



## ECM MOTOR SUPPLEMENTAL MANUAL LIGHT COMMERCIAL UNITS

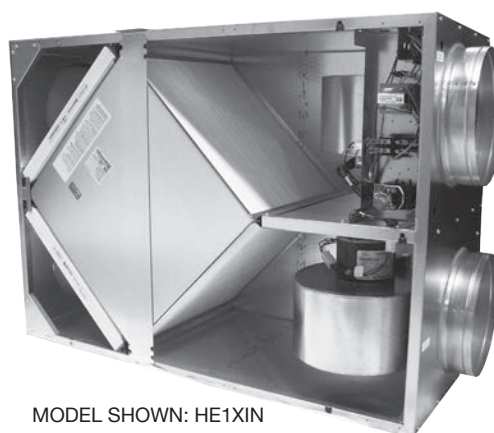
ECM MOTORS FOR:  
EV450 (IN & RT)  
HE1X (IN & RT)  
HE1.5X (IN & RT)



MODEL SHOWN: HE1.5XRT



MODEL SHOWN: EV450IN



MODEL SHOWN: HE1XIN



## WE DO IT ALL EVERYWHERE!

From Alaska to Puerto Rico, small installations or extremely large ones, RenewAire provides today's commercial builders, engineers, and contractors, as well as business owners and building administrators with complete ventilation solutions that do more for less.

Our systems are presently operating in diverse commercial installations across the country, including: Elementary/Secondary Schools, Government Buildings, Municipal Facilities, Major Private Companies, Hotels/Motels, Nursing Homes/Healthcare Centers, Colleges/Universities, Military Bases, Financial Institutions, Charitable Organizations, Restaurants/Food Service, and Sports Training Facilities.

As much as our unsurpassed quality and performance, our customers can also depend on our professional support staff for swift, professional assistance with all their technical, application, and service needs. **Every time. Anywhere.**

At RenewAire - unlike other ventilation suppliers - advanced ventilation solutions are all we do. Our sole passion. Which is why for all commercial projects, we are the "V" in HVAC...and the only name you need to know.

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## PRODUCT INFO

## ECM MOTORS

RenewAire's light commercial units are offered with optional electronically commutated motors (ECM). ECM motors have higher efficiencies with considerable energy savings over a standard permanent split capacitor motor. The ECM motors offered in RenewAire ERVs are constant torque with a variety of speed control options. The motors operate at fixed speed or variable speed with speed inputs from fixed resistors, potentiometer, or 0-10Vdc analog signal.

## CAUTION

When an external 10VDC source control is used the maximum distance between ECM motor and 10VDC source control cannot exceed 33 feet (10m).

## ABOUT ECM MOTORS

## OPERATING CONTROLS

A wide variety of low voltage (24VAC) control schemes may be selected to meet the ventilation needs of the facility. These include time clock, occupancy sensor, carbon dioxide sensor, and others. Building Management Systems (BMS) may also control the unit with external control by others.

## ELECTRICAL SPECIFICATIONS

ELECTRICAL RATINGS FOR ECM UNITS					
	Phase (unit)	Input Voltage	FLA (motor)	MCA (unit)	MOPD (unit)
EV450	1	115 VAC	9	11.3	15
		208-230 VAC	5.1 - 4.9	6.4	15
HE1X	1	115 VAC	9	20.3	25
		208-230 VAC	5.1 - 4.9	11.5	15
HE1.5X	1	115 VAC	8.0	18.0	20
		208-230 VAC	6.2	14.0	15

# ECM MOTORS

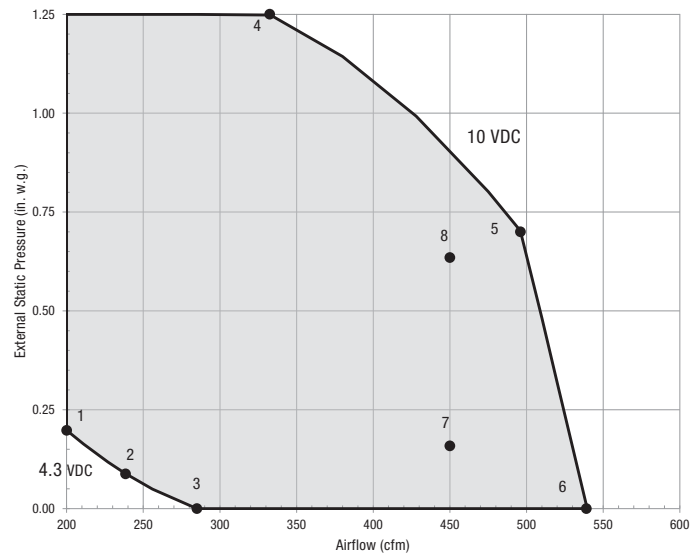
## PRODUCT INFO

### ECM OPTION OPERATING RANGES

Sample Points			
Point	CFM	ESP*	Watts
1	200	0.20	88
2	238	0.09	81
3	285	0.00	123
4	333	1.25	327
5	496	0.70	519
6	539	0.00	520
7	450	0.16	324
8	450	0.64	407

**Note:** Watts is for the entire unit.  
\*Inches Water Column

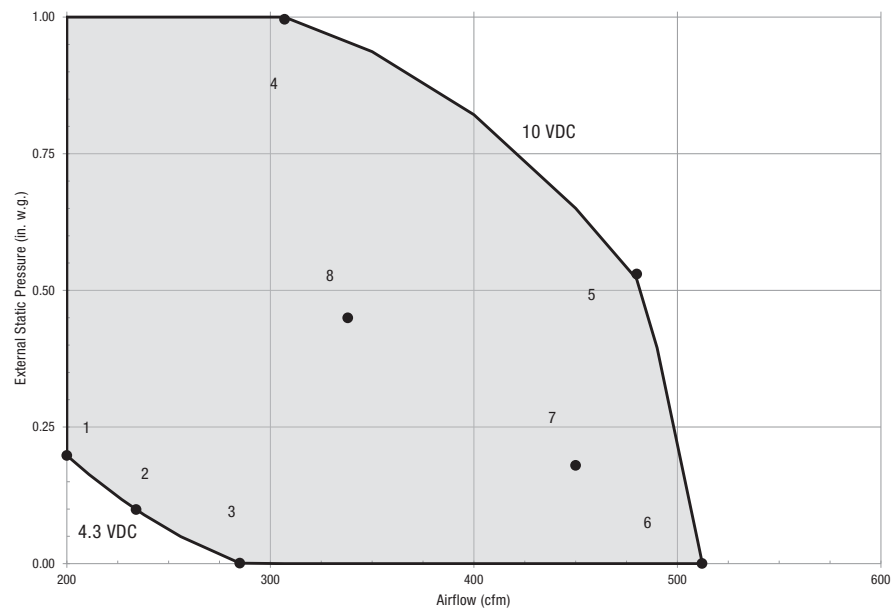
#### F1 EV450IN ECM



Sample Points			
Point	CFM	ESP*	Watts
1	200	0.20	88
2	230	0.09	81
3	285	0.00	123
4	307	1.00	308
5	408	0.53	510
6	512	0.00	520
7	450	0.18	347
8	338	0.45	218

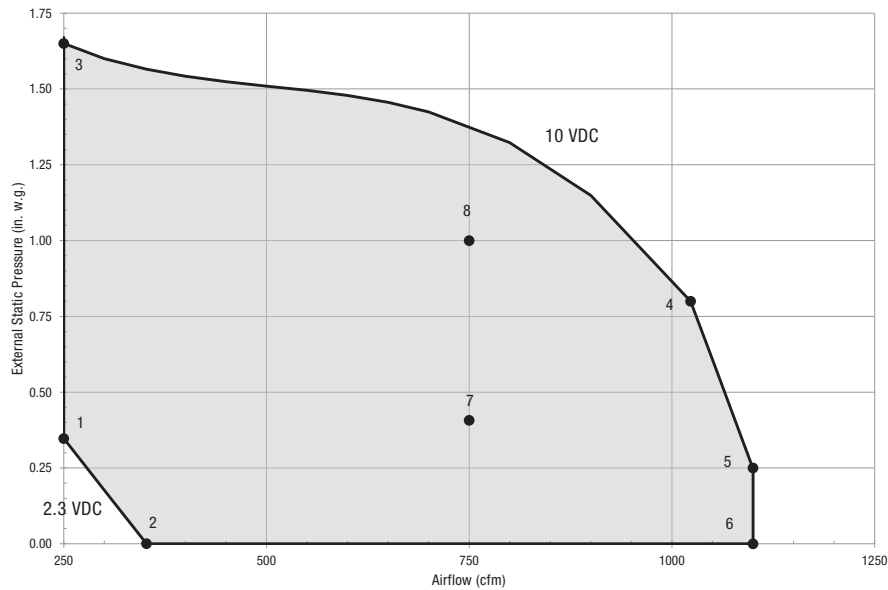
**Note:** Watts is for the entire unit.  
\*Inches Water Column

#### F2 EV450RT ECM



## PRODUCT INFO

### F3 HE1XIN ECM (H or V)

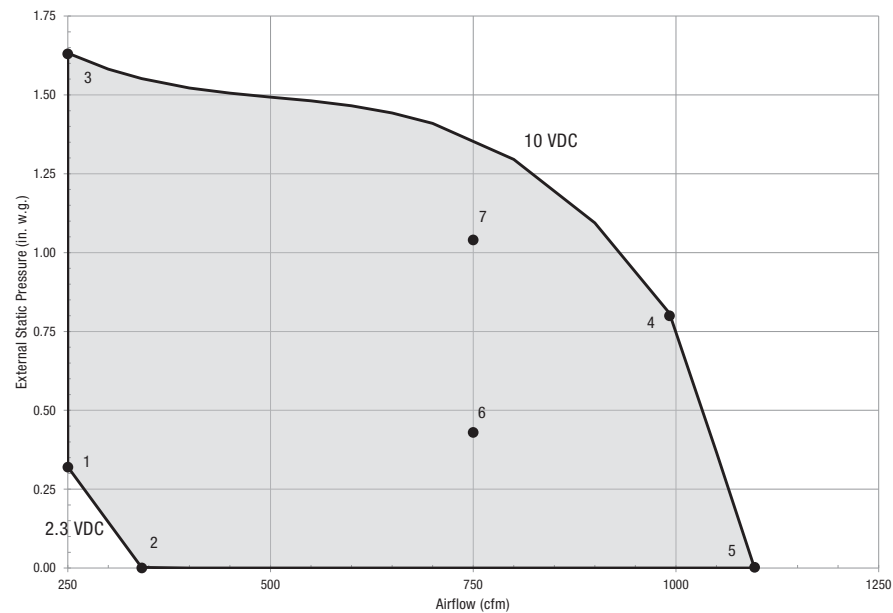


### ECM OPTION OPERATING RANGES

Sample Points			
Point	CFM	ESP*	Watts
1	250	0.35	115
2	352	0.00	84
3	250	1.65	545
4	1023	0.80	1100
5	1100	0.25	1160
6	1100	0.00	1010
7	750	0.41	486
8	750	1.00	655

**Note:** Watts is for the entire unit.  
\*Inches Water Column

### F4 HE1XRT ECM



Sample Points			
Point	CFM	ESP*	Watts
1	250	0.32	115
2	341	0.00	86
3	250	1.63	545
4	992	0.80	1080
5	1097	0.00	1010
6	750	0.43	473
7	750	1.04	655

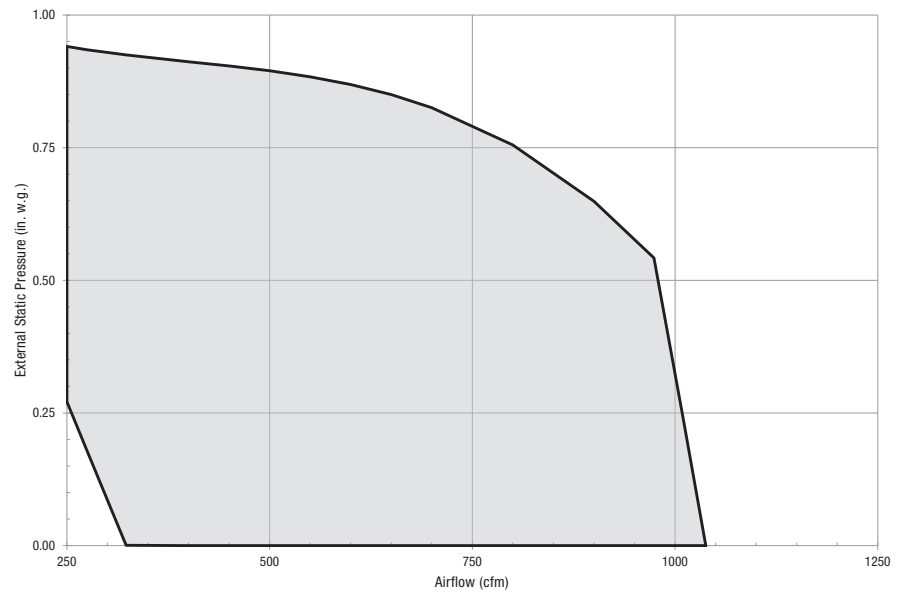
**Note:** Watts is for the entire unit.  
\*Inches Water Column

## PRODUCT INFO

### ECM OPTION OPERATING RANGES

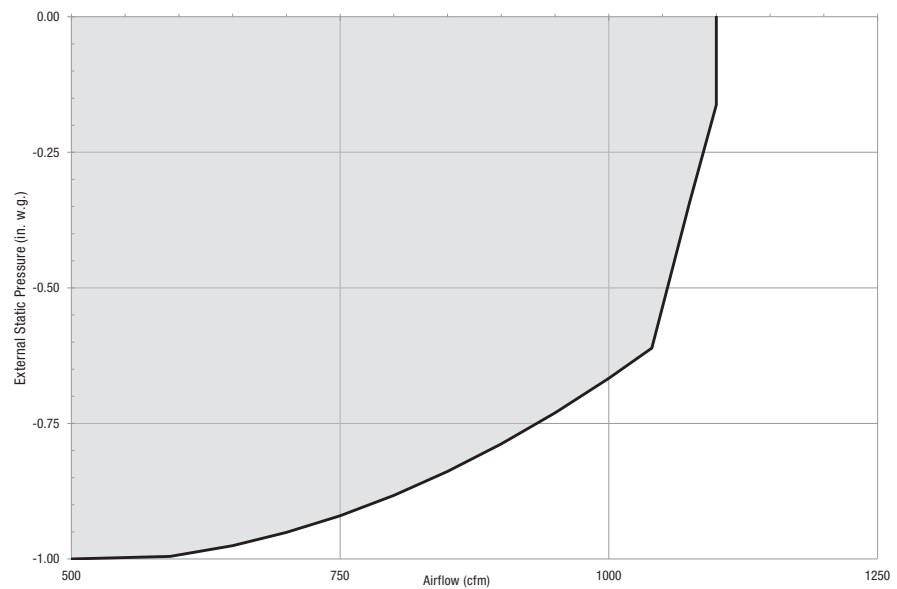
#### F5 HE1XRTC ECM

##### Unit Tied Into Seperate Ducts



#### F6 HE1XRTC ECM

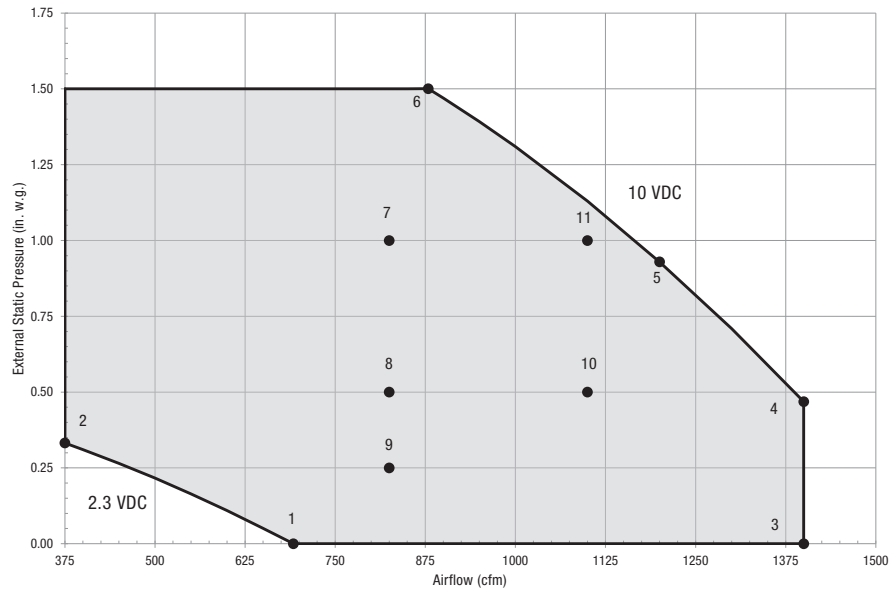
##### Unit Tied Into Air Handler



## PRODUCT INFO

### ECM OPTION OPERATING RANGES

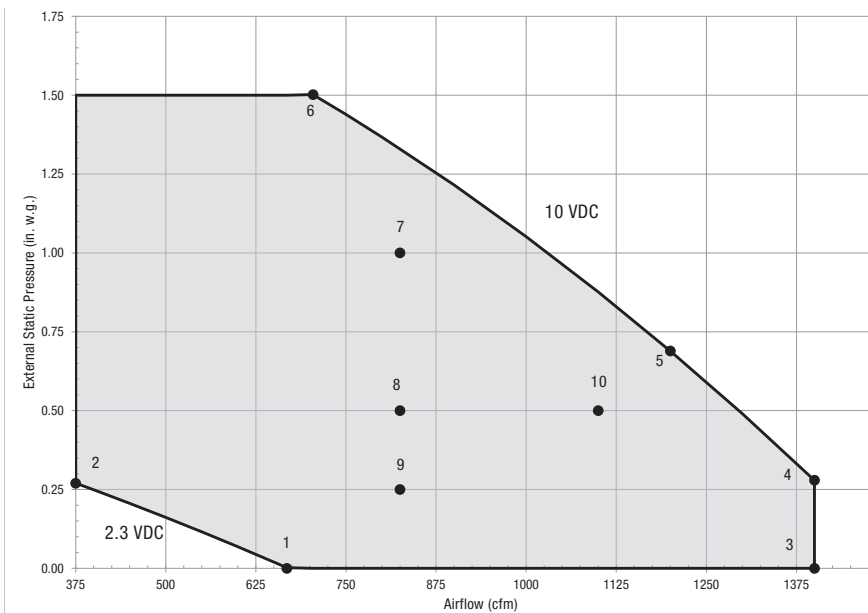
#### F7 HE1.5XIN ECM (H or V)



HE1.5XIN			
Sample Points			
Point	CFM	ESP*	Watts
1	692	0.00	190
2	375	0.33	177
3	1400	0.00	788
4	1400	0.47	1018
5	1200	0.93	1020
6	879	1.50	966
7	825	1.00	710
8	825	0.50	497
9	825	0.25	393
10	1100	0.50	722
11	1100	1.00	951

Note: Watts is for the entire unit.  
\*Inches Water Column

#### F8 HE1.5XRT ECM



HE1.5X-RT ECM			
Sample Points			
Point	CFM	ESP*	Watts
1	668	0.00	190
2	375	0.27	177
3	1400	0.00	854
4	1400	0.28	1018
5	1200	0.69	1020
6	704	1.50	907
7	825	1.00	812
8	825	0.50	520
9	825	0.25	423
10	1100	0.50	909

Note: Watts is for the entire unit.  
\*Inches Water Column

## INSTALLATION

### PLANNING YOUR INSTALLATION

#### CAUTION

To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc., out of unit.

#### WARNING

##### **RISK OF FIRE, ELECTRIC SHOCK, OR INJURY. OBSERVE ALL CODES AND THE FOLLOWING:**

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lockout/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. This unit must be grounded.
6. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment. If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
7. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
8. This unit is intended for general ventilating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
9. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
10. If installed indoors this unit must be properly ducted to the outdoors.

#### PRINCIPLES OF EXTERNAL CONTROL

The light commercial units with ECM motors are designed for control by a wide variety of low voltage (24VAC) controls to meet the ventilation needs of the facility. These include time clock, occupancy sensor, carbon dioxide sensor, building management system (BMS) and others. These devices are commonly known as 2-wire, 3-wire, and 4-wire devices. RenewAire offers separately the following for standalone control of the ERV:

- Digital Time Clocks TC7D-W and TC7D-E
- Occupancy Sensors MC-C and MC-W
- Carbon Dioxide Sensor/Controllers C02-W and C02-D

#### HE1X & HE1.5X ONLY

The external control device connects to the Light Commercial unit to operate each blower independently or for one blower to act as leader and the other blower to act as follower. When operating independently, a single external switch or relay calls for operation but each speed control motor can respond independently to switch or analog signal source.

When acting as leader-follower, again, a single external source calls for operation and then one motor responds to the input signal. The Light Commercial HE1X & HE1.5X units have the versatility that either the exhaust air (EA) motor or the fresh air (FA) motor can act as leader. Connection of an external control device to the Light Commercial Unit is simple. All external control device wires connect to a terminal block(s) in the unit's electrical box.



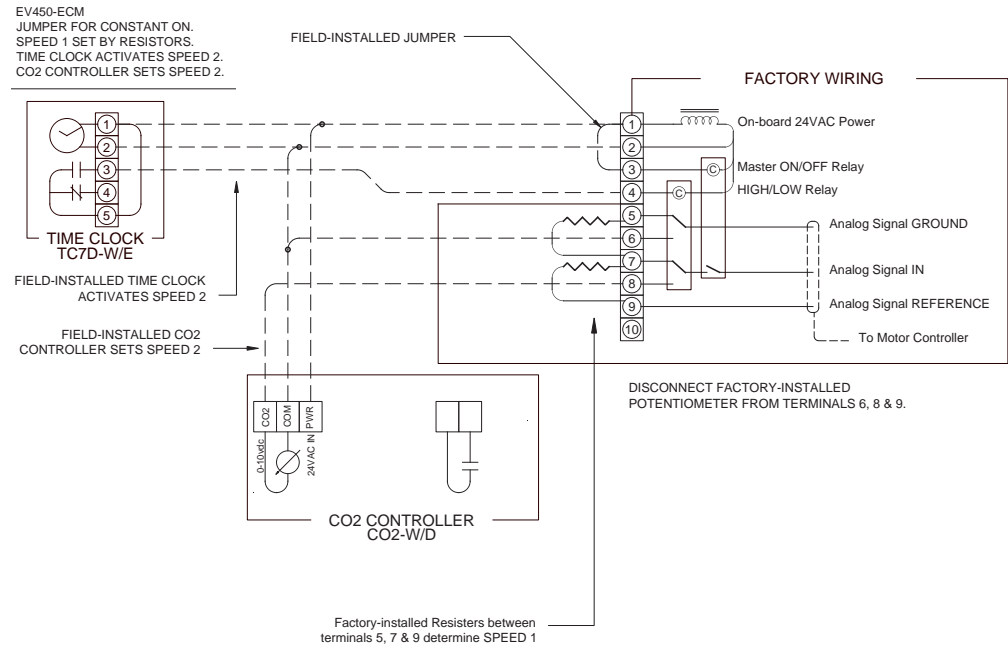


# ECM MOTORS

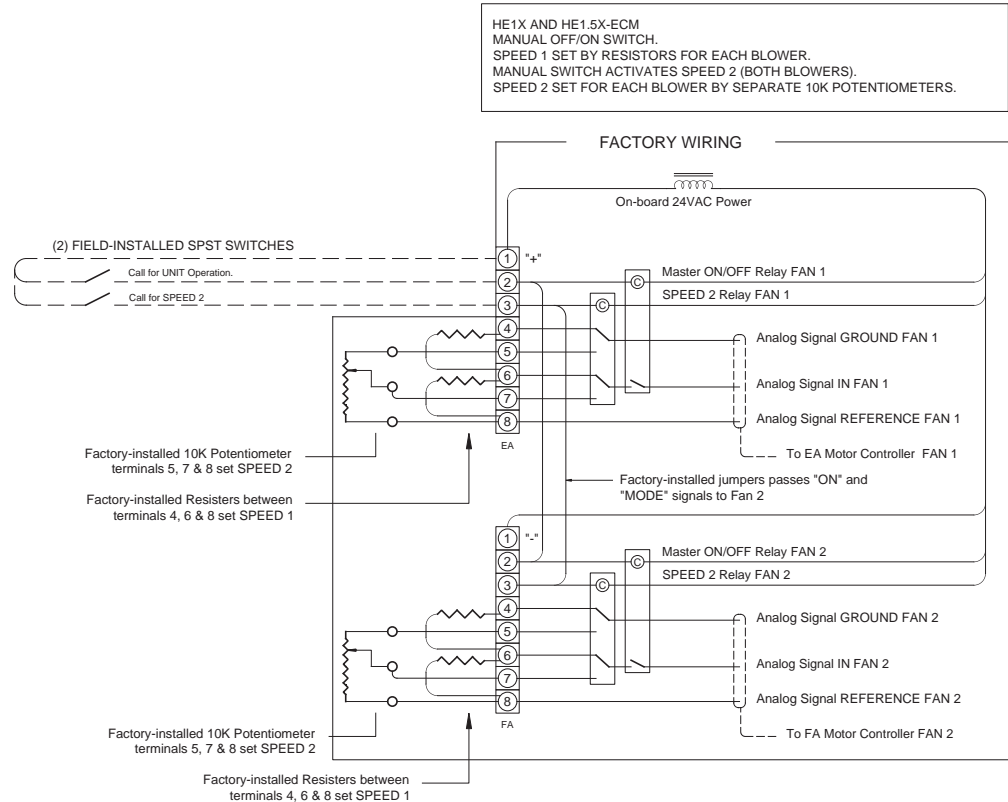
## INSTALLATION

### WIRING SCHEMATICS BY CONTROL METHOD

#### EV450 0-10 VDC SIGNAL FROM CO2 CONTROL

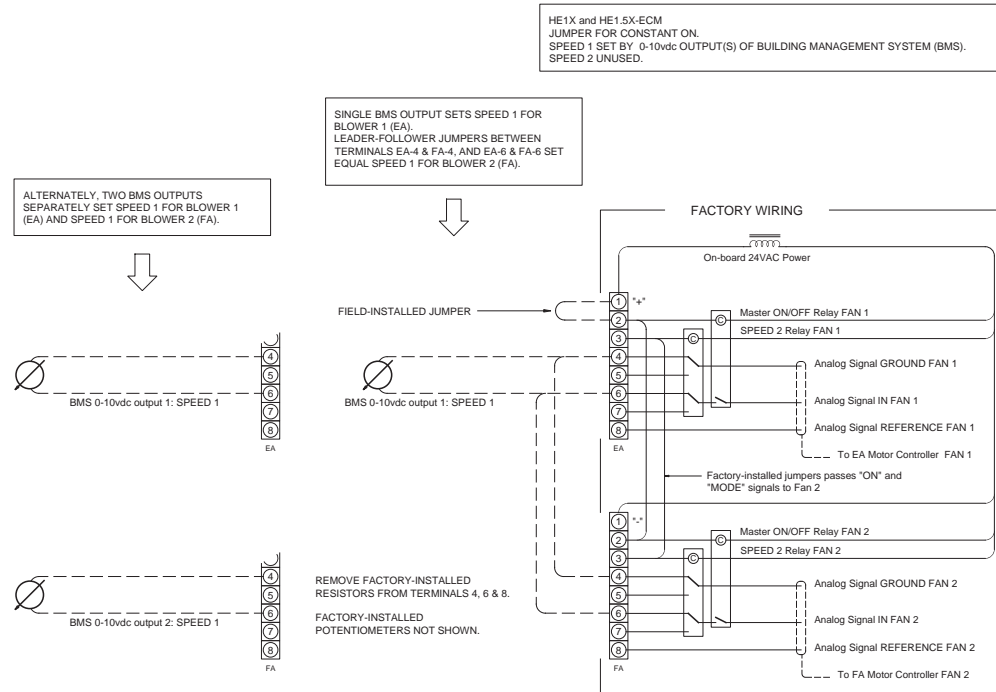


#### HE1X & HE1.5X FIXED SPEED CONTROL

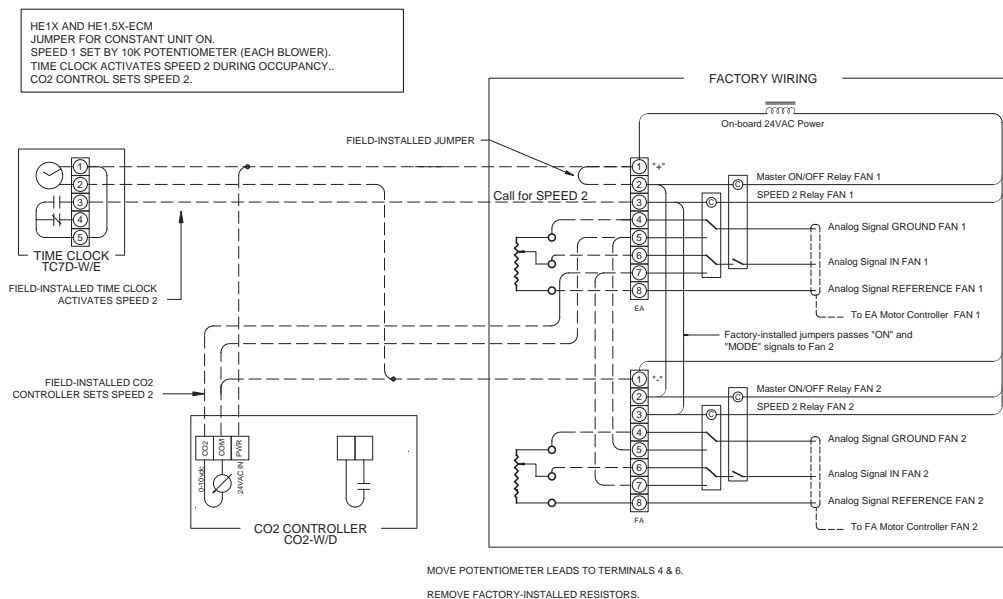


### HE1X & HE1.5X 0-10 VDC SIGNAL FROM EXTERNAL CONTROL OR BMS

### WIRING SCHEMATICS BY CONTROL METHOD



### HE1X & HE1.5X 0-10 VDC SIGNAL FROM CO2 CONTROL

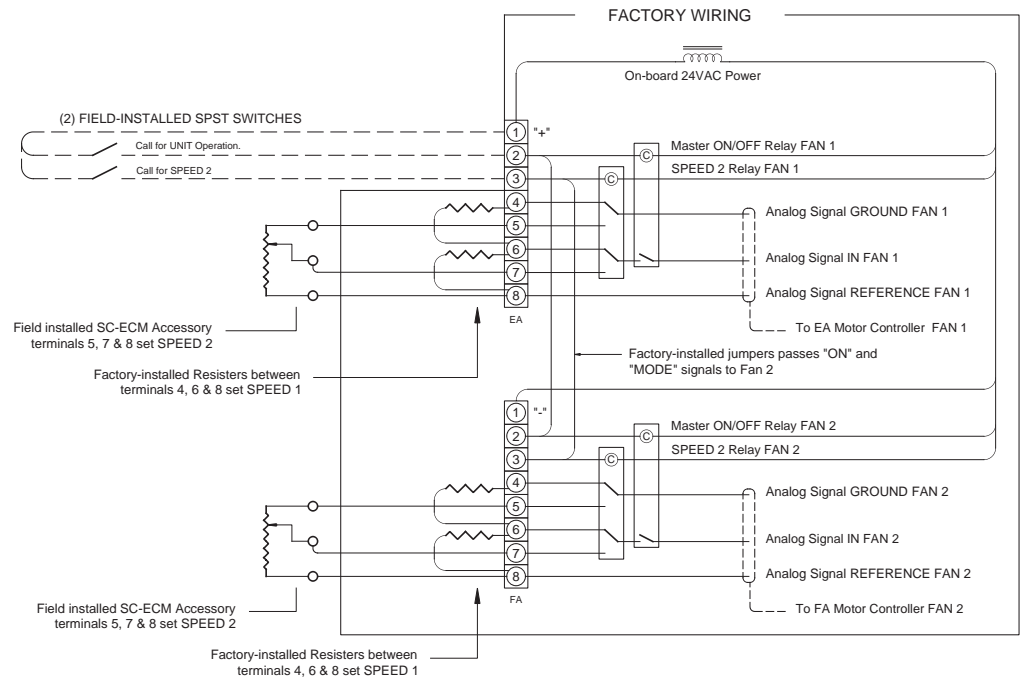


## INSTALLATION

### WIRING SCHEMATICS BY CONTROL METHOD

### SPEED CONTROL SC-ECM ACCESSORY CONTROL

SC-ECM  
MANUAL OFF/ON SWITCH.  
SPEED 1 SET BY RESISTORS FOR EACH BLOWER.  
MANUAL SWITCH ACTIVATES SPEED 2 (BOTH BLOWERS).  
SPEED 2 SET FOR EACH BLOWER BY SEPARATE 10K POTENTIOMETERS.



## START-UP

**AIRFLOW PERFORMANCE**

The ERV is factory wired to operate at low fixed speed and high variable speed.

Airflows must be measured and the unit's potentiometers adjusted so that it operates at the airflow volumes specified for the installation.

Use the pressure taps in the core and filter doors to determine the airflow. Figure 1 translates the pressure drop across the energy recovery core to the actual airflow volume.

**MEASURING AIRFLOW****Equipment Required**

- Magnehelic gauge or other device capable of measuring 0-1.5 in. water of differential pressure.
- 2 pieces of flexible tubing, 1/8" ID, 1/16" wall works best.

**NOTE:** Be sure to remove cap from pressure port before inserting tubing. Insure tubing is well seated in pressure ports.

**NOTE:** The tubing should extend in the pressure port approximately 1 inch.

**Cross Core Static Pressure Measurement Instructions**

- The individual differential static pressures (DP) are measured using the installed pressure ports located in the front of the units core access doors.

**NOTE:** These ports are carefully located on the unit to give the most accurate airflow measurement.

**NOTE:** Do not relocate pressure ports.

**CAUTION**

Make sure clean filters are installed before balancing airflow. Dirty or clogged filters reduce airflow through the unit.

**CAUTION**

Very low airflow rates may result in fouling of the energy exchanger core. Do not reduce airflow to below 250 cfm per core.

**AIRFLOW**

- To read SCFM of Fresh Air (FA) install the "high" pressure side (+) of your measuring device to the Outside Air (OA) port and the "low" pressure side (-) to the Fresh Air (FA) port.
- To read SCFM of Room Air (RA) install the "high" pressure side (+) of your measuring device to the Room Air (RA) port and the "low" pressure side (-) to the Exhaust Air (EA) port.
- Use the reading displayed on your measurement device to cross reference the CFM output using the conversion chart.

**NOTE:** Be sure to replace cap into pressure port when air flow measuring is completed.

- Adjust air flow by changing the potentiometer setting for the measured airstream.

**NOTE:** For best performance the airflow rate for both the Fresh Air and the Exhaust Air should be roughly equal ("balanced"). In some facilities a slight positive or negative pressure in the building is desired. RenewAire energy recovery ventilators can generally operate with a flow imbalance of up to 20% without significant loss in energy recovery efficiency.

## ECM MOTORS

### START-UP

#### AIRFLOW VS. PRESSURE DROPS

AIRFLOW PREDICTED BY PRESSURE DROP ACROSS CORE (SCFM)														
DP ("H2O)	EV450IN ECM		HE1XINV ECM		HE1XINH ECM		HE1.5XIN ECM		HE1XRT ECM		HE1XRTC ECM		HE1.5XRT ECM	
	FA	RA	FA	RA	FA	RA	FA	RA	FA	RA	FA	RA	FA	RA
0.10	--	--	--	--	--	--	--	--	--	--	--	--	335	--
0.15	--	--	--	--	--	--	380	320	--	--	--	--	450	--
0.20	200	200	280	--	260	--	500	440	--	--	--	--	555	--
0.25	225	225	330	270	310	290	620	565	--	--	--	--	650	--
0.30	245	245	380	320	360	340	740	695	280	250	--	--	745	--
0.35	265	265	425	375	415	390	860	825	325	290	--	--	835	300
0.40	285	285	470	430	470	440	980	960	370	330	--	--	920	380
0.45	305	305	520	480	520	490	1095	1095	415	370	--	--	1005	475
0.50	330	330	570	530	570	540	1215	1235	460	410	650	--	1085	575
0.55	350	350	620	580	620	590	1330	1375	515	455	688	--	1165	685
0.60	370	370	670	630	670	640	1450	1515	550	500	725	555	1240	805
0.65	390	390	720	680	720	690	1565	--	595	540	770	610	1315	935
0.70	410	410	770	730	770	740	--	--	640	580	815	665	1385	1070
0.75	430	430	815	785	820	790	--	--	690	620	853	720	1460	12220
0.80	455	455	860	840	870	840	--	--	740	660	890	775	1530	1375
0.85	475	475	910	890	920	890	--	--	785	700	933	828	--	1535
0.90	495	495	960	940	970	940	--	--	830	740	975	880	--	--
0.95	--	--	1010	990	1020	990	--	--	875	785	1018	938	--	--
1.00	--	--	1060	1040	1070	1040	--	--	920	830	1060	995	--	--
1.05	--	--	--	1090	--	1090	--	--	965	870	--	1048	--	--
1.10	--	--	--	--	--	--	--	--	1010	910	--	1100	--	--





#### **UNMATCHED VENTILATION SUPPORT**

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