

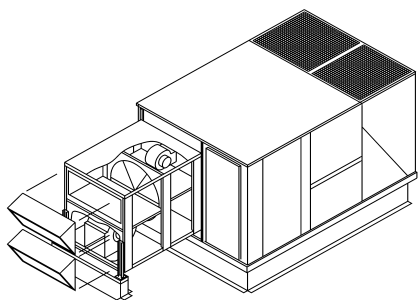


Heating and Air Conditioning

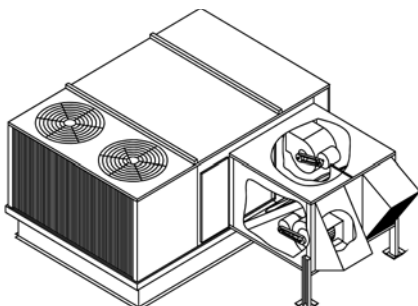
TECHNICAL GUIDE

MAXA-M\$ER[®]

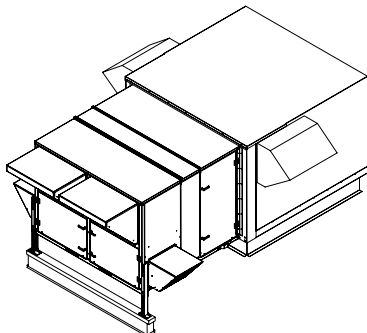
V* Series Unitized Energy Recovery Ventilators



ERV Unit with Predator[®] Packaged Unit



ERV Unit with Sunline[®] Packaged Unit



ERV Unit with Millennium[®] Packaged Unit

DESCRIPTION

- Reduces cooling load at design temperatures up to 4 tons per 1000 cfm of outside air.
- Reduces heating load up to 2.5 Tons Btuh per 1000 CFM of outside air.
- Dry energy transfer. Moisture in supply (intake) air stream is transferred to exhaust air stream in a vapor state, eliminating condensate plumbing from the UERV.
- Attaches directly to the York rooftop units. All mounting equipment is provided.
- Separate fused power supply. (Except Millennium or VR74 or VR122)
- Filters / mist eliminators are provided on the entering air openings.
- Adjustable support legs are provided.
- Two modes of operation (Pivoting Wheel Models only)
 - Recovery mode during normal energy recovery operation.
 - True economizer mode when outside sensor calls for economizer operation (3 - 12.5 ton packaged units equipped with economizers). U. S. Patent 5,548,970.
- Pivoting wheel models used with packaged unit with economizer. Sequence of operation controlled by economizer controller. (Small Sunline and Predator Only)
- Balancing dampers provided on VR, VH and VU Modules. (Except Millennium or VR74 and VR122)
- Centrifugal blowers (both intake and exhaust for high static capability and low sound levels). (Except Millennium, VR74 and VR122)
- Heavy gauge galvanized steel cabinets corrosion protected with powder paint process that match York units.
- Fully insulated cabinet.
- AHRI certified internal enthalpy wheel is provided.
- Internal enthalpy wheel made of polymeric material with silica gel impregnated into the material. The enthalpy wheel has a five year limited warranty.
- Internal enthalpy wheels are easily cleanable. Large wheels (25 inch diameter and above) are split into easily removable pie segments. Smaller wheels can be removed from the ERV.
- Continuous operation down to 10 °F (-12 °C) without defrost at indoor relative humidity up to 40%. For temperatures below 10 °F (-12 °C), Optional Low Ambient Control Kit is required. Kit includes temperature sensor to control the ERV before frost build up can occur on recovery wheel.

Note: MAXA-M\$ER[®] UERV's are designed for use with rooftops using 14" high or greater roof curbs.

Note: Predator models ZF/ZH/ZJ/XP* 037-150, with ERV must use "slab" type economizers and downflow position.



Energy recovery COMPONENT rated in accordance with AHRI/ANSI Standard 1060-2005 and certified to AHRI. Actual performance in packaged equipment may vary.



ETL Certified per UL 1995 and CSA 22.2

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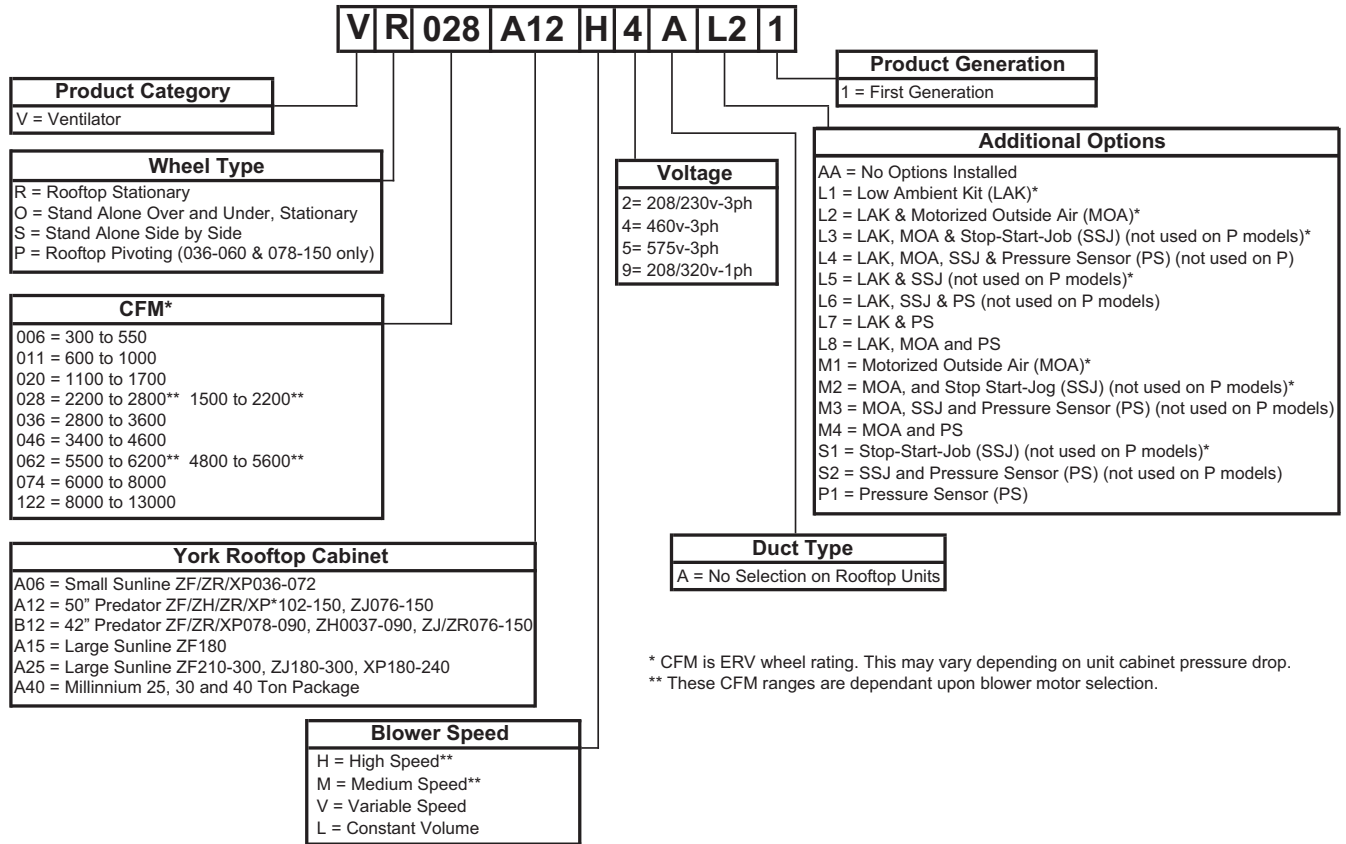
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YORK UERV MODEL NOMENCLATURE

York UERV Model Nomenclature



* CFM is ERV wheel rating. This may vary depending on unit cabinet pressure drop.
** These CFM ranges are dependant upon blower motor selection.

APPLICATIONS

Unitized Energy Recovery Ventilators (UERV) are used with the York rooftop packaged units. The internal wheel provides sensible and latent energy exchange between the entering and exhaust air streams of a building. This allows a substantial amount of the energy, which is normally lost in the exhaust air stream to be returned into the entering air. Ideal applications are areas that have cold or hot temperatures, or areas that have high humidity or very low humidity (recover exhaust air from buildings that have humidifiers to add humidity). Application software is available to provide the energy and dollar savings for all areas of the United States and Canada.

PRINCIPLE OF OPERATION

The UERV enthalpy wheel contains parallel layers of a polymeric material that are impregnated with silica gel (desiccant). The wheel is located in the entering (intake) air and exhaust air streams of the ventilation equipment. As the wheel rotates through each air stream, the wheel surface adsorbs sensible and latent energy. In the heating mode, the wheel rotates to provide a constant transfer of heat from the exhaust air stream to the colder intake air stream. During the cooling season, the process is reversed. On units equipped with an economizer (3 - 12.5 tons), the wheel pivots out of the air stream to allow economizer to operate normally for "free cooling" when outdoor temperature and humidity is acceptable. During economizer operation, the UERV exhaust blower continues to run, providing power exhaust for the system. The intake blower is de-energized during economizer operation.

AHRI/ANSI STANDARD 1060-2005 FOR AIR-TO-AIR ENERGY RECOVERY VENTILATION EQUIPMENT

The Air-Conditioning, Heating and Refrigeration Institute (AHRI) issued Standard 1060-2005 to certify air-to-air energy recovery ventilators. This standard deals specifically with the ratings of the Energy Recovery Wheel that is incorporated into the Energy Recovery Ventilator (ERV). All of the York ERV's have an AHRI certified energy recovery wheel. The data shown in the specification charts is the AHRI certified ratings for the wheel. Actual performance in the ERV may vary.

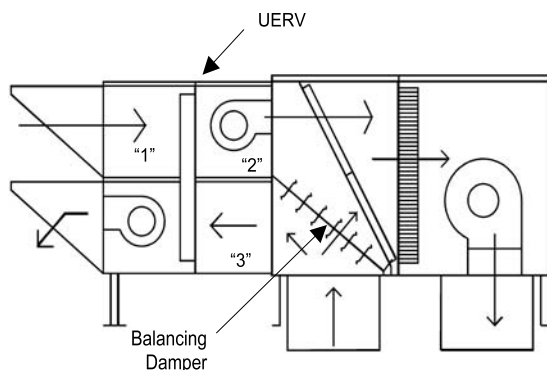


FIGURE 1 - UNITIZED ENERGY RECOVERY VENTILATOR

Critical Terms for Standard 1060 are as follows:

1. **Effectiveness.** The measured energy recovery effectiveness not adjusted to account for that portion of the psychrometric change in the leaving supply air (Station 2) that is the result of leakage of entering exhaust air (Station 3) rather than exchange of heat or moisture between the air streams.
2. **Net Effectiveness.** The measured recovery effectiveness adjusted to account for that portion of the psychrometric change in the leaving supply air (Station 2) that is the result of leakage of the entering exhaust air (Station 3) rather than exchange of heat or moisture between the air streams.
3. **Exhaust Air Transfer Ratio (EATR).** The tracer gas concentration difference between the leaving supply air (Station 2) and entering supply (outdoor) air stream (Station 1) divided by the tracer gas concentration in the entering exhaust (return) air (Station 3) at the 100% rated air-flow, expressed as a percentage.
4. **Outdoor Air Correction Factor (OACF).** The entering supply (outdoor) airflow (Station 1) divided by the measured (gross) leaving supply airflow (Station 2).

ENERGY RECOVERY WHEEL

The heart of the Energy Recovery Ventilator is the Energy Recovery Wheel (defined by AHRI as a rotary heat exchanger). The wheel has a patented design of parallel layers of wrapped polymeric material that is impregnated with a silica gel (desiccant). This unique design makes it the only truly cleanable wheel on the market today. The small wheels (30 inch diameter and smaller) are slide out cassettes, and the larger wheels have pie segments that are removable for cleaning.

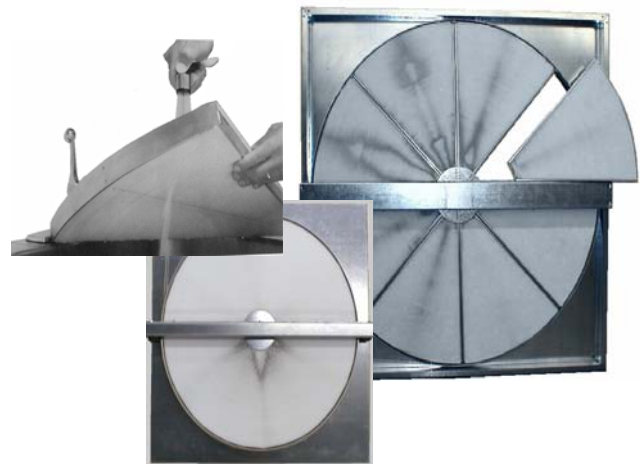


FIGURE 2 - ENERGY RECOVERY WHEEL

CROSS LEAKAGE IN UERV'S (PURGE SECTORS)

The issue of cross leakage in rotary wheel based UERV's used in space conditioning applications is often misunderstood. As a result, many systems are installed with purge sectors and the additional fan capacity required to allow these sectors to function when in fact they are unnecessary. A better understanding of the rationale for the purge sector, and its history, allows us to dispense with the purge sector, its added first cost and continuing cost of operation.

A purge sector minimizes the carry over cross leakage from the exhaust into the supply (outside air) air stream by shunting a portion of the supply air back into the exhaust air stream across the seal separating the exhaust and supply. This is required in industrial applications where the exhaust carries contaminants. This typically results in air volume being 15%

to 20% higher to get the desired air intake, and the cost associated with it.

In space conditioning applications, where the ventilation is operating to maintain acceptable indoor air quality, there are no contaminants in concentrations large enough to cause concern. Cross leakage in the UERV system results in a small amount of the exhaust air, typically less than 5% in balanced airflow, returning to the space. This is not contaminated air, as some would suggest. It is however air that effectively never left the space. The operation cost of moving this air is far less than that required for a purge sector. Do not use the York UERV's in applications that have concentrations of contaminants.

TABLE 1: UERV OUTSIDE AIR CFM SELECTION BY CFM

Unit-Tons	300-550	600-1000	1100-1700	1500-2800	2800-3600	3400-4600	4800-5600	5500-6200	6000-8000	8000-13000	
Rooftop	1.5 - 6	1.5 - 6	Stand Alone type ERV's are available for all tonnage sizes.								
		7.5 - 12.5	7.5 - 12.5	7.5 - 12.5							
				15 - 25	15 - 25	15 - 25	15 - 25	15 - 25			
									25 - 40	30 - 40	
Stand Alone ERV's are available for equipment room applications.											

OPTIONAL ACCESSORIES - FIELD INSTALLED

UERV Equipment Support - 8 inch (203 mm) high base for support of the exhaust and intake end of the UERV. Must be ordered separately from the UERV.

match the specified unit. See specification pages for required curb. Must be ordered separately from UERV.

Stand Alone Balancing Damper - Balancing dampers are used with VO and VS models when ERV is connected to the rooftop unit, not to ductwork on the roof.

<u>UERV</u>	<u>Equipment Support Part No.</u>
VR006	1ES0401
VR/P011	1ES0402
VR/P020	1ES0402
VR/P028	1ES0402

<u>UERV</u>	<u>Equipment Support Part No.</u>
VR036	1ES0403
VR046	1ES0403
VR062	1ES0404
VR074	
VR122	

Roof Curb - A 14 or 24 inch (355 or 610 mm) roof curb is required to match supply and exhaust openings of the UERV with the rooftop units. York provides a full line of roof curbs to

OPTIONAL ACCESSORIES - FACTORY INSTALLED

Low Ambient Control Kit - Prevents frost formation on energy wheel heat transfer surfaces by terminating the intake blower operation when discharge air temperature falls below a field selectable temperature setting. Intake blower operation resumes operation after temperature rises above the adjustable temperature differential.

Pressure Sensor - Measurement device on the UERV to determine airflow across the Wheel.

Motorized Intake Air Damper - Damper mounts in the outdoor air intake hood. It opens when the UERV is energized and closes when de-energized.

Stop-Start-Jog - Function that rotates the Enthalpy Wheel (non-pivoting models) on a preset timer to prevent contamination of the wheel during economizer operation.

ERV Option Codes (ex.: VR028A12H4AL3 would be an R28 series high speed 460 volt UERV with a Low Ambient kit, Motorized Outside Air, and Stop-Start-Jog kit.)

- L1 - Low Ambient Kit (LAK) *
- L2 - LAK & Motorized. Outside Air (MOA) *
- L3 - LAK, MOA, & Stop-Start-Jog (SSJ) *
- L4 - LAK, MOA, SSJ, & Pressure Sensor (PS)
- L5 - LAK and SSJ *
- L6 - LAK, SSJ, and PS
- L7 - LAK and PS
- L8 - LAK, MOA, and PS
- M1 - Motorized Outside Air (MOA) *
- M2 - MOA and Stop-Start-Jog (SSJ) *
- M3 - MOA, SSJ, and Pressure Sensor (PS)

- M4 - MOA and PS
- S1 - Stop-Start-Jog (SSJ) *
- S2 - SSJ and Pressure Sensor (PS)
- P1 - Pressure Sensor (PS)

NOTE: * denotes only options available for VR074 & VR122.

HOW TO SELECT THE PROPER AIR CONDITIONING UNIT AND UNITARY ENERGY RECOVERY VENTILATOR

1. Determine the air conditioning load requirements with the required amount of outside air without an UERV.
2. Select the proper UERV for the outside air CFM requirements and calculate the tonnage reduction through the York UERV software program.
3. Select the air conditioning unit required by reducing the load determined in step 1 by the reduction in step 2. (Example: If the load in Step 1 was 10 tons, and the reduction in Step 2 was 2.5 tons, select a 7.5 ton unit.)
4. Select the proper UERV based on the select unit. The York part numbering scheme is as follows:

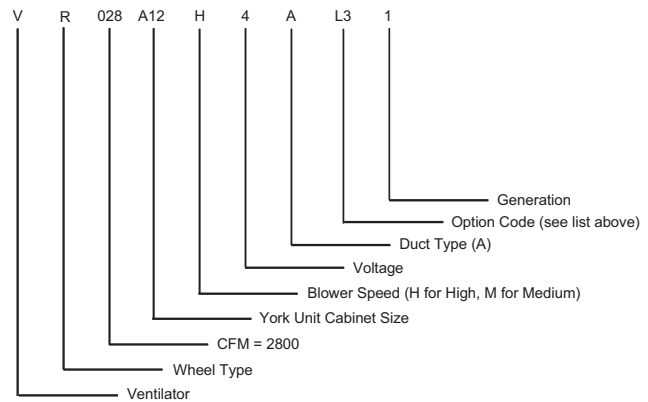


TABLE 2: PERFORMANCE - 3 THROUGH 12 1/2 TON UNITS

"R" Series Stationary Wheel for Units without Economizers								
York Packaged Unit Model No.	Unit Size (Tons)	ERV CFM Range	Matching ERV Model	Voltage & Phase	Voltage Code	Nominal AHRI Data (Total)		
						CFM	Net Effectiveness	
							Heating	Cooling
Small Sunline ZF036-060 ZR036-060 XP036-060	3 - 6	300-550	VR006A06H	110v-1ph	1	500	65%	64%
				208/230v-1ph	9			
				208/240v-3ph	2			
				460v-3ph	4			
	600-1000	VR011A06H	208/230v-1ph	9	900	73%	72%	
			208/230v-3ph	2				
			460v-3ph	4				
			575v-3ph	5				
(42") Short Predator ZH037-090 ZF078-090 ZJ037-061 ZR037-090	3 - 7.5	300-550	VR006B06H	208/230v-3ph	2	500	65%	64%
				460v-3ph	4			
				575v-3ph	5			
	600-1000	VR011B12H	208/230v-3ph	2	900	73%	72%	
			460v-3ph	4				
			575v-3ph	5				
	1100-1700	VR020B12H	208/230v-3ph	2	1600	65%	64%	
			460v-3ph	4				
			575v-3ph	5				
(50") Tall Predator ZF102-150 ZH102-150 ZJ078-150 XP102-150 ZR102-150	6 - 12.5	600-1000	VR011A12H	208/230v-3ph	2	900	73%	72%
				460v-3ph	4			
				575v-3ph	5			
		1100-1700	VR020A12H	208/230v-3ph	2	1600	65%	64%
				460v-3ph	4			
				575v-3ph	5			
	1500-2200	VR028A12M	208/230v-3ph	2	1950	71%	70%	
			460v-3ph	4				
			575v-3ph	5				
	2200-2800	VR028A12H	208/230v-3ph	2	2600	65%	63%	
			460v-3ph	4				
			575v-3ph	5				

Note 1: Complete York ERV model number includes the electrical information. Example ZF 060 needing 500 CFM outside of air at 230 volts/3 phase. Model would be a VR006A06H2AAA1.

TABLE 3: PERFORMANCE - 15 THROUGH 25 TON UNITS

Use this table to determine ventilation and size requirements. Table shows York packaged units and matching ERV model, Air Flow Range, and AHRI rated Net Effectiveness at 100% of rated CFM.

"R" Series Stationary Wheel for Units without Economizers								
York Packaged Unit Model No.	Unit Size (Tons)	ERV CFM Range	Matching ERV Model	Voltage & Phase	Voltage Code	Nominal AHRI Data (Total)		
						CFM	Net Effectiveness	
							Heating	Cooling
Large Sunline ZF180 ZJ180 ZR180 XP180	15	1500-2200	VR028A25H	208/230v-3ph	2	1950	71%	70%
				460v-3ph	4			
				575v-3ph	5			
		2200-2800	VR028A25H	208/230v-3ph	2	2600	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		2800-3600	VR036A15H	208/230v-3ph	2	3100	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		3400-4600	VR046A15H	208/230v-3ph	2	3900	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		4800-5600	VR062A25M	208/230v-3ph	2	4125	71%	70%
				460v-3ph	4			
				575v-3ph	5			
		5500-6200	VR062A25H	208/230v-3ph	2	5500	65%	63%
				460v-3ph	4			
				575v-3ph	5			
Large Sunline ZJ210-300 ZR240-300 ZF210-300 XP240	17.5 - 25	2200-2800	VR028A25H	208/230v-3ph	2	2600	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		2800-3600	VR036A25H	208/230v-3ph	2	3100	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		3400-4600	VR046A25H	208/230v-3ph	2	3900	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		4800-5600	VR062A25M	208/230v-3ph	2	4125	71%	70%
				460v-3ph	4			
				575v-3ph	5			
		5500-6200	VR062A25H	208/230v-3ph	4	5500	65%	63%
				460v-3ph	5			
				575v-3ph	2			
Millennium Z32 Z33 Z34	25-40	6000-8000	VR074A40*	208/230v-3ph	2	6600	65%	63%
				460v-3ph	4			
				575v-3ph	5			
		8000-13000	VR122A40*	208/230v-3ph	2	10800	65%	63%
				460v-3ph	4			
				575v-3ph	5			

Note 1: Complete York ERV model number includes the electrical information. Example: ZJ180 needing 2800 CFM outside of air at 230 volts/3 phase. Model would be a VR028A15H2AAA1.

Note 2: For VR074 and VR122 units used with an economizer must have the Start-Stop-Jog (SSJ) option.

TABLE 4: PERFORMANCE - PIVOTING WHEEL MODELS

"P" Series Pivoting Wheel for Units with Economizers									
York Packaged Unit Model No.	Unit Size (Tons)	ERV CFM Range	Max. CFM Power Exhaust	Matching ERV Model	Voltage & Phase	Voltage Code	Nominal AHRI Data (Total)		
							CFM	Net Effectiveness	
								Heating	Cooling
Small Sunline ZF036-060 ZR036-060 XP036-060	3 - 6	600-1000	1900	VP011A06H	208/230v-1ph	9	900	73%	72%
					208/240v-3ph	2			
					460v-3ph	4			
					575v-3ph	5			
Short Predator (42") ZH037-090 ZF078-090 ZJ037-061 ZR037-090 XP078-090	7.5 - 8.5	600-1000	1900	VP011B12H	208/230v-3ph	2	900	73%	72%
					460v-3ph	4			
					575v-3ph	5			
		1100-1700	3000	VP020B12H	208/230v-3ph	2	1600	65%	64%
					460v-3ph	4			
					575v-3ph	5			
Tall Predator (50") ZF102-150 ZH102-150 ZJ078-150 XP102-150 ZR102-150	6.5 - 12.5	600-1000	1900	VP011A12H	208/230v-3ph	2	900	73%	72%
					460v-3ph	4			
					575v-3ph	5			
		1100-1700	3000	VP020A12H	208/230v-3ph	2	1600	65%	64%
					460v-3ph	4			
					575v-3ph	5			
		1500-2200	3450	VP028A12M	208/230v-3ph	2	1950	71%	70%
					460v-3ph	4			
					575v-3ph	5			
		2200-2800	4200	VP028A12H	208/230v-3ph	2	2600	65%	63%
					460v-3ph	4			
					575v-3ph	5			

Note 1: Complete York ERV model number includes the electrical information. Example ZF 060 needing 800 CFM outside of air at 230 volts/3 phase. Model would be a VP011A06H2AAA1.

2: Predator models ZF/ZH/ZJ/XP* 037-150, with ERV must use "slab" type economizers and downflow position.

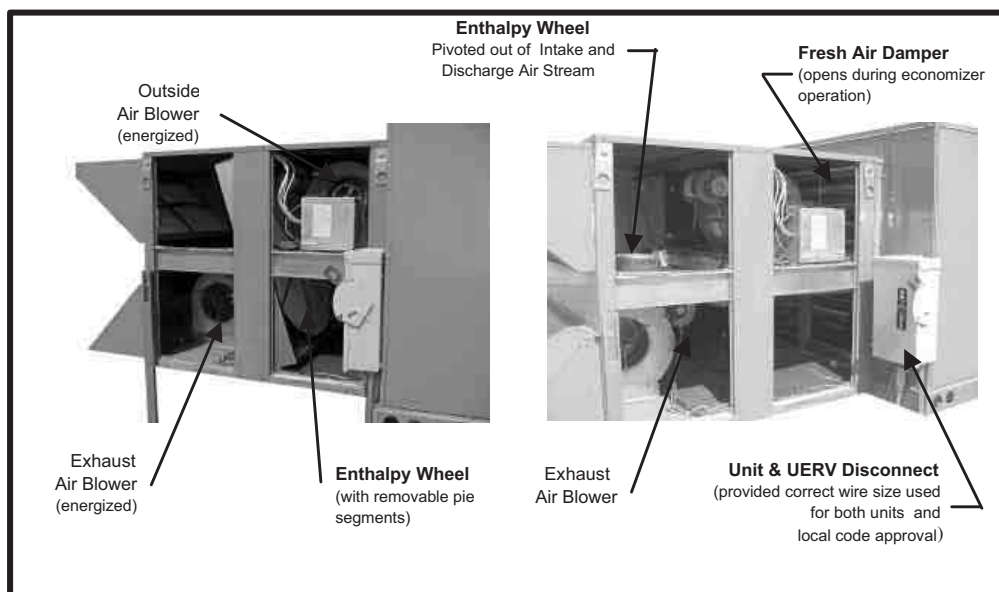


FIGURE 3 - "P" SERIES PIVOTING WHEEL FOR UNITS W/ECONOMIZERS

TABLE 5: SPECIFICATIONS AND ELECTRICAL DATA - 300 THROUGH 550 CFM ERV'S

Model Numbers		VS006 - S/S Stand Alone Stationary VR006 - Rooftop Stationary VO006 - O/U Stand Alone Stationary		
Line Voltage - 60hz		115v-1ph	208/230v/460-1ph	208/230v/460-3ph
Fresh Air Blower	Motor - hp / type	0.25 / PSC		
	Wheel Size (dia x width) - in	5.5 x 6.3		
	Motor Speed - rpm	1780		
	Motor Speed(s)	2		
	Bearing Type	Sleeve		
	Full Load Amps	3.8		
	Service Factor	1.1		
Exhaust Air Blower	Motor - hp	0.25 / PSC		
	Wheel Size (dia x width) - in	5.5 x 6.3		
	Motor Speed - rpm	1780		
	Motor Speed(s)	2		
	Bearing Type	Sleeve		
	Full Load Amps-Stationary	3.8		
	Service Factor	1.1		
Wheel Electrical Data	Potential Volts	115		
	Motor Speed (RPM)/Wheel (RPM)	1050/68		
	Full Load Amps	0.7		
Total Electrical	MCA	8.7		
	OCPD	10		
Wheel Data	Wheel Depth	2		
	Wheel Diameter	19.3		
	Construction / Media Type	One Piece / Polymeric		
Enthalpy Wheel AHRI Rating Data	Nominal Airflow CFM	500 @ .6Δ		
	EATR - -0.50 H ₂ O	9.90%		
	EATR - 0.00 H ₂ O	0.20%		
	EATR - +0.50 H ₂ O	0.00%		
	OACF - -0.50 H ₂ O	1.02%		
	OACF - 0.00 H ₂ O	1.33		
	OACF - +0.50 H ₂ O	1.59%		
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total
Total Effectiveness	100% Airflow Heating	68%	60%	65%
	75% Airflow Heating	73%	65%	70%
	100% Airflow Cooling	68%	60%	64%
	75% Airflow Cooling	73%	65%	69%
Net Effectiveness	100% Airflow Heating	68%	60%	65%
	75% Airflow Heating	73%	65%	70%
	100% Airflow Cooling	68%	60%	64%
	75% Airflow Cooling	73%	65%	69%
Curb	A/C Unit Curb Height - in	14		
Weights	Shipping Weight - lbs.	198		
	Net Weight - lbs.	155		

Note: 1: A stepdown transformer is provided to stepdown high voltage primary to 115 volt secondary.

TABLE 6: SPECIFICATIONS AND ELECTRICAL DATA - 600 THROUGH 1700 CFM ERV'S

Model Numbers		VR011 - Rooftop Stationary VP011 - Rooftop Pivoting VO011 - O/U Stand Alone VS011 - S/S Stand Alone				VR020 - Rooftop Stationary VP020 - Rooftop Pivoting VO020 - O/U Stand Alone VS020 - S/S Stand Alone		
Line Voltage - 60hz		208/ 230v-1ph	208/ 230v-3ph	460v- 1ph	460v-3ph	208/230v-3ph	460v-3ph	575v-3ph
Fresh Air Blower	Motor - hp / type	.5 / PSC				1.0 / Belt		
	Wheel Size (dia x width) - in	10 x 6 AT				9 x 9		
	Motor Speed - rpm	1120 / 960 / 850				1725		
	Motor Speed(s)	3				Adjustable Sheave		
	Bearing Type	Sleeve				Ball		
	Full Load Amps	3.4				3.8	1.9	1.4
	Service Factor	1				1.15		
Exhaust Air Blower	Motor - hp Stationary	.5 / PSC				1.0 / Belt		
	Motor - hp Pivoting	.5 / PSC				1.5 / Belt		
	Wheel Size (dia x width) - in	10 x 6 AT				9 x 9		
	Motor Speed - rpm	1120 / 960 / 850				1725		
	Motor Speed(s)	3				Adjustable Sheave		
	Bearing Type	Sleeve				Ball		
	Full Load Amps-Stationary	3.4	3.4	1.5	1.5	3.8	1.9	1.4
	Full Load Amps-Pivoting	3.4	3.4	1.5	1.5	5.6	2.8	2.0
Service Factor	1				1.15			
Wheel Electrical Data	Potential Volts	208 / 230				208 / 230		
	Motor Speed (RPM)/Wheel (RPM)	1050/56				1050/46		
	Full Load Amps	0.3				0.3		
Total Electrical	MCA - Stationary	8.25	8.25	4.4	4.4	8.85	4.58	3.45
	OCPD - Stationary	10	10	6	6	12	6	5
	MCA - Pivoting	8.25	8.25	4.4	4.4	11.1	5.7	4.2
	OCPD - Pivoting	10	10	6	6	15	8	6
Wheel Data	Wheel Depth - in	3				3		
	Diameter - in	25.3				30.346		
	Construction / Media Type	Segmented / Polymeric				Segmented / Polymeric		
Enthalpy Wheel AHRI Rating Data	Nominal Airflow CFM	900 @ 1.0Δ				1600 @ .95Δ		
	EATR - -1.00 H ₂ O	9.30%				7.80%		
	EATR - 0.00 H ₂ O	0.70%				0.40%		
	EATR - +1.00 H ₂ O	0.00%				0.00%		
	OACF - -1.00 H ₂ O	0.97%				0.97%		
	OACF - 0.00 H ₂ O	1.19%				1.16%		
	OACF - +1.00 H ₂ O	1.34%				1.29%		
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total		Sensible	Latent	Total
Total Effectiveness	100% Airflow Heating	76%	68%	73%		68%	61%	65%
	75% Airflow Heating	81%	73%	78%		72%	67%	71%
	100% Airflow Cooling	76%	68%	72%		68%	61%	64%
	75% Airflow Cooling	81%	73%	76%		72%	67%	70%
Net Effectiveness	100% Airflow Heating	76%	68%	73%		68%	61%	65%
	75% Airflow Heating	81%	73%	78%		72%	67%	71%
	100% Airflow Cooling	76%	68%	72%		68%	61%	64%
	75% Airflow Cooling	81%	73%	76%		72%	67%	70%
Curb	A/C Unit Curb Height - in	14 on A06				24		
Weights	Shipping Weight - lbs.	318				425		
	Net Weight - lbs.	245				345		

Note: 1. Pivoting electrical data applies to VP models only.

TABLE 7: SPECIFICATIONS AND ELECTRICAL DATA - 1500 THROUGH 2800 CFM ERV'S

Model Numbers		* VR028 - Rooftop Stationary * VP028 - Rooftop Pivoting VO028 - O/U Stand Alone			VS028 - S/S Stand Alone		
Line Voltage - 60hz		208/230v-3ph	460v-3ph	575v-3ph	208/230v-3ph	460v-3ph	575v-3ph
Fresh Air Blower	Motor - hp / type	1.5 / Belt			2 / Belt		
	Wheel Size (dia x width) - in	10 x 10			10 x 10		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps	5.6	2.8	2	7.0	3.5	2.4
	Service Factor	1.15			1.15		
Exhaust Air Blower	Motor - hp Stationary	1.5 / Belt			2 / Belt		
	Motor - hp Pivoting	3 / Belt			-		
	Wheel Size (dia x width) - in	10 x 10			10 x 10		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps-Stationary	5.6	2.8	2	7.0	3.5	2.4
	Full Load Amps-Pivoting	9	4.4	3.6	-	-	-
Service Factor	1.15			1.15			
Wheel Electrical Data	Motor - hp (1 phase)	0.17			0.17		
	Potential Volts	200-208 / 230			200-208 / 230		
	Motor Speed (RPM)/Wheel (RPM)	825/58			825/58		
	Full Load Amps	0.6			0.6		
Total Electrical	MCA - Stationary	13.2	6.9	5.1	16.4	8.5	6
	OCPD - Stationary	20	10	7	20	10	7
	MCA - Pivoting	17.5	8.9	7.1	-	-	-
	OCPD - Pivoting	25	12	10	-	-	-
Wheel Data	Wheel Depth x Diameter - in	3 x 37.759			3 x 37.759		
	Construction / Media Type	Segmented Pies / Polymeric			Segmented Pies / Polymeric		
Enthalpy Wheel AHRI Rating Data	Nominal Airflow CFM	2600 @ .95Δ			2600 @ .95Δ		
	EATR - -1.00 H ₂ O	6.10%			6.10%		
	EATR - 0.00 H ₂ O	0.40%			0.40%		
	EATR - +1.00 H ₂ O	0.00%			0.00%		
	OACF - -1.00 H ₂ O	0.99%			0.99%		
	OACF - 0.00 H ₂ O	1.13%			1.13%		
OACF - +1.00 H ₂ O	1.23%			1.23%			
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total	Sensible	Latent	Total
Total Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	74%	67%	71%	74%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	74%	67%	70%	74%	67%	70%
Net Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	74%	67%	71%	74%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	74%	67%	70%	74%	67%	70%
Curb	A/C Unit Curb Height - in	24 on A12, 14 on A15 & A25			24 on A12, 14 on A15 & A25		
Weights	Shipping Weight - lbs.	470			470		
	Net Weight - lbs.	395			395		

* Electric data is for (A12) ZH/ZF/ZJ 078-150 and XP 078-150 only.

** Electric data is for (A15 and A25) ZH/ZF/ZJ 180-300 and XP 180 and 240 only.

Note: Pivoting electrical data applies to VP models only.

TABLE 8: SPECIFICATIONS AND ELECTRICAL DATA - 2800 THROUGH 3600 CFM ERV'S

Model Numbers		VR036 - Rooftop Stationary VS036 - S/S Stand Alone			VO036 - O/U Stand Alone		
Line Voltage - 60hz		208/230v-3ph	460v-3ph	575v-3ph	208/230v-3ph	460v-3ph	575v-3ph
Fresh Air Blower	Motor - hp / type	2 / Belt			2 / Belt		
	Wheel Size (dia x width) - in	12 x 9			12 x 9		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps	7.0	3.5	3.2	7.0	3.5	2.4
	Service Factor	1.15			1.15		
Exhaust Air Blower	Motor - hp Stationary	3 / Belt			2 / Belt		
	Wheel Size (dia x width) - in	12 x 9			12 x 9		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps-Stationary	7.0	3.5	3.2	7.0	3.5	2.4
	Service Factor	1.15			1.15		
Wheel Electrical Data	Motor - hp (1 phase)	0.50			0.50		
	Potential Volts	200-208 / 230			200-208 / 230		
	Motor Speed (RPM)/Wheel (RPM)	1725/64			1725/64		
	Full Load Amps	1.2			1.2		
Total Electrical	MCA - Stationary	16.4	8.6	6.6	16.4	8.6	6.6
	OCPD - Stationary	25	12	9	25	12	9
Wheel Data	Wheel Depth x Diameter - in	3 x 41.825			3 x 41.825		
	Construction / Media Type	Segmented Pies / Polymeric			Segmented Pies / Polymeric		
Enthalpy Wheel AHRI Rating Data	Nominal Airflow CFM	3100 @ .9Δ			3100 @ .9Δ		
	EATR - -1.00 H ₂ O	4.90%			4.90%		
	EATR - 0.00 H ₂ O	1.30%			1.30%		
	EATR - +1.00 H ₂ O	0.30%			0.30%		
	OACF - -1.00 H ₂ O	0.99%			0.99%		
	OACF - 0.00 H ₂ O	1.07%			1.07%		
	OACF - +1.00 H ₂ O	1.12%			1.12%		
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total	Sensible	Latent	Total
Total Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	74%	67%	71%	74%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	74%	67%	70%	74%	67%	70%
Net Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	74%	67%	71%	74%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	74%	67%	70%	74%	67%	70%
Curb	A/C Unit Curb Height - in	24			24		
Weights	Shipping Weight - lbs.	571			571		
	Net Weight - lbs.	475			475		

TABLE 9: SPECIFICATIONS AND ELECTRICAL DATA - 3400 THROUGH 5600 CFM ERV'S

Model Numbers		VS046 - S/S Stand Alone			VR046 - Rooftop Stationary VO046 - O/U Stand Alone		
Line Voltage - 60hz		208/230v-3ph	460v-3ph	575v-3ph	208/230v-3ph	460v-3ph	575v-3ph
Fresh Air Blower	Motor - hp / type	5 / Belt			3 / Belt		
	Wheel Size (dia x width) - in	12 x 12			12 x 12		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps	12.8	6.4	5.1	9.4	4.3	3.4
	Service Factor	1.15			1.15		
Exhaust Air Blower	Motor - hp Stationary	5 / Belt			3 / Belt		
	Wheel Size (dia x width) - in	12 x 12			12 x 12		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps-Stationary	12.8	6.4	5.1	9	4.4	3.6
	Service Factor	1.15			1.15		
Wheel Electrical Data	Motor - hp (1 phase)	0.5			0.5		
	Potential Volts	200-208 / 230			200-208 / 230		
	Motor Speed (RPM)/Wheel (RPM)	1075/57			1075/57		
	Full Load Amps	1.2			1.2		
Total Electrical	MCA - Stationary	30	15.6	12	22	11	9.1
	OCPD - Stationary	40	25	15	30	15	12
Wheel Data	Wheel Depth x Diameter - in	3 x 46.776			3 x 46.776		
	Construction / Media Type	Segmented Pies / Polymeric			Segmented Pies / Polymeric		
Enthalpy Wheel AHRI Rating Data	Nominal Airflow CFM	3900 @ .95Δ			3900 @ .95Δ		
	EATR - -1.00 H ₂ O	4.40%			4.40%		
	EATR - 0.00 H ₂ O	1.10%			1.10%		
	EATR - +1.00 H ₂ O	0.20%			0.20%		
	OACF - -1.00 H ₂ O	0.99%			0.99%		
	OACF - 0.00 H ₂ O	1.06%			1.06%		
	OACF - +1.00 H ₂ O	1.11%			1.11%		
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total	Sensible	Latent	Total
Total Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	73%	67%	71%	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%	73%	67%	70%
Net Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	73%	67%	71%	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%	73%	67%	70%
Curb	A/C Unit Curb Height - in	24			24		
Weights	Shipping Weight - lbs.	920			920		
	Net Weight - lbs.	805			805		

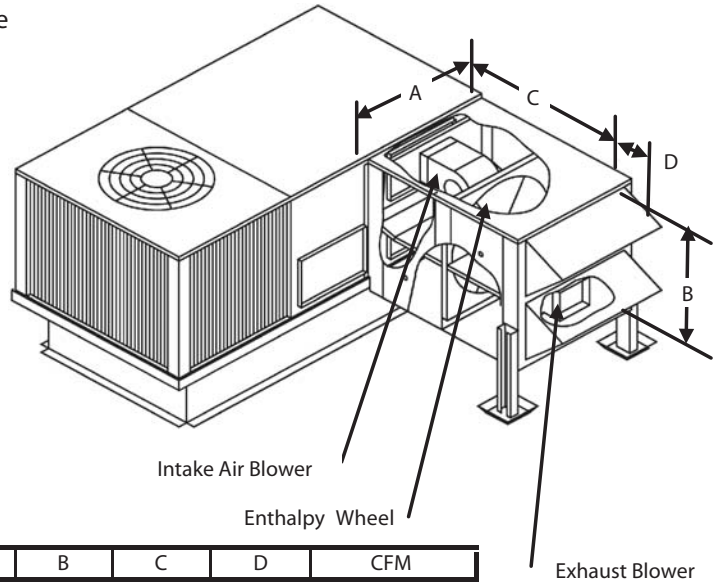
TABLE 10: SPECIFICATIONS AND ELECTRICAL DATA - 5500 THROUGH 6200 CFM ERV'S

Model Numbers		VR062 - Rooftop Stationary VO62 - O/U Stand Alone			VS062 - S/S Stand Alone		
Line Voltage - 60hz		208/230v-3ph	460v-3ph	575v-3ph	208/230v-3ph	460v-3ph	575v-3ph
Fresh Air Blower	Motor - hp / type	5 / Belt			5 / Belt		
	Wheel Size (dia x width) - in	12 x 12			12 x 12		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps	15	7.4	5.8	15	7	5.8
	Service Factor	1.15			1.15		
Exhaust Air Blower	Motor - hp Stationary	5 / Belt			5 / Belt		
	Wheel Size (dia x width) - in	12 x 12			12 x 12		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps-Stationary	14.8	7	5.1	14.8	7	5.1
	Service Factor	1.15			1.15		
Wheel Electrical Data	Motor - hp (1 phase)	0.5			0.5		
	Potential Volts	200-208 / 230			200-208 / 230		
	Motor Speed (RPM)/Wheel (RPM)	1075/54			1075/54		
	Full Load Amps	1.2			2.7		
Total Electrical	MCA - Stationary	34.8	17.5	13.6	34.8	17.5	13.6
	OCPD - Stationary	40	25	20	40	25	20
Wheel Data	Wheel Depth x Diameter - in	3 x 52.026			3 x 52.026		
	Construction / Media Type	Segmented Pies / Polymeric			Segmented Pies / Polymeric		
Enthalpy Wheel AHRI Rating Data	Nominal Airflow CFM	5500 @ .95Δ			5500 @ .95Δ		
	EATR - -1.00 H ₂ O	4.00%			4.00%		
	EATR - 0.00 H ₂ O	1.00%			1.00%		
	EATR - +1.00 H ₂ O	0.20%			0.20%		
	OACF - -1.00 H ₂ O	0.99%			0.99%		
	OACF - 0.00 H ₂ O	1.06%			1.06%		
	OACF - +1.00 H ₂ O	1.10%			1.10%		
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total	Sensible	Latent	Total
Total Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	73%	67%	71%	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%	73%	67%	70%
Net Effective-ness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	73%	67%	71%	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%	73%	67%	70%
Curb	A/C Unit Curb Height - in	24			24		
Weights	Shipping Weight - lbs.	1250			1250		
	Net Weight - lbs.	1075			1075		

TABLE 11: SPECIFICATIONS AND ELECTRICAL DATA - 6000 THROUGH 13000 CFM UERV'S

UERV Series		VR074			VR122		
Line Voltage - 60hz		208/230v-3ph	460v-3ph	575v-3ph	208/230v-3ph	460v-3ph	575v-3ph
Exhaust Air Blower	Motor - hp	(2) 5 / Belt			(2) 7.5 / Belt		
	Wheel Size (dia x width) - in	(2) 12 x 12			(2) 15 x 15		
	Motor Speed - rpm	1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball		
	Full Load Amps	14.8	7	5	22.4	9.7	7.8
	OCPD	20	9	7	30	15	10
	Service Factor	1.15			1.15		
Wheel Electrical Data	Motor - hp (3 phase)	0.25	0.25	0.25	0.25	0.25	0.25
	Motor Speed (RPM)/Wheel (RPM)	850/49			850/51		
	Full Load Amps	2.5	1.2	0.95	2.5	1.2	0.95
	OCPD	3	2	2	3	2	2
Total Electrical	MCA	34.9	16.6	12.7	52	22.6	19
	OCPD	50	20	15	70	30	25
Wheel Data	Wheel Depth x Diameter - in	3 x 58			3 x 74		
	Construction / Media Type	Segmented Pies / Polymeric			Segmented Pies / Polymeric		
Enthalpy Wheel Airflow Data	Nominal Airflow CFM	6600 @ .95Δ			10800 @ .95Δ		
	EATR - -1.00 H ₂ O	4.60%			3.40%		
	EATR - 0.00 H ₂ O	1.90%			1.20%		
	EATR - +1.00 H ₂ O	0.90%			0.40%		
	OACF - -1.00 H ₂ O	0.99%			0.99%		
	OACF - 0.00 H ₂ O	1.05%			1.04%		
	OACF - +1.00 H ₂ O	1.09%			1.07%		
Thermal Ratings @ 0" Pressure Diff.		Sensible	Latent	Total	Sensible	Latent	Total
Total Effectiveness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	73%	67%	71%	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%	73%	67%	70%
Net Effectiveness	100% Airflow Heating	68%	60%	65%	68%	60%	65%
	75% Airflow Heating	73%	67%	71%	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%	73%	67%	70%
Curb	A/C Unit Curb Height - in	14			14		
Weights	Shipping Weight - lbs.	2800			3000		
	Net Weight - lbs.	2600			2800		

Small Sunline
ZF036-060
ZR036-060
XP036-060

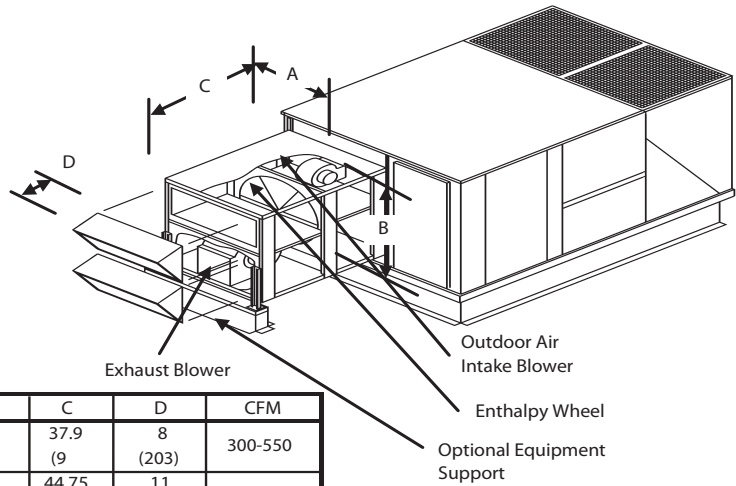


14" High Curbs Required - -1RC0434

ERV Model	York Size	A	B	C	D	CFM
VR006A06H	036-072	24.75 (629)	24.63 (624)	37.96 (964)	8 (203)	300-550
VR011A06H	036-072	32.13 (816)	33.5 (851)	48.75 (1238)	8 (203)	600-1000
VP011A06H	036-072	32.13 (816)	33.5 (851)	48.75 (1238)	8 (203)	600-1000

FIGURE 4 - UERV DIMENSIONAL DATA - 036 THROUGH 060

Predator
ZH037, 049, 061, 078, 090, 102, 120, 150
ZF078, 090, 102, 120, 150
ZR037, 049, 061, 078, 090, 102, 120, 150
XP078, 090, 102, 120, 150

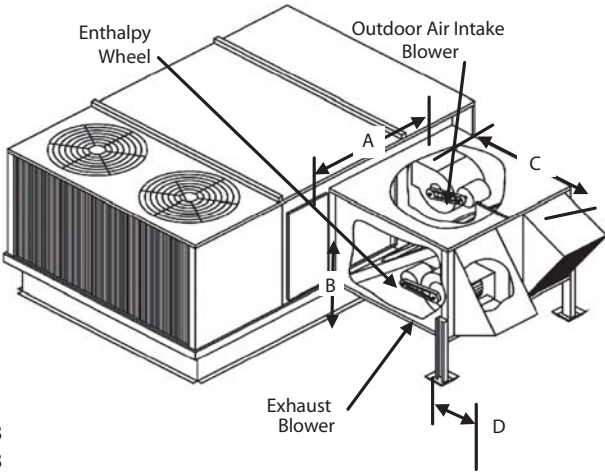


14" High Curbs Required on "VR06" - 1RC0471
14" High Curbs Required on "VR011" & "VP011" - 1RC0471
24" High Curbs Required on "VR020" & "VP020" - 1RC0476
24" High Curbs Required on "VR028" & "VP028" - 1RC0476

Model Number	York Size	A	B	C	D	CFM
VR006B12H	037-061	24.75 (629)	24.63 (624)	37.9 (9)	8 (203)	300-550
VR011B12H	078-102	32.13 (816)	33.5 (851)	44.75 (1137)	11 (279)	600-1000
VP011B12H						
VR020B12H	078-102	37.25 (946)	37.5 (953)	60.38 (1533)	20.32 (516)	1100-1700
VP020B12H						
VR011A12H	090-150	32.13 (816)	33.5 (851)	44.75 (1137)	11 (279)	600-1000
VP011A12H						
VR020A12H	090-150	37.25 (946)	37.5 (953)	60.38 (1533)	20.32 (516)	1100-1700
VP020A12H						
VR028A12M	090-150	42.63 (1083)	43.56 (1106)	64.25 (1631)	18.32 (466)	1500-2200
VP028A12M						
VR028A12H	090-150	42.63 (1083)	43.56 (1106)	64.25 (1631)	18.32 (466)	2200-2800
VP028A12H						

FIGURE 5 - UERV DIMENSIONAL DATA - 037 THROUGH 150 (3 - 12 1/2 TONS)

Large Sunline
 ZF180, 210, 240, 300
 ZR240, 300
 ZJ180, 210, 240, 300
 XP180, 240

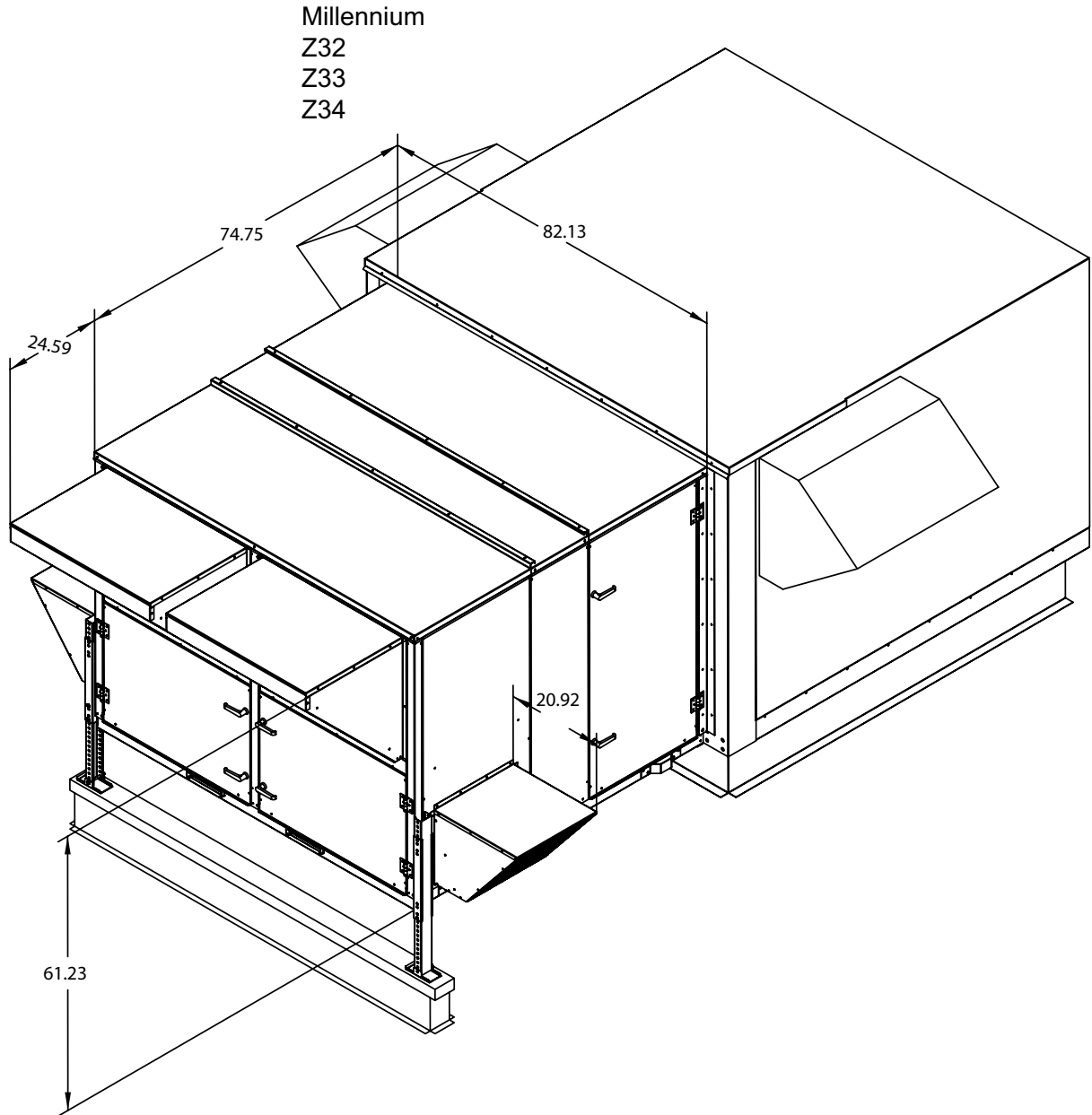


14" Roofcurbs Required on "VR028" - 1RC0436 - 437
 24" High Curbs Required on "VR036" - 1RC0477 or 1RC0478
 24" High Curbs Required on "VR046" - 1RC0477 or 1RC0478
 24" High Curbs Required on "VR062" - 1RC0477 or 1RC0478

Model Number	Unit Size	A	B	C	D	CFM
VR028A15M	180	42.63	43.56	52.13	22.50	1500-2200
VR028A15H		(1083)	(1106)	(1327)	(572)	2200-2800
VR028A25M	180-300					
VR036A15H	180	46.68	57.38	60.00	30.50	2800-3600
VR036A25H	180-300	(1186)	(1457)	(1524)	(775)	
VR046A15H	180	52.68	57.38	60.00	30.50	3400-4600
VR046A25H	180-300	(1338)	(1457)	(1524)	(775)	
VR062A15M	180	58.88	57.38	60.00	30.50	4800-5600
VR062A25M	180-300	(1496)	(1457)	(1524)	(775)	
VR062A15H	180	58.88	57.38	60.00	30.50	5500-6200
VR062A25H	180-300	(1496)	(1457)	(1524)	(775)	

NOTE: Refer to Unit Price Pages for exact unit, ERV and curb matchup.

FIGURE 6 - UERV DIMENSIONAL DATA - 180 THROUGH 300 (15 - 25 TONS)



- Designed to meet Millennium unit specifications
- 14' High Curbs Required
- Rooftop unit blower exceeds the capacity of the ERV Exhaust Blowers

Model Number	CFM	Description
VR074A40L	6000 - 8000	Constant Volume
VR074A40V	6000 - 8000	Variable Air Volume
VR122A40L	8000 - 13000	Constant Volume
VR122A40V	8000 - 13000	Variable Air Volume

- See blower performance charts for airflow at various external static pressures.

FIGURE 7 - MILLENNIUM UNIT VR074 AND VR122 (25 - 40 TON)

TABLE 12: BLOWER PERFORMANCE CHART - VR074

Exhaust						
Blower RPM for VR074, (2) 5HP, Barometric Hood						
		External Static Pressure (in water)				
		0	0.5	1	1.5	2
CFM	6000	910	1060	1200	1300	1400
	6500	955	1095	1225	1360	1430
	7000	1000	1130	1260	1380	1475
	7500	1040	1170	1290	1400	1500
	8000	1080	1200	1315	1425	1530

Notes:

1. Drive losses included in the above table
2. Performance can vary depending on ambient conditions
3. Blower RPMs are for reference only






RPM Range		
	Low 910-1320	Standard Unit
	High 1325-1565	Optional Kit (01-KIT-RH58)

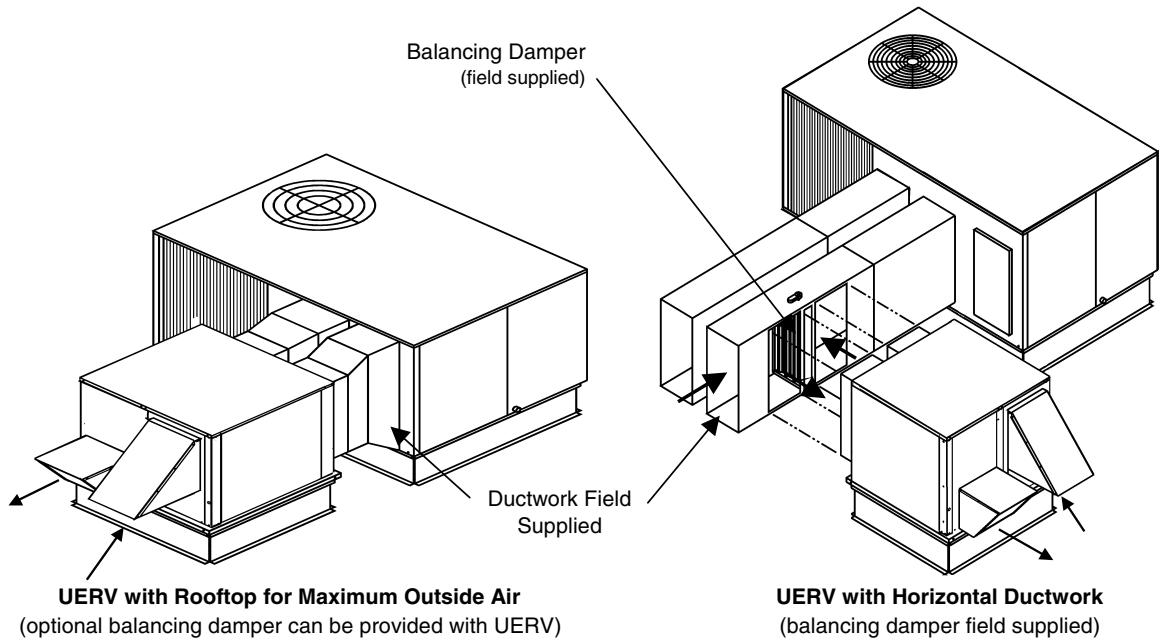
TABLE 13: BLOWER PERFORMANCE CHART - VR122

Exhaust						
Blower RPM for VR122, 7.5HP, Barometric Hood						
		External Static Pressure (in water)				
		0	0.5	1	1.5	2
CFM	8000	775	900	1030	1125	1200
	9000	825	945	1055	1150	1240
	10000	875	985	1090	1190	1280
	11000	925	1030	1125	1215	1310
	12000	970	1070	1165	1250	1355
	13000	1015	1110	1200	1280	1360

Notes:

1. Drive losses included in the above table
2. Performance can vary depending on ambient conditions
3. Blower RPMs are for reference only

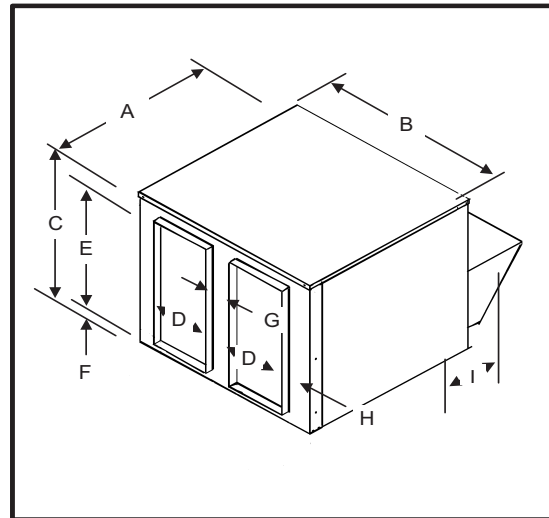
RPM Range		
	Low 775-1000	Standard Unit
	Med 1000-1200	Optional Kit (01-KIT-RM74)
	High 1175-1375	Optional Kit (01-KIT-RH74)



Features and Notes

1. Stand Alone design allows higher levels of outdoor air to be introduced into the a/c unit.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper is field provided when UERV is connected to ductwork. **System will not operate properly without balancing damper.**
4. Roof curbs are available for the UERV's.
5. CFM at 0.0 external static pressure.

UERV Roof Curbs	
Series	Model Number
VS006	1RC0480
VS011	1RC0481
VS020	1RC0482
VS028	1RC0483
VS036	1RC0484
VS046	1RC0485
VS062	1RC0486

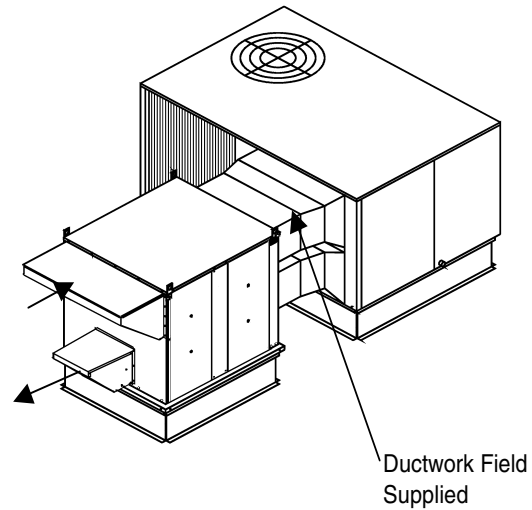


UERV Series	UERV Data		Dimensional Data								
	CFM Range	Curb Size	A	B	C	D	E	F	G	H	I
VS006	300-550	23.25 x 32.5	34.69	24.75	24.63	8.00	20.00	2.32	2.00	0.75	8.00
VS011	600-1000	30.25 x 43	44.25	32.13	33.50	12.00	27.00	3.25	5.00	1.56	17.00
VS020	1100-1700	35.5 x 52.75	54.38	37.25	37.50	12.00	30.00	1.63	4.00	4.06	20.32
VS028	1500-2800	41 x 49.5	52.25	42.62	43.56	14.00	32.00	1.63	4.00	4.75	22.50
VS036	2800-3600	41.81 x 55.75	60	46.69	57.37	16.5	39.5	6.03	9.00	6.00	30.50
VS046	3400-4600	47.81 x 55.75		52.69					10.32	6.66	
VS062	4800-6200	54 x 55.75		58.88					13.41	8.21	

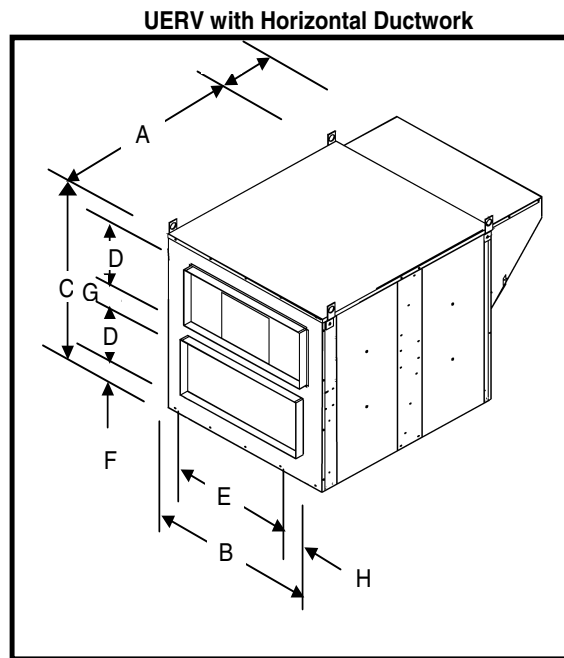
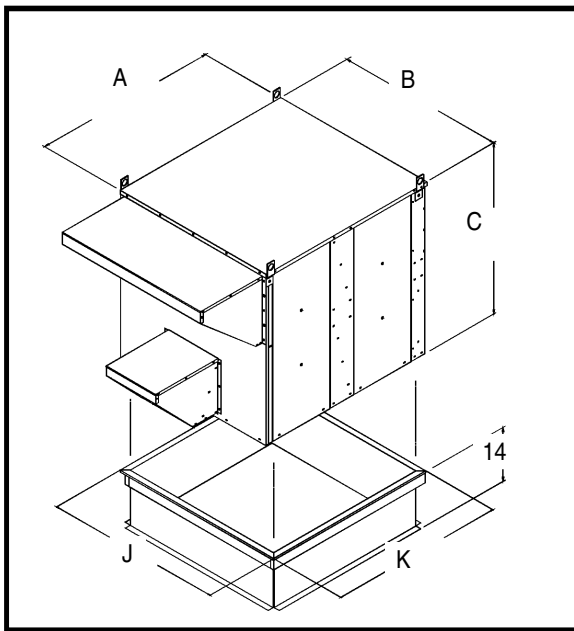
FIGURE 8 - STAND ALONE UERV'S FOR SIDE BY SIDE DUCT ARRANGEMENTS

Features and Notes

1. Stand Alone design allows higher levels of outdoor air to be introduced into the a/c unit.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper field supplied.
4. Roof curbs are available for the UERV's.
5. CFM is based on 0 external static pressure.



UERV Roof Curbs	
Series	Model No
VO006	1RC0480
VO011	1RC0481
VO020	1RC0482
VO028	1RC0483
VO036	1RC0484
VO046	1RC0485
VO062	1RC0486



UERV Data			Dimensional Data								
UERV Series	CFM Range	Curb Size (J x K)	A	B	C	D	E	F	G	H	I
VO006	300-550	23.25 x 32.5	34.83	24.75	24.63	8.00	20.00	2.00	2.25	2.32	8.00
VO011	600-1000	30.25 x 43	44.75	32.13	33.50	12.00	27.00	2.60	5.00	2.56	11.00
VO020	1100-1700	35.5 x 52.75	52.38	37.25	37.50	12.00	30.00	4.50	4.00	3.63	20.32
VO028	1500-2800	41 x 49.5	52.25	42.63	43.56	14.00	32.00	4.75	4.00	5.31	18.32
VO036	2800-3600	41.81 x 55.75	60.00	46.69	57.37	16.50	39.50	8.19	8.00	3.59	18.32
VO046	3400-4600	47.81 x 55.75	60.00	52.69	57.37	16.50	39.50	8.19	8.00	6.59	18.32
VO062	4800-6200	54 x 55.75	60.00	58.88	57.37	16.50	39.50	8.19	8.00	9.68	18.32

FIGURE 9 - STAND ALONE UERV'S FOR OVER AND UNDER DUCT ARRANGEMENTS

GUIDE SPECIFICATIONS

Prepared for the guidance of architects, consulting engineers, and mechanical contractors.

GENERAL

Furnish and install _____ mechanical cooling system, complete with a Unitized Energy Recovery Ventilator (UERV).

APPROVALS

The Unitized Energy Recovery Ventilator will contain an energy recovery component rated in accordance with AHRI/ANSI Standard 1060-2005 with ratings certified by AHRI.

Cabinet

UERV shall be designed to attach directly to the a/c (rooftop, upflow, horizontal) unit. It shall be G90 galvanized material with a powdered enamel paint finish electrostatically bonded to the metal. Cabinet panels where conditioned air is handled shall be fully insulated to prevent sweating and minimize sound. Openings shall be provided for power connections. Lifting devices will be provided for rigging. Test ports shall be provided so airflow can be measured across the energy recovery wheel.

Intake Air Blower (direct drive)

UERV shall contain a centrifugal blower. All UERV's will be equipped with direct drive PSC blower motors. The motor will be multiple speed and will be individually controlled. Airflow will also be adjustable by means of a damper on the intake air opening. Blowers and motors will be removable through means of a connecting plug for ease of servicing.

Intake Air Blower (belt drive)

UERV shall contain a centrifugal blower. It shall have ball bearings and adjustable belt drive. Motor mount base shall permit ease of motor changeover and belt tension adjustment. On pivoting wheel models, supply blower will be de-energized during economizer operation. (Except for VR074 and VR122.)

Exhaust Air Blower (direct drive)

UERV shall contain a centrifugal blower. All UERV's will be equipped with direct drive PSC blower motors. The motor will be multiple speed and shall be individually controlled. Blowers and motors will be removable through means of a connecting plug for ease of servicing. On pivoting wheel models, blower shall be sized to provide power exhaust during economizer operation.

Exhaust Air Blower (belt drive)

UERV shall contain a centrifugal blower. It shall have ball bearings and adjustable belt drive. Motor mount base shall permit ease of motor changeover and belt tension adjustment. On pivoting wheel models, exhaust blowers shall be

sized to provide power exhaust during economizer operation. Where single blowers cannot provide adequate exhaust, two blowers will be utilized. One blower is energized during energy recovery mode, and both blowers are energized during economizer mode.

Energy Recovery Wheel

The energy recovery device shall be a rotary heat exchanger per AHRI Standard 1060 description. The device will be an enthalpy wheel coated with a silica gel desiccant by a patented process without the use of binders or adhesives which may plug the desiccant aperture. The substrate shall be a lightweight polymer. Desiccant shall not dissolve or deliquesce in the presence of water or high humidity. The wheel shall be easily cleanable with standard coil cleaning solution. On UERV's Series 20 and less, the wheel will easily be removable from the cabinet for cleaning. On UERV's Series 20 and above, the wheel will be provided with removable segments for cleaning and maintenance. All diameter and perimeter seals shall be provided. The energy recovery cassette shall be Underwriters Laboratories Recognized Component for electrical and fire safety.

Balancing Dampers

Balancing dampers will be provided for all VR UERV's. These dampers will be mounted inside the rooftop air conditioning unit to adjust for the amount of exhaust air on packaged units. On pivoting wheel models, the unit economizer becomes the balancing damper. Upflow and horizontal ERVs' will have the balancing damper provided in the ERV. Optional on VO and VS UERV's when connected to rooftop units. (Except for VR074 and VR122.)

Barometric Relief Dampers

Barometric relief dampers will be provided in the exhaust air hood to prevent air infiltration when the UERV is de-energized.

ERV Support

All UERV's will be provided with support legs attached to the cabinet to support the intake and exhaust end of the ERV unit. Horizontal ERV's will be provided with support brackets for hanging.

Filters

All units shall be provided with mist eliminator type filters in the intake air hood.

Power Connection

The UERV shall be provided with a single point power connection for high voltage.

OPTIONS

Optional UERV Equipment Support

Furnish and install the optional equipment support for the intake and exhaust end of the unit.

Optional Roof Curb

Furnish and install the optional roof mounting frame to maintain proper height above the roof.

Optional Low Ambient Kit

Furnish and install the optional low ambient kit to prevent frost formation on the energy recovery wheel.

Optional Motorized Intake Air Damper

Furnish and install the optional motorized intake air damper.

Optional Stop-Start-Jog

On units without economizers furnish and install the optional stop-start-jog controls.

SEQUENCE OF OPERATION:

Fixed Models - Normal Operation

1. The space thermostat sends a signal to the RTU for cooling, heating or fan only operation.
2. The ERV is activated simultaneously with the supply blower of the RTU. The intake blower, the exhaust blower, and the wheel rotation motor of the ERV are activated. These motors will remain energized as long as the supply blower on the RTU is energized. The RTU is in standard (non-economizer) mode.
3. If the optional motorized fresh air damper in the outside air intake of the ERV is present, it opens and the ERV is energized.
4. If the optional low ambient kit is present, and the temperature leaving the exhaust side of the wheel drops below the field adjusted set point on the temperature sensor of the low ambient kit, the optional motorized fresh air damper will close and the intake blower will de-energize. The exhaust air blower and wheel rotation motor will continue to operate. When the temperature sensor has a sixteen-degree rise, the wheel is defrosted and the optional motorized damper will open and the fresh air blower will reactivate.

Pivoting Models - Normal Operation

1. The space thermostat sends a signal to the RTU for cooling, heating or fan only operation.

2. The ERV is activated with the supply blower of the RTU. The intake blower, the exhaust blower, and the wheel rotation motor of the ERV are activated. These motors will remain energized as long as the supply blower on the RTU is energized and the RTU is in standard (non-economizer) mode.
3. If the optional motorized fresh air damper in the outside air intake of the ERV is present, it opens and the ERV is energized.
4. If the optional low ambient kit is present, and the temperature leaving the exhaust side of the wheel drops below the field adjusted set point on the temperature sensor of the low ambient kit, the optional motorized fresh air damper will close and the intake blower will de-energize. The exhaust air blower and wheel rotation motor will continue to operate. When the temperature sensor has a sixteen-degree rise, the wheel is defrosted and the optional motorized damper will open and the fresh air blower will reactivate.

Pivoting Models - Economizer Operation

1. The space thermostat sends a signal to the RTU for cooling operation.
2. The outdoor air sensor for the RTU senses the outdoor air and determines it is appropriate for economizer operation.
3. As the economizer outside air dampers open, the ERV economizer end switch is activated sending a signal to the ERV that the system is in the economizer mode.
4. The intake blower, the exhaust blower and the wheel rotation motor all deactivate for up to two minutes. The optional motorized fresh air damper (if present) also closes.
5. The ERV enthalpy wheel pivots out of the air stream and the bypass dampers along each side of the intake blower open.
6. After a time delay to allow the wheel to pivot out of the airstream and the bypass dampers to open, the optional motorized fresh air damper opens to allow for full economizer operation, and the exhaust blower is reactivated to provide power exhaust for the system.

UERV TROUBLESHOOTING GUIDE

UERV BELOW 600 CFM WITH STATIONARY WHEEL (NO ECONOMIZER)

UERV will not operate.

1. Quick check items.
 - a. Verify S51 door switch is closed. The switch must be in the closed position to power the A130 circuit board.
 - b. Verify the A130 circuit board switch SW1 Power is in the "on" position.
 - c. Verify 24 volts to A130 circuit board terminals TB1 "G" and "C" if in the cooling mode, or "W" and "C" if in the heating mode. The terminals must be powered to allow any blower relays / contactors to operate.
2. Verify high voltage power to UERV.
 - a. Verify 110 volts for UERV to L1 and L2 on TB2 on the A130 board.
 - b. Verify the F1 fuse is good. Replace any bad fuses.
 - c. Verify that the T28 step down transformer on 208, 230, and 460 volt units have the voltage correctly applied to the correct transformer terminals.

UERV has power, but the enthalpy wheel does not spin.

1. Check wheel belt is in place and tight.
2. Verify the A130 circuit board switch SW1 Power is in the "on" position.
3. Verify the A130 circuit board terminals Wheel "1" and "2" are outputting 110 volts to B28 wheel motor through J/P150 plug assembly.
4. Verify B28 wheel motor C23 capacitor is good. Replace the capacitor if it is bad.
5. If the optional Stop, Start, Jog (SSJ) feature is installed, verify that the temperature setpoint on the SSJ does not have the wheel stopped.
6. If all of the above are operational, the wheel motor is bad. Replace it with new motor.

UERV has power, but the exhaust blower does not operate.

1. Verify the A130 circuit board switch SW1 Power is in the "on" position.
2. Verify the A130 circuit board terminals Exhaust "1" and "3" if in high speed operation, or "1" and "2" if in low speed operation are outputting 110 volts to B26 exhaust blower motor through J/P151 plug assembly.

3. Verify B26 wheel motor C25 capacitor is good. Replace the capacitor if it is bad.
4. If all of the above are operational, the exhaust motor is bad. Replace it with new motor.

UERV has power, but the fresh air blower does not operate.

1. Verify the A130 circuit board switch SW1 Power is in the "on" position.
2. Verify the A130 circuit board terminals Fresh "1" and "3" if in high speed operation, or "1" and "2" if in low speed operation are outputting 110 volts to B27 fresh air blower motor through J/P148 plug assembly.
3. On units equipped with the optional low ambient control, verify that the A130 circuit board TB3 terminals marked "low ambient" are closed. The low ambient control will stop the fresh air motor operation and close the optional outside air damper if it senses conditions for frost on the UERV wheel. The "low ambient" terminals can be jumped together to verify if the low ambient control has the fresh air blower stopped.
4. Verify B27 wheel motor C26 capacitor is good. Replace the capacitor if it is bad.
5. If all of the above are operational, the fresh air motor is bad. Replace it with new motor.

UERV has power, but the optional motorized fresh air damper does not open.

1. Verify 24 volts to A130 circuit board terminals TB1 "G" and "C" if in the cooling mode, or "W" and "C" if in the heating mode.
2. Verify the A130 circuit board switch SW1 Power is in the "on" position.
3. Verify 24 volts to B30 motorized outdoor air motor through J/P160 plug assembly.
4. If all of the above are operational, replace the outdoor air damper motor.

UERV ABOVE 600 CFM WITH STATIONARY WHEEL (NO ECONOMIZER)

UERV will not operate.

1. Quick check items.
 - a. Verify S51 door switch is closed. The switch must be in the closed position to power the A130 circuit board.

- b. Verify 24 volts to A130 circuit board terminals XFORMER "+" and "-". The terminals must be powered to allow blower contactors to operate.
 - c. Verify 24 volts to A130 circuit board terminals TB 37 numbers "1" and "3". Terminal "1" is the hot and "3" is the common side of the power source from activation power source (a/c unit, energy management control, etc.). Typically, "1" would be from the blower contactor on an a/c unit.
2. Verify high voltage power to UERV.
 - a. Check for correct voltage for UERV to L1 and L2 on 1-phase units.
 - b. Check for correct voltage for UERV to L1, L2, and L3 on 3-phase units.
 - c. Verify the F29 fuses are good. Replace any bad fuses.
 - d. Verify that the T27 transformer has the UERV voltage correctly applied to the correct transformer terminals.

UERV has power, but the enthalpy wheel does not spin.

1. Check wheel belt is in place and tight.
2. Verify the A130 circuit board terminals Exhaust "A" (hot) and "B" (common) are outputting 24 volts to K163 contactor terminal "A" and "B" and that the contacts are closed.
3. Verify power to B28 wheel motor.
4. Verify B28 wheel motor C23 capacitor is good. Replace the capacitor if it is bad. (Except VR074 to VR122)
5. If the optional Stop, Start, Jog (SSJ) feature is installed, verify that the timer on the SSJ does not have the wheel stopped.
6. If all of the above are operational, the wheel motor is bad. Replace it with new motor.

UERV has power, but the exhaust blower does not operate.

1. Check that the blower belt is in place and tight on belt drive models. If it is loose, tighten it. If it is broken replace it.
2. Verify the A130 circuit board terminals Exhaust "A" (hot) and "B" (common) are outputting 24 volts to K163 contactor terminal "A" and "B", and that the contacts are closed.
3. Verify power to B26 exhaust blower motor.
4. On direct drive models, verify B26 wheel motor C25 capacitor is good. Replace if necessary.

5. If all of the above are operational, the exhaust motor is bad. Replace it with new motor.

UERV has power, but the fresh air blower does not operate.

1. Check that the blower belt is in place and tight on belt drive models. Tighten it if it is loose. Replace it if it is broken.
2. Verify the A130 circuit board terminals Fresh "A" (hot) and "B" (common) are outputting 24 volts to K164 contactor terminal "A" and "B", and that the contacts are closed.
3. Verify power to B27 fresh air blower motor through J/P148 plug assembly.
4. On direct drive models, verify B27 wheel motor C26 capacitor is good. Replace if necessary.
5. On units equipped with the optional low ambient control, verify that the circuit on the A130 circuit board terminal "5" and "6" is closed. The low ambient control will stop the fresh air motor operation and close the optional outside air damper if it senses frost on the UERV wheel. Terminal "5" and "6" can be jumped together to verify if the low ambient control has the fresh air blower stopped.
6. If all of the above are operational, the fresh air motor is bad. Replace it with new motor.

UERV has power, but the optional motorized fresh air damper does not open.

1. Verify 24 volts to the A130 circuit board terminals XFORMER "+" and "-".
2. Verify 24 volts to A130 circuit board terminals TB 37 numbers "1" and "3". Terminal "1" is the hot and "3" is the common side of the power source from activation power source (a/c unit, energy management control, etc.). Typically, "1" would be from the blower contactor on an a/c unit.
3. Verify 24 volts to B30 motorized outdoor air motor through J/P160 plug assembly.
4. If all of the above are operational, replace the outdoor air damper motor.

UERV ABOVE 600 CFM WITH PIVOTING WHEEL (USED WITH ECONOMIZER)

UERV will not operate.

1. Quick check items.
 - a. Verify S51 door switch is closed. The switch must be in the closed position to power the A130 circuit board.

- b. Verify 24 volts to A130 circuit board terminals XFORMER "+" and "-". The terminals must be powered to allow any blower relays / contactors to operate.
 - c. Verify 24 volts to A130 circuit board terminals TB 37 numbers "1" and "3". Terminal "1" is the hot and "3" is the common side of the power source from activation power source (a/c unit, energy management control, etc.). Typically, "1" would be from the blower contactor on an a/c unit.
2. Verify high voltage power to UERV.
 - a. Check correct voltage for UERV to L1 and, L2 on 1-phase units.
 - b. Check for correct voltage to L1, L2, and L3 on 3-phase units.
 - c. Verify the F29 fuses are good. Replace any bad fuses.
 - d. Verify that the T27 transformer has the UERV voltage correctly applied to the correct transformer terminals.

UERV has power, but the enthalpy wheel does not spin.

1. Check wheel belt is in place and tight.
2. Verify the A130 circuit board terminals Exhaust 1 "A" (hot) and "B" (common) are outputting 24 volts to K163 contactor terminal "A" and "B" and that the contacts are closed.
3. Verify power to B28 wheel motor through J/P150 plug assembly.
 - a. If there is no power on the T1 leg of the motor (pivoting models only) verify that the S110 switch located inside the B29 damper motor is in the closed position.
4. Verify B28 wheel motor C23 capacitor is good. Replace the capacitor if it is bad.
5. If all of the above are operational, the wheel motor is bad. Replace it with new motor.

UERV has power, but the exhaust blower does not operate.

1. Check that the blower belt is in place and tight. If it is loose, tighten it. If it is broken replace it.
2. Verify the A130 circuit board terminals Exhaust 1 "A" (hot) and "B" (common) are outputting 24 volts to K163 contactor terminal "A" and "B", and that the contacts are closed.
3. Verify power to B26 exhaust blower motor through J/P151 plug assembly.

4. On direct drive models, verify B26 wheel motor C25 capacitor is good. Replace if necessary.
5. If all of the above are operational, the exhaust motor is bad. Replace it with new motor.

UERV has power, but the fresh air blower does not operate.

1. Energy Recovery Mode of operation.
 - a. Check that the blower belt is in place and tight on belt drive models. Tighten it if it is loose. Replace it if it is broken.
 - b. Verify the A130 circuit board terminals Fresh "A" (hot) and "B" (common) are outputting 24 volts to K164 contactor terminal "A" and "B", and that the contacts are closed.
 - c. Verify power to B27 fresh air blower motor through J/P148 plug assembly.
 - d. On units equipped with the optional low ambient control, verify that the circuit on the A130 circuit board terminal "5" and "6" is made. The low ambient control will stop the fresh air motor operation and close the optional outside air damper if it senses frost on the UERV wheel. Terminal "5" and "6" can be jumped together to verify if the low ambient control has the fresh air blower stopped.
 - e. On direct drive models, verify B27 wheel motor C26 capacitor is good. Replace if necessary.
 - f. If all of the above are operational, the fresh air motor is bad. Replace it with new motor.
2. Economizer Mode of operation.
 - a. The fresh air blower is not operational in the economizer mode.

UERV has power, but the wheel does not rotate out of airstream during economizer operation.

1. Check the linkage from the B29 damper motor to the UERV wheel.
2. Verify shipping retainers are removed.
3. Verify the S122 economizer end switch is closed. The switch is located on the damper and closes when the damper moves from minimum position to the economizer position (field adjustable).
4. Verify the B29 damper motor has 24 volts to terminals "B" and "T1" through J/P160 plug assembly
5. If all of the above are operational, replace the damper motor.

UERV has power, but the optional motorized fresh air damper does not open.

1. Verify 24 volts to the A130 circuit board terminals XFORMER "+" and "-".
2. Verify 24 volts to A130 circuit board terminals TB 37 numbers "1" and "3". Terminal "1" is the "hot" and "3" is the "common" side of the power source from activation power source (a/c unit, energy management control, etc.). Typically, "1" would be from the blower contactor on an a/c unit.
3. Verify 24 volts to B30 motorized outdoor air motor through J/P160 plug assembly.
4. If all of the above are operational, replace the outdoor air damper motor.