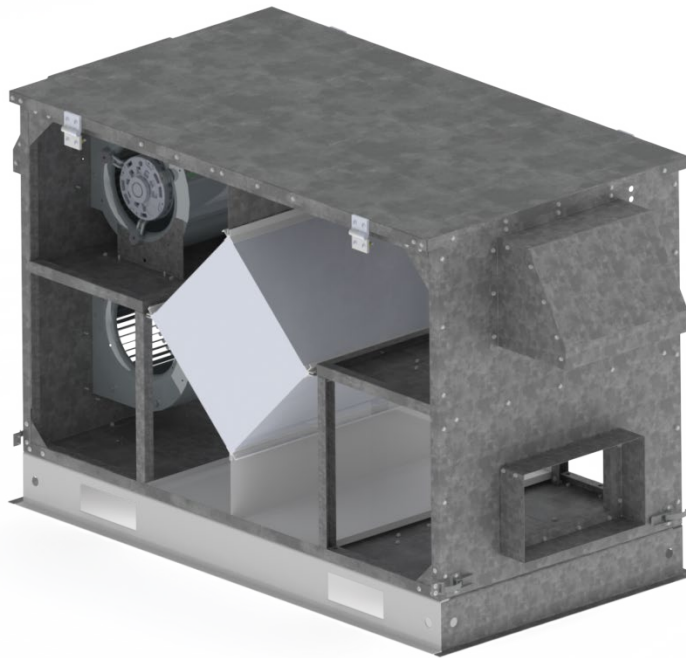




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ECM SERIES



ERV PRODUCT MANUAL ECM1000

* LEAVE THIS DOCUMENT WITH THE BUILDING OWNER

Specifications, dimensions and ratings may change without notice
as a result of ongoing product development and improvements.

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1. ABOUT THE HRV / ERV

The heat recovery ventilator (HRV) provides fresh air to a conditioned space while exhausting an equal amount of stale air. Heat energy is transferred from one air stream to the other within a non-contact cross flow heat exchanger. ERV models transfer latent energy (moisture) from the higher to lower air stream.

- A. Two fan motor sets deliver fresh air into the space and exhaust stale air from the space.
- B. Incoming fresh air is filtered before flowing through the heat exchange core.
- C. Stale air flows through the cross-flow heat exchanger and transfers the heat (HRV) (and moisture (ERV)) to the incoming fresh air.
- D. Warm fresh air is distributed through an independent ductwork system or an existing air distribution system.

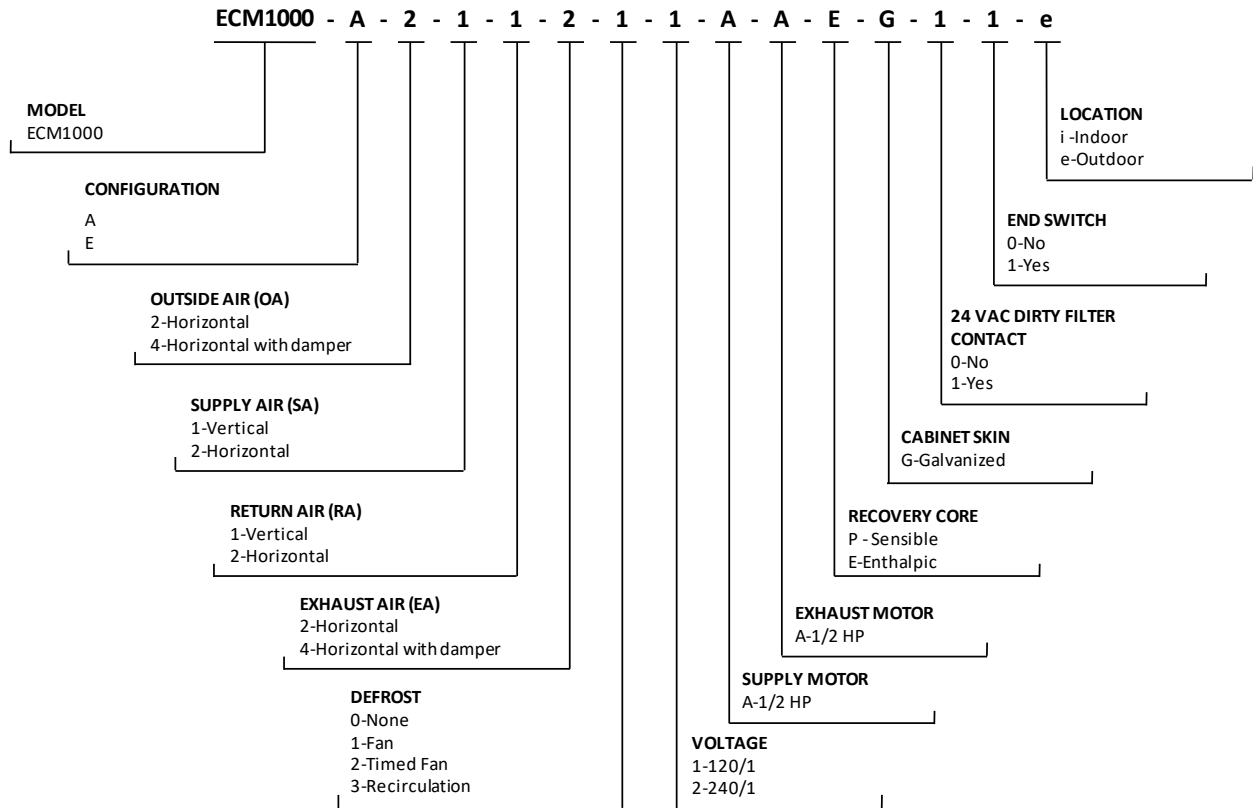
2. PRODUCT SELECTION

Unit Options

S - Standard
O - Optional for no additional charge
\$ - Optional for additional charge

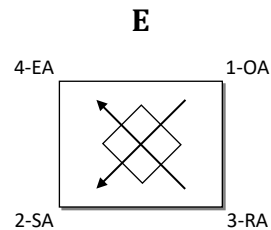
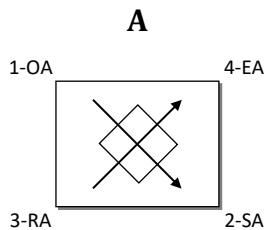
		ECM1000
Capacity (CFM range)		0-1000
Location	Indoor	O
	Outdoor	O
Defrost	None	S
	Exhaust Only (temperature on/off)	\$
	Timed Exhaust(temperature on/timed off)	\$
	Recirculation	\$
Voltage and Speeds	120/1	S
	240/1	O
Core	Sensible	S
	Enthalpy	\$
Cabinet Finish	Galvanized Steel	S
Outside Air Dampers	None	S
	Motorized	\$
Exhaust Air Dampers	None	S
	Gravity	\$
Supply Air Discharge	Horizontal (end)	O
	Vertical (down)	O
Return Air Intake	Horizontal (end)	O
	Vertical (down)	O
Dirty Filter contacts		\$
Auxiliary contacts - e.g. interlock		\$

3. NOMENCLATURE



Port Configuration:

- 1-OA = Outside Air
- 2-SA = Supply Air
- 3-RA = Return Air
- 4-EA = Exhaust Air



4. SAMPLE SPECIFICATION

4.1 GENERAL

System description:

Packaged Energy Recovery Ventilator capable of transferring latent energy designed to be used as a standalone ventilation system or as part of an engineered HVAC system with flat plate, cross flow heat exchanger integral to the unit.

Quality Assurance

Unit shall be constructed to CSA C22.2 standards and carry the mark label of an approved certifying body. Unit shall undergo 100% functionality testing at the factory prior to shipping. Heat exchangers shall be certified and currently listed AHRI and shall meet UL 94 flame spread and smoke generation requirements.

Storage and Handling

Unit shall not be used during construction. Unit shall be stored and handled according to the manufacturer's instructions.

Warranty

Unit shall have a 2 year warranty on all parts except the core which has a 15 year warranty (polypropylene) or 5 year warranty (enthalpy).

4.2 EQUIPMENT

Construction

The cabinet shall be single-wall construction of 22 Ga. galvanized steel. The unit shall be insulated with 1" foil faced insulation. All serviceable components shall be accessible through a hinged front access panel.

The heat exchanger core shall be easily removable for servicing.

Filtration

Unit shall come complete with 1" thick MERV 8 filters (standard).

Unit shall come complete with 1" thick MERV 13 filters (optional).

Heat exchanger

Polypropylene core constructed of flame retardant material and certified and currently listed with AHRI to Standard 1060.

Enthalpy core shall be constructed of a membrane treated to resist mold and odor causing bacteria, have latent energy transfer properties, flame retardancy, and be certified and currently listed with AHRI to Standard 1060.

Defrost

1. None - The unit may be ordered without defrost ability
2. Exhaust-Only Defrost – A temperature sensor shuts down the supply fan when the leaving exhaust air is cold enough to freeze condensate. The supply fan remains off until the leaving exhaust air has reached +8C (47 F). The defrost sensor will allow some field adjustment of the initiation temperature.
3. Timed Fan Defrost – A temperature sensor shuts down the supply fan when the outside air is cold enough to freeze condensate. The supply fan remains off for a set length of time. The supply fan resumes normal operation for a set length of time and the cycle repeats as long as the outside air temperature is below the set point. Both defrost and run cycles shall be field adjustable via the unit's control.
4. Recirculation Defrost – A temperature sensor initiates defrost when outside air is cold enough to freeze condensate. The exhaust fan shuts down, the recirculation damper opens, the gravity and motorized back draft dampers close. The defrost cycle occurs for a field selectable length of time followed by a field selectable time of normal operation. The cycle repeats as long as the outside air temperature warrants.

Dirty Filter Contact

Yes – 2 pressure switches with the unit.

No – pressure switches not supplied.

End switch

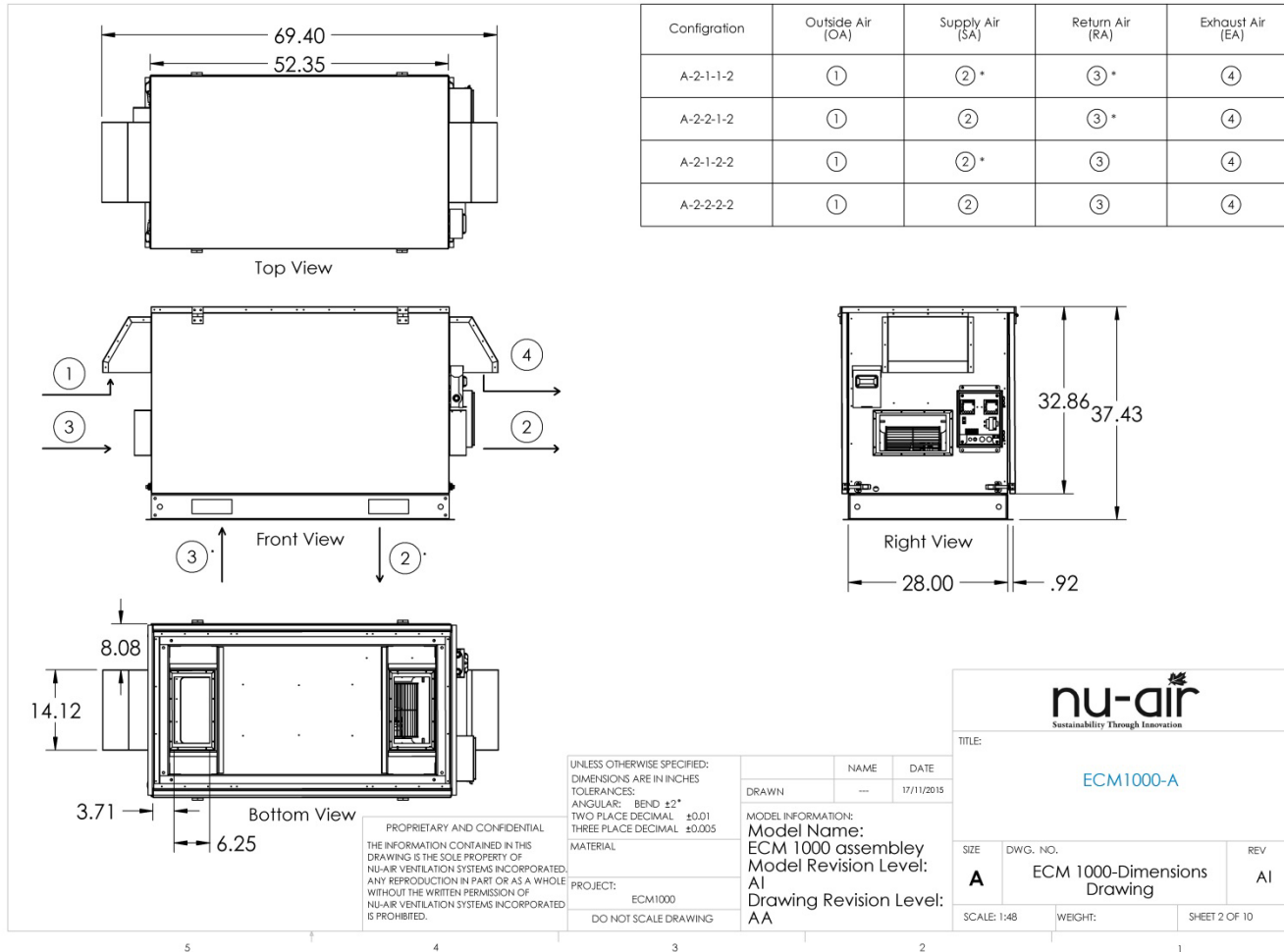
An auxiliary contact from each motor starter shall be provided. This contact is shipped dry but can be made 24VAC by moving a jumper.

Roof Curb

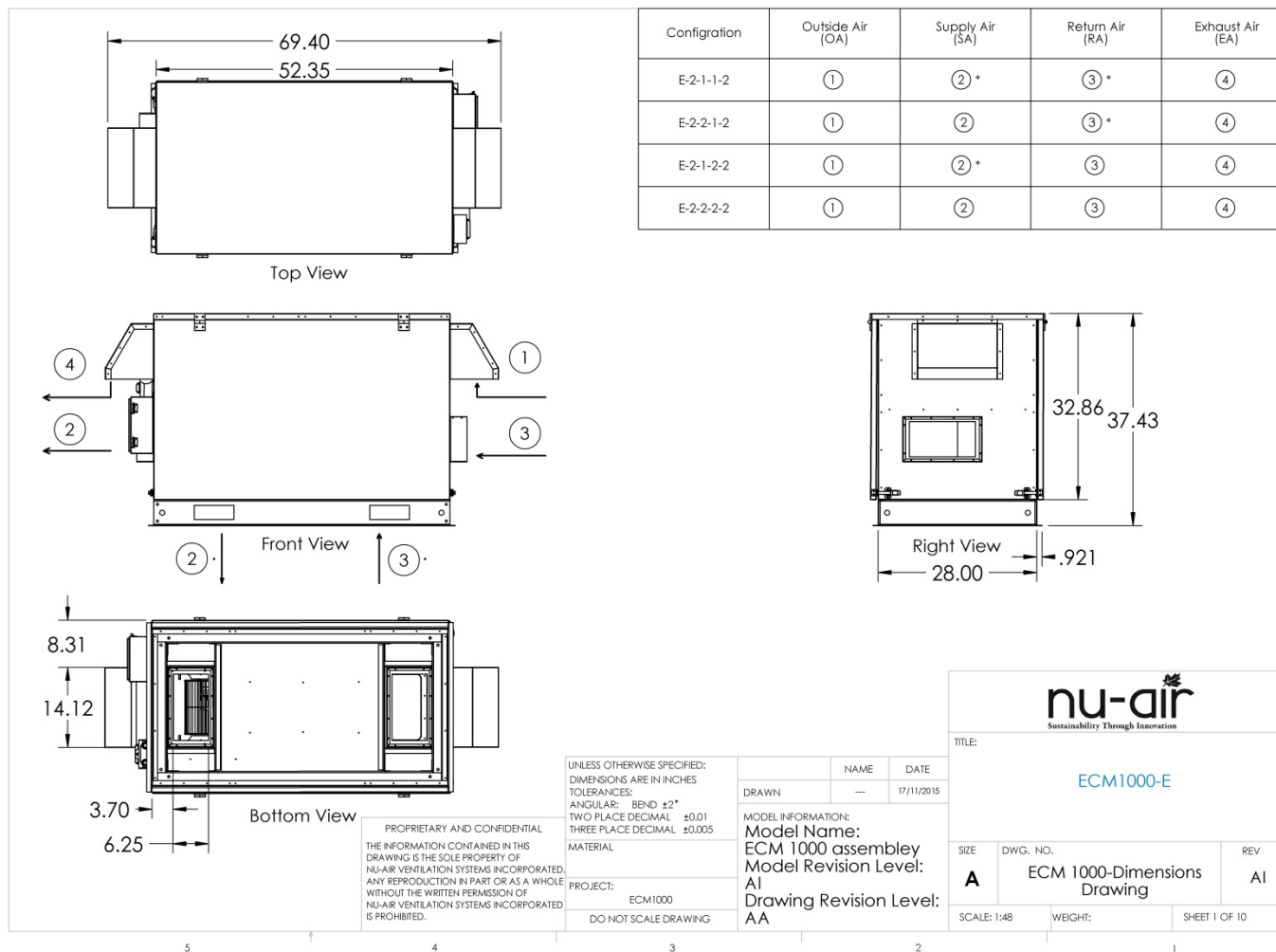
A 14" roof curb shall be supplied by the equipment manufacturer.

5. DIMENSIONAL DATA

5.1 A-Series

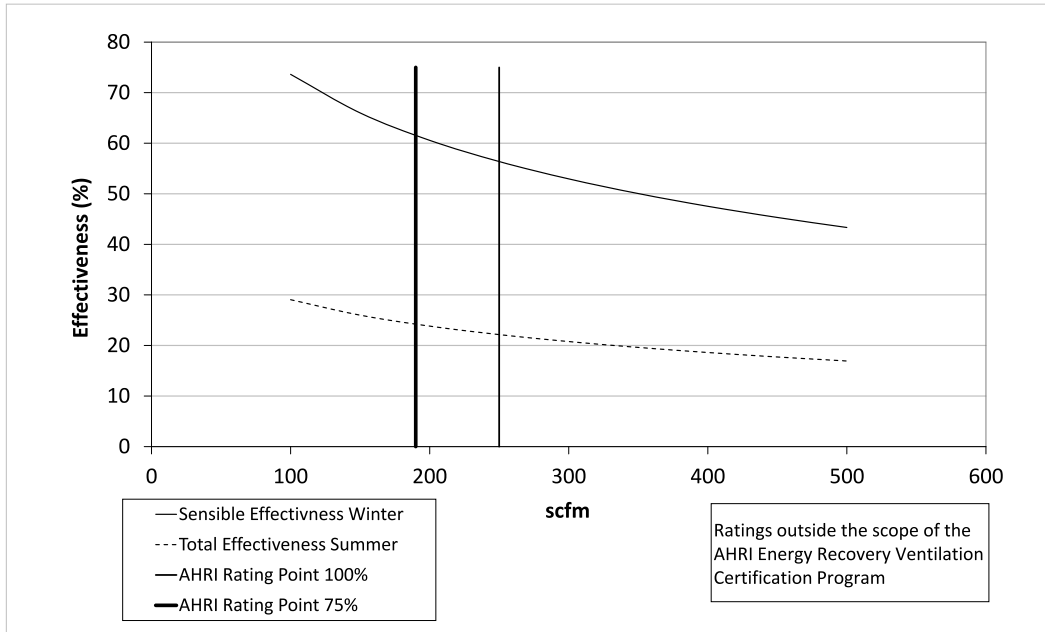


5.2 E-Series



6. PERFORMANCE DATA – EFFECTIVENESS

6.1 Sensible Core



Model no.:	PC 14
Type:	Plate
Nominal Air Flow (scfm):	150
Pressure drop (inches):	0.19

Leakage Ratings	Diff. Pressure	EATR %	OACF
Test 1	-0.5	5	1.00
Test 2	0	0.8	1.00
Test 3	0.5	0.5	1.00

Thermal Effectiveness Ratings at 0" Pressure Differential

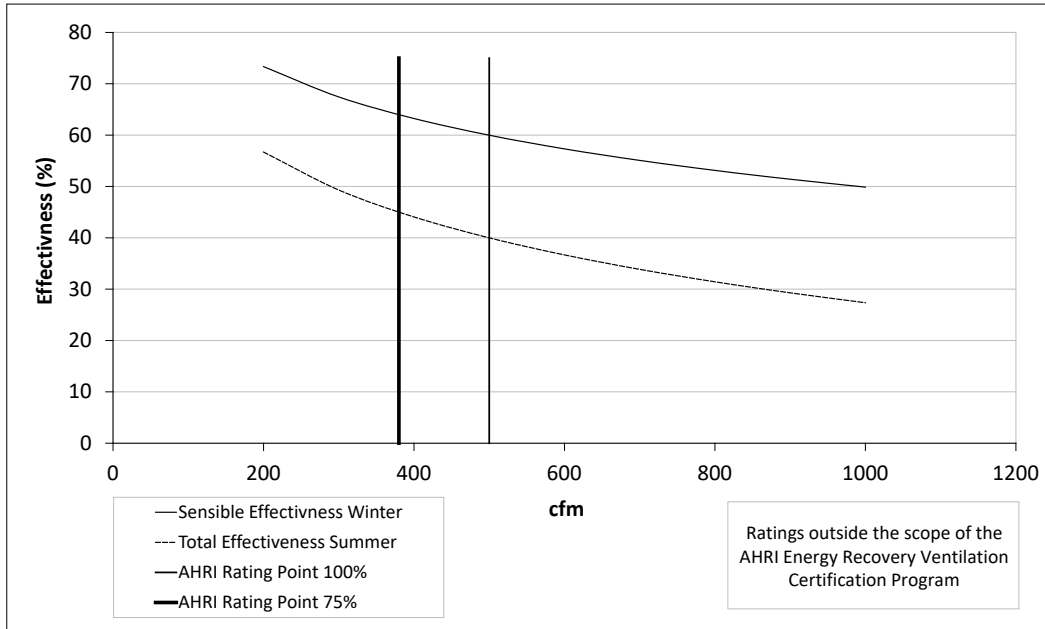
	Sensible	Latent	Total
100% air Flow Heating	66	0	43
75% air Flow Heating	70	0	46
100% air Flow cooling	64	0	30
75% air Flow Cooling	69	0	31



Energy recovery component is certified by AHRI to AHRI Standard 1060. Actual performance in packaged equipment may vary.

	Net Sensible	Net Latent	Net Total
100% air Flow Heating	66	0	43
75% air Flow Heating	70	0	46
100% air Flow cooling	64	0	30
75% air Flow Cooling	69	0	31

6.2 Enthalpy Core



Model no.:	EC-14
Type:	Plate
Nominal Air Flow (scfm):	250
Pressure drop (inches):	0.27

Leakage Ratings	Diff. Pressure	EATR %	OACF
Test 1	-0.5	5	0.92
Test 2	0	0.8	1.07
Test 3	0.5	0.5	1.2

Thermal Effectiveness Ratings at 0" Pressure Differential

	Sensible	Latent	Total
100% air Flow Heating	60	39	53
75% air Flow Heating	64	44	57
100% air Flow cooling	60	27	40
75% air Flow Cooling	65	33	45

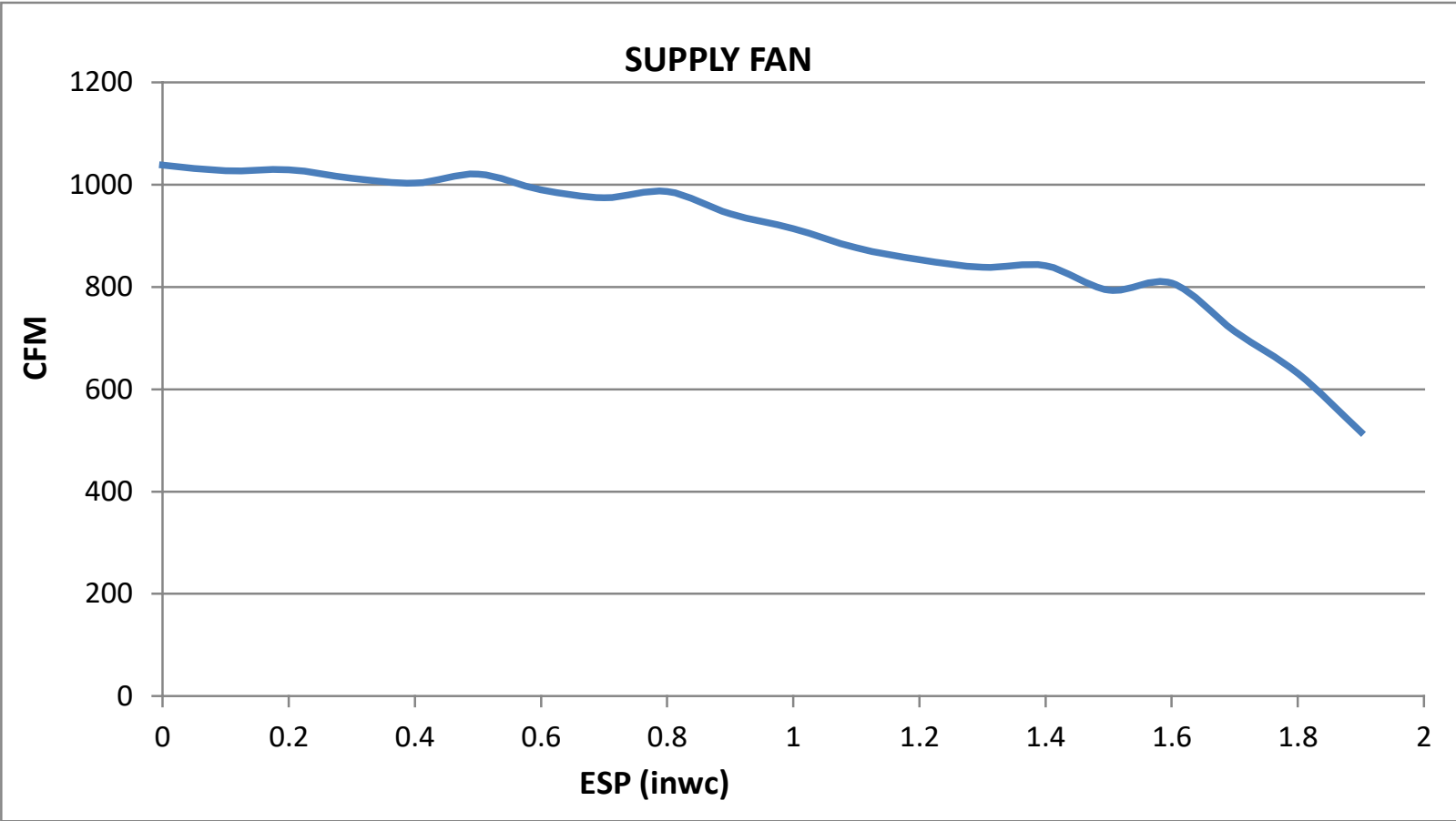


Energy recovery component is certified by AHRI to AHRI Standard 1060. Actual performance in packaged equipment may vary.

	Net Sensible	Net Latent	Net Total
100% air Flow Heating	60	39	52
75% air Flow Heating	64	44	57
100% air Flow cooling	60	26	39
75% air Flow Cooling	65	32	45

7. PERFORMANCE DATA – FAN CURVE

Max speed shown. All points under the curve are achievable.



8. ELECTRICAL DATA

8.1 General Info

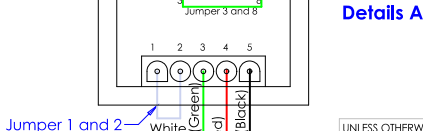
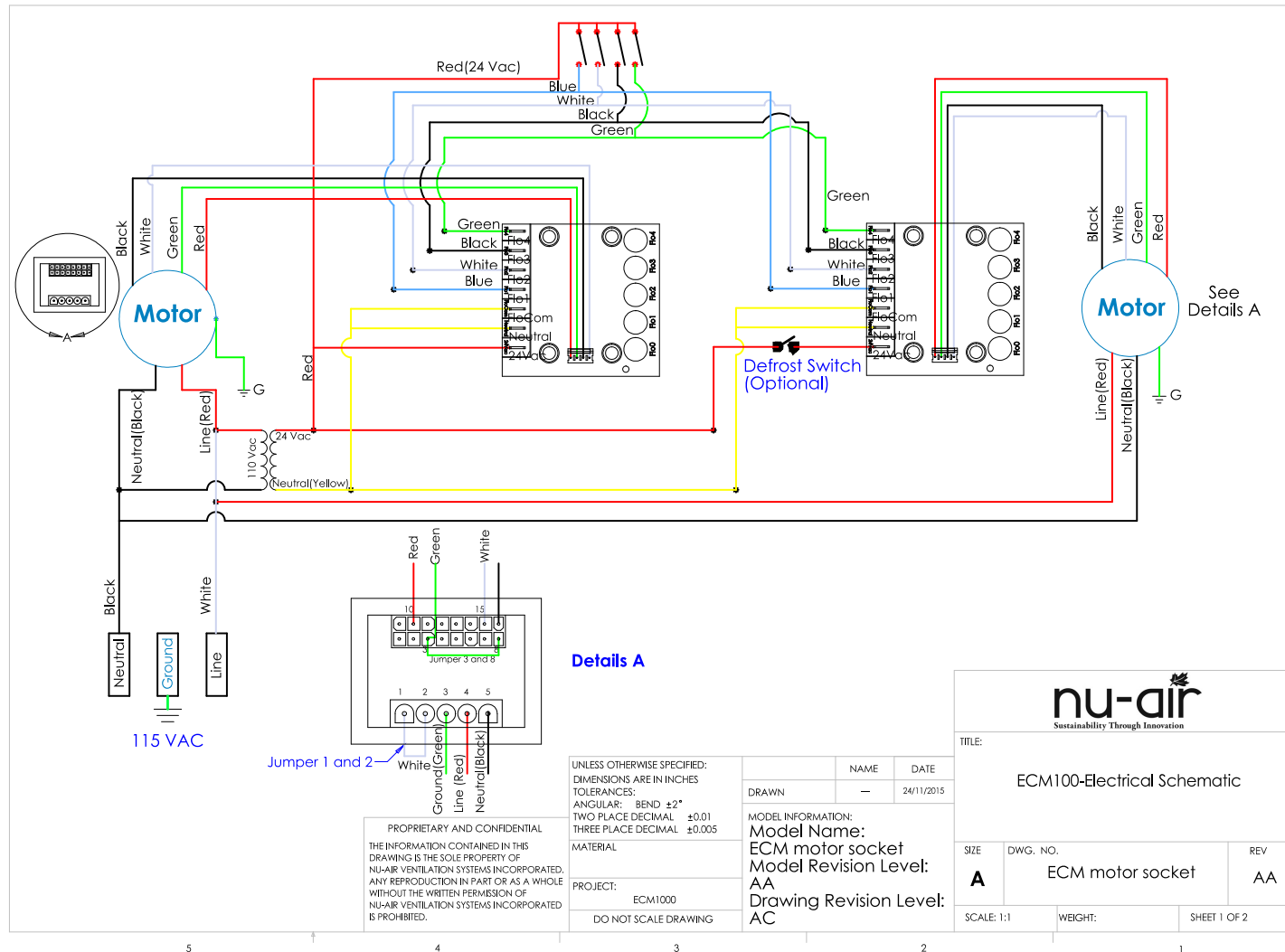
Voltage / Phase	120/1	240/1
Unit FLA (Full Load Amps)	15.4	8.6
Minimum Circuit Ampacity (MCA)	18.3 Amps	10.7 Amps
Maximum Over Current Protection (MOCP)	25 Amps	15 Amps

8.2 Boards and potentiometers

In the ECM1000, up to 4 speeds can be used. Each speed is variable via potentiometers on the PCB. If 2 or more speeds are called, the highest speed is used.

9. ELECTRICAL SCHEMATICS

9.1 115 VAC



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UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 TOLERANCES:
 ANGULAR: BEND $\pm 2^\circ$
 TWO PLACE DECIMAL ± 0.01
 THREE PLACE DECIMAL ± 0.005

MATERIAL

PROJECT: ECM1000

DO NOT SCALE DRAWING

MODEL INFORMATION:
 Model Name:
 ECM motor socket
 Model Revision Level:
 AA
 Drawing Revision Level:
 AC

NAME	DATE
DRAWN	24/11/2015

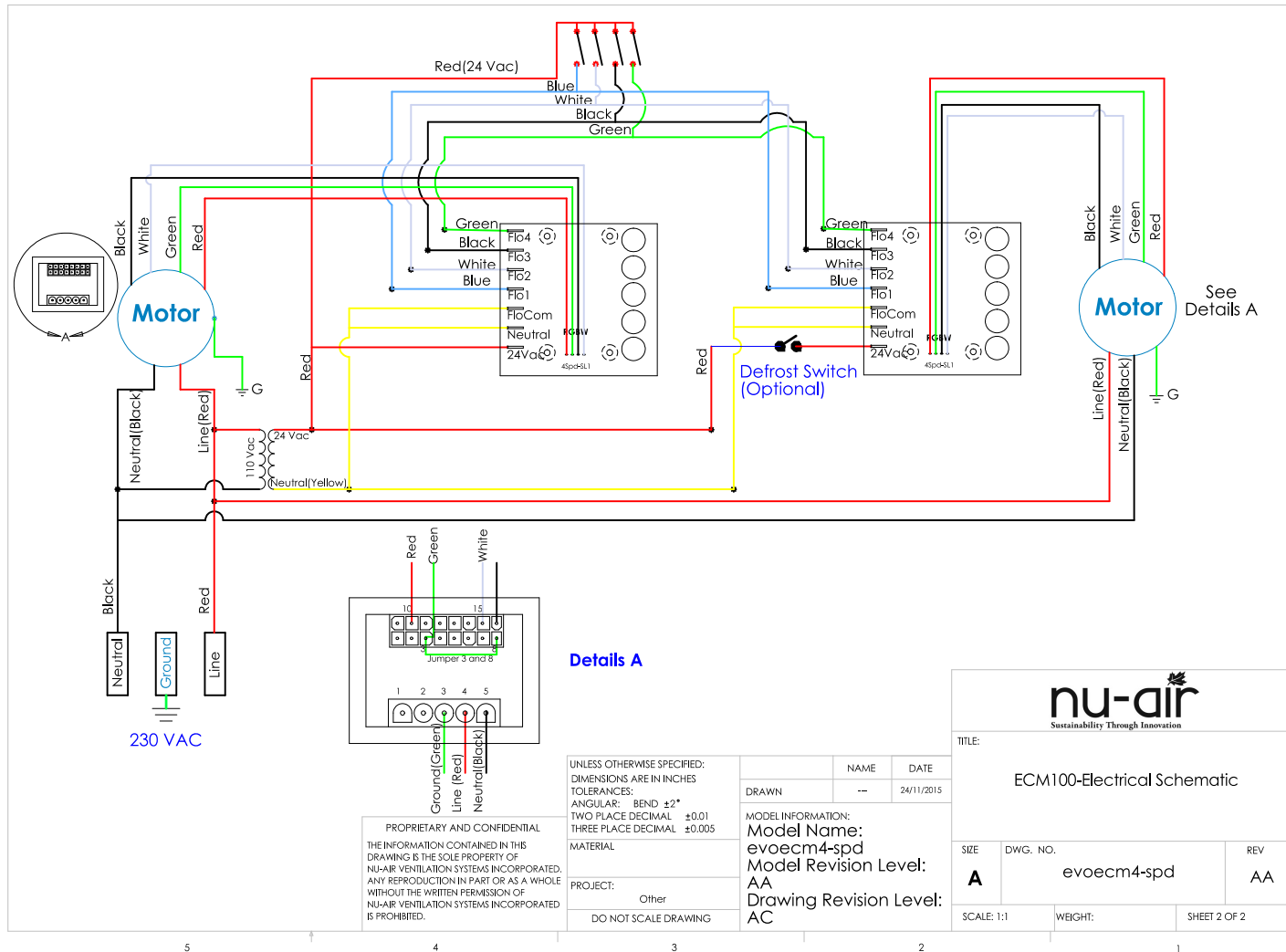
nu-air
 Sustainability Through Innovation

TITLE:
 ECM100-Electrical Schematic

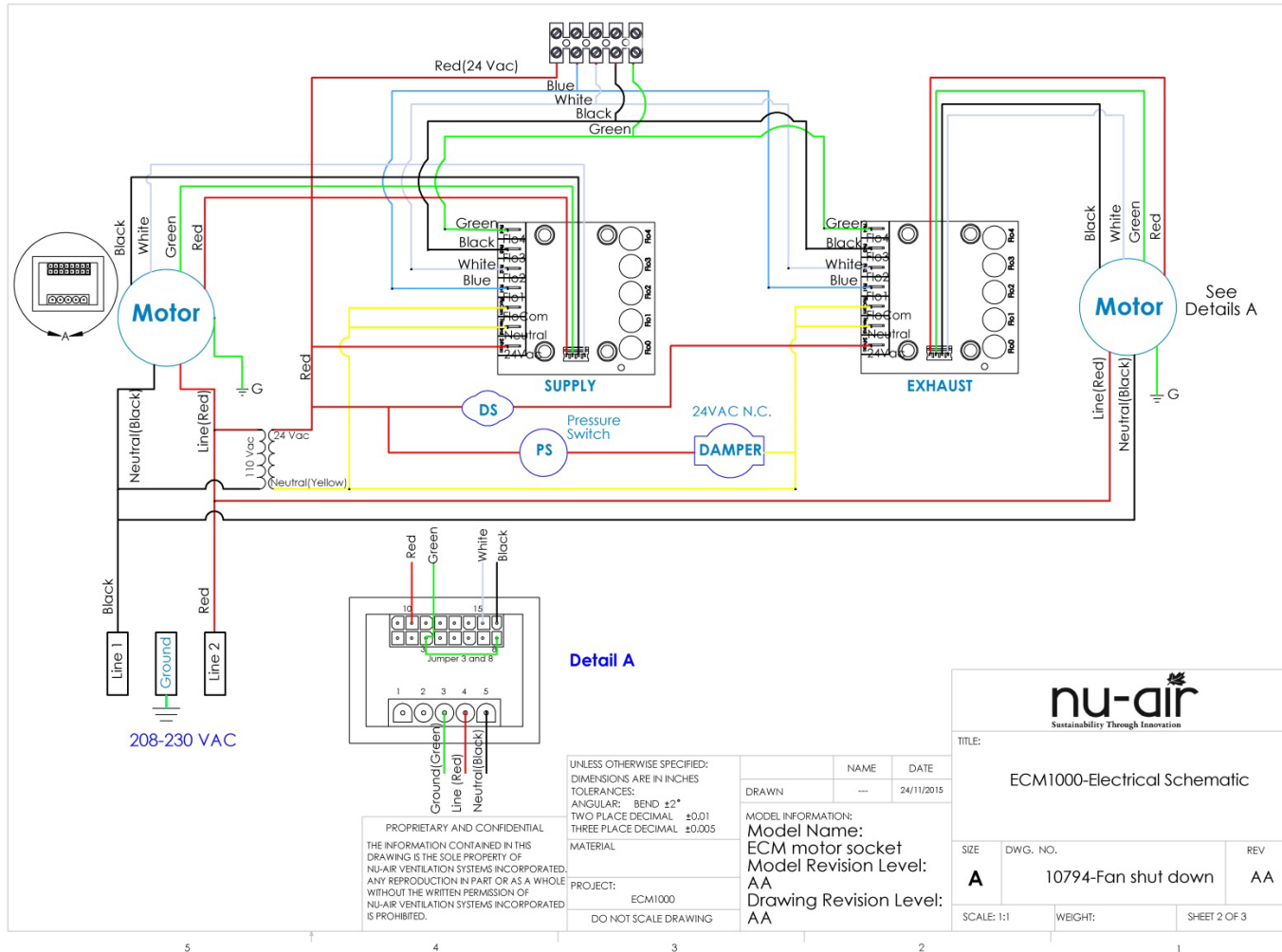
SIZE	DWG. NO.	REV
A	ECM motor socket	AA

SCALE: 1:1 WEIGHT: SHEET 1 OF 2

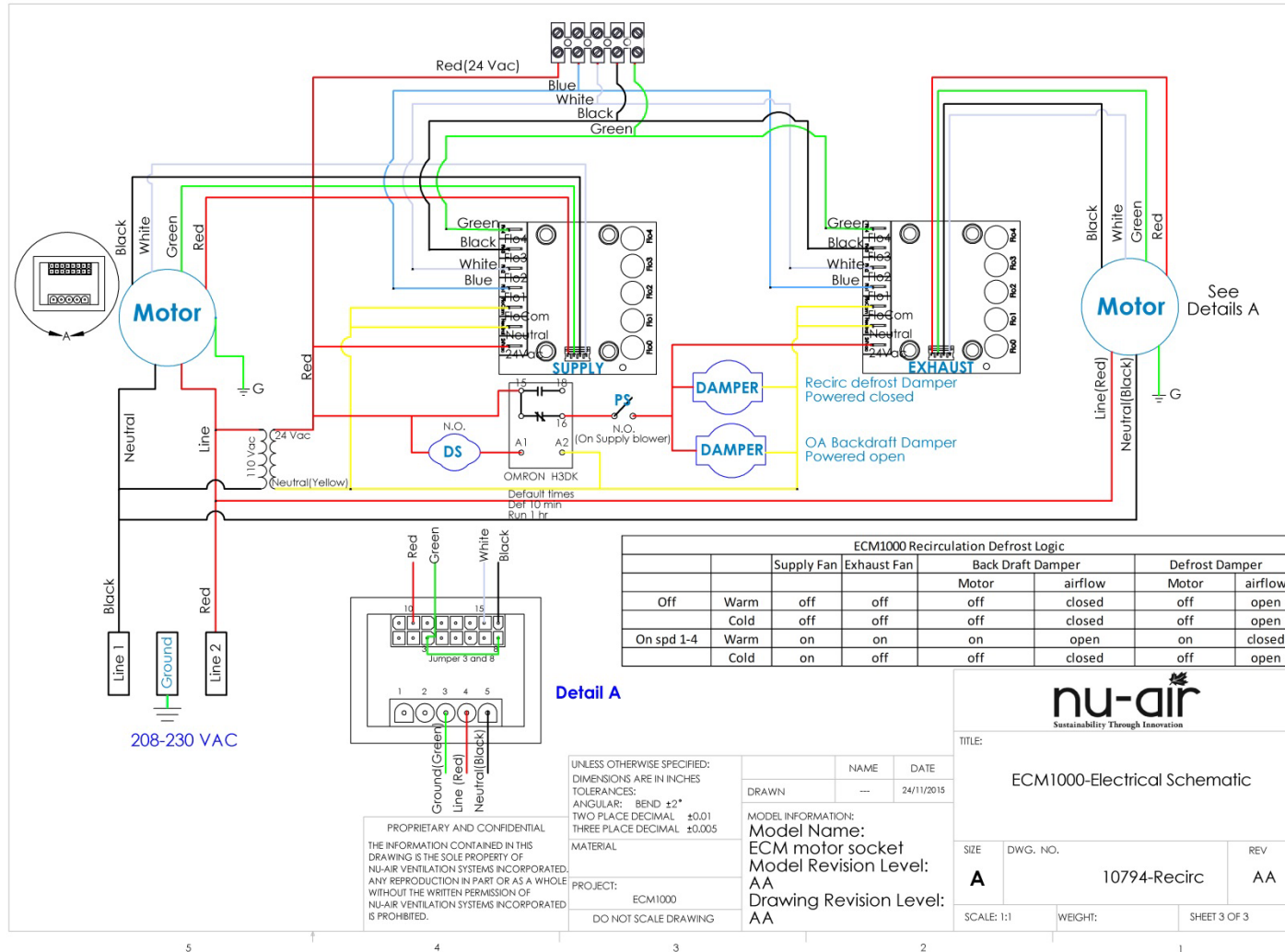
9.2 230 VAC



9.3 Fan Shut down



9.4 Recirculation



10. INSTALLATION

10.1 INSTALLATION INSTRUCTIONS

10.1.1 Installer's Responsibilities

Installers are responsible for the performance of the ventilation system and for ensuring that all codes and standards are met.

- Do not mount the fresh air supply near a source of contaminated air such as automotive exhaust, gas or propane exhaust or oil tanks.
- Combustion appliances such as furnaces and hot water heaters must not draw combustion air directly from an HRV.

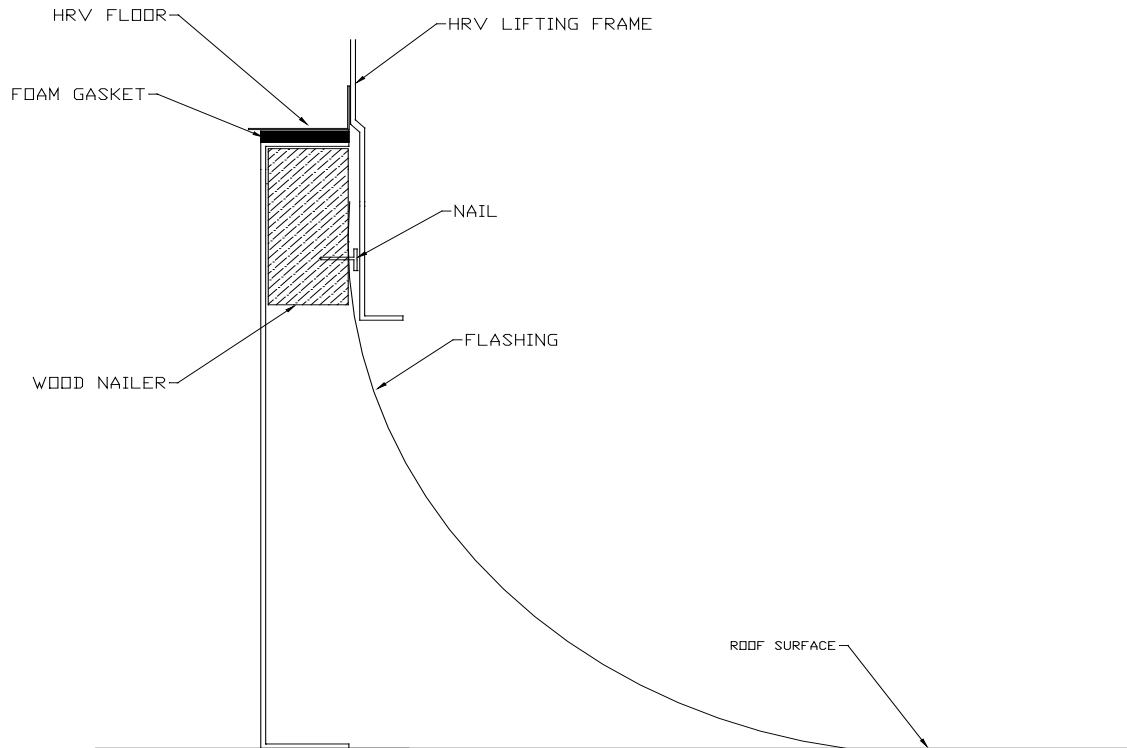
10.2 Installation Basics

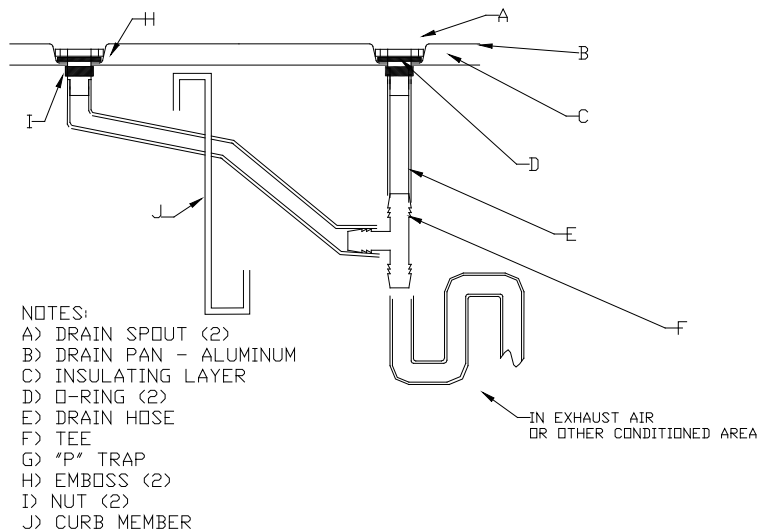
ASHRAE Standard 62-99 recommends the following. Ventilation systems should be designed to prevent re-entrainment of exhaust contaminants, condensation or freeze-ups and growth of microorganisms. Make-up air inlets and exhaust air outlets shall be located to avoid contamination of the makeup air. Contaminants from sources such as cooling towers, sanitary vents, vehicular exhaust, and street traffic should be avoided.

10.3 Mounting the Unit (Roof Top Units)

1. Determine where the unit is to be located on the roof
2. Refer to the unit detail drawing for roof openings and cut accordingly
3. Place the curb on the roof and ensure it is level
4. Flash the curb with roofing membrane tying in to the wood nailer. Do not attach flashing to the HRV.
5. Apply the foam gasket to all top flanges of the curb forming a continuous, watertight seal.
6. Lift the unit onto the curb. Do not drag on the roof.

7. Tie in the supply and return ducts, electrical wiring and run condensate drain into the conditioned space through the exhaust air duct.
8. In very cold climates, use heat trace tape on the condensate line.





10.4 Connecting To Other Equipment

If the HRV is used upstream of an air handler or similar equipment (e.g. fresh air into economizer section), the startup sequence must be HRV first followed by the air handler. If the air handler is started first, the HRV's fresh air fan will rotate backward and the motor may not be able to overcome the extra load causing the motor to over amp and potentially damage the blower wheel.

10.5 Controls and Electrical Connection

HRV must be connected to a power source of voltage and phase indicated on the starter box and according to applicable local electrical codes.

10.6 Balancing the System

Unless otherwise specified by the system designer, set up the HRV with balanced supply and exhaust air flows.

Once the HRV system is installed, do the following:

- Close all windows and doors.
- Turn off any exhaust only systems.
- To balance the HRV, set the machine on high speed.
- Make a small hole in the supply duct at least 10 feet downstream of the fan. Insert a Pitot tube in the cross sectional center of the duct.
- Measure the pressure with a digital manometer or magnehelic gauge.
- Record the value and repeat the procedure for the exhaust air stream.
- Install a balancing damper in the air stream with the greater flow and damper back until the pressure equals that of the opposite air stream.

10.7 START UP AND COMMISSIONING

1. Turn the unit on and verify motor operation and proper rotation for both fans in all speeds. Test controls both locally (hand) and with any remote controls (auto).
2. Individually measure supply and exhaust air motor amps with all covers on. If a motor is over amping, lower the fan speed by adding resistance (damper) to the duct.
3. Check that overload protection is set 20% greater than motor FLA.
4. Check that filters are present, clean and properly orientated.
5. Verify core orientation and that guides are in tracks.
6. Check condensate drain installation is tight.
7. Verify the ducting is in accordance with the design specifications. It is good practice to use flexible duct connectors between the unit and the duct system, seal all duct joints, separate intake and exhaust hoods by at least 3 m (10 ft), insulate and vapour barrier cold side ducting.
8. A qualified air balancer should make the final adjustments to damper, and VFD settings to meet the specified air flow.

11. MAINTENANCE

CAUTION: *Disconnect power before servicing.*

a. FILTERS

Dirty filters can reduce ventilation efficiency, resulting in unbalanced airflow and damage or shorten the life of the motors. Check at least every three months and replace yearly or when necessary depending on indoor and outside air conditions.

Nu-Air recommends a spare set of filters (4 in total, 13.5" x 13.75" x 0.625" filters) be ordered with the ERV for maintenance stores.

b. FANS

When cleaning the filters, take the opportunity to vacuum any interior surfaces including the fan blades.

c. MOTORS

The motors are equipped with permanently sealed and lubricated bearings

d. CONDENSATE DRAIN

Twice per year wipe clean the condensate drain pan.

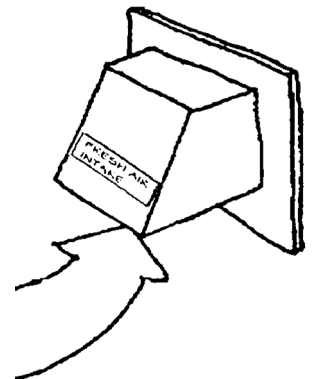
e. CORE

For service, the core (heat exchanger) can be removed from the unit by sliding it (or core sections) forward on the guides. Observe proper orientation when replacing the core in the HRV. Observe the following practices for core cleaning:

- **HRV core** should be removed and cleaned at least once a year using a non-corrosive enzyme detergent in cold water.
- **ERV core** should be removed and cleaned at least once a year using a vacuum equipped with a gentle brush attachment—do not wash the ERV core(s) or use a rigid brush (e.g. hard plastic or steel bristles) as these practices will damage the core membrane material.

f. EXTERIOR HOODS

Regularly check the outside vents and clean any obstructions such as grass, leaves or other debris. Do not replace the screen with mesh smaller than 1/4" as this will restrict airflow. During winter operation, ensure snow and frost does not build up and restrict or block openings.



12. WARRANTY

NU-AIR COMMERCIAL HRV's & ERV's

Models: ECM1000

Nu-Air warrants its Light Commercial Series HRV's and ERV's to be free from defects on all components including motors, circuit boards, transformers, and switches when subject to normal and proper use for a period of two (2) years from the date of purchase. Nu-Air warrants its Compliant Series HRV core to be free from defects for a period of 15 years. Nu-Air warrants its Compliant Series ERV core to be free from defects for a period of 5 years.

Should a manufacturing defect occur during the warranty period, Nu-Air will supply replacement parts FOB our plant at no charge. Labour costs to remove and reinstall these parts are not covered under this warranty.

This warranty is expressly in lieu of all other warranties or obligations and in no event shall Nu-Air be liable for consequential or incidental damages of any kind, including damage to the building, its contents or any person therein.

This warranty does not cover damage to the unit due to the following: 1) improper installation or unreasonable use of unit: 2) failure to provide reasonable and necessary maintenance.



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