RUSKIN®

EVT-04ERV-SUB
MAY 27, 2014

ENERVENT+© SERIES: EVT-09 EVT-19, EVT-28, EVT-36, EVT-46, EVT-62, EVT-74, EVT-88, EVT-10, EVT-12

ENERGY RECOVERY VENTILATOR WITH OPTIONAL TEMPERING

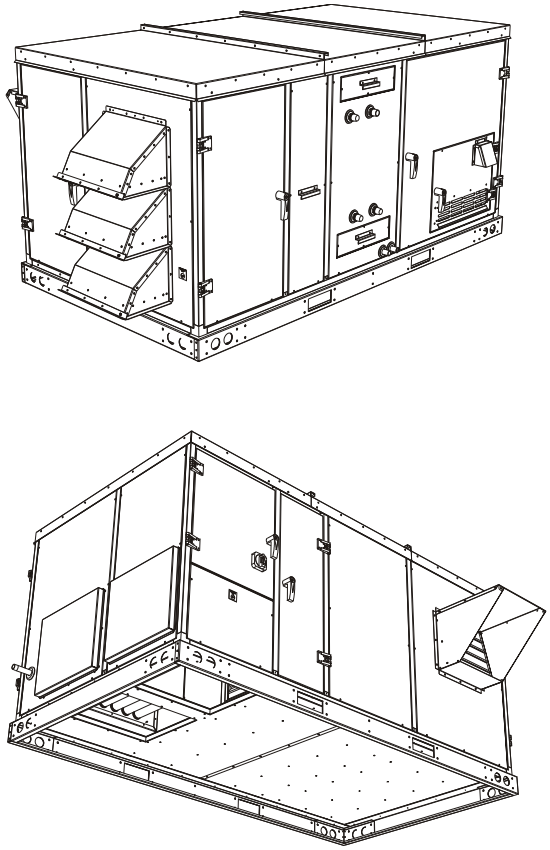
Energy recovery COMPONENT certified to the AHRI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with AHRI Standard 1060-2000. Actual performance in packaged equipment may vary.

ETL Certified per UL 1995 and CSA 22.2

I - FEATURES and OPTIONS (Figure 1)

A. BASIC UNIT - STANDARD FEATURES

1. **BASE RAIL** - Full perimeter, reinforced, heavy-gauge base rail with forklift slots and rigging holes maintains structural integrity during transportation, handling, and installation.
2. **MODULAR FRAME** - Extruded aluminum Modular Frame System adds structural strength and rigidity to entire cabinet. Assures a square, sturdy overall structure and frame for access doors and other openings such as supply and return openings.
3. **DOUBLE-WALL CONSTRUCTION** - All exterior panels, plus divider panel between supply and exhaust chambers, are double-wall construction; which, along with multiple modular framing cross members, adds strength and rigidity to the top and bottom panels. Each panel has an interior core of 1 inch, R-3.6 fiberglass insulation for effective thermal and acoustical performance.
4. **ACCESS DOORS** - Hinged with tool-less, quarter-turn latching handles that possess a "cam latch" assuring tight air and water seal. Provide quick access to components and protect panels and roof from damage. Hinges and handles are made of high strength nylon reinforced fiberglass.
5. **AIRXCHANGE ERC** - Standard Energy Recovery Cassette is an all-welded stainless steel assembly containing a desiccant coated (enthalpy) wheel. Desiccant used is silica gel, which has superior moisture handling capacity in the working range above 30% R.H., the range of greatest concern. Patented and proprietary process permanently bonds desiccant to surface without adhesives permitting long life with repeated washings without loss of effectiveness. Removable, light weight segments make easy cleaning and replacement possible and convenient. An AHRI Certified Component assuring credible and reliable performance per AHRI Standard 1060.
6. **SILENT-PRO® BLOWERS** - Manufactured specifically for Ruskin Rooftop Systems by Lau Industries to a proprietary specification. Shafts are ground and polished steel mounted in permanently lubricated, sealed, ball bearing pillow-block bearings selected for a minimum life of L-10. All supply and exhaust blowers are belt driven to allow independent balancing of supply and exhaust airflow.
7. **VIBRATION ISOLATORS** - Both the supply and the exhaust blowers are mounted on neoprene vibration isolators providing additional acoustical performance.
8. **BLOWER MOTORS and DRIVES** - NEMA Premium Efficient motors that exceed requirements of Energy



EXTERIOR VIEWS

Policy Act of 1992. Base mount with easy adjustment of belt tension. Mounting permits "slide-out" of motor and adjustable mount for easy service or replacement. All drive combinations are sized for 150% of driven horsepower. Low, medium, and high speed drive kits are available to achieve required CFM range. Fixed diameter cast iron pulley on blower with adjustable pitch cast iron sheave on motor - laser aligned for V-belt connection.

9. **AIRFLOW CHOICE** - Available in downflow (vertical) or horizontal supply and return airflow configuration.
10. **OUTDOOR AIR HOOD** - Angled to prevent water induction and includes 1 inch aluminum mesh mist elimination filters. Shipped as a separate kit with instructions for field assembly and installation.
11. **EXHAUST AIR HOOD** - Shipped separately as an assembly for field installation. Includes back draft dampers and cover screen.
12. **AIR FILTERS** - Supply and return MERV 8 (optional MERV 11 and MERV 13 available), 2 inch pleated filters with average dust spot efficiency of 30-35%.
13. **CONTROLS** - All internal electrical components are factory wired for single-point power connection. Units with electric pre-heat and/or post-heat are wired with field supplied independent power supply. All components are UL Listed, Approved, or Recognized where applicable and wired in compliance with National Electric Code (NEC). Hinged external access door to control box has an interlocking, fused NEMA 3R disconnect switch. Control box containing all major electrical control components has removable cover panel.

    Direct Digital Controller - Signal conditioning is performed by a KMC BAC-5831, programmable direct digital controller (DDC), with features that allow state-of-the-art commercial HVAC control. Controller communicates with building automation systems that support the BACnet Application Specific Controller profile. BACnet is one of the HVAC industry's most popular open-standard protocols. "Open" because it is openly available for use by virtually any manufacturer and "standard" because it has been adopted as standard by various independent industry organizations.

B. OPTIONS and ACCESSORIES

14. **DAMPERS** - Parallel-blade, motorized or gravity, damper assembly for outdoor or exhaust airflow. Aluminum blades with galvanized steel frames.
15. **DEFROST CONTROL** - Three types of frost control available:
    a. Electric pre-heater (shown)
    b. Exhaust only
    c. Modulating wheel (EVT-28 & up with VFD)

    Pre-Heater - An ETL Certified Component, two-stage heater with controls wired at the factory. Single point power for the heating elements to be field provided.

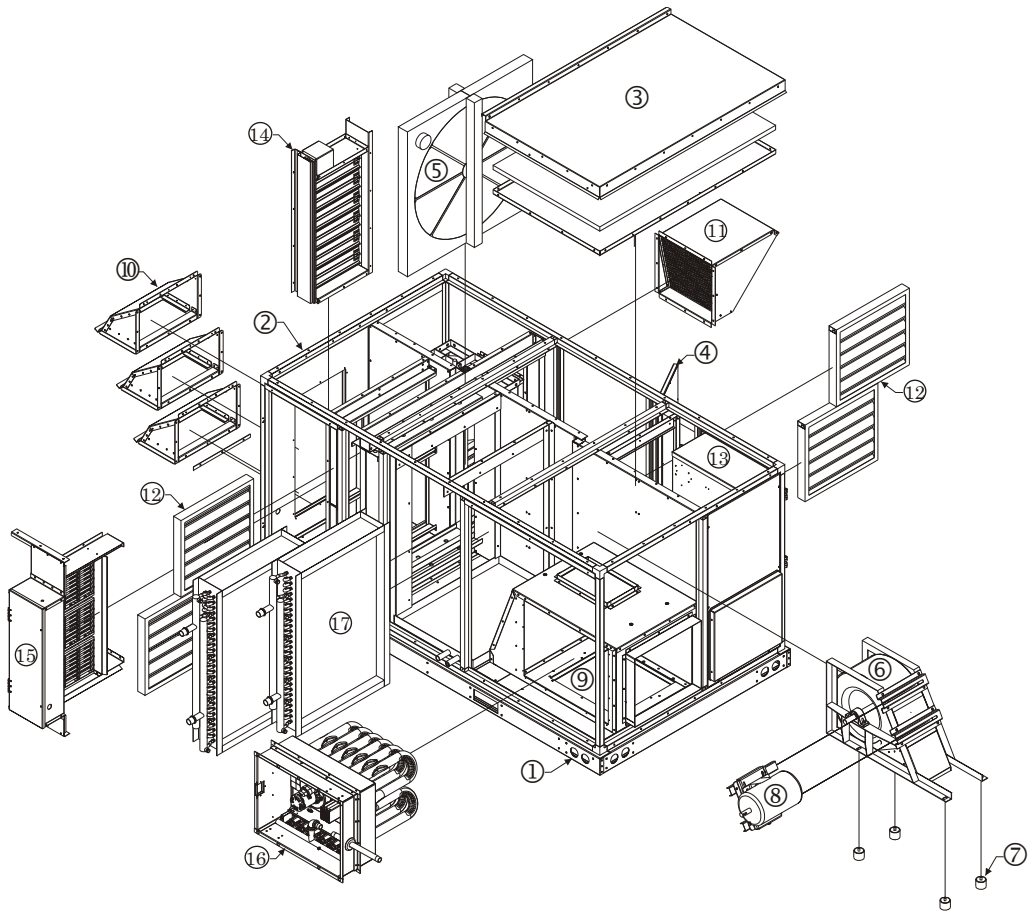


FIGURE 1 - FEATURES AND OPTIONS

16. **SUPPLEMENTAL POST-HEAT** - Two post-heaters are available: Gas Fired (shown) and Electric.

    Gas Fired Post-Heat - An ETL Certified Component. Standard with aluminized inshot burners, direct spark ignition, electronic flame sensor, combustion air inducer, and redundant automatic 2-stage (EVT-28 and larger) gas valve with manual shut-off. Additional options available are 5:1 modulation and; when a high turn-down gas input ratio is needed; a split-manifold, 10:1 modulation is recommended to optimize efficiency at the highest rate. Heat exchanger is tubular construction, aluminized steel (EVT-10 and EVT-12 are stainless steel), and life cycle tested. Stainless steel heat exchanger is an option, but is required if mixed air temperature is below 45° F. Electric spark ignition of burners on each operating cycle. System permits main gas valve to stay open only when the burners are proven to be lit. Should a loss of flame occur, gas valve closes, shutting of gas to burners. Ignition module has LED to indicate status as troubleshooting aid. Ignition control is factory installed in heating compartment. Redundant limit controls are factory installed with fixed temperature setting. Heat limit controls protect heat exchanger and other components from overheating. Flame roll-out switch, flame sensor and combustion air inducer proving switch protect system operation.

    Electric Post-Heat - An ETL Certified Component, with controls wired at the factory. Single point power for the heating elements to be field provided. Staging ranges from 1 to 4 depending on the unit size and heater option selected.

17. **TEMPERING COILS** - Copper tube and aluminum fin construction, rated in accordance to ARI Standard 410. Tubing and return bends are seamless copper conforming to ASTM B75 and ASTM B251 for standard pressure applications. Designed to withstand 250 psi maximum operating pressures and a maximum temperature of 300°F. Aluminum fins are Sine Wave and are die-formed to provide self-spacing collars which completely cover the entire tube surface. Copper tubes are mechanically expanded to form an interference fit with the fin collars.

    Chilled and Hot Water - Design permits in-tube water velocities up to 6 ft/sec. Headers have factory-installed air vents and drain plugs placed at the highest and lowest points respectively. MPT connections are provided.

    Direct Expansion - All copper tubing is internally enhanced with Rifled surfacing for improved heat transfer performance. Factory-installed, externally adjustable, Thermal Expansion Valve is standard. Two-stage, interlaced circuiting is provided for the EVT-46 and larger units with the Neutral Air Option (see **SECTION V - TEMPERING MODE**) and for the EVT-28 and larger with the Neutral Air Plus Option.

PRODUCT SPECIFICATIONS - A summary of specifications for the **ENERVENT**+ series is listed in **Table 1.**

II - GENERAL

The ENERVENT+ series consists of ten separate and distinct unit capacities in five different cabinet sizes. Approximate overall sizes are: EVT-09 and EVT-19 47x52x94 (HxWxD), EVT-28 and EVT-36 54x62x111, EVT-46 and EVT-62 70x80x136, EVT-74 and EVT-88 77x90x150, EVT-10 and EVT-12 88x102x162

The Neutral Air Option (see **SECTION V - TEMPERING MODE**) cooling coils (chilled Water and direct expansion) are sized to deliver at least neutral air (equal to or below return air conditions); which nominally results in a cooling capacity of 1.5 ton for the EVT-09, 4 ton for the EVT-19, 6 ton for the EVT-28, 8 ton for the EVT-36, 10 ton for the EVT-46, 13.5 ton for the EVT-62, 16 ton for the EVT-74, 19 ton for the EVT-88, 21 ton for the EVT-10 and 26 ton for the EVT-12.

The Neutral Air Plus cooling coils are sized to deliver neutral air, plus meet an additional cooling load; which nominally results in a cooling capacity of 4 ton for the EVT-09, 8 ton for the EVT-19, 12 ton for the EVT-28, 15 ton for the EVT-36, 20 ton for the EVT-46, 26 ton for the EVT-62, 32 ton for the EVT-74, 37 ton for the EVT-88, 43 ton for the EVT-10 and 50 ton for the EVT-12.

The heating coil (hot water) is similarly sized to deliver neutral air and nominally delivers 34,000 Btuh for the EVT-09, 89,000 Btuh for the EVT-19, 140,000 Btuh for the EVT-28, 188,000 Btuh for the EVT-36, 230,000 Btuh for the EVT-46, 300,000 Btuh for the EVT-62, 345,000 Btuh for the EVT-74, 420,000 Btuh for the EVT-88, 475,000 Btuh for the EVT-10, 580,000 Btuh for the EVT-12.

Electric or Gas Post-Heat Options are offered if it is necessary to meet heating loads beyond that required to achieve a space neutral condition.

III - DIMENSIONS

Overall unit dimensions are illustrated and tabulated in **Figure 2**.

IV - PARTS ARRANGEMENT

Figure 1 shows the parts arrangement for the ENERVENT+ series, including major standard features and factory-installed options that are offered and; therefore, may be included in the unit being installed. The unit shown is the EVT-09; however it is typical of the entire series with regard to component location, features, and options available.

V - BASIC OPERATING MODES

A. ENERGY RECOVERY MODE

The Energy Recovery Mode utilizes two blowers operating continuously with one supplying the required VOLUME of fresh outdoor air, and the other exhausting an equal VOLUME of stale indoor air returned from the conditioned space. Energy Recovery is achieved by slowly rotating the Energy Recovery Wheel within its cassette framework, known as the Energy Recovery Cassette, or ERC.

During *winter* operation the ERC absorbs heat and moisture from the return air stream during one half of a complete revolution and recovers that energy by transferring it to the cold, dryer outdoor air during the other half of the same revolution. The process automatically reverses for *summer* operation when heat and moisture are absorbed from the fresh, outdoor supply air and transferred to the return air stream being exhausted. This transfer of energy takes place at an efficiency of 70 to 80%.

This mode of operation allows outdoor air ventilation rates to be increased by a factor of three or more without additional energy penalty or increase in size of heating or cooling systems.

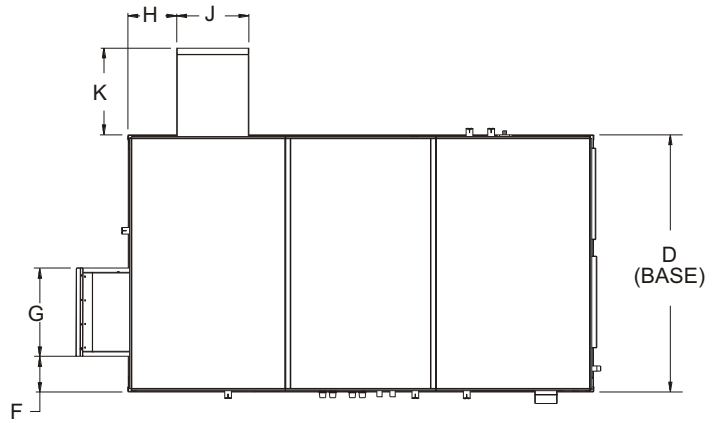
B. TEMPERING MODE

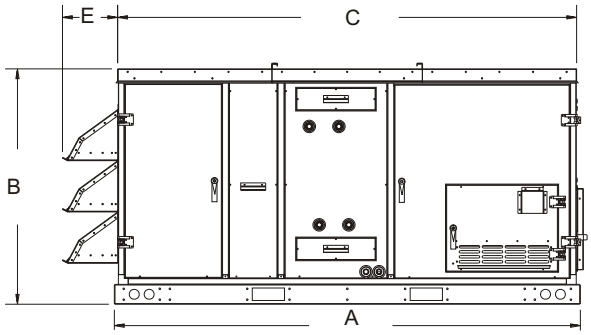
Neutral Air Option - Also available are cooling and heating options installed after the ERC to further temper the supply air to achieve a space neutral condition. This is an ideal solution for applications requiring 100% outdoor air.

EVT Unit#		EVT-09	EVT-19	EVT-28	EVT-36	EVT-46
CFM Range (Min-Max)		600- 1,000	900- 1,900	1,600-2,800	2,400-3,600	3,000- 4,600
ERC Model		2510C	3019C	3628	4136	4646
Supply Blower	Model	A9 x 4AT	A10 x 6A	A12 x 6A	A12 x 9A	A15 x 11A
	Shaft Dia. (in.)	0.750	0.750	1.000	1.000	1.188
	Max RPM	2894	2488	2069	2058	1714
Exhaust Blower	Model	A9 x 4AT	A10 x 6A	A12 x 9A	A12 x 12A	A15 x 11A
	Shaft Dia. (in.)	0.750	0.750	1.000	1.188	1.188
	Max RPM	5200	2488	2058	2091	1714
Supply Drive Kits (Mtr HP-RPM Range)	Min HP	1-2250/1625 1641/1094	1-1703/1230 1250/833	1.5-1591/1193 1250/833	2-1489/1117 1167/843	2-1212/875 913/659
	Med HP	---------	1.5-2068/1670 1703/1230	2-1591/1193 1346/1010	3-1750/1333 1395/1111	3-1434/1142 1160/924 957/778
	Max HP	1.5-2593/1944	2-2068/1670	3-1750/1333 1395/1111	5-1750/1422	5-1434/1142 1160/924
Exhaust Drive Kits (Mtr HP-RPM Range)	Min HP	1-2250/1625 1641/1094	1-1703/1230 1250/833	1-1193/795	1.5-1193/795	2-1212/875 913/659
	Med HP	---------	1.5-2068/1670 1703/1230	1.5-1500/1083 1193/795	2-1432/1034	3-1434/1142 1160/924 957/778
	Max HP	1.5-2593/1944	2-2068/1670	2-1500/1083	3-1564/1191	5-1434/1142 1160/924
Supply ESP (in.wg)	Min	0	0	0	0	0
	Max	1.5	1.5	1.5	1.5	1.5
Exhaust ESP (in.wg)	Min	0	0	0	0	0
	Max	1	1	1	1	1
Weight (lbs)		1510	1670	2610	2780	3080

EVT Unit#		EVT-62	EVT-74	EVT-88	EVT-10	EVT-12
CFM Range (Min-Max)		3,400-6,200	5,400-7,400	6,400-8,800	7,600-10,000	8,000-12,000
ERC Model		5262	5874	6488	68100	74122
Supply Blower	Model	A15 x 11A	A18 x 13A	A18 x 13A	A20 x 9H (2)	A20 x 9H (2)
	Shaft Dia. (in.)	1.188	1.188	1.188	1.438	1.438
	Max RPM	1714	1478	1478	1278	1278
Exhaust Blower	Model	A18 x 13A	A18 x 18A	A18 x 18A	A20 x 20H	A20 x 20H
	Shaft Dia. (in.)	1.188	1.438	1.438	1.688	1.688
	Max RPM	1478	1501	1501	1278	1278
Supply Drive Kits (Mtr HP-RPM Range)	Min HP	3-1395/1111 1122/894 913/723	3-813/648	5-991/805 813/648	5-813/648 687/558	7.5-991/805 846/703 705/575
	Med HP	5-1395/1111 1122/894	5-1155/938 957/778 813/648	7.5-1263/1046 1160/924 932/789	7.5-1027/837 846/703	10-1087/866 882/717
	Max HP	7.5-1454/1158	7.5-1263/1046 1160/924	10-1263/1046	10-1087/866	15-1104/914
Exhaust Drive Kits (Mtr HP-RPM Range)	Min HP	2-818/591	3-813/648	5-991/805 813/648	3-599/484	5-753/565
	Med HP	3-957/778 813/648	5-1047/850 882/703	7.5-1263/1046 1160/924 932/789	5-813/648 687/558	7.5-882/717 775/631
	Max HP	5-1187/945 957/778	7.5-1263/1046 1160/924	10-1263/1046	7.5-882/717	10-1087/866 882/717
Supply ESP (in.wg)	Min	0	0	0	0	0
	Max	1.5	1.5	1.5	1.5	1.5
Exhaust ESP (in.wg)	Min	0	0	0	0	0
	Max	1	1	1	1	1
Weight (lbs)		3330	5210	5560	6230	6670

TABLE 1 - UNIT SPECIFICATIONS





UNIT OVERALL DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	K
EVT-09 / -19	93 ½	47 ⅜	92 ¼	51 ¾	11 ⅛	6 ⅝	17 ¾	9	14 ⅜	18 ¼
EVT-28 / -36	110 ⅞	54 ⅜	109 ⅝	61 ⅝	13 ⅞	6 ¾	20	8 ⅝	15 ⅜	18 ¼
EVT-46 / -62	135 ½	70	134 ¼	79 ½	17 ½	7 ¼	24 ½	11 ⅞	20 ⅜	18 ¼
EVT-74 / -88	149 ½	76 ⅞	148	90 ¼	19 ¼	11 ⅜	29	12 ¼	27 ¾	21 ¼
EVT-10 / -12	161 ½	88 ¼	160 ¼	101 ⅞	21	10 ¾	34	15 ⅜	27 ¾	21 ¼

FIGURE 2 - OVERALL DIMENSIONS

Neutral Air Plus Option - If a cooling capacity beyond that required to achieve a space neutral condition is desired there is an option available that will meet that requirement. This will provide a solution for applications requiring 100% outdoor air, plus meet an additional cooling load. See supplemental brochure for cooling performance with matching condensing unit.

C. HOW IT WORKS

The ERC contains an Enthalpy Wheel that is a new concept in rotary air-to-air heat exchangers. Designed as a packaged unit for ease of installation and maintenance, the standard unit (without optional features) requires only the connection of electrical power to make the system operational. The Enthalpy Wheel is coated with a Silica Gel Desiccant using a patented and proprietary process developed by the wheel manufacturer that permanently bonds it to the polymer substrate without adhesives. Even after years of operation and repeated washings, the desiccant remains in place.

Silica Gel is a highly porous solid adsorbent material that structurally resembles a rigid sponge. Water vapor is transferred between two air streams of different vapor pressures; which drives water molecules into/from the desiccant cavities to transfer moisture from the more humid air stream to the dryer air stream.

Enthalpy is a term representing total heat energy, meaning sensible heat energy plus latent heat energy. Sensible and latent heat are the two components of total heat. Sensible heat is the energy contained in dry air and can be recovered by simply effecting a temperature change in a given VOLUME of air. While latent heat is the energy contained in the water vapor within moist air.

During the summer cooling season the latent heat can only be removed by condensing that vapor below its dew point with the optional cooling coil (water or refrigerant) and draining off the condensate or by absorbing it from the moist supply air stream and then transferring it to the dryer return air stream, which exhausts it to the outside. For buildings that require a large amount of outside air to meet ventilation codes, this greatly reduces the cooling load on the air conditioning system. An additional load reduction can be achieved if the Enervent unit contains the optional Tempering Coil.

In the winter heating season this vapor transfer capability works to increase moisture in the supply air stream by absorbing it from the return air. This reduces the amount of humidification required to maintain comfort level in the occupied space during the heating season. Since the Enthalpy Wheel transfers moisture entirely in the vapor phase, the wheel remains dry eliminating wet surfaces that retain dust and promote fungal growth. Because it is always dry and constantly rotating between the supply and exhaust air streams, which reverses the direction of air flow each half cycle, dust or other particles impinging on the surface are blown off when it rotates into the opposite air stream. This creates a self-cleaning effect.

When the outdoor air temperatures are below 15°F, it is recommended to use the optional Low Ambient Kit.

XII - OPTIONS (FACTORY INSTALLED)

A. ELECTRIC PRE-HEAT

Pre-Heaters are standard as 2-stage, step control. Step control heaters are designed with multiple stagers made up of equal increments of heating capacity. For example, a 10 kw heater with two stages will be composed of two 5 kw stages. Pre-Heaters are single point wired at the factory. A temperature sensor (with field adjustable set point) is mounted in the outdoor air stream after the pre-heater to turn the pre-heater on. See Frost Control Application/ Operation for typical set points. If the temperature falls below the set point and the wheel pressure drop sensor is triggered, the first stage of the pre-heater will turn on. If the first stage does not satisfy the set point, the second stage will also turn on.

B. TEMPERING COILS

Factory installed cooling and/or heating coils are mounted downstream of the Energy Recovery Cassette (ERC) on the supply air side of the unit. All connections are located external to the unit. Water coil connections are wrought copper MPT, and refrigerant coil connections (suction and liquid) are SWT. All coils are copper tubing and aluminum fin construction with expanded collar interface between tube and fin for efficient heat transfer.

Water System - Chilled and hot water coils may be ordered together or separate in a given unit for installation in either a four-pipe or a two-pipe system respectively. Water coils are not normally recommended for use with entering air temperatures below 40°F; but, while no system can be 100% safe against freeze-up with water coils, the ERC does maintain an air temperature higher than 40°F entering the coil. However; glycol solutions, or brines, are the only safe fluid for use in water coils with low entering air temperatures. Additionally, continuous fluid circulation through the coil is highly recommended.

Refrigerant System - Evaporator coil performance is based on Refrigerant 410A matched with a suitably sized condenser. Ruskin does **not** provide the condensing unit; but a distributor with an externally adjustable, externally equalized expansion valve (TXV) is provided by Ruskin. Providing the TXV with liquid line connection external to the unit reduces installation time and provides peak cooling performance across entire application range.

As a guide for selecting a matching condensing unit the TXV provided with each coil was nominally sized for each unit as follows:

UNIT	TXV NOM SIZE	
	NEUTRAL AIR	NEUTRAL AIR PLUS
EVT-09	1.5 TON	4 TON
EVT-19	4 TON	8 TON
EVT-28	6 TON	12 TON
EVT-36	8 TON	15 TON
EVT-46	10 TON	20 TON
EVT-62	13.5 TON	26 TON
EVT-74	16 TON	32 TON
EVT-88	19 TON	37 TON
EVT-10	21 TON	43 TON
EVT-12	26 TON	50 TON

C. ELECTRIC POST-HEAT

Post-Heat will stage on and cycle with thermostat demand. Number of stages will vary depending on Post-Heat assembly. See Post-heat wiring diagram on unit for sequence of operation. Limit controls are factory-set and are not adjustable. A minimum air volume must be maintained through Post-Heat section per **Table 2** to avoid tripping the limit during long periods of operation.

D. GAS POST-HEAT

Construction - Heat exchanger is tubular construction. Standard material is aluminized steel for all units except the EVT-10 and EVT-12 where stainless steel is required. Stainless steel is optional for all other units unless the air temperature supplied to the heat exchanger is below 45°F, where it is required. Burners are inshot, aluminized steel, with direct spark ignition and the gas valve is a redundant automatic dual stage with manual shut-off.

ELECTRIC POST-HEAT - REQUIRED MINIMUM AIR FLOW					
UNIT	NON CFM	MAX KW	NO STAGES	KW AVAIL	MIN CFM
EVT-09	1,000	9.6	1	9.6	800
EVT-19	1,900	19.2	2	19.2	1,600
			1	9.6	800
EVT-28	2,800	19.2	1	19.2	1,600
EVT-36	3,600	19.2	2	38.4	3,200
			1	19.2	1,600
EVT-46	4,600	38.4	2	38.4	3,200
			1	19.2	1,600
EVT-62	6,200	57.6	3	57.6	4,800
			2	38.4	3,200
			1	19.2	1,600
EVT-74	7,400	60	2	60	5,000
			1	30	2,500
EVT-88	8,800	90	3	90	7,500
			2	60	5,000
			1	30	2,500
EVT-10	10,000	90	3	90	7,500
			2	60	5,000
			1	30	2,500
EVT-12	12,000	120	4	120	10,000
			3	90	7,500
			2	60	5,000
			1	30	2,500

TABLE 2- MINIMUM CFM WITH ELECTRIC POST-HEAT OPTION

Controls - Ignition Control provides positive, direct ignition of burners on each operating cycle. The system permits main gas valve to stay open only when burners are proven to be lit. Should flame loss occur, the gas valve closes, shutting off the gas supply to the burners. Ignition module has coded LED to indicate status and aid in troubleshooting. Redundant limit controls are factory installed with fixed temperature setting. Heat limit controls protect heat exchanger and other components from overheating. Flame roll-out switch, flame sensor and combustion air proving switch protect system operation.

Available Selections - **See Chart 2** on **Page 12** for available capacities and specifications by unit size. **Chart 3** on **Page 12** lists performance data for all gas heat units.

E. MOTORIZED DAMPERS

Intake Air - Damper mounts behind the outdoor air intake hood. Opens when the ERV is energized and closes when de-energized. Powered by B30 damper motor.

Exhaust Air - Mounts between the exhaust blower and the return air exhaust hood. Operates in conjunction with Motorized Intake Air Damper. Powered by B31 damper motor.

F. DIRTY FILTER SENSOR

Measures pressure drop across Intake and Exhaust Filters and sends a signal to field wired alarm when filters require maintenance.

G. FROST CONTROL

Extremely cold outdoor air temperatures can cause moisture condensation and frosting on the energy recovery wheel (ERW). The temperature below which frost will begin to accumulate is referred to as the Frost Threshold Temperature, and is a function of both outside temperature and indoor relative humidity (**See Table 3**). Frost formation causes reduction of airflow through the

FROST THRESHOLD TEMPERATURE (OD DB)				
INDOOR RH (%)	INDOOR DB TEMPERATURE			
	70°F	72°F	75°F	80°F
20	-14	-13	-11	-8
30	-3	-2	-1	3
40	5	7	9	11
50	13	13	15	18
60	18	19	21	26

TABLE 3 - FROST THRESHOLD GUIDELINES

ERW; therefore, without frost control, energy recovery and airflow may be significantly reduced.

Frost control is an optional feature that will control wheel frosting. Three frost Control options are available:

1. Exhaust Only
2. Variable ERW Speed
3. Electric Pre-Heat

Exhaust Only - A thermostat control is provided to shut down the supply blower when outdoor temperature drops to a field-selected frost control setting. The thermostat is located within the outdoor air intake hood. To avoid depressurization of the conditioned space, automatic or pressure operated fresh air dampers may be required as part of the ventilation system.

Variable ERC Speed - Available for EVT-46, -62, -74, -88, -10 and -12 only. Achieves frost control by using the degradation of ERC effectiveness that results from decreasing its rotational speed. Control strategy uses input from two sensors: the first measures temperature of the incoming air, and the second determines temperature of the exhaust air. Both sensors have a field-adjustable setpoint. The variable speed system is engaged whenever the incoming air temperature falls below the set point determined from **Table 3**. The wheel rpm is controlled to maintain a minimum exhaust temperature, selected using **Table 4**. As the wheel slows, losing effectiveness, less energy is recovered from the exhaust air allowing it to exit at a warmer temperature. Values in **Table 4** have been derived from the accepted empirical model to allow entering supply air to remove all water deposited on the wheel by the exhaust. This option is best used for applications where the hours required for frost control are limited.

EXHAUST AIR TEMPERATURE AND ERW EFFECTIVENESS						
ERW EFF	70°F AND 20% RH INDOORS		70°F AND 30% RH INDOORS		70°F AND 40% RH INDOORS	
	DESIGN TEMP	EAT	DESIGN TEMP	EAT	DESIGN TEMP	EAT
%	F°	F°	F°	F°	F°	F°
0.80	-13	4.0	-3	12.0	4	17.3
0.70	-15	11.0	-4.5	18.0	3	23.1
0.60	-19	17.0	-8	24.0	1	28.6
0.50	-26	22.0	-13	28.5	-3	33.5
0.45	-31	25.0	-17	31.0	-5	36.2
0.40	-40	26.0	-24	32.5	-10	38.0

TABLE 4 - EXHAUST AIR LEAVING TEMPERATURE AND ENERGY RECOVERY WHEEL EFFECTIVENESS

Electric Pre-Heat - This is the recommended method of preventing frost formation while ensuring required ventilation rates for most cold climate applications. A constant air temperature, above the frost threshold, is maintained entering the ERC by cycling a 2-stage electric heat unit located just after the fresh air hood. The heater is controlled by a field adjustable temperature sensor located at the inlet of the wheel. If the temperature falls below the setpoint the first stage will turn on. If that does not satisfy the load, the second stage turns on. See Pre-Heat wiring diagram for circuit logic.

H. CO_2 SENSOR

Helps control indoor air quality based on CO_2 levels in the occupied space. High CO_2 levels can either trigger a response from the EnERVent unit by turning on the blowers to bring in fresh air or by modulating the blowers if a VFD option has been selected. See Basic Unit wiring diagram for circuit information.

I. ROTATION SENSOR

The circuit indicates the absence of pulses, within a specified time range, provided by a magnetic sensor detecting a magnet mounted on wheel surface. After the initial time delay of approximately 5 seconds from circuit power up, if the sensor fails to provide a signal pulse (no wheel rotation) within approximately 5 additional seconds, the alarm relay will activate the latch (until circuit powers down) providing a 5 amp contact closure output. This would indicate no wheel rotation and/or magnet in the system has stopped at the magnetic sensor pickup point. If the pulse (wheel rotation) is detected within the approximately 5 second time period, the alarm relay will remain open. No field timing adjustment of any type will be required.

J. SMOKE DETECTORS

Duct mounted smoke detectors can be installed in both return and/or supply air streams. Signals from the smoke detectors can be set to start-up or shut-down the ERV unit if smoke is detected. See Basic Unit wiring diagram for circuit information.

K. LOW AMBIENT KIT

Limits HVAC system operation when outdoor temperature is below 10°F.

L. SENSIBLE-ONLY ERC

An Energy Transfer Wheel without the latent energy transfer capability of the standard Enthalpy Wheel is available for dry-climate application (RH less than 30%). This wheel does not have the Silica Gel coating applied.

M. MERV 11 and 13 AIR FILTERS

All units are shipped with MERV 8 supply and exhaust air filters. MERV 11 or 13 filters are available as factory installed options. MERV 8 filters are 30-35% efficient. MERV 11 provides 60-65% efficiency at roughly the same resistance level. The MERV 13 filter achieves the minimum efficiency requirements (80-85%) of LEED Green Building design. All are 2 inch thick, V-pleat design, supported with expanded metal with Minimum Efficiency Reporting Value determined per ASHRAE 52.2.

N. ELECTRONIC TEMPERATURE CONTROL SYSTEM

Works in conjunction with optional heating and cooling coils to temper the supply air back to ambient conditions. Tempering the air entering the occupied pace allows

Enervent to bring in 100% outside air without putting an additional load on the rooftop unit. The ETCS can be entreated with a building automation system.

O. ECONOMIZER APPLICATION

Operation of the Energy Recovery Wheel can be altered, sometimes referred to as Start, Stop, Jog, to take advantage of economizer operation, which amounts to free cooling. This is accomplished by:

De-energizing The ERC - Accomplished with a signal from a Primary Temperature Sensor mounted in the air intake compartment. This sensor will de-energize the energy wheel when the outdoor air temperature falls below the set point; which is factory set at 65°F, but is field adjustable. An Override temperature sensor is also furnished in the outdoor air intake compartment to deactivate the economizer mode. This Override sensor, also field adjustable, is factory set at 50°F; i.e., something less that the Primary sensor. The two sensors together create a deadband where the ERC will not operate and free cooling can enter the building unconditioned.

P. REMOTE PANEL

The Remote Panel is available with a number of different alarm lights and switches to control the unit. It ships loose and requires mounting and wiring in the field. The panel is available with the following features:

- Unit On/Off Switch
- Unit On/Off Light
- 7-Day Time Clock
- Hand/Off/Auto Switch
- Time Delay Override
- Exhaust Air Dirty Filter Light
- Supply Air Dirty Filter Light
- Economizer Light
- Frost Control Light
- Wheel Rotation Sensor Light

Q. GFCI SERVICE OUTLET

A 120 VAC GFCI service outlet is shipped loose for field installation. Requires separate power source so power is available when unit main disconnect is turned off for servicing.

R. EME INTAKE LOUVERS

A fresh air hood consisting of a built-in, louvered, moisture eliminator requiring no maintenance during the life of the unit. This contrasts with the standard hood, which contains an aluminum mesh filter(s) requiring routine maintenance. The EME intake surface is parallel to front of the unit and extends outward approximately four inches.

S. VFD BLOWER CONTROL

Variable Frequency Drives (VFD) control the blower speed. One VFD is provided for each blower (supply and return). The VFD's provided are Allen-Bradley PowerFlex 40. Refer to the unit control center for unit specific wiring diagram.

EVT-09 SUPPLY & EXHAUST AIR PERFORMANCE RATINGS																
AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)														
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
600	1250	1120	0.20	1338	0.28	1536	0.37	1721	0.47	1893	0.58	na	na	na	na	na	na
700	1458	1249	0.29	1446	0.38	1624	0.48	1792	0.59	1952	0.70	2105	0.83	2251	0.95	na	na
800	1667	1375	0.40	1557	0.51	1720	0.62	1874	0.74	2020	0.86	2162	0.99	2299	1.12	2432	1.26
900	1875	1495	0.53	1667	0.66	1819	0.78	1961	0.91	2097	1.04	2228	1.17	2356	1.31	2480	1.46
1000	2083	1618	0.69	1781	0.83	1924	0.97	2057	1.11	2185	1.25	2307	1.39	2426	1.54	2542	1.70

EVT-19 SUPPLY & EXHAUST AIR PERFORMANCE RATINGS																
AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)														
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	1385	**746**	**0.16**	1002	0.27	1216	0.38	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
1150	1769	**869**	**0.29**	1088	0.42	1281	0.55	1453	0.70	1610	0.85	**na**	**na**	**na**	**na**	**na**	**na**
1400	2154	984	0.46	1175	0.61	1349	0.77	1508	0.94	1656	1.12	1794	1.29	1923	1.47	**na**	**na**
1650	2538	1096	0.69	1263	0.86	1421	1.05	1568	1.24	1706	1.43	1837	1.63	1960	1.84	2078	2.05
1900	2923	1205	0.97	1353	1.17	1497	1.38	1632	1.59	1761	1.81	1884	2.04	2002	2.26	**2114**	**2.49**

EVT-28 SUPPLY AIR PERFORMANCE RATINGS																
AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)														
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	1951	**697**	**0.39**	876	0.57	1033	0.75	1177	0.95	1309	1.15	**na**	**na**	**na**	**na**	**na**	**na**
1900	2317	**784**	**0.60**	941	0.81	1083	1.02	1215	1.24	1338	1.47	1454	1.70	1564	1.95	**1668**	**2.20**
2200	2683	865	0.87	1006	1.10	1136	1.34	1257	1.59	1372	1.84	1481	2.10	1585	2.37	1684	2.64
2500	3049	950	1.21	1076	1.47	1196	1.74	1308	2.01	1414	2.29	1516	2.57	1614	2.87	1709	3.17
2800	3415	1032	1.62	1145	1.91	1255	2.20	1361	2.50	1461	2.81	1555	3.12	1648	3.44	**1738**	**3.76**

EVT-28 EXHAUST AIR PERFORMANCE RATINGS																
AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)														
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1600	1416	645	0.29	852	0.46	1024	0.64	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
1900	1681	712	0.44	899	0.63	1060	0.84	1204	1.05	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
2200	1947	772	0.61	943	0.84	1094	1.07	1231	1.31	1357	1.56	1473	1.82	**na**	**na**	**na**	**na**
2500	2212	834	0.83	991	1.09	1133	1.35	1263	1.61	1383	1.88	1495	2.16	**1601**	**2.45**	**1701**	**2.75**
2800	2478	890	1.09	1037	1.37	1171	1.66	1294	1.95	1409	2.25	**1517**	**2.55**	**1620**	**2.86**	**1717**	**3.18**

EVT-36 SUPPLY AIR PERFORMANCE RATINGS																
AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)														
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2400	2124	**772**	**0.70**	939	0.94	1088	1.19	1222	1.44	1346	1.71	1462	1.98	1570	2.26	na	na
2700	2389	**832**	**0.90**	987	1.21	1126	1.48	1224	1.76	1373	2.05	1484	2.34	1589	2.65	1689	2.95
3000	2655	888	1.20	1032	1.51	1164	1.82	1285	2.12	1399	2.44	1506	2.75	1608	3.08	1705	3.41
3300	2920	944	1.52	1078	1.86	1202	2.19	1318	2.53	1428	2.87	1531	3.21	1629	3.56	1723	3.92
3600	3186	999	1.89	1125	2.26	1243	2.62	1353	2.99	1458	3.36	1557	3.73	1652	4.10	1744	4.48

EVT-36 EXHAUST AIR PERFORMANCE RATINGS																
AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)														
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2400	1667	**753**	**0.60**	932	0.86	1090	1.14	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
2700	1875	809	0.80	974	1.08	1123	1.38	1259	1.70	1385	2.03	**na**	**na**	**na**	**na**	**na**	**na**
3000	2083	859	1.02	1013	1.33	1154	1.65	1284	1.99	1405	2.35	1519	2.72	**na**	**na**	**na**	**na**
3300	2292	908	1.27	1053	1.61	1186	1.96	1310	2.32	1427	2.70	1537	3.09	**1641**	**3.49**	**na**	**na**
3600	2500	956	1.56	1094	1.93	1220	2.31	1338	2.69	1450	3.09	**1556**	**3.50**	**1658**	**3.93**	**1755**	**4.37**

CHART 1 - BLOWER PERFORMANCE

EVT-46 SUPPLY & EXHAUST AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	1887	**610**	**0.71**	756	1.01	885	1.32	1001	1.65	1107	1.99	1205	2.34	**na**	**na**	**na**	**na**
3400	2138	**657**	**0.96**	793	1.29	914	1.64	1024	2.00	1126	2.37	1221	2.75	1310	3.14	**na**	**na**
3800	2390	704	1.26	830	1.62	944	2.00	1049	2.40	1146	2.80	1238	3.21	1325	3.63	1407	4.06
4200	2642	750	1.60	867	2.01	975	2.42	1075	2.84	1169	3.28	1257	3.72	1341	4.18	1421	4.64
4600	2893	795	2.01	905	2.44	1007	2.89	1102	3.35	1192	3.82	1277	4.29	1359	4.78	1434	5.28

EVT-62 SUPPLY AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3400	2138	**594**	**0.83**	**738**	**1.15**	864	1.49	979	1.85	1084	2.21	1182	2.59	1273	2.97	1359	3.37
4100	2579	**672**	**1.32**	799	1.71	913	2.10	1018	2.52	1116	2.94	1208	3.37	1295	3.81	1377	4.26
4800	3019	748	1.96	862	2.42	966	2.88	1062	3.34	1153	3.82	1239	4.31	1321	4.81	1400	5.31
5500	3459	823	2.78	926	3.30	1021	3.82	1111	4.35	1195	4.89	1276	5.43	1354	5.98	1428	6.55
6200	3899	895	3.79	989	4.37	1078	4.96	1161	5.55	1240	6.14	1316	6.74	13.89	7.35	1460	7.97

EVT-62 EXHAUST AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3400	1491	**482**	**0.64**	625	0.99	747	1.37	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
4100	1798	**537**	**0.99**	664	1.40	776	1.83	877	2.28	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
4800	2105	**589**	**1.44**	704	1.91	807	2.39	902	2.90	990	3.43	1072	3.97	**na**	**na**	**na**	**na**
5500	2412	640	2.00	745	2.53	840	3.07	929	3.63	1013	4.21	1091	4.80	1166	5.42	**1236**	**6.05**
6200	2719	687	2.67	784	3.25	873	3.85	957	4.47	1036	5.10	1111	5.74	**1182**	**6.41**	**1250**	**7.09**

EVT-74 SUPPLY AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5400	2368	**575**	**1.66**	687	2.17	789	2.70	881	3.24	968	3.80	1050	4.38	1126	4.98	1199	5.59
5900	2588	**608**	**2.07**	714	2.62	810	3.19	899	3.77	982	4.37	1061	4.98	1136	5.62	1207	6.27
6400	2807	**640**	**2.52**	741	3.13	833	3.74	918	4.36	998	5.00	1074	5.65	1147	6.32	1216	7.01
6900	3026	673	3.06	769	3.71	856	4.36	938	5.02	1015	5.69	1088	3.62	1159	7.09	1226	7.81
7400	2719	707	3.66	798	4.36	882	5.06	960	5.75	1035	6.47	1105	7.20	1174	7.94	1239	8.70

EVT-74 EXHAUST AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5400	1882	559	1.53	683	2.13	792	2.77	890	3.43	981	4.12	**na**	**na**	**na**	**na**	**na**	**na**
5900	2056	588	1.87	706	2.53	810	3.21	905	3.92	993	4.54	1075	5.41	**na**	**na**	**na**	**na**
6400	2230	617	2.27	729	2.97	829	3.70	921	4.45	1006	5.23	1086	6.03	1163	6.88	1233	7.69
6900	2404	646	2.71	752	3.46	848	4.24	937	5.04	1020	5.86	1098	6.70	1171	7.57	1242	8.45
7400	2578	676	3.22	777	4.02	870	4.84	955	5.69	1036	6.56	1112	7.45	1184	8.36	1252	9.28

EVT-88 SUPPLY AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6400	2807	**617**	**2.40**	720	3.00	813	3.61	900	4.22	981	4.86	1058	5.51	1131	6.17	1201	6.85
7000	3070	656	3.01	753	3.68	841	4.34	924	5.00	1001	5.68	1075	6.38	1145	7.08	1214	7.81
7600	3333	695	3.72	786	4.44	870	5.16	949	5.88	1023	6.61	1094	7.34	1162	8.10	1227	8.87
8200	3596	734	4.53	823	5.35	900	6.08	975	6.86	1046	7.64	1115	8.43	1180	9.22	1243	10.03
8800	2719	773	5.45	853	6.28	930	7.12	1002	7.95	1071	8.78	1136	9.61	1200	10.46	**1260**	**11.30**

CHART 1 (CONT'D) - BLOWER PERFORMANCE

EVT-88 EXHAUST AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6400	2230	**591**	**2.12**	705	2.81	807	3.54	901	4.29	988	5.06	1069	5.85	1145	6.67	1217	7.50
7000	2439	**625**	**2.63**	733	3.39	831	4.17	920	4.97	1004	5.80	1082	6.65	1159	7.54	1228	8.40
7600	2648	**659**	**3.22**	761	4.04	854	4.87	940	5.73	1021	6.61	1097	7.51	1170	8.43	1239	9.37
8200	2857	692	3.88	789	4.76	879	5.65	961	6.57	1039	7.50	1113	8.45	1184	9.43	1251	10.42
8800	3066	725	4.63	818	5.56	903	6.52	983	7.48	1058	8.47	1130	9.48	1199	10.51	**1264**	**11.55**

EVT-10 SUPPLY AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7600	2242	**520**	**2.35**	610	3.05	694	3.80	775	4.60	851	5.44	923	6.32	991	7.23	1060	8.17
8200	2419	**548**	**2.85**	632	3.58	713	4.37	788	5.21	861	6.09	931	7.01	998	7.97	1061	8.94
8800	2596	575	3.40	655	4.18	731	5.01	803	5.89	873	6.81	941	7.78	1005	8.76	1067	9.78
9400	2773	603	4.03	679	4.85	750	5.72	820	6.63	886	7.59	951	8.59	1013	9.62	1074	10.68
10000	2950	630	4.72	702	5.59	771	6.49	837	7.45	901	8.44	963	9.47	1023	10.55	**1082**	**11.65**

EVT-10 EXHAUST AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7600	1788	484	2.06	584	2.86	678	3.75	764	4.69	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
8200	1929	507	2.46	602	3.31	691	4.24	774	5.23	851	6.26	**na**	**na**	**na**	**na**	**na**	**na**
8800	2071	530	2.91	620	3.80	704	4.77	784	5.81	859	6.89	**na**	**na**	**na**	**na**	**na**	**na**
9400	2212	554	3.42	638	4.34	719	5.36	795	6.43	868	7.56	**937**	**8.74**	**na**	**na**	**na**	**na**
10000	2353	577	3.97	657	4.94	734	5.99	807	7.11	878	8.29	**945**	**9.51**	**1009**	**10.76**	**na**	**na**

EVT-12 SUPPLY AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8000	2360	**523**	**2.56**	**610**	**3.27**	692	4.03	770	4.85	845	5.72	916	6.62	984	7.55	1049	8.51
9000	2655	**569**	**3.46**	649	4.25	707	4.89	795	5.96	865	6.89	932	7.85	996	8.85	1058	9.88
10000	2950	615	4.56	688	5.41	757	6.31	824	7.25	888	8.24	951	9.26	1011	10.33	1070	11.43
11000	3245	660	5.85	728	6.78	793	7.75	854	8.75	914	9.80	973	10.89	1030	12.01	1086	13.17
12000	3540	703	7.32	768	8.36	828	9.39	886	10.46	942	11.57	997	12.71	1051	13.89	1103	15.11

EVT-12 EXHAUST AIR PERFORMANCE RATINGS

AIR VOLUME (CFM)	OUTLET VELOCITY (FPM)	TOTAL STATIC PRESSURE (In. w.g.)															
		0.00		0.50		1.00		1.50		2.00		2.50		3.00		3.50	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8000	1882	**482**	**2.19**	580	3.00	671	3.90	756	4.87	835	5.88	**na**	**na**	**na**	**na**	**na**	**na**
9000	2118	**521**	**2.92**	610	3.80	676	4.55	773	5.81	849	6.90	920	8.03	**na**	**na**	**na**	**na**
10000	2353	**560**	**3.79**	641	4.74	719	5.78	793	6.88	864	8.05	932	9.26	997	10.51	**na**	**na**
11000	2588	599	4.81	673	5.84	746	6.94	814	8.11	881	9.34	946	10.62	**1008**	**11.95**	**1065**	**13.31**
12000	2824	624	5.75	705	7.08	771	8.22	837	9.47	900	10.77	**961**	**12.11**	**1020**	**13.51**	**1078**	**14.95**

	LOW SPEED	**XXXX**	An operating point in BOLD TYPE indicates a field furnished drive.
	MED SPEED	**na**	This operating point is outside the efficient operating range of the blower.
	HIGH SPEED	**XXXX**	This operating point exceeds the maximum BHP of the blower motor.

Notes:

1. This blower data accounts for the pressure drop across the Energy Recovery Wheel and the internal cabinet losses, but does not include the pressure drop for selected Accessories and Options; which can be found in the corresponding tables and must be added to the system External Static Pressure to determine Total Static Pressure correct RPM and BHP.
2. Gross Supply Air Performance Ratings (airflow, pressure, and power) are at Port 2 with Port 1, Port 3 and Port 4 at manufacturers specified static pressures, with Port 1 and Port 3 equal.
3. Gross Exhaust Air Performance Ratings (airflow, pressure, and power) are to Port 3 with Port 1, Port 2 and Port 4 at manufacturers specified static pressures, with Port 2 and Port 4 equal.
4. Power rating (bhp) does not include drive losses.
5. Performance ratings do not include the effects of appurtenances in the air stream.
6. Drives are sized for a minimum of 150% of driven horsepower.
7. WATTS = 746 x BHP

UNIT	AIR VOLUME (cfm)		INPUT	OUTPUT @ 81% EFF			MANIFOLD PRESSURE		NATURAL GAS
				ALL	2-STAGE	MODULATING			
	Min.	Max.	HIGH FIRE (Btuh)	HIGH FIRE[1] (Btuh)	LOW FIRE[2] (Btuh)	LOW FIRE[3] (Btuh)	HIGH FIRE	LOW FIRE	ORIFICE SIZE
EVT-09	300	1,000	40,000	32,400	17,800	NA	3.5	1.1	51
EVT-19	600	1,900	80,000	64,800	35,600		3.5	1.1	51
EVT-28	900	2,800	112,500	91,100	50,100		3.5	1.1	46
EVT-36	1,200	3,600	150,000	121,500	66,800	12,200	3.5	1.1	46
EVT-46	1,500	4,600	200,000	162,000	89,100	16,200	3.5	1.1	42
EVT-62	1,900	6,200	250,000	202,500	111,400	20,300	3.5	1.1	42
EVT-74	2,200	7,400	300,000	243,000	133,700	24,300	3.5	1.1	34
EVT-88	2,600	8,800	350,000	283,500	155,900	28,400	3.5	1.1	34
EVT-10	3,000	10,000	400,000	324,000	178,200	32,400	3.5	1.1	3.3mm
EVT-12	3,700	12,000	500,000	405,000	263,300	40,500	3.7	1.6	3.3mm

1. High Fire (Stage 2) output is at the guaranteed minimum of 81% efficiency.
2. Low Fire (Stage 1) output is 55% of High Fire output except for EVT-12, which is 65%.
3. Low Fire (Modulating) output is 20% of one half the High Fire output.

CHART 2 - GAS POST-HEAT DATA

GAS HEAT PERFORMANCE DATA															
MODEL	INPUT	OUTPUT[1]	Temperature Rise (TR, deg F)												
			20	25	30	35	40	45	50	55	60	65	70	75	80
	(Btuh)		CFM												
EVT-09	40,000	32,400	1,500	1,200	1,000	860	750	670	600	550	500	470	430	400	380
EVT-19	80,000	64,800	3,000	2,400	2,000	1,720	1,500	1,340	1,200	1,100	1,000	930	860	800	750
EVT-28	112,500	91,100	4,220	3,380	2,820	2,420	2,110	1,880	1,690	1,540	1,410	1,300	1,210	1,130	1,060
EVT-36[2]	150,000	121,500	5,630	4,500	3,750	3,220	2,820	2,500	2,250	2,050	1,880	1,740	1,610	1,500	1,410
EVT-46[2]	200,000	162,000	7,500	6,000	5,000	4,290	3,750	3,340	3,000	2,730	2,500	2,310	2,150	2,000	1,880
EVT-62[2]	250,000	202,500	9,380	7,500	6,250	5,360	4,690	4,170	3,750	3,410	3,130	2,890	2,680	2,500	2,350
EVT-74[2]	300,000	243,000	11,250	9,000	7,500	6,430	5,625	5,000	4,500	4,100	3,750	3,460	3,210	3,000	2,800
EVT-88[2]	350,000	283,500	13,130	10,500	8,750	7,500	6,570	5,840	5,250	4,780	4,380	4,040	3,750	3,500	3,290
EVT-10[2]	400,000	324,000	15,000	12,000	10,000	8,580	7,500	6,670	6,000	5,460	5,000	4,620	4,290	4,000	3,750
EVT-12[3]	500,000	405,000	18,750	15,000	12,500	10,720	9,380	8,340	7,500	6,820	6,250	5,770	5,360	5,000	4,690

1. Listed Output is at the guaranteed minimum efficiency of 81%
2. Stainless Steel Heat Exchanger is Standard for Modulating Gas Heat Options Only.
3. Stainless Steel Heat Exchanger is Standard for all Gas Heat Options.

CHART 3 - GAS HEAT PERFORMANCE (CFM VS TR)