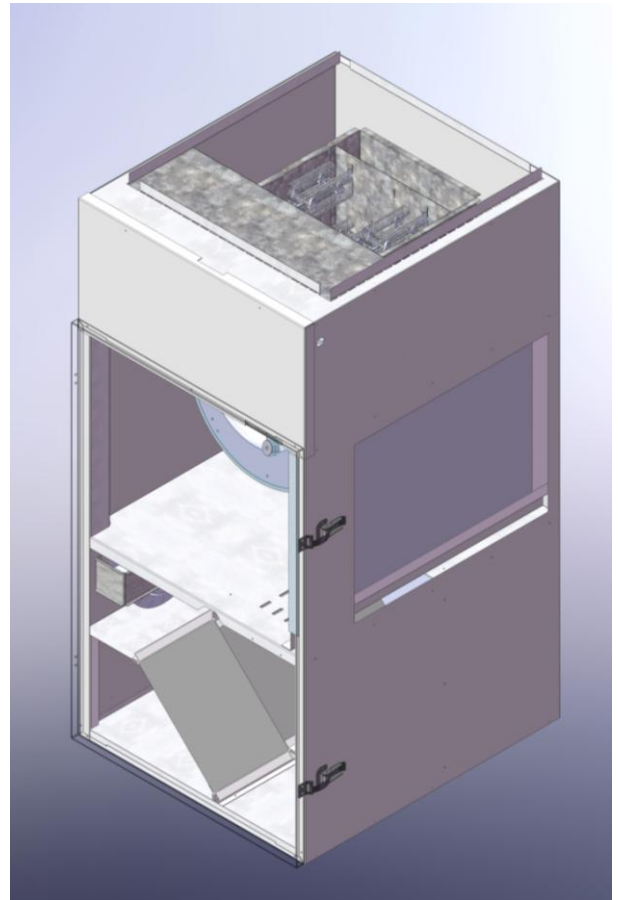


ELECTRIC

ENERBOSS

By: Nu-Air Ventilation Systems Inc.

- Electric furnace &
- Heat Recovery Ventilator
- All in One Unit



OPERATING MANUAL

EE10, EE15, EE20

nu-air
Sustainability Through Innovation

TABLE OF CONTENTS

1	GETTING STARTED	3
2	ELECTRICAL CONNECTIONS.....	3
2.1	THERMOSTAT	3
2.2	VENTILATION CONTROLS.....	3
3	DIMENSIONAL DATA.....	4
3.1	MINIMAL CLEARANCES	4
4	DUCTING	5
4.1	TRADITIONAL DUCTING (LOW VELOCITY)	5
4.2	HRV DUCTING	5
4.2.1	<i>Ducting to the Outside (Weather Hoods).....</i>	<i>5</i>
4.2.2	<i>Locating the Weather Hoods.....</i>	<i>6</i>
5	DRAINS.....	6
6	COMMISSIONING	7
6.1	SUPPLY AIR BALANCING	7
6.2	AUTOMATIC AND MANUAL RESETS	8
6.3	STAGING	8
6.3.1	<i>Heater staging:</i>	<i>8</i>
6.3.2	<i>Blower staging;</i>	<i>8</i>
6.4	HRV BALANCING	9
6.4.1	<i>Balancing mode 1.....</i>	<i>9</i>
6.4.2	<i>Balancing Mode 2</i>	<i>9</i>
7	SERVICE AND MAINTENANCE:.....	10
8	SUMMARY SPECIFICATIONS.....	10
8.1	DIMENSIONAL, BLOWER AND ELECTRICAL DATA	10
8.2	HRV FAN PERFORMANCE	11
9	APPENDIX A – ENERBOSS CONTROLLER & WIRING INFORMATION.....	11
9.1	ELECTRICAL SCHEMATIC	12
9.2	OPERATIONAL STATES.....	13
10	WARRANTY	14

1 GETTING STARTED

The unit is shipped complete with the following:

1. The air-handler HRV module
2. Filters
3. HRV drain kit

Additional items required which are field installed include: duct fittings, a thermostat, a dehumidistat and other accessories such as grills and wire.

Note: When locating/placing the Enerboss, 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

Power

The heating elements of the enerboss are 240 VAC. The air handler/HRV runs on 120 VAC. Therefore a single point, hard-wired electrical connection with 240/120/N VAC is needed.

Control

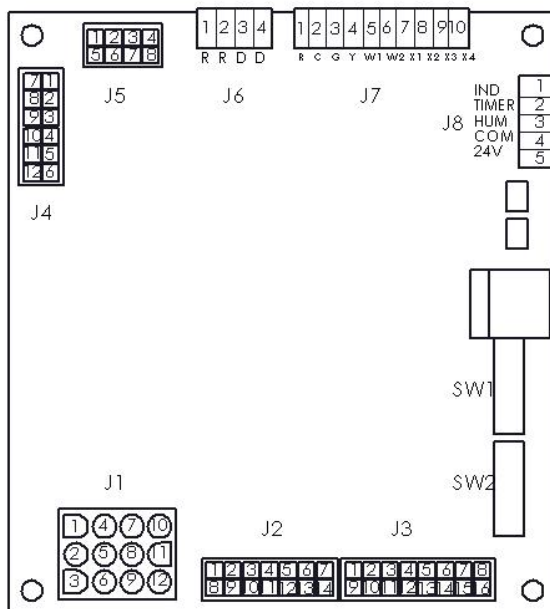
There are control terminals for a thermostat, ventilation timers, a dehumidistat and auxiliary equipment connections. A heat/cool thermostat with fan switch connects to R, G, Y, W and sometimes C of J7. J8 is for high speed ventilation controls. W2 and X1-4 are not used. A two wire dehumidistat connects to Humidity and 24 V. A push button timer, Nu-Air p/n WIN-20 connects to 24 V(power), Timer SW (switch) and Indicator (LED). 24 VAC and Com (J8) or R&C on J7 bring control voltage off the board to facilitate controlling an outdoor condenser unit, humidifier, electronic air cleaner, etc. J6 has an end switch (relay SW) that closes when a call for heat is present.

2.1 Thermostat

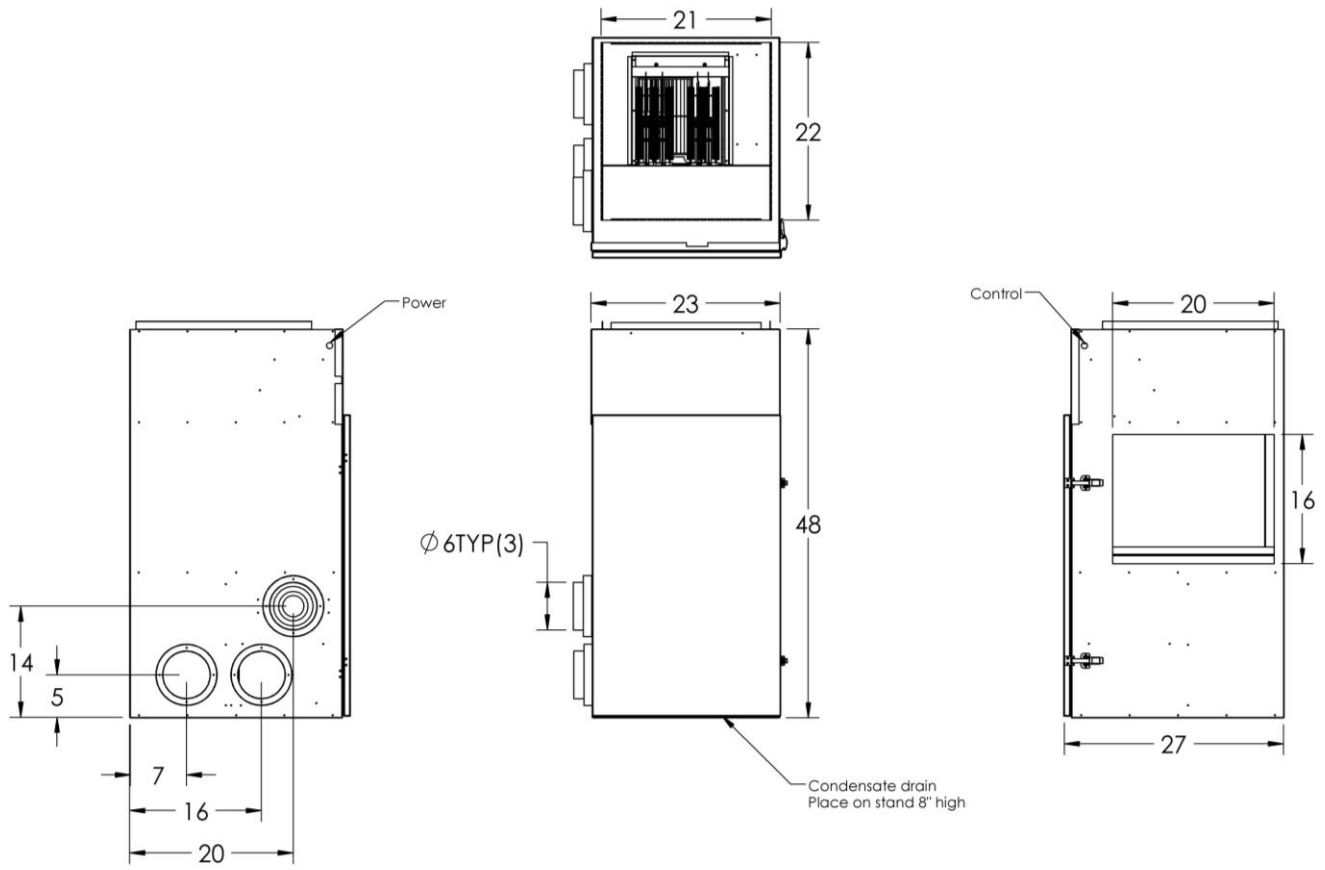
A heat/cool thermostat with fan switch connects to J7 R, G, Y, W1. C is 24V common. W2, X1, X2, X3, X4 are not used.

2.2 Ventilation controls

A two wire dehumidistat and/or mechanical timers connect to J8-5&3 (24V and Humidity) for automatic high speed ventilation. Nu-Air's WIN20 push button connects to J8 1, 2&5.



3 DIMENSIONAL DATA



3.1 Minimal Clearances

- Front -14 inch
- Back -zero
- Left -8 inch
- Right -20 inch
- Bottom -8 inch – use stand or blocks for condensate drain

4 DUCTING

Air Handler

The Enerboss distributes heating, cooling and ventilation air through a 22x22 rectangular plenum in an up-blast configuration. Return air enters the unit through a 16x20 rectangular duct opening located on the side.

4.1 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. **Supply air should be 700 to 800 fpm and return air velocity 600 to 700 fpm.**

NOTE: A damper is required in the main return duct for balancing the HRV during commissioning.

4.2 HRV Ducting

Fresh air from the outside, exhaust air from space and exhaust air to outside all connect to the left hand side of the unit via 6-inch diameter ducting. The Enerboss with integrated HRV allows for wet room collection of exhaust air via an independent duct system. Six-inch diameter main lines branch off, reduce in size and terminate in the kitchen, washroom, laundry, etc. HRAI and others offer guidelines for duct sizing. Nu-Air recommends the use of these guidelines as good engineering practice.

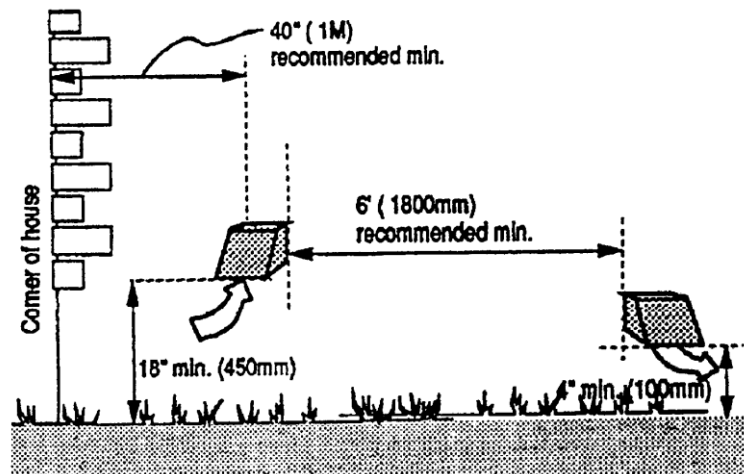
4.2.1 Ducting to the Outside (Weather Hoods)

Between the weather hoods and the HRV you must use fully insulated ducting with an integrated **vapour** barrier. Insulated ducting with an integrated **vapour** barrier must also be used on all runs passing through unheated areas. This will avoid condensation problems and energy losses.

The minimum RSI value of insulation should equal that of the local building codes.

1. Insulated flex duct slides over the galvanized sleeve of the weather hood.
2. Use sheathing tape (red) to join the inner duct to the hood's sleeve.
3. Tape the **vapour** barrier to back of the hood without compressing the insulation. Caulk or foam seal around the collars and hoods to eliminate air and water leaks.
4. Locate the hoods for easy access to the bird screen for cleaning purposes.

Make the insulated duct that connects the weather hoods to the HRV as short as possible to minimize airflow restrictions. Avoid sharp bends and stretch out the inner lining of the flex duct as much as possible to reduce static pressure and maximize airflow.



4.2.2 Locating the Weather Hoods

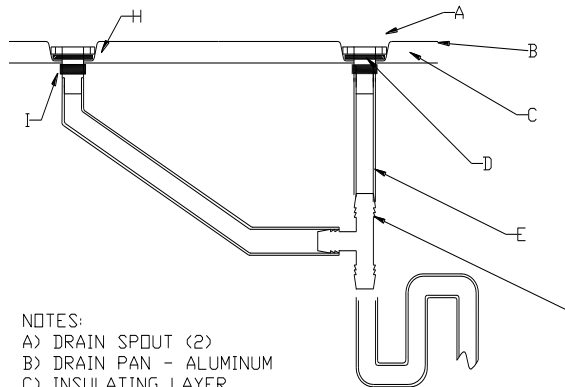
There should be a minimum of 6' (feet) of separation between the fresh air and exhaust hoods. Supply hoods should be a minimum of 18" (inches) above the ground level. Exhaust hoods should be at least 4 "(inches) above the ground level. Holes through the wall should be 1" larger then the collar on the hood. Fresh air hoods must be 3' away from any other appliance exhaust vent or furnace vent.

Fresh air intakes should be located away from possible sources of contamination such as:

- | | |
|------------------------|-------------------------------|
| Gas meters | Garbage containers |
| Oil fill pipes | Vehicle exhaust |
| Dryer or other exhaust | Within attics or crawl spaces |

5 DRAINS

Install drain spouts in the bottom of the HRV section. Tighten with a speed nut and connect 5/8" plastic hose as shown below. Fill the trap with water.



- NOTES:
- A) DRAIN SPOUT (2)
 - B) DRAIN PAN - ALUMINUM
 - C) INSULATING LAYER
 - D) D-RING (2)
 - E) DRAIN HOSE 5/8" ID, (10 feet)
 - F) TEE FITTING, BARBED
 - G) "P" TRAP
 - H) EMBOSS (2)
 - I) SPEED NUT (2)

6 COMMISSIONING

6.1 Supply Air Balancing

The supply air motor is an ECM operating in constant cfm mode. Adding static will not significantly reduce the total air flow as you would expect with a psc motor. On ducted systems the amount of air at each grille can be regulated with dampers.

The Enerboss control board contains two banks of switches labeled SW1 and SW2. The heating and cooling fan speeds are set according to the table below. Do not use a setting outside the recommended range for the heater capacity being installed. Speeds higher than those recommended will be uncomfortably cool and speeds lower than the recommended will be too hot and may trip the limit switches.

			Electric Enerboss				
T-STAT MODE	TAP	ADJUST TAP	HIGH SPEED	1st stage heat and circulation			
2nd stage heat	A	A	525	10 kW Range	15 kW Range	20 kW Range	
		B	578				
		C	473				
	B	A	600				
		B	660				
		C	540				
	C	A	750				
		B	825				
		C	675				
	all off	A	900				
		B	990				
		C	810				
3rd stage heat & COOL	A	A	700	364	10 kW Range	15 kW Range	20 kW Range
		B	770	400			
		C	630	328			
	B	A	800	416			
		B	880	458			
		C	720	374			
	C	A	1000	520			
		B	1100	572			
		C	900	468			
	all off	A	1200	624			
		B	1320	686			
		C	1080	562			

6.2 Automatic and Manual Resets

The heater elements are equipped with an automatically resetting thermostats that break at 160 F. Additionally a manual reset thermostat will cut power from the transformer if the supply air temperature exceeds 170 F. To estimate the supply air temperature use;

$$S.A.T. (F) = kW*3000/cfm + 70$$

Delay Taps are used to configure the ramp up and ramp down profiles of the blower during a call. Pre run is the time in minutes and flow rate in percent that the blower operates at the start of a call. Short run is the time and speed the blower operates at after the end of the pre run. Off delay is the time and speed the blower operates at following the end of a call. Typically Delay A is used for 10 kW, B is used for 15 kW and C is used for 20 kW.

		Minutes	CFM %
Delay A	Pre run	1	75
Delay B	Pre run	2	75
Delay C	Pre run	3	75
All off	Pre run	4	75

“CONFIG” taps A and B have no affect and should be left OFF.

Factory Defaults						
Model	Heat	Cool	config	Delay	Adjust	config
EE10	A	B	-	A	B	-
EE15	C	C	-	B	A	-
EE20	-	-	-	C	A	-

“-“ indicates all switches in that bank OFF.

6.3 Staging

Both the main blower speed and the heater elements are staged.

6.3.1 Heater staging:

First - 10 kW, 0-5 minutes

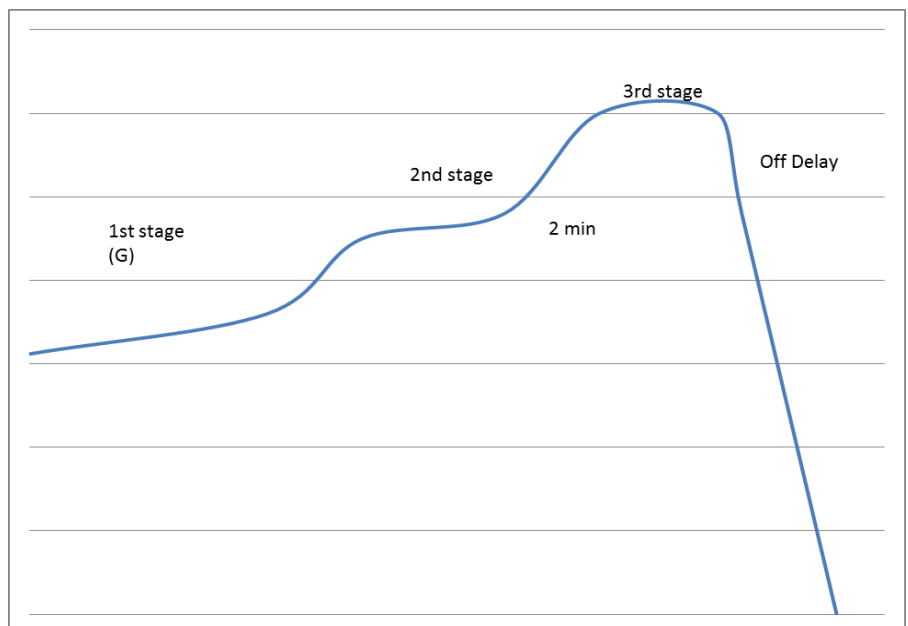
Second 15 kW, 5-10 minutes

Third 20 kW, 10 + minutes

up to the maximum available in the unit.

6.3.2 Blower staging;

- 0-5 min - circulation speed
- 5-delay – 80% of heating speed
- End of delay – 10 min – heating speed
- 10 – 12 min – 80% cooling speed
- 12 min – end of call – cooling speed
- End of call – plus 2 minutes – ramp down to 0 or G depending on thermostat setting.



The length of the delay is set according to the table above.

6.4 HRV Balancing

The HRV *exhaust air* can be adjusted in low and high speed using the control board and the procedure that follows. The amount of outside air is adjusted using dampers. A damper in the return air can be closed (partially) to increase outside air flow or opened to decrease outside air flow. If outside air needs to be further reduced, a balancing damper located in the HRV outside air compartment should be used.

When balancing the HRV:

- Close all windows, doors and fireplace dampers.
- Turn off any exhaust systems such as bathroom fans, range hoods, central vacuums or dryers.

There are two modes of operation in which the HRV needs to be balanced.

- 1) High speed (High ventilation switch J8 humidity and 24 VAC).
- 2) Low speed (thermostat fan ON, no heat or cool calls).

Balancing Sequence:

High Speed Balancing – set supply and exhaust to the specified flows

Low speed balancing – Fan On. Reduce the higher flow to match the lower

6.4.1 *Balancing mode 1*

High Speed Balancing:

With all dampers fully open and the exhaust fan speeds at the factory setting, run the air handler in high ventilation mode.

a. Outside Air High Speed Adjustment

If the outside air flow is too low, gradually close the return air damper until the desired OA flow is measured. If the outside air flow is too high gradually close the outside air balancing damper until the OA flow is obtained.

b. Exhaust Air High Speed Adjustment

Locate the two blue pots on the circuit board. The top pot adjusts the exhaust fan HIGH speed. Turn clockwise to increase and counterclockwise to decrease CFM. Adjust the exhaust flow rate to within 10% of the OA rate. This speed control only affects the HRV fan. The main blower speed is not changed by turning the pots.

6.4.2 *Balancing Mode 2*

Low Speed Balancing

Measure and record the flow rate of the Outside Air

With the air handler in low speed ventilation (fan On, thermostat system switch off) using the same method described above. Note: *No adjustment can be made to this flow without affecting the high speed flow and repeating the high speed balance.*

Measure the exhaust air from building low speed flow. Use the *lower* pot to adjust the exhaust fan LOW speed. Turn clockwise to increase and counterclockwise to decrease CFM. Adjust until the flow matches that of the outside air.

NOTE: For low speed balancing a micro manometer should be used. Magnehelic gauges do not have low enough resolution for these low pressures. Alternatively, velocity may be measured at the outside hoods with a vane anemometer or similar

7 SERVICE AND MAINTENANCE:

Nu-Air recommends annual service and maintenance by a qualified HVAC contractor. The annual check should include:

- Filter Replacement - Return air and HRV
- HRV Core cleaning
- Vacuuming of the fan blades with soft brush
- Wipe down of all interior surfaces of the cabinet with disinfectant
- Check the controls for proper operation
- Check and rebalance the HRV as needed
- Inspection of the duct work
- Check outside hoods for debris and blockage

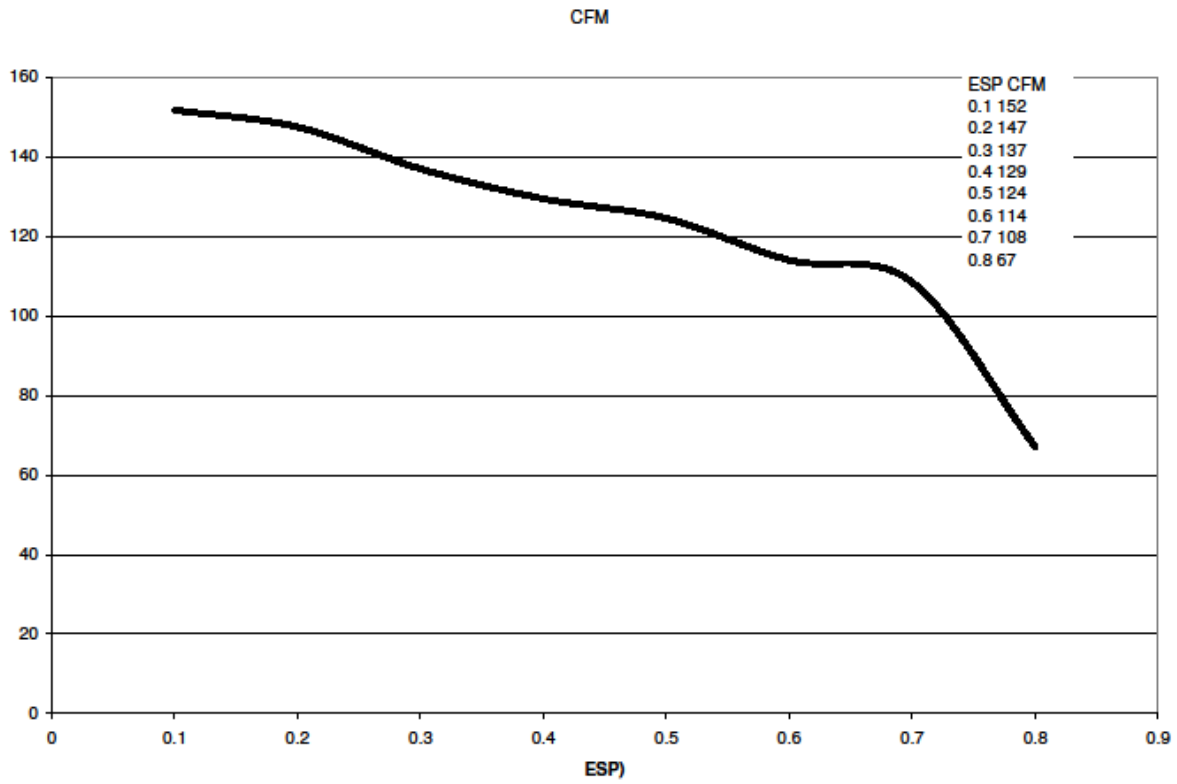
8 Summary Specifications

8.1 Dimensional, blower and electrical data

Model	Dimensional Data			Blower Data (defaults)			Electrical Data			
	Width (in)	Height (in)	Depth (in)	Low	Med	High	Volts	FLA	MCA	Min conductor AWG
EE10	23	48	27	458	578	880	N/120/240	49.6	60	8
EE15				520	750	1000		70.5	80	6
EE20				624	900	1200		91.3	100	4

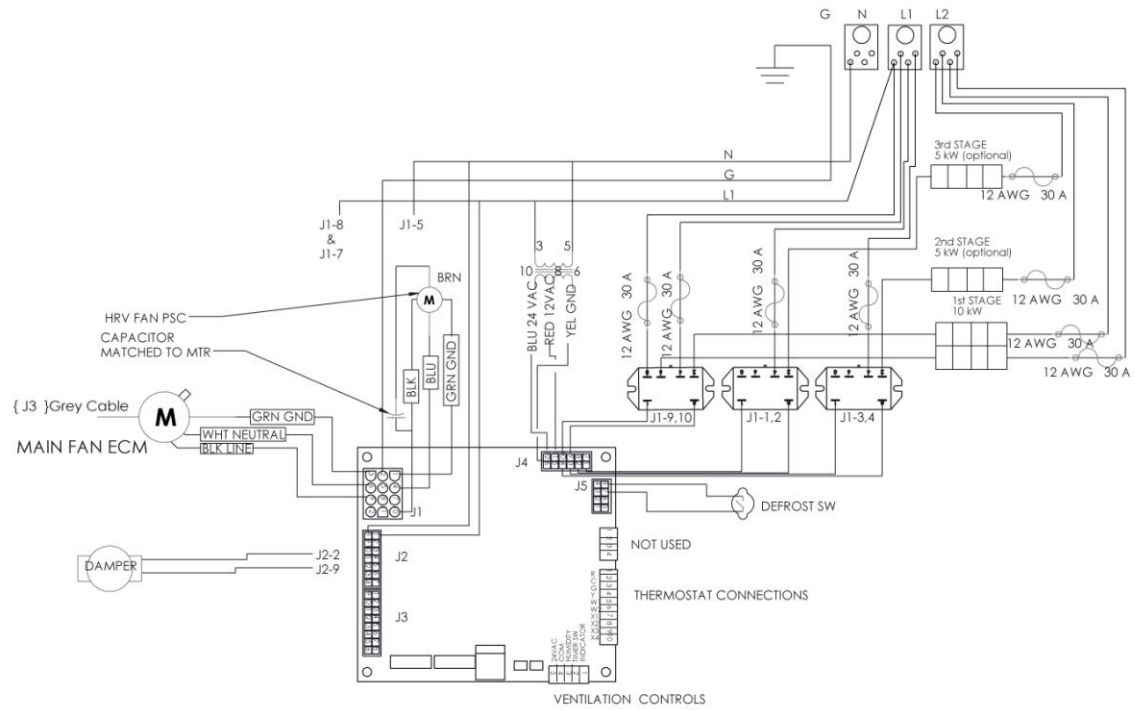
8.2 HRV Fan performance

9



APPENDIX A – ENERBOSS CONTROLLER & WIRING INFORMATION

9.1 Electrical Schematic



Volts	Hz	Amps 10 kW	Amps 15 kW	Amps 20 kW
120/240V/N 3 wire and gnd	60	45	66	87

Wire Table	Mains	Pwr 240 V	Pwr 120 V	Control
10 kW	8 AWG	12 AWG	14 Ga - J1- 2,3,5,6,7,9,11	22 AWG
15 kW	6 AWG	12 AWG	18 Ga - J11,4,7,10	22 AWG
20 kW	4 AWG	12 AWG	18 Ga - J2-2,9	22 AWG

9.2 Operational States

ElectricEnerboss States					
Device	State				
Blower	Off	Low	Med	High	
		G	W+5-10 min	W+10 -	
		W + 0-5 min		H	
		Ds		T	20 min
				Y	
Priority to high speed calls					
HRV	Priority->				
	Low	Off	High		
	G	Ds	H		
	W any		T	20 min	Inputs
	Y				G Thermostat Fan on
Priority to high speed calls					
					Y Thermostat Cooling
					W W1.Thermostat first stage heat
Throttling Damper					
	ON		Off		Ds Dryer Switch
	W+5-10 min!H+!T		W+ 0-5		Df Defrost
	W+10 - +!H+!T		T		T HRV timer
	Y+!H+!T		H		H dehumidistat
	Df	4/36, scan repeat			
Electric Heater (1st Stage)					
	Off	ON			+ = and
		W			! = not
Cooling Valve (2nd Stage)					
	Off	ON			
		W+ >5 min			
Heating Valve (3rd Stage)					
	Off	ON			
		W+> 10 min			

10 WARRANTY

YOUR *Enerboss*

TRANSFERABLE WARRANTY

Should your *Enerboss* cease to function within Five (5) years 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 cost would be your responsibility.

Lifetime Core Warranty

If the polypropylene core in your **NU-AIR** Heat Recovery Ventilator fails due to a defect in material or workmanship **NU-AIR** Ventilation Systems Inc. will supply a new core FOB factory to replace the defective part. Delivery and labor costs are your responsibility.

(There is a two year warranty on our latent core)

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 *Enerboss*. See water heater, boiler or compressor manufacturer's warranty.



P.O. Box 2758 16 Nelson St., Windsor, NS B0N 2T0

Tel: (902) 798-2261 Fax: (902) 798-2557

Email: nuair@nu-airventilation.com Website: www.nu-airventilation.com

