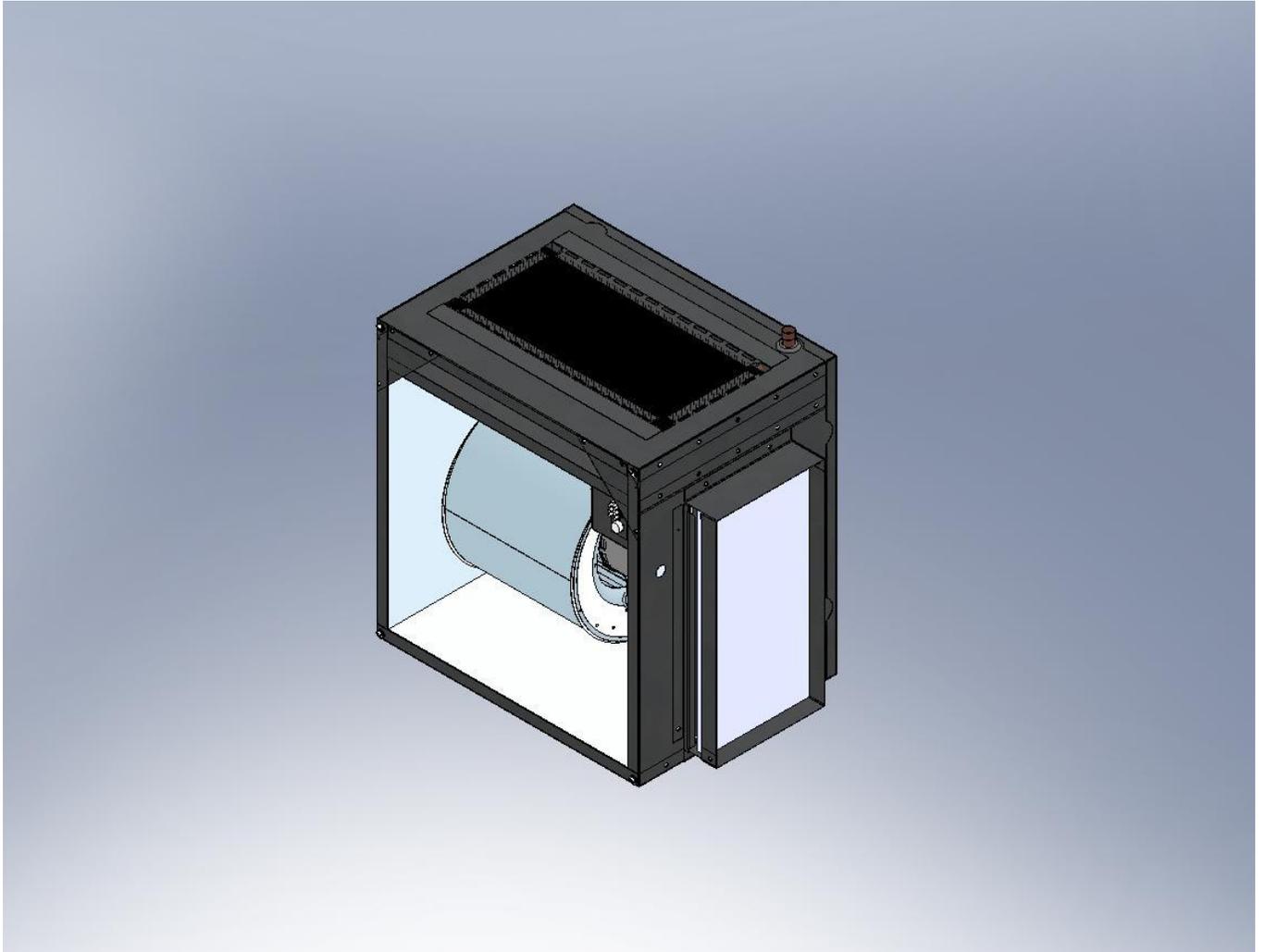


ECAH SERIES ECM AIR HANDLER



ECAH40

OPERATING MANUAL

nu-air
Sustainability Through Innovation

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1 GETTING STARTED

The unit is shipped complete with the following:

1. The air-handler HRV module
2. Circulating pump
3. Check valve
4. Filters
5. HRV drain kit

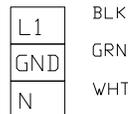
Additional items required which are field installed include: plumbing fittings and valves such as an air purge valve, anti scald valve, shut off valve, gate valves, pipe insulation and drain valves. Also required are duct fittings, a thermostat, a dehumidistat and other accessories such as grills and wire.

Note: When locating/placing the Air Handler, ensure there is a minimum clearance of 8 inches below to allow for drain pipe connections. This can be accomplished by way of stand (Part # Ener Stand) or blocks.

2 ELECTRICAL CONNECTIONS

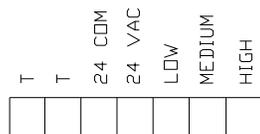
A single point, hard-wired electrical connection requiring 115 VAC service and a **dedicated** 15 amp fused circuit .

Mains Power 120 V Terminal Block

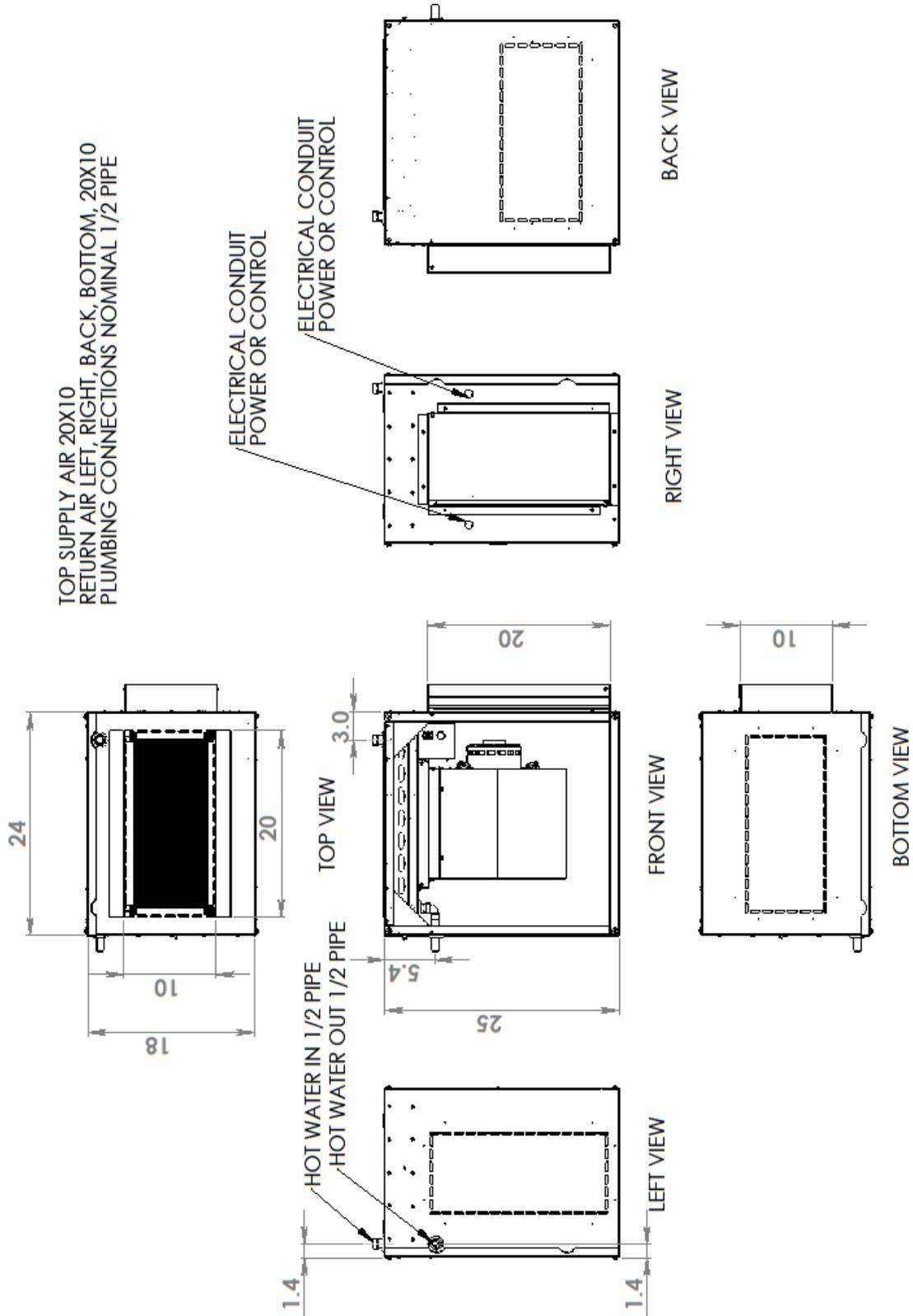


There are 7 available terminals for control connections. Power the thermostat (R) with 24 VAC. Chose low, medium or high for heating (W) and cooling (Y) speeds. Continuous fan (G) if used is typically set to Low. 24 COM can be used for auxiliary devices (humidifier, AC condenser). T and T are dry contacts that close when medium speed is engaged. This can be use to control a boiler or pump relay (24 V only).

Low Voltage Terminal Block



3 DIMENSIONAL DATA



4 PLUMBING

All plumbing between components is typically done with 1/2" copper pipe and appropriate fittings. All interconnecting piping is to be insulated.

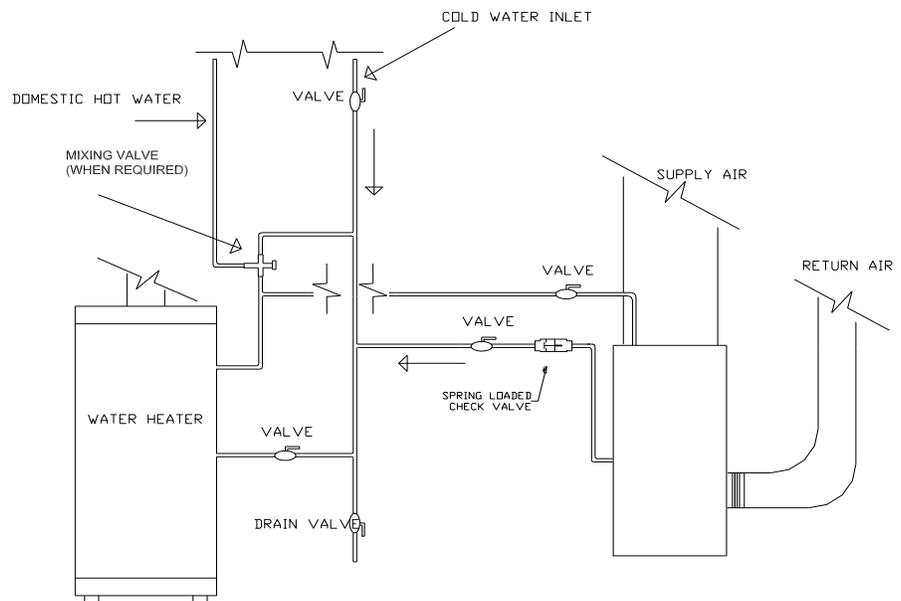
System Types:

- a) An **Open System** uses hot water from the residential hot water heater to supply both domestic hot water and hot water to the Air Handler for space heat. See schematic on next page. Well systems that incorporate a pressure tank are normally open systems.
- b) A system becomes **closed** when a backflow prevention valve or check valve is installed in the cold water pipe upstream of the water heater. The backflow prevention valve does not allow pressure created by the heated water to be relieved into the cold water system. Therefore an expansion tank must be installed. Local codes may require this type of system.

The **spring loaded check valve** must be installed on the return water line close to the Air Handler. Ensure flow arrow points to tank or boiler.

An **air purge valve** should be installed at the high point in the supply line close to the Air Handler.

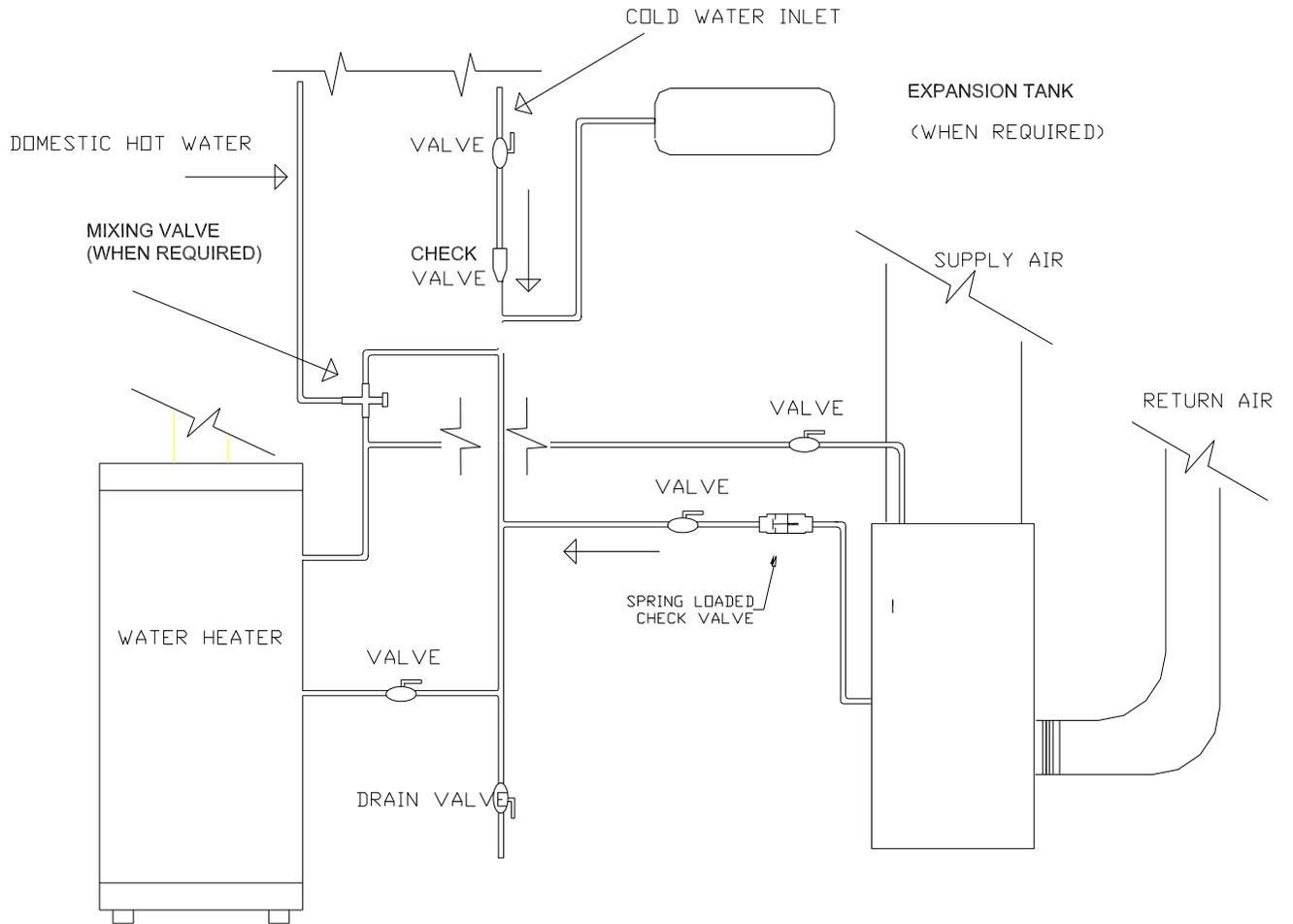
4.1 Open System



NOTES :

1) PLUMBING COMPONENTS AND SYSTEM CONFIGURATION MAY VARY FROM THE DIAGRAM PORTRAYED. REFER TO PROVINCIAL CODES, LOCAL BYLAWS AND INSTALLATION MANUALS SUPPLIED WITH THE WATER HEATER AND ENERBOSS BEFORE STARTING ANY INSTALLATION WORK.

4.2 Closed System



5 DUCTING

Air Handler

The Air Handler distributes heating, air through a 20x10 rectangular plenum in an up-blast configuration. Return air enters the unit through a 20x10 rectangular duct knock out on the sides, back or bottom.

5.1 Traditional Ducting (Low Velocity)

Good engineering practice should be followed when designing a duct system. Nu-Air recommends the use of HRAI's Residential Air System Design Manual.

Duct Type	SUPPLY FPM		RETURN FPM	
	recommended	maximum	recommended	maximum
Main Duct	700	900	600	700
Branch Duct	600	750	600	650

6 COMMISSIONING

6.1 Water Side Commissioning

6.1.1 Filling the water heater and setting system temperature:

1. At this point all valves should be closed and the system dry.
2. Open the cold water supply valve and a hot water tap.
3. Fill the water heater/boiler with water allowing air to escape at the open tap. Shut off the tap when air has stopped escaping.
4. Using the boiler or water heater's control, set the system to operate at your design temperature. See Equipment Selection Chart and preliminary design information forms.
5. Following the manufacturers instructions, start the water heater and allow it to reach the set point.

For cases where high water temperatures are used, an anti-scald valve will be required. Set this to 120 F and verify by measuring the water temperature at the taps.

6.1.2 To fill the heating loop:

1. Connect a garden hose to the drain valve and direct water to a floor drain or similar.
2. Open the drain valve.
3. Open the heating loop's hot water supply shut off valve
4. Allow water to flow until only water (no air) is flowing at the drain.
5. Close the hot water shut off valve.

6. Open the return water shut off valve and allow water to flow until no air is escaping at the drain.
7. Close the drain valve.
8. Open the hot water shut off valve.

6.1.3 Purging the pump and verifying flow in the heating loop:

1. Turn on electrical power to the Air Handler.
2. Set the house thermostat well above room temperature to force a call for heat.
3. Check that the circulating pump and fan are operating.
4. Hot water should be entering the fan coil and cooler water leaving.
5. Warm air should be exiting all supply grills/diffusers.
6. Apply the supplied warning label to the water heater near the aqua stat without covering any existing labels.

6.1.4 Water flow Balancing:

This step should be done when both the room air temperature and water heater temperature are stabilized.

NOTE: Return air temperature needs to be near 70 F (21 C).

1. Initiate a call for heat from the room thermostat.
2. Measure the supply (SAT) and return (RAT) air temperatures.
3. Measure the supply (SWT) and return (RWT) water temperatures
4. Calculate the heat output by the formula:

$$\text{Btu/hr} = (\text{SAT}-\text{RAT}) \times \text{CFM} \times 1.08$$

(See Air Handler spec sheet for CFM at heating speed.)

5. If the design heat loss is not being met at this condition, increase the water heater temperature set point and repeat the previous steps
6. If the water temperature drop in the fan coil is less than 20 F, adjust the throttling valve to reduce water flow. NOTE: ▲ T increases above 20 F (11 C) increases water heater efficiency.
7. Repeat until heat loss is met and water temperature drop is greater than or equal to 20 F.
8. The minimum recommended supply air temperature is 115 F.
9. If the supply air temperature or heat output cannot be met at with a 20 F water temperature drop, allow a lower temperature drop across the coil.
- 10. Important - Verify the anti-scald valve is adjusted properly once final adjustments have been made. [140 F (60 C) or less]**

6.2 COMISSIONING SHEET

Equipment Installed			
Enerboss		Design Heat Loss	
Water Heater			
Make		Design Heat Gain	
Model			
Storage		USGal	
Input		Btu/hr	
System Components Installed			

Heating Loop Shut off Valves		Anti-scald Valve	
Drain Valve		Back flow prevention valve	
Throttling Valve		Expansion Tank	
Air Purge Valve		Off Season Circulation control	Yes

System Start Up Check List			
Fill Water Heater with Water		Start Air Handler	
Heater at design temperature		Check Circulation Pump	
Fill Heating Loop with Water		Check Fan Operation	
Purge Circulation Pump		Label Water Heater	

Design Information			
Total Heat Loss		Air handler Output (110-140% DHL)	
Return Air Temperature	70	Entering Water Temperature	
Cooling Speed Airflow		Delivered Air Temperature	
		Effective Water Heater Output (120% AHO)	F8
		Heating Speed Airflow	
		Return Water Temperature	

Comissioning Measurements			
Entering Water Temperature Measured	F1	Air handler Output at EWT	F2
Required Air temp. rise (F2/(F8x1.08))	F10	Required Supply Air Temp. F9 + F10	F11
Water temp. drop F1 - F12	F13	Actual Supply Air Temp. Measured	F14
		Return Air Temperature Measured	F9
		Return Water Temperature Measured	F12
		Anti-scald Outlet Temp. Measured	F15

Note: The key criteria when comparing commissioning vs design is to meet Btu output, maintain 20F temperatre drop and ensure domestic water temperature at the fixtures is below 140F.

System Check: $BTU/HR = (SAT - RAT) \times CFM \times 1.08$

$$cfm = \frac{BTU/HR}{1.08 \times \Delta T}$$

7 SERVICE AND MAINTENANCE:

Nu-Air recommends annual service and maintenance by a qualified HVAC contractor.

Disconnect the power supply to the Air Handler before attempting any service.

Maintenance should include:

QUARTERLY

1. Filter Replacement

Wipe down all interior surfaces of the cabinet with disinfectant.

ANNUALLY

1. Coil cleaning – Vacuum with a brush attachment. If necessary, wash with a non toxic coil cleaner taking precautions not to wet motors and electrical components.

To access the heating coil, remove the EC motor/blower by disconnecting the two molex connectors and removing the two screws at the front of the blower housing.

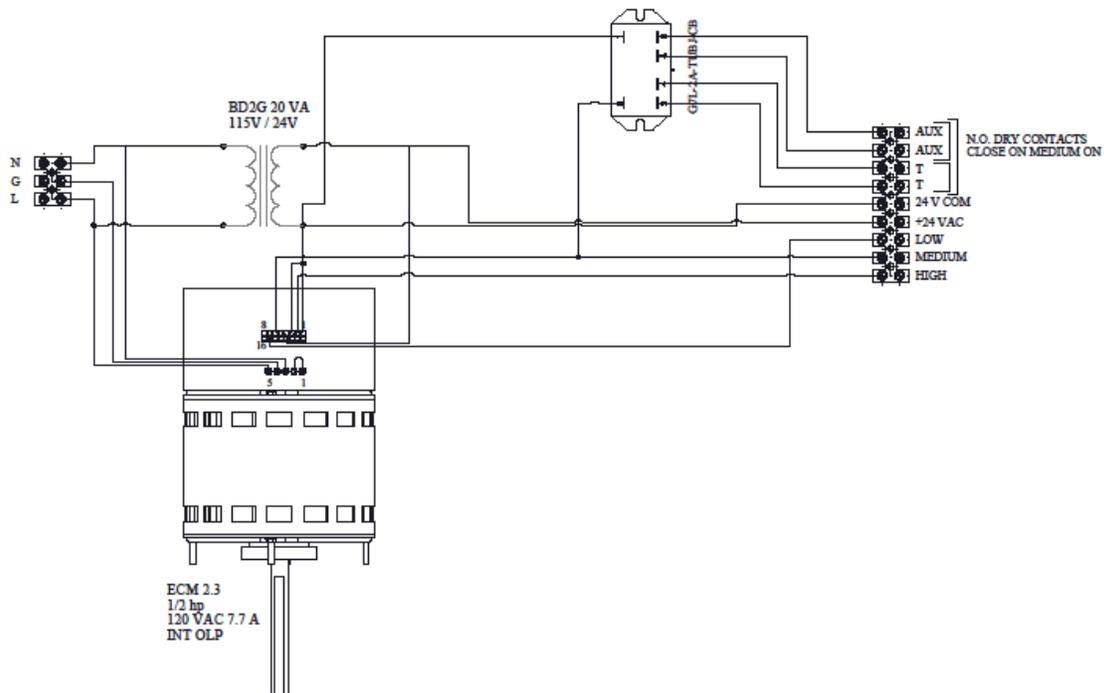
2. Fans – Vacuum or use a small brush to clean the blades.

3. Check the controls for proper operation.

4. Check boiler/ water heater set point against commissioning report.

5. Inspect the duct work for air leaks (at joints and seams) and blockages (crushed ducts and crimps at elbows).

8 WIRING DIAGRAM



9 SPECIFICATIONS

ECM air handler with hydronic coil (heating).

Features:

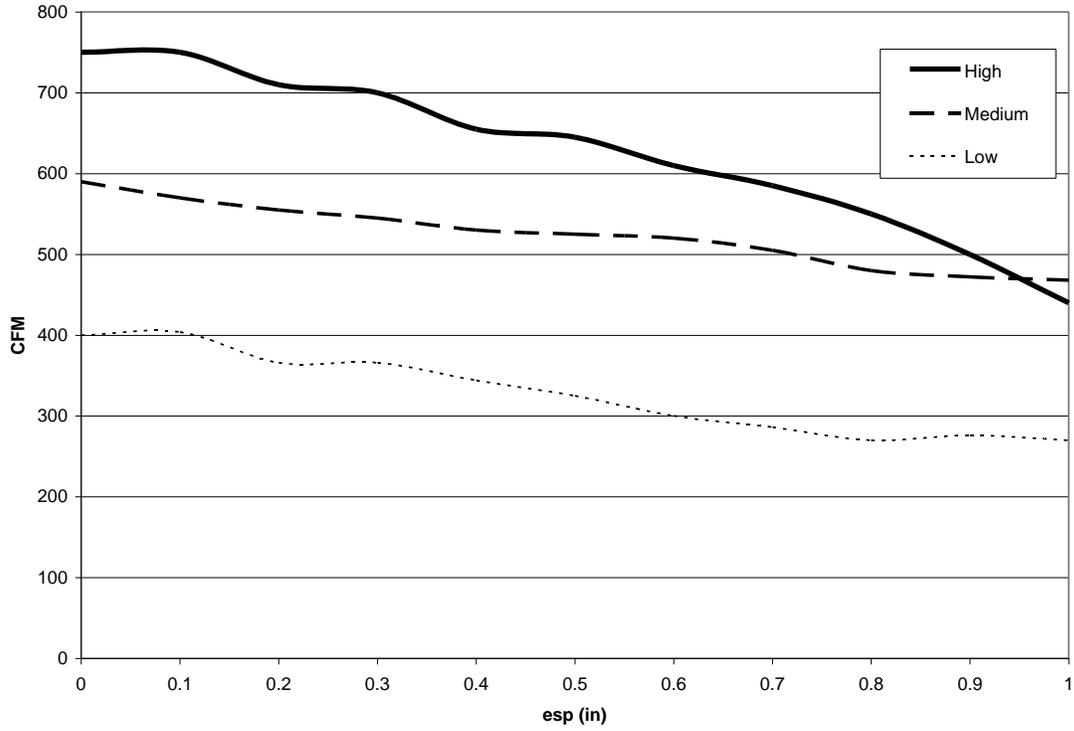
- 3-speed ECM motor. 800, 600 and 400 cfm.
- 3-row hot water coil
- Installer configurable return air locations. Left, right, back, bottom
- Reversible door access
- 24 VAC, 20VA transformer for thermostat and auxiliary components
- Relay contact closure for boiler t-stat, pump, etc.
- 22 Ga galvanized steel construction
- Thermally insulated cabinet

Coil Performance

GPM		2			3			4		
EWT		140	160	180	140	160	180	140	160	180
CFM	400	19,116	24,757	30,448	20,476	26,476	32,516	21,206	27,392	33,611
	600	24,074	31,230	38,466	26,559	34,402	42,315	27,946	36,157	44,428
	800	27,635	35,873	44,216	31,252	40,526	49,900	33,340	43,186	53,121
FPD (ft)		0.8	0.7	0.7	1.6	1.5	1.5	2.7	2.6	2.5

Blower/Motor Performance

ECAH40



Electrical Data

Power	
Volts	120
Hz	60
FLA	7.7

Power consumption at installed ducting of 0.2"		
Low	88	Watts
Medium	190	Watts
High	325	Watts

Controls	24 VAC, 20 VA				
Terminals	Low	Med	High	24 V	Com
Relay contact Normally open, closes on Medium speed call *					
* Factory shipped on medium. Installer may chose other speeds with simple field wiring					

10 WARRANTY

YOUR Air Handler

TRANSFERABLE WARRANTY

Should your *ECAH Series Air Handler* cease to function within one (1) year of the date of original purchase due to defective material or workmanship of the product, **NU-AIR** Ventilation Systems Inc. will supply a new or rebuilt part FOB factory to replace the defective part. Delivery, installation, and labor costs are not covered.

Warranty Limitations

The above warranty does not cover damage to the unit while in your possession (other than damages caused by defective parts or material) due to the following: 1) improper installation or unreasonable use of unit; 2) failure to provide reasonable and necessary maintenance. If the unit is put to commercial use or application other than consumer use, warranty is for a period of one (1) year. This warranty does not cover water heaters, instantaneous water heaters, boilers or condenser units supplied or used with the Air Handler. See water heater, boiler or compressor manufacturer's warranty.



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