	107°	105°	103°
		Heat (Kbtu/H)	34	36	38	39	41	43	45	47
	5gpm	Supply Air (°F)	115°	113°	111°	109°	108°	106°	104°	102°
		Heat (Kbtu/H)	33	35	37	38	40	42	43	46
	4gpm	Supply Air (°F)	113°	111°	110°	108°	106°	104°	103°	101°
		Heat (Kbtu/H)	32	34	35	37	38	40	41	43
	3gpm	Supply Air (°F)	111°	109°	107°	105°	104°	102°	100°	98°
		Heat (Kbtu/H)	31	32	33	34	36	37	38	40

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### AH4260E1 Temperature & Heat Values at 140,160&180°F and 7,8,9&10 gallons per minute at selected speeds



SPEED	CFM	HEAT Settings (SW1)		
		1	2	3
A	1007	OFF	OFF	OFF
B	1102	ON	OFF	OFF
C	1197	OFF	ON	OFF
D	1311	ON	ON	OFF
E	1425	OFF	OFF	ON
F	1558	ON	OFF	ON
G	1710	OFF	ON	ON
H	1900	ON	ON	ON

Water Temperature	Flow	CFM	1007 (A)	1102 (B)	1197 (C)	1311 (D)	1425 (E)	1558 (F)	1710 (G)	1900 (H)
180°F H <sub>2</sub> O	10gpm	Supply Air (°F)	148°	146°	144°	141°	139°	136°	133°	130°
		Heat (Kbtu/H)	86	91	96	101	106	112	117	124
	9gpm	Supply Air (°F)	147°	145°	142°	140°	137°	135°	132°	129°
		Heat (Kbtu/H)	85	90	94	99	104	109	115	121
	8gpm	Supply Air (°F)	146°	144°	141°	138°	136°	133°	130°	127°
		Heat (Kbtu/H)	83	88	92	97	102	107	112	118
	7gpm	Supply Air (°F)	145°	142°	139°	137°	134°	131°	129°	125°
		Heat (Kbtu/H)	82	86	90	95	99	104	109	114
160°F H <sub>2</sub> O	10gpm	Supply Air (°F)	134°	132°	130°	128°	126°	124°	121°	119°
		Heat (Kbtu/H)	70	74	78	82	86	91	95	101
	9gpm	Supply Air (°F)	133°	131°	129°	127°	125°	123°	120°	118°
		Heat (Kbtu/H)	69	73	77	81	85	89	94	99
	8gpm	Supply Air (°F)	132°	130°	128°	126°	124°	121°	119°	117°
		Heat (Kbtu/H)	68	72	75	79	83	87	91	96
	7gpm	Supply Air (°F)	131°	129°	127°	124°	122°	120°	118°	115°
		Heat (Kbtu/H)	66	70	73	77	81	84	88	93
140°F H <sub>2</sub> O	10gpm	Supply Air (°F)	119°	118°	116°	115°	113°	111°	110°	108°
		Heat (Kbtu/H)	54	57	60	64	67	70	74	78
	9gpm	Supply Air (°F)	119°	117°	116°	114°	112°	111°	109°	107°
		Heat (Kbtu/H)	53	56	59	62	66	69	72	76
	8gpm	Supply Air (°F)	118°	116°	115°	113°	111°	110°	108°	106°
		Heat (Kbtu/H)	52	55	58	61	64	67	70	74
	7gpm	Supply Air (°F)	117°	115°	114°	112°	110°	109°	107°	105°
		Heat (Kbtu/H)	51	54	57	60	62	65	68	72

All installations and services must be performed by qualified personnel.

## **BLOWER TIME DELAY**

In cases where the yellow wires are used to start and stop the hydronic pump, SW2 may be used to delay when the blower is cycled on or off to increase comfort and efficiency.

Use Table D1 to set the switches appropriately

**Table D1: Delays before blower cycles “ON or “OFF”**

SW2 Positions		“ON” Delay	SW2 Positions		“OFF” Delay
1	2	(Seconds)	3	4	(Minutes)
OFF	OFF	30	OFF	OFF	2
ON	OFF	60	ON	OFF	4
OFF	ON	120	OFF	ON	6
ON	ON	480	ON	ON	8

## **DUCT SYSTEM**

The duct system and load sizing calculation should follow the design standards of Air Conditioning Contractors of America (ACCA) - manuals D & J - or the American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE) Latest Edition Fundamentals Volume.

To aid you in evaluating existing duct systems quickly, review the chart on Page 11 which shows the CFM capacity for square inch areas, based on .10" wc static pressure (SP) loss on the supply systems.

Each of the system's components (trunk lines, take-offs, runs and register and grill-free areas) must be properly sized and matched together to ensure you are obtaining the air handling capacity of the duct system. A 12x8 duct with a 400 CFM capacity, for example, **MAY NOT** flow 400 CFM if the register(s) to which it connects can only flow a total of 200 CFM.

The air handling capacity **MUST BE EQUAL TO** the supply system at a minimum when sizing the return air duct system. It is recommended to follow design parameters set down by ACCA or ASHRAE on the return air duct systems.

All installations and services must be performed by qualified personnel.

**DUCT SIZES FOR HOMES**

**Velocity Approximately 800 Feet Per Minute**

CFM	DIA.	SQ.”	RECTANGULAR DUCT DIMENSIONS ... INCHES								
45	4	12.5									
65	5	19.6									
100	6	28							6x6	9x4	
150	7	38							8x6	12x4	
200	8	50							10x6	14x4	
250	9	63						8x8	12x6	18x4	
300	9	63						10x8	14x6	20x4	
400	10	78							12x8	16x6	25x4
500	12	113					10x10	14x8	19x6	30x4	
600	12	113					12x10	16x8	22x6	38x4	
700	12	113					14x10	18x8	26x6		
800	14	154				12x12	15x10	20x8	28x6		
900	14	154				14x12	17x10	22x8	32x6		
1000	16	201				15x12	18x10	24x8	34x6		
1100	16	201			14x14	16x12	20x10	26x8	40x6		
1200	16	201			15x14	17x12	22x10	28x8	42x6		
1300	16	201			16x14	18x12	22x10	30x8	46x6		
1400	18	255			16x14	19x12	24x10	32x8	48x6		
1500	18	255			17x14	20x12	26x10	34x8	50x6		
1600	18	255		16x16	18x14	22x12	26x10	36x8	54x6		
1700	18	255		17x16	20x14	22x12	28x10	38x8	58x6		
1800	18	255		18x16	20x14	24x12	30x10	40x8	62x6		
1900	20	314		18x16	22x14	26x12	32x10	44x8	64x6		
2000	20	314		20x16	22x14	26x12	34x10	46x8			
2200	20	314	18x18	20x16	24x16	28x12	36x10	48x8			

**THE INDOOR EVAPORATOR COIL**

1. **EVAPORATOR COIL** is a finned coil through which air in the home is circulated. Heat from the air is transferred to the liquid refrigerant inside the evaporator coil. The coils for use in AH air handlers are in an A-shaped configuration (A Models).
2. **CONDENSATE DRAIN PAN** is attached to the bottom of the evaporator coil to collect water condensed out of the air. Two drain fittings are provided for connection to a convenient drain point.
3. **HORIZONTAL CONDENSATE DRAIN PAN** is attached to the right side of the first one for horizontal left to right air flow. It may be relocated to the left side as well. A drain fitting is provided for connection to a convenient drain point.

**TUBING LINE SETS**

1. **SUCTION LINE** is an insulated large copper tube connecting the outlet of the A/C evaporator to the suction inlet of the A/C **CONDENSER**.

All installations and services must be performed by qualified personnel.

2. **LIQUID LINE** is a single small tube connecting the outlet of the A/C condenser to the expansion valve inlet on the A/C evaporator coil.

**TUBING SIZE REFERENCE CHART**

Tube Diameter for Total Line Length						
	0-50'		50-75'		75-100'	
MODEL <sup>1</sup>	Suction	Liquid	Suction	Liquid	Suction	Liquid
2AC10024-2	3/4"	3/8"	3/4"	3/8"	3/4"	3/8"
2AC10030-2	7/8"	3/8"	7/8"	3/8"	7/8"	1/2"
AC1324 & AC1330	3/4"	3/8"	7/8"	3/8"	1-1/8"	1/2"
AC1424 & AC1430						
2AC10036-2, 2AC10042-2, 2AC10048-2 & 2AC10060-2	7/8"	3/8"	1-1/8"	1/2"	1-1/8"	1/2"
AC1336, AC1342, AC1348 & AC1360						
AC1336, AC1342, AC1348 & AC1360						

<sup>1</sup> It is not recommended to use the AC10 series condensers with these air handlers. The “non-bleed” TXV on the evaporators may cause the condenser to stall during warm weather.

**NOTES:**

For line lengths over 25' adjust charge accordingly per foot of variation from chart.

- .65 oz. per foot for 3/8" and 3/4" line set
- .674 oz. per foot for 3/8" and 7/8" line set
- .694 oz. per foot for 1/2" and 7/8" line set
- .72 oz. per foot for 1/2" and 1" line set
- .76 oz. per foot for 5/8" and 1-1/8" line set

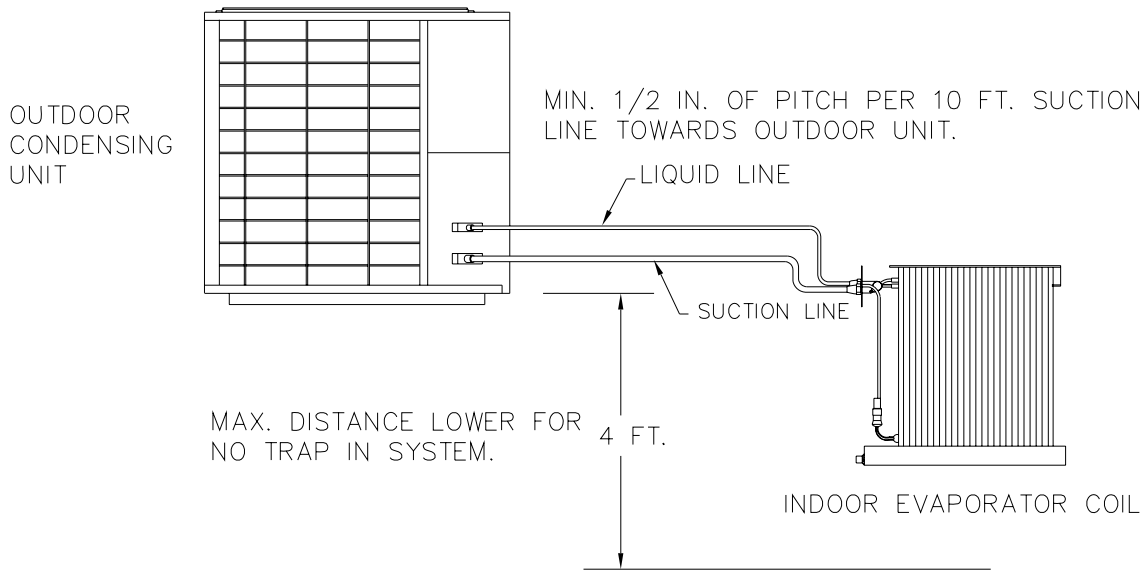
These charges are to be used in conjunction with a liquid sub-cooling measurement for best performance.

All installations and services must be performed by qualified personnel.

## TUBING INSTALLATION

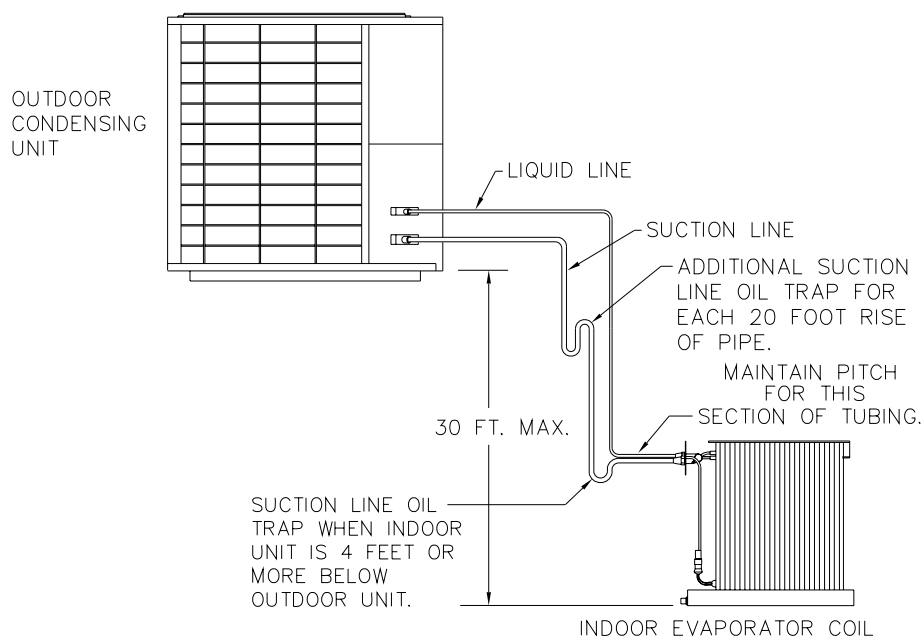
The compressor oil is constantly pumped through the refrigerant lines in normal operation of an air conditioning system. To ensure proper lubrication of the compressor by avoiding oil accumulation at undesirable points in the system, follow the guidelines listed below:

1. No traps in the suction line are necessary if the outdoor condensing unit is level with the indoor evaporator coil or the indoor evaporator coil is 4 feet or less lower than the outdoor condensing unit. Any horizontal runs of suction line should have minimum 1/2" pitch for every 10 feet of line towards the outdoor condensing unit. See Figure F.



**Figure F.**

2. A trap is necessary in the suction line at the indoor evaporator coil if the indoor evaporator coil is more than 4 feet below the outdoor condensing unit.



**Figure G1.**

All installations and services must be performed by qualified personnel.

**NOTE:** Multiple suction line traps are recommended for longer or multiple suction lines. See Figure G1. An inverted trap should be installed on the horizontal suction line near the evaporator coil to prevent liquid flood back to the compressor (See Figure G2.) if the indoor evaporator coil is located 10' or more above the condensing unit.

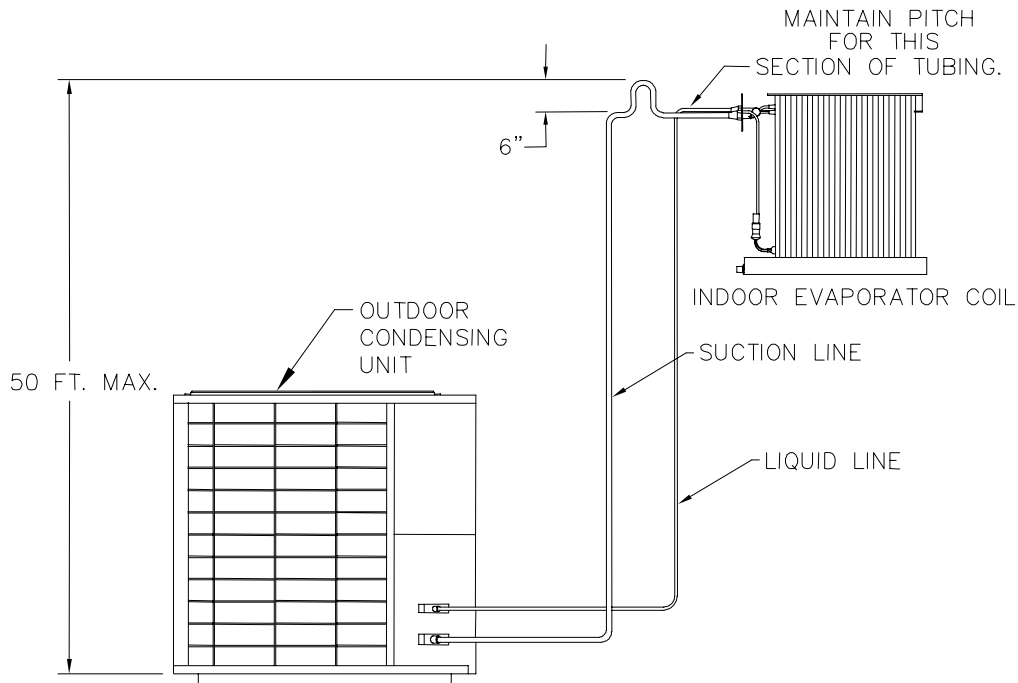


Figure G2.

A gradual loop in the tubing can be constructed to take up the excess tubing if you find that too much tubing has been brought onto a job. Such a loop **MUST** be kept in a horizontal (flat) plane to avoid trapping the oil.

Refrigerant lines should be inserted into a suitable conduit or raceway when the lines are to be buried between the building and the outdoor condensing unit. The lines must be provided with sufficient protection and support to prevent damage when installed above ground.

When making "on the job" tubing, a solder of 95% tin, 5% antimony or any of the silver solders such as SilFos, Phos-Copper, Easy-Flo 35 or 45, should be used. No attempt will be made here to instruct proper soldering or brazing technique but it is necessary that the installer be properly instructed in accordance with good existing practices.

All joints and fittings must be properly leak tested as per EPA guidelines after "on the job" tubing has been made up. The line set and the evaporator coil must be evacuated to 29.96" Hg (1000 microns) or lower when all joints and fittings are leak free. The service valves on the condenser may then be opened to release the refrigerant to the system. Verify proper system performance. See condensing unit manual for additional performance data.

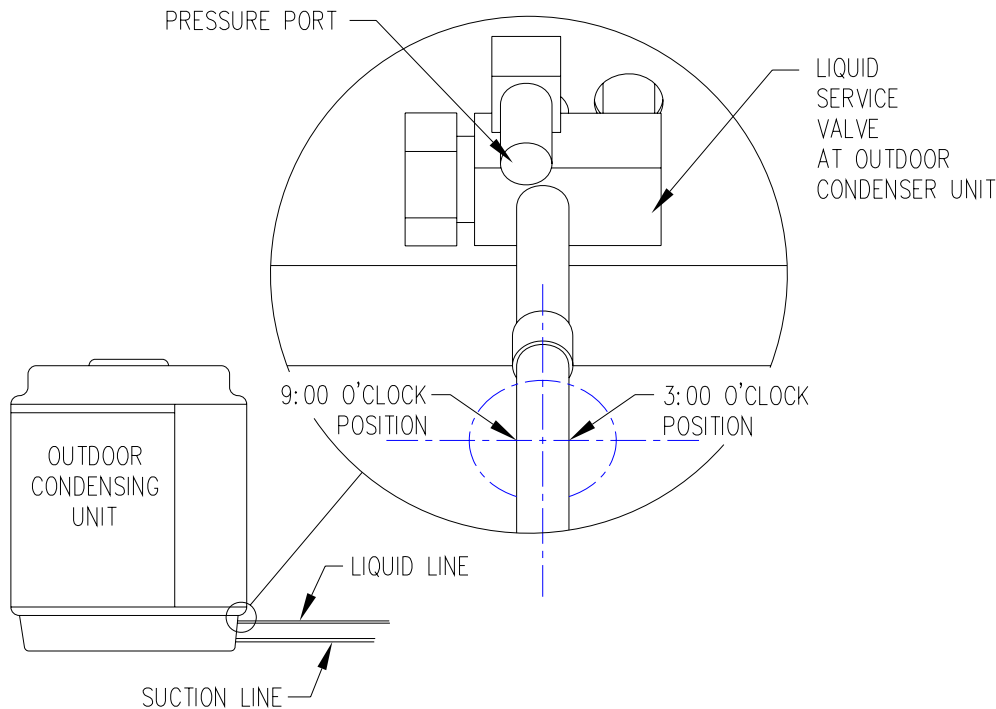
All installations and services must be performed by qualified personnel.

### **HOW TO MEASURE LIQUID SUB-COOLING**

(NOTE: A good electronic thermometer and accurate liquid pressure gauge with a check valve in the Schraeder fitting are necessary).

**⚠CAUTION:** Failure to use a liquid side hose fitting with a built in check valve may result in personal injury and significant refrigerant loss.

Sub-cooling is measured by taking a temperature and pressure reading. See Figure I. The pressure reading is gauged at the pressure port located on the liquid service valve. The temperature reading is taken at the liquid line at the 3:00 o'clock or 9:00 o'clock position with the liquid line as the center of the clock.



**Figure I.**

Make sure the tube where the temperature is measured is not in direct sunlight.

Read the temperature at the liquid line.

Read the liquid pressure.

Then convert pressure into temperature.

Next, subtract the measured tube temperature from the converted suction temperature.

The end result is the liquid sub-cooling.

### **EXAMPLE:**

Measured Temp = 95°F

Measured Pressure = 211 PSI which equates to a 105°F saturation temperature.

(Listed temperature for measured pressure according to R-22 temperature scale on manifold gauge or R-22 section of pressure temperature chart)

The difference equals the degrees superheat = 10°F



All installations and services must be performed by qualified personnel.

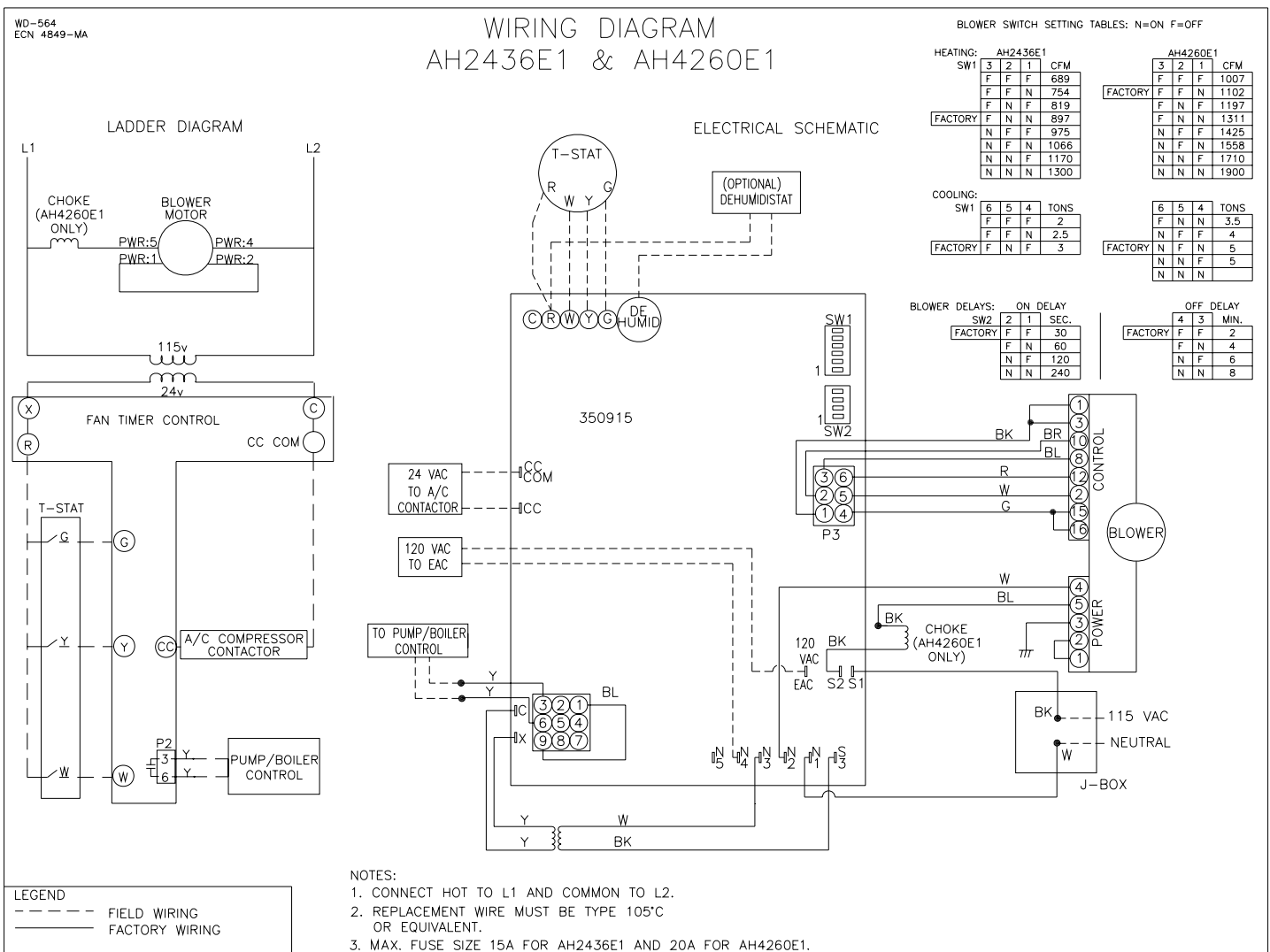
A liquid sub-cooling of about 10°F leaving the condenser is good over a wide range of operating conditions for a system with a TXV in the evaporator like the AH2436E1 & AH4260E1.

**MEASURING TEMPERATURE DROP ACROSS THE “A” COIL:**

The temperature drop across the coil should be around 18°F to 23°F difference between inlet and outlet air. This should be measured as close to the air handler as possible, to eliminate duct losses.

**ELECTRICAL**

All wiring must conform to the provisions of local codes or in the absence of local codes with the provisions of the National Electrical Code, ANSI/NFPA No. 70-Latest Edition and this instruction manual. Equivalent type wire must be used if any of the original wire supplied with the unit needs to be replaced. A 10 amp time delayed fuse or circuit breaker is recommended.



**NOTE:** Condensing unit is not included in above amp rating.

**All installations and services must be performed by qualified personnel.**

The following points must be checked by the installer and/or electrician before the air conditioning system is started:

1. Check every electrical connection of "PUSH-ON" or "SCREW-ON" terminals to ensure it is on tightly on its proper post.
2. Review wiring diagram for proper routing.

### **UA ADAPTER CABINET**

The UA adapter cabinet is designed to be used in conjunction with the AH AIR HANDLER to allow a free standing (vertical discharge) installation. The UA cabinet is shipped completely assembled and ready for installation.

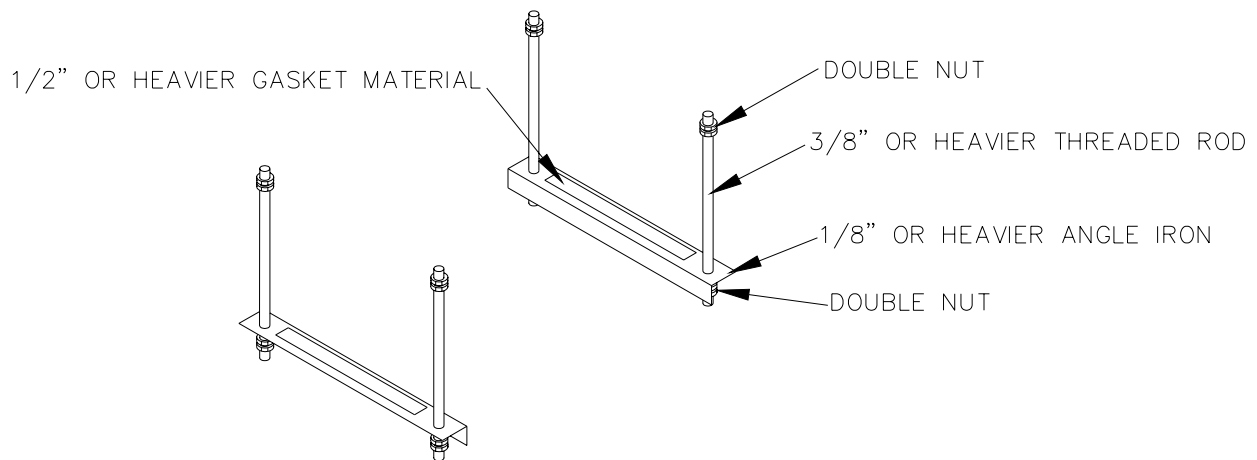
The return air opening can face either left or right by exchanging the front filter door and rear filter block-off assemblies.

The AH AIR HANDLER is then placed on the UA adapter cabinet, inlet side down.

The UA cabinet is equipped with a permanent washable air filter.

### **AH AIR HANDLER RECOMMENDED SUSPENSION PROCEDURE**

The detail below is the proper and safest way to suspend the AH. These components should be easily found at your local hardware store.



### **ECM TROUBLE SHOOTING DIAGNOSTIC FEATURES**

**All installations and services must be performed by qualified personnel.**

The control board is equipped with 4 green Input Status LEDs and 1 red Board Status LED. These are intended to provide a quick view into furnace performance without requiring a voltmeter.

The green Input Status LEDs are driven by the “Y”, “W”, “G”, and “DEHUM” inputs and are located directly below those inputs. They will light to indicate the presence of these signals.

The red Board Status LED has two functions:

It will light when the board recognizes a valid input signal and will stay lit until all valid signals are removed. This is intended to show that the board is functioning and able to respond to input signals.

It will flash rapidly while 120VAC is missing from the LIMIT switch. This is intended to give a quick visual indication of the High LIMIT switch.

## **B. GENERAL GUIDELINES TO TROUBLESHOOTING GE ECM – DRIVEN SYSTEMS**

**⚠CAUTION: Disconnect power from unit before removing or replacing connectors, or servicing motor. Wait at least 5 minutes after disconnecting power before opening motor.**

<b>SYMPTOM</b>	<b>CAUSE/PROCEDURE</b>
<b>Motor rocks slightly when starting</b>	<ul style="list-style-type: none"> <li>• This is normal start-up for ECM</li> </ul>
<b>Motor won't start</b> <ul style="list-style-type: none"> <li>• No movement</li> </ul>	<ul style="list-style-type: none"> <li>• Check power at motor</li> <li>• Check low voltage (24 VAC R to C) at motor</li> <li>• Check low voltage connections (G,PWM,W,R,C,) at motor</li> <li>• Check for unseated pins in connectors on motor harness</li> <li>• Test with a temporary jumper between R – G</li> <li>• Check motor for tight shaft</li> <li>• Perform motor/control replacement check</li> <li>• <b>Run Moisture Check</b></li> </ul>
<ul style="list-style-type: none"> <li>• Motor rocks, but won't start</li> </ul>	<ul style="list-style-type: none"> <li>• Check for loose or compliant motor mount</li> <li>• Make sure blower wheel is tight on shaft</li> <li>• Perform motor/control replacement check</li> </ul>
<b>Motor oscillates up &amp; down while being tested off of blower</b>	<ul style="list-style-type: none"> <li>• It is normal for motor to oscillate with no load on shaft.</li> </ul>
<b>Motor starts, but runs erratically</b> <ul style="list-style-type: none"> <li>• Varies up and down or intermittent</li> </ul>	<ul style="list-style-type: none"> <li>• Check line voltage for variation or “sag”</li> <li>• Check low voltage connections (G,PWM,W,R,C,) at motor, unseated pins in motor harness connectors</li> <li>• Check “Bk” for erratic CFM command (in variable speed applications)</li> <li>• Check-out system controls – T' stat?</li> <li>• Perform Moisture Check</li> </ul>
<ul style="list-style-type: none"> <li>• “Hunts” or “puffs” at high CFM (speed)</li> </ul>	<ul style="list-style-type: none"> <li>• Does removing panel or filter reduce “puffing”? <ul style="list-style-type: none"> <li>➢ Reduce restriction</li> <li>➢ Reduce max airflow</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Stays at low CFM despite system call for cool or heat CFM</li> </ul>	<ul style="list-style-type: none"> <li>• Check low voltage (T' stat) wires and connections</li> <li>• Verify fan is not in delay mode – wait until delay complete</li> <li>• “R” missing/not connected at motor</li> <li>• Perform motor/control replacement check</li> </ul>
<ul style="list-style-type: none"> <li>• Stays at high CFM</li> </ul>	<ul style="list-style-type: none"> <li>• “R” missing/not connected at motor</li> <li>• Is fan in delay mode? – wait until delay time</li> </ul>

**All installations and services must be performed by qualified personnel.**

	<ul style="list-style-type: none"> <li>complete</li> <li>Perform motor/control replacement check</li> </ul>
<ul style="list-style-type: none"> <li>Blower won't shut off</li> </ul>	<ul style="list-style-type: none"> <li>Current leakage from controls into G,Y or W?</li> <li>Check for Triac switched t'stat or solid state relay</li> </ul>

<b>Excessive noise</b>	<ul style="list-style-type: none"> <li>Determine if it's air noise, cabinet, duct or motor noise – interview customer, if necessary</li> </ul>
<ul style="list-style-type: none"> <li>Noisy blower or cabinet</li> </ul>	<ul style="list-style-type: none"> <li>Check for loose blower housing, panels, etc.</li> <li>High static creating high blower speed? <ul style="list-style-type: none"> <li>➤ Check for air whistling thru seams in ducts, cabinets or panels</li> <li>➤ Check for cabinet/duct deformation</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>"Hunts" or "puffs" at high CFM (speed)</li> </ul>	<ul style="list-style-type: none"> <li>Does removing panel or filter reduce "puffing"? <ul style="list-style-type: none"> <li>➤ Reduce restriction</li> <li>➤ Reduce max airflow</li> </ul> </li> </ul>
<b>Evidence of Moisture</b>	
<ul style="list-style-type: none"> <li>Motor failure or malfunction has occurred and moisture is present</li> </ul>	<ul style="list-style-type: none"> <li>Replace motor and perform <b>Moisture Check</b></li> </ul>
<ul style="list-style-type: none"> <li>Evidence of moisture present inside air mover</li> </ul>	<ul style="list-style-type: none"> <li>Perform <b>Moisture Check</b></li> </ul>

<b><u>DO</u></b>	<b><u>DON'T</u></b>
<ul style="list-style-type: none"> <li>Check-out motor, controls, wiring and connections thoroughly before replacing motor</li> </ul>	<ul style="list-style-type: none"> <li>Automatically assume the motor is bad.</li> </ul>
<ul style="list-style-type: none"> <li>Orient connectors down so water can't get in <ul style="list-style-type: none"> <li>➤ Install "drip loops"</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Locate connectors above 7 and 4 o'clock positions</li> </ul>
<ul style="list-style-type: none"> <li>Use authorized motor and control model #'s for replacement</li> </ul>	<ul style="list-style-type: none"> <li>Replace one motor or control model # with another (unless an authorized replacement)</li> </ul>
<ul style="list-style-type: none"> <li>Keep static pressure to a minimum: <ul style="list-style-type: none"> <li>➤ Recommend high efficiency, low static filters</li> <li>➤ Recommend keeping filters clean</li> <li>➤ Design ductwork for min static, max comfort</li> <li>➤ Look for and recommend ductwork improvement, where necessary, in replacement</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Use high pressure drop filters – some have ½" H<sub>2</sub>O drop!</li> <li>Use restricted returns</li> </ul>
<ul style="list-style-type: none"> <li>Size the equipment wisely</li> </ul>	<ul style="list-style-type: none"> <li>Oversize system then compensate with low airflow</li> </ul>
<ul style="list-style-type: none"> <li>Check orientation before inserting motor connectors</li> </ul>	<ul style="list-style-type: none"> <li>Plug in power connector backwards</li> <li>Force plugs</li> </ul>

**Moisture Check**

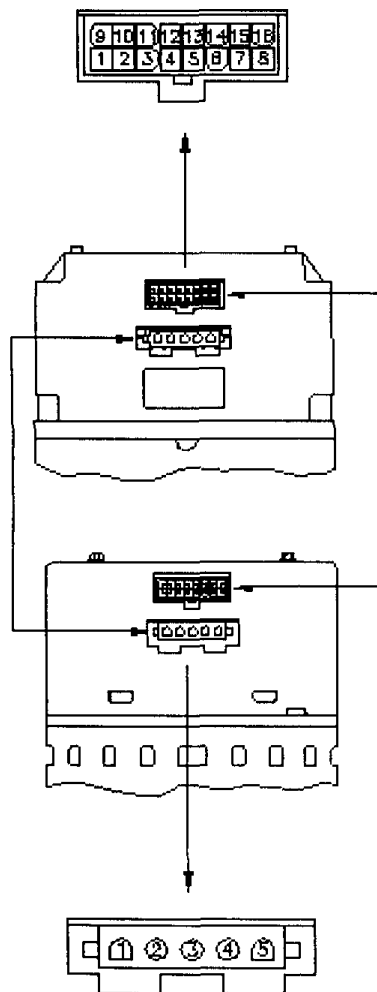
- Connectors are orientated "down" (or as recommended by equipment manufacturer)
- Arrange harnesses with "drip loop" under motor
- Is condensate drain plugged?
- Check for low airflow (too much latent capacity)
- Check for undercharged condition
- Check and plug leaks in return ducts, cabinet

**Comfort Check**

- Check proper airflow settings

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- Low static pressure for lowest noise
- Set low continuous-fan CFM
- T'stat in bad location?



CONTROL CONNECTOR ***	
PWB HEADER AMP 770974-1	
PIN	DESCRIPTION
1	C1
2	W/W1
3	C2
4	DELAY
5	COOL
6	Y1
7	ADJUST
8	OUT-
9	D
10	BK/PWM
11	HEAT
12	R
13	EM/W2
14	Y/Y2
15	G
16	OUT+

\*\*\* SUGGESTED MATING CONNECTOR  
HOUSING - AMP 770583-1  
CONTACT - AMP 770904-1

POWER CONNECTOR *	
PWB HEADER AMP 1-350949-0	
PIN	DESCRIPTION
1	JUMPER PIN 1 TO PIN 2 FOR 120VAC LINE INPUT <u>ONLY</u> **
2	
3	CHASSIS GROUND
4	AC LINE
5	AC LINE

\* SUGGESTED MATING CONNECTOR  
HOUSING - AMP 1-480763-1  
CONTACT - AMP 350537-1

**\*\* WARNING - APPLYING 240VAC LINE INPUT WITH PIN 1 TO PIN 2 JUMPER IN PLACE WILL PERMANENTLY DAMAGE UNIT.**

**Figure K: ECM PIN CONNECTORS**

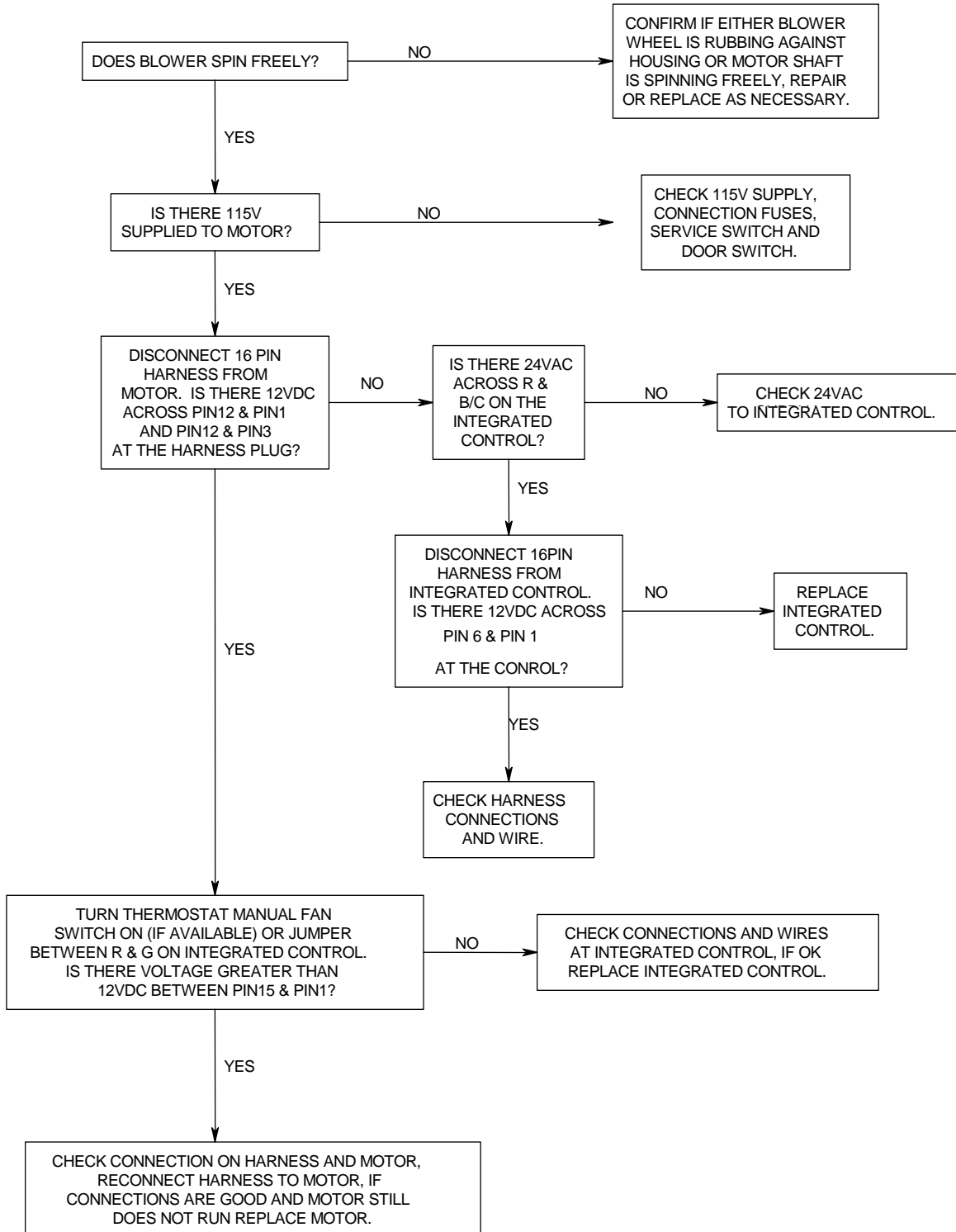
Troubleshooting table above and Figure K adapted from GE Industrial Systems publication GED-7161C, "Troubleshooting GE ECM - Driven Systems".

All installations and services must be performed by qualified personnel.

## TROUBLESHOOTING CHARTS

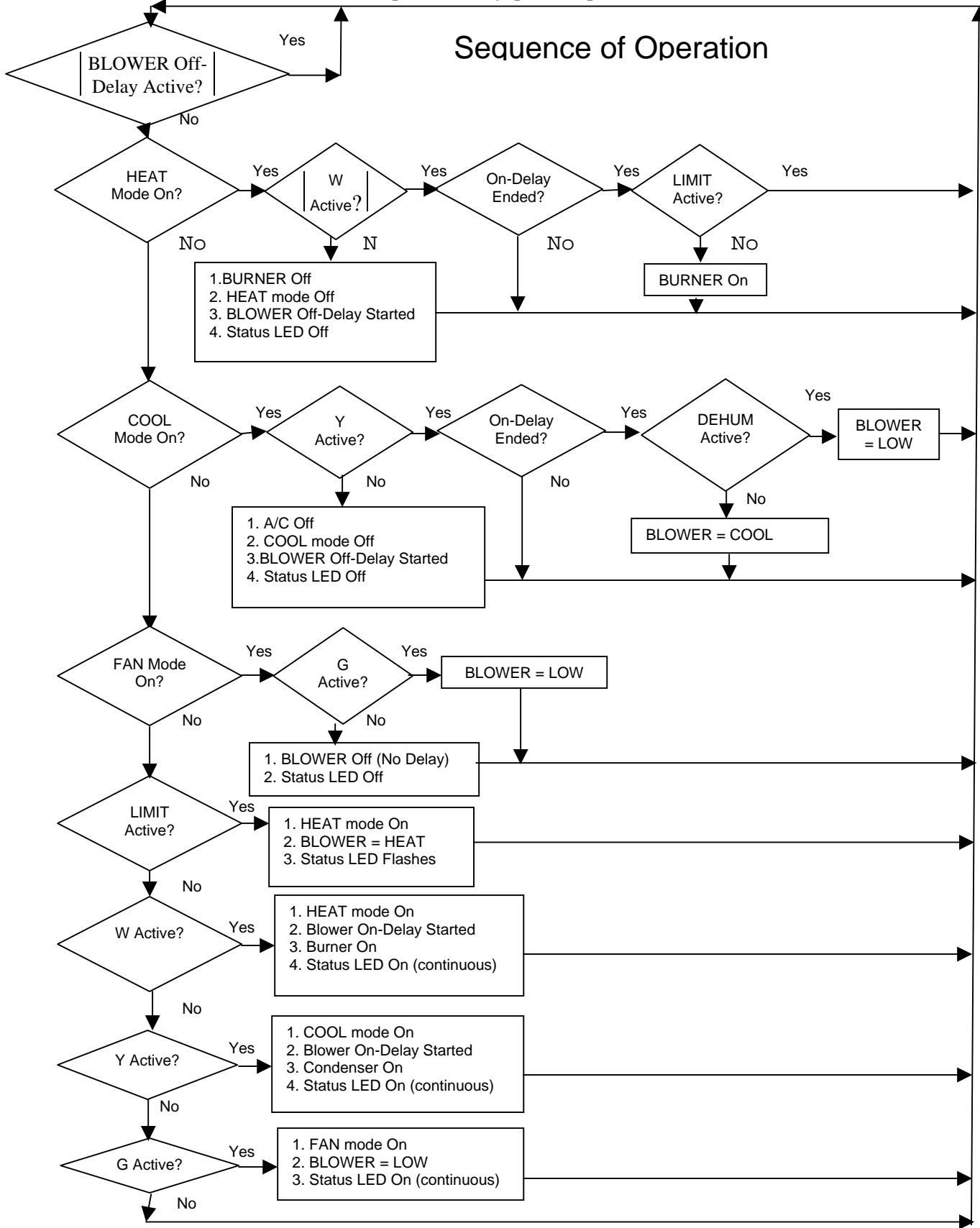
THIS GUIDE SHOULD BE USED IN THE CASE OF A STOPPED OR MANFUNCTIONED ECM BLOWER MOTOR. THE FOLLOWING SHOULD HELP ESTABLISH THE TYPE OF MALFUNCTION OR DEVIATION FROM THE NORMAL BLOWER OPERATION.

TO USE THIS DIAGRAM, YOU JUST NEED TO FOLLOW THE INSTRUCTIONS IN THE BOXES.



All installations and services must be performed by qualified personnel.

## Sequence of Operation



**All installations and services must be performed by qualified personnel.**

### **Sequence of Operation Glossary**

Inputs: LIMIT - 120vac power from the High Limit Switch used to power the burner.

W- Switched 24vac indicating a Heat call from the thermostat.

Y - Switched 24vac indicating a Cool call from the thermostat.

G - Switched 24vac indicating a call for blower operation from the thermostat.

DEHUM - Switched 24vac indicating a call for Dehumidification from a de-humidistat.

#### 2 Stage Control

Inputs: LIMIT - 120vac power from the High Limit Switch used to power the burner.

W1- Switched 24vac indicating a Heat call from the thermostat. (Low fire)

W2- Switched 24vac indicating a Heat call from the thermostat. (High fire)

Y - Switched 24vac indicating a Cool call from the thermostat.

G - Switched 24vac indicating a call for blower operation from the thermostat.

DEHUM - Switched 24vac indicating a call for Dehumidification from a de-humidistat.

NOTE: 2-Stage T-stat

W1 – Low Fire

W2 – High Fire

Connect 2-Stage T-stat to both W1 and W2.

Single Stage T-stat

W2

Connect single stage T-stat to W2 only.

BLOWER Speeds:

HEAT - The Heating Blower speed selected by positions 1, 2 & 3 of SW1 (CFM tables on page 4)

COOL - The Cooling Blower speed selected by positions 4, 5 & 6 of SW1 (CFM tables on page 4)

LOW - The LOW Blower speed selected by positions 4, 5 & 6 of SW1 (CFM tables on page 4)

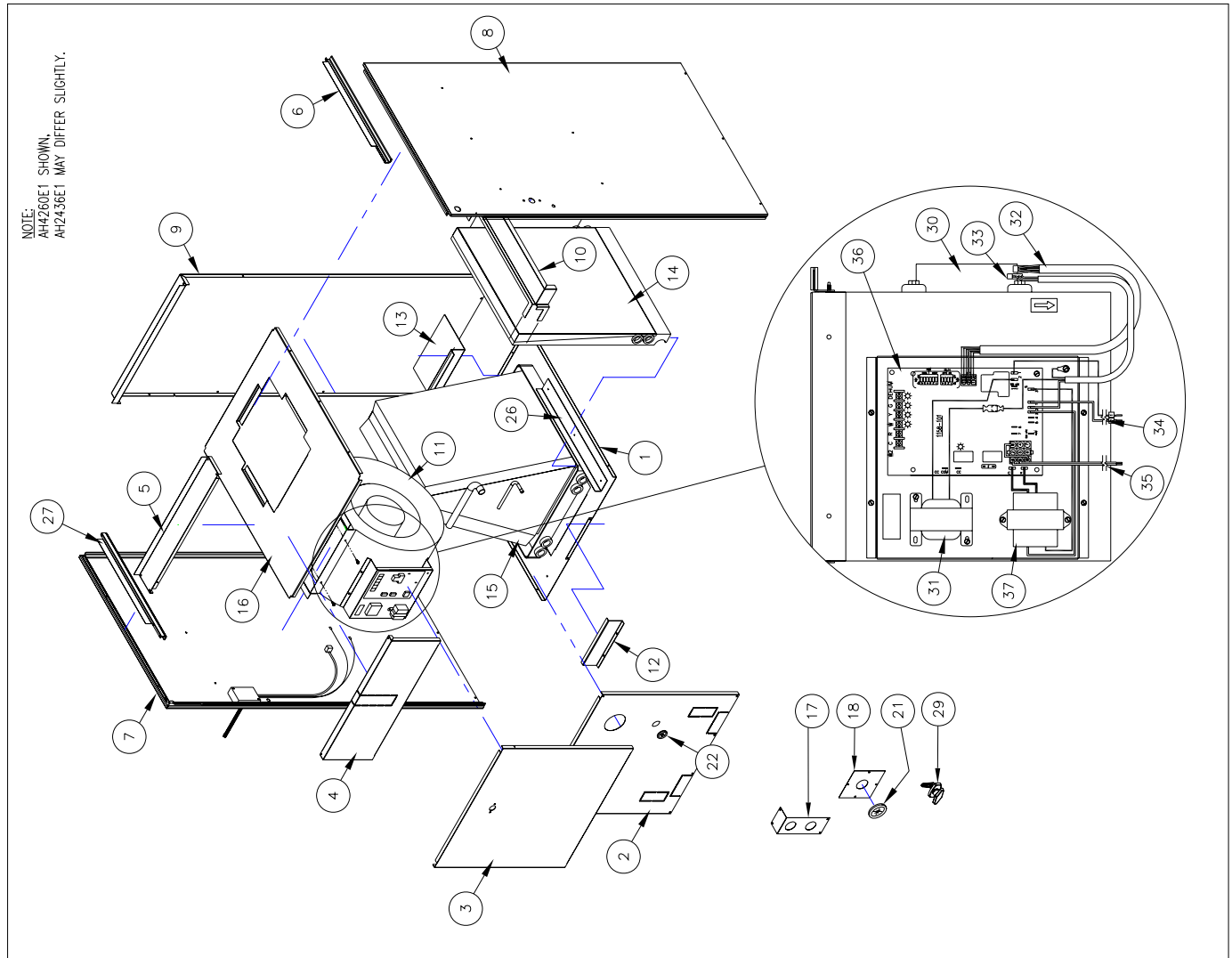
### **ECM – PSC Replacement**

In an emergency situation, a defective ECM motor can be replaced with a PSC motor to provide temporary circulating air flow for heating or cooling. This is done by replacing the ECM motor in the motor mounting bracket with a PSC motor of similar Horsepower. Wire the common lead (typically white) of the replacement PSC motor to the neutral (common) terminal on the fan control board (N - 1 through 7). Connect the high-speed replacement PSC motor lead (typically black) to the EAC terminal on the fan control board. The EAC contact is energized with 115VAC any time the control board is calling for fan operation whether in heating or cooling mode. This replacement should be only used in emergency situations and only until a replacement ECM motor can be obtained and reinstalled.



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## REPLACEMENT PARTS



ITEM	PARTS DESCRIPTION	AH2436E1		AH4260E1	
		PART NO.	QTY	PART NO.	QTY
1	BOTTOM	18511	1	18512	1
2	DOOR, BOTTOM	18504-1	1	18505-1	1
3	DOOR, MIDDLE	18523-1	1	18524-1	1
4	DOOR, TOP	18521-1	1	18522-1	1
5	PANEL, FRONT TOP	18527-1	1	18528-1	1
6	COIL CHANNEL, RIGHT	18529-1	1	18530-1	1
7	SIDE CASING, LEFT	18517-1	1	18515-1	1
8	SIDE CASING, RIGHT	18518-1	1	18516-1	1
9	CASING, BACK	18519-1	1	18520-1	1
10	COIL SUPPORT	18501	1	18502	1
11	BLOWER SUB-ASSEMBLY	S00S4451	1	S00S4452	1
12	PAN CUP	18510	1	18508	1
13	RETAINER	18550	1	18509	1
14	DRAIN PAN, HORIZONTAL	360226	1	360228	1
15	EVAPORATOR, A-COIL	12U2430AG15	1	12U3648AG17	1
16	BLOWER PAN	18525	1	18526	1
17	TRIM PLATE	18531-1	1	18532-1	1
18	TRIM PLATE	18507-1	1	18507-1	1
19					
20					
21	GROMMET, 2.00" O.D.	360507	1	360507	1
22	GROMMET, 1.12" O.D.	360506	1	360506	1
23					
24					
25					
26	ANGLE, PAN SUPPORT	18587	1	18587	1
27	COIL CHANNEL, LEFT	18588-1	1	18589-1	1
29	DOOR HANDLE PACKAGE	AOPS7578	1	AOPS7578	1
30	PROGRAMMED MOTOR REPLACEMENT KIT	AOPS7451	1	AOPS7452	1
31	INDUCTOR (POWER CHOKE)	—	—	350856	1
32	WIRE HARNESS(MOTOR CONTROL)	350334	1	350334	1
33	WIRE HARNESS(MOTOR POWER)	350333	1	350333	1
34	WIRE HARNESS(POWER)	350929	1	350929	1
35	WIRE HARNESS(CIRCULATION PUMP)	350930	1	350930	1
36	CONTROL, FAN TIMER	350915	1	350915	1
37	TRANSFORMER 24v	350464	1	350464	1
38					

# Owner's Copy

## Thermo Products, LLC. Air Handler "PEACE OF MIND" Warranty (Limited)

### Five Year Parts and Transportation      Ten Year Warranty on Hydronic Heating Coil

Thermo Products, LLC., an Indiana corporation, hereby warrants the Thermo Pride Air Handler manufactured by it to be free from defects in material and workmanship. The warranty is extended to the original owner(s) whose name(s) appear on this certificate, on the Warranty Registration Card returned to Thermo Products, LLC. and also to any subsequent owner(s).

**1ST-5TH YEAR:** During the first 60 months after installation, all parts of the air handler are warranted with the exception of maintenance items which require periodic replacement (i.e. air filter). The owner may arrange with the original installing dealer or any other qualified dealer of the owner's choice to replace a defective part. Any labor costs involved in the diagnosis, service or the removal and replacement of a defective part are the responsibility of the owner. Warranted replacement parts will be shipped by prepaid freight with instructions to the dealer for disposition of the defective part. Beyond the fifth year, only the Thermo Pride Hydronic Heating Coil is covered. *(NOTE: FOR EVAPORATOR COIL WARRANTY INFORMATION REFER TO WARRANTY PROVIDED WITH THE THERMO PRIDE AIR CONDITIONING CONDENSOR AND EVAPORATOR COIL)*

**BEYOND THE 5TH YEAR:** The Thermo Pride Hydronic Heating Coil carries a Ten Year Warranty. If at any time during the warranty period the Hydronic Heating Coil becomes defective, Thermo Products, LLC. will provide, at its option, either a replacement Hydronic Heating Coil or the necessary repair of the defect on a no charge basis. Any labor costs involved in the diagnosis, removal and replacement of a Hydronic Heating Coil are the responsibility of the owner. The owner may arrange with any qualified HVAC dealer for necessary service. Any transportation costs associated with the replacement of a warranted Hydronic Heating Coil are the responsibility of Thermo Products, LLC. If Thermo Products, LLC. requests the return of the defective Hydronic Heating Coil it must be returned by prepaid transportation at the expense of the owner.

#### THE CONDITIONS OF THIS WARRANTY ARE:

- A. The owner must complete and return the WARRANTY REGISTRATION CARD within ninety (90) days of installation to activate Warranty Coverage. If the completed WARRANTY REGISTRATION CARD is received after the ninety (90) day period, the date of installation will be considered the ninetieth (90th) day after the date the unit was sold to the dealer.
  - B. The unit must be operated within its rated capacity as indicated on the rating label.
  - C. The unit must operate with a duct system designed in accordance with ACCA (Air Conditioning Contractors of America) Manual D (current edition) recommendations.
  - D. The unit must be installed, set up and maintained in accordance with local and state codes and/or THERMO PRODUCTS, LLC. installation and operation instructions.
  - E. The unit must not be installed in any structure where a corrosive atmosphere exists such as may be found in dry cleaning establishments, laundromats, beauty parlors or industrial buildings without first contacting Thermo Products, LLC. concerning proper application. A corrosive atmosphere is one contaminated by chlorine or fluorine, or any of the halogen group.
  - F. Safety controls which are supplied with the unit and having pre-set maximums must not be modified, altered, or by-passed.
  - G. The unit must not be modified and/or operated in any manner other than its design configuration.
  - H. The unit must remain at its original installation address.
  - I. Thermo Products, LLC. shall not be responsible for any failure due to water damage and/or acts of God.
- FAILURE TO COMPLY WITH ANY OF ABOVE CONDITIONS WILL VOID ANY AND ALL WARRANTIES LISTED ABOVE.**

THIS WARRANTY EXPRESSLY SUPERSEDES ALL OTHER WARRANTIES AND OBLIGATIONS OF THERMO PRODUCTS, LLC. NO PERSON HAS AUTHORITY TO ALTER OR MODIFY THE TERMS OF THIS WARRANTY IN ANY MANNER. THERMO PRODUCTS, LLC. ASSUMES NO LIABILITY FOR CONSEQUENT DAMAGE OF ANY KIND, AND THE PURCHASER BY ACCEPTANCE OF THIS EQUIPMENT ASSUMES ALL LIABILITY FOR THE CONSEQUENCE OF ITS USE OR MISUSE BY THE PURCHASER, HIS EMPLOYEE, OR OTHERS.

Dealers Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Date of Installation \_\_\_\_\_

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Owner(s) \_\_\_\_\_

Installation Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

## Thermo Products, LLC.

P. O. Box 217  
North Judson, Indiana 46366  
PH-574-896-2133