FläktGroup

SEMCO

HIGH RECOVERY EFFICIENCY

INDOOR AIR QUALITY

FV SERIES

WHERE RECOVERABLE ENERGY AND SYSTEM EFFICIENCY ARE MAXIMIZED

The function of an Energy Recovery Ventilator (ERV) is to continuously provide the code required quantity of outdoor air during occupancy, with **uncompromised quality and in an energy efficient manner.**

High recovery efficiency with low pressure loss

Self-cleaning, fluted media

Designed with an aluminum substrate built to meet NFPA 90A smoke and flame ratings

AHRI CERTIFIED®
www.ahridirectory.org
Air-to-Air ERV
AHRI Standard 1060
Energy Recovery COMPONENT is certified. Actual performance in packaged equipment may vary.

Use of the AHRI Certified™ mark indicates a manufacturer's participation in the certification program. For verification of certification for individual products, go to www.ahrinet.org.

The choice to specify an ERV is a positive step toward ensuring that your building will have a high quality indoor climate, however, the selection of proper equipment for the desired environment is critical. On both counts, the FläktGroup SEMCO FV series product is the right choice.

FläktGroup SEMCO has industry-leading technical expertise to assist in specifying the right equipment to ensure that a building has the highest possible air quality with a system that will maximize an owner's return on investment.

The most important component in an energy recovery system is the wheel: the total enthalpy recovery wheel should recapture the temperature and humidity from the exhaust airstream without transferring a high percentage of indoor contaminants back to the occupied space. The FläktGroup SEMCO FV Series is standardly equipped with our industry-leading True 3Å wheel.

OPTIMIZE RECOVERY EFFECTIVENESS AND PARASITIC PRESSURE LOSS FOR MAXIMUM ENERGY SAVINGS

Wheels designed to operate with high air pressure losses result in fan electrical inputs that erode the energy savings by the recovery device. The FläktGroup SEMCO True 3Å wheel optimizes the parasitic pressure loss across the energy wheel media. The FV is properly designed to operate at a high recovery efficiency with low pressure loss balancing heating and cooling savings with fan energy use.

SELF-CLEANING, FLUTED MEDIA ELIMINATES HIGH PARASITIC FILTER PRESSURE LOSSES

Because few commercial applications receive proper maintenance, some ERVs require high MERV filters in the outdoor and return airstreams, significantly lowering system operating efficiency due to additional fan energy required to overcome the increasing filter static loss. This is why the FV by FläktGroup SEMCO is designed to require minimal maintenance while effectively operating with low efficiency filters without impacting the long term performance of the recovery device. This will assure high indoor air quality, top efficiency, and compliance with design codes and standards.

AQFLOW® AIRFLOW MEAUREMENT

The FV series ERV is equipped with the AQFlow, an on-board display of the outdoor air being provided to the occupied space at any moment in time. This device is important for documenting code compliance, knowing when filters should be cleaned/replaced, and for initial air balancing of the system. While measuring the total airflow to a space

can be straightforward, accurately measuring outdoor airflow can be challenging. The FläktGroup SEMCO AQFlow® provides documentation of outdoor airflow, and an integrated, effective system to facilitate accurate air balancing and commissioning.

SAFETY FIRST – MINIMIZING FLAME SMOKE GENERATION AND COMPLIANCE WITH NFPA 90A

The FV Series standard 3Å Wheel is designed with an aluminum substrate built to meet smoke and flame ratings, unlike other non-metal energy recovery wheels. This is important when considering the liability to the design team and more importantly, the danger posed to the building occupants, should a fire occur.

SEPARATION OF INTAKE HOOD AND EXHAUST AIR OUTLET

An ERV with the fresh air intake hood adjacent to or on top of the exhaust air outlet will return a substantial amount of the exhausted contaminants back to the occupied space, degrading the quality of the indoor environment. The FV is specifically designed with the outdoor air intake on one side of the system, and a high velocity discharge hood on the opposite side to ensure the maximum possible separation of the two airstreams compared to competitive unitary systems.

true 3Å™
PATENTED PERFORMANCE

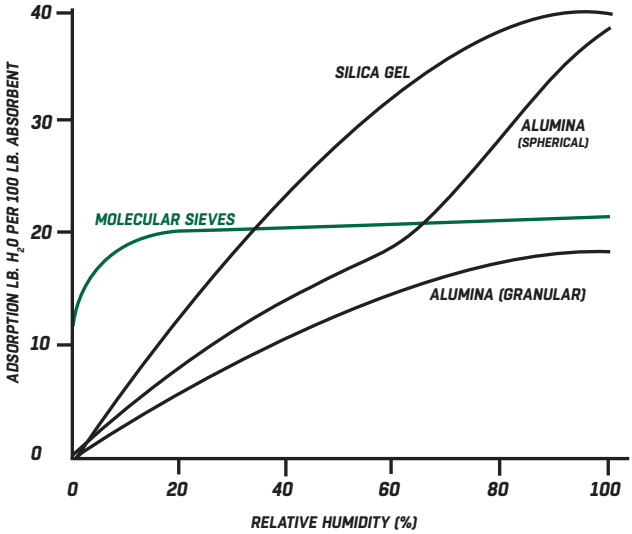
ANTIMICROBIAL WHEEL SURFACE

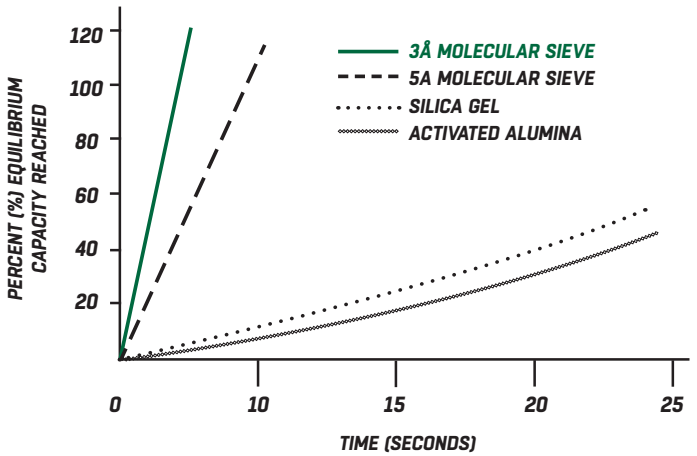
The outdoor air system should not act as an amplification site for microbial activity. The FläktGroup SEMCO FV Series 3Å energy recovery wheel is treated with a desiccant, which captures microbes from the outdoor air. The inner walls of the FV are lined with a sound reducing GreenGuard® Certified antimicrobial foam insulation that is easily cleaned and does not support the growth of bacteria.

WHEEL DESICCANT AND WHAT SETS 3Å APART

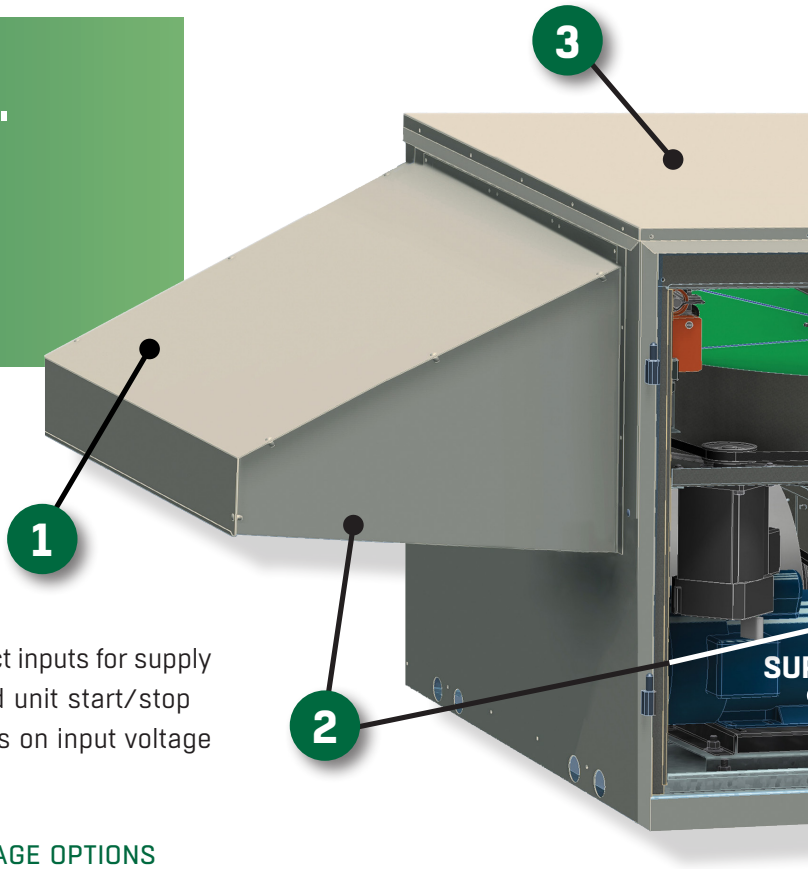
Pioneered by FläktGroup SEMCO, 3Å molecular sieve on the enthalpy wheels was developed for its rapid rate of adsorption and size that limits contaminants.

THE 3Å ADVANTAGE





ADVANCED DESIGN.
UNPARALLELED FEATURES.



1. HOODS & DAMPERS
- Outdoor airflow damper
- Intake hood with a cleanable filter
- Exhaust air back draft damper

2. FILTER SECTIONS
- Filtration for both the OA and RA
- 1-inch thick aluminum, washable
- Optional 2” thick pleated type

3. CABINET CONSTRUCTION
- Galvanized steel cabinet construction
- Entire cabinet insulated
- Hinged doors for easy access
- Floor of the unit built as a pan
- 750 hour salt spray finish (1500 hour option available)
- Optional dual wall construction

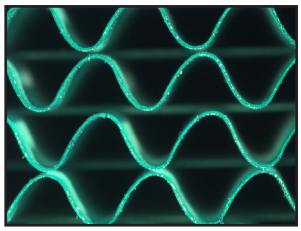
4. THE TRUE 3Å TOTAL ENERGY WHEEL
- Long life bearings
- Low leak brush seals
- Structural spoke system
- 3Å molecular sieve media

5. SUPPLY & EXHAUST FANS
- Sized for quiet and efficient operation
- Multiple motor/sheave combination to match design requirements

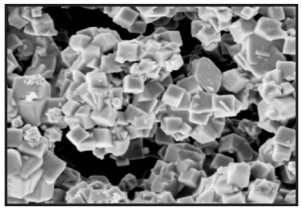
6. ELECTRICAL PACKAGE WITH SINGLE POINT CONNECTION
- All motors wired to starters
- Optional variable frequency drive for supply and exhaust fans
- Accepts contact inputs for supply fan, wheel, and unit start/stop
- Multiple options on input voltage to units

7. CONTROL PACKAGE OPTIONS
- Stop/Jog Economizer allows the wheel to be stopped automatically during mild outdoor temperatures with periodic brief rotation to maintain the self-cleaning feature of the heat exchanger
- Wheel Frost Protection allows the wheel only to be stopped by the stop/jog economizer at a predetermined outdoor temperature in applications where a preheat coil or thermostat shut-off of the FV unit is not desired.
- Rotation Detector Sensor can provide an alarm signal indicating failure of the wheel rotation.

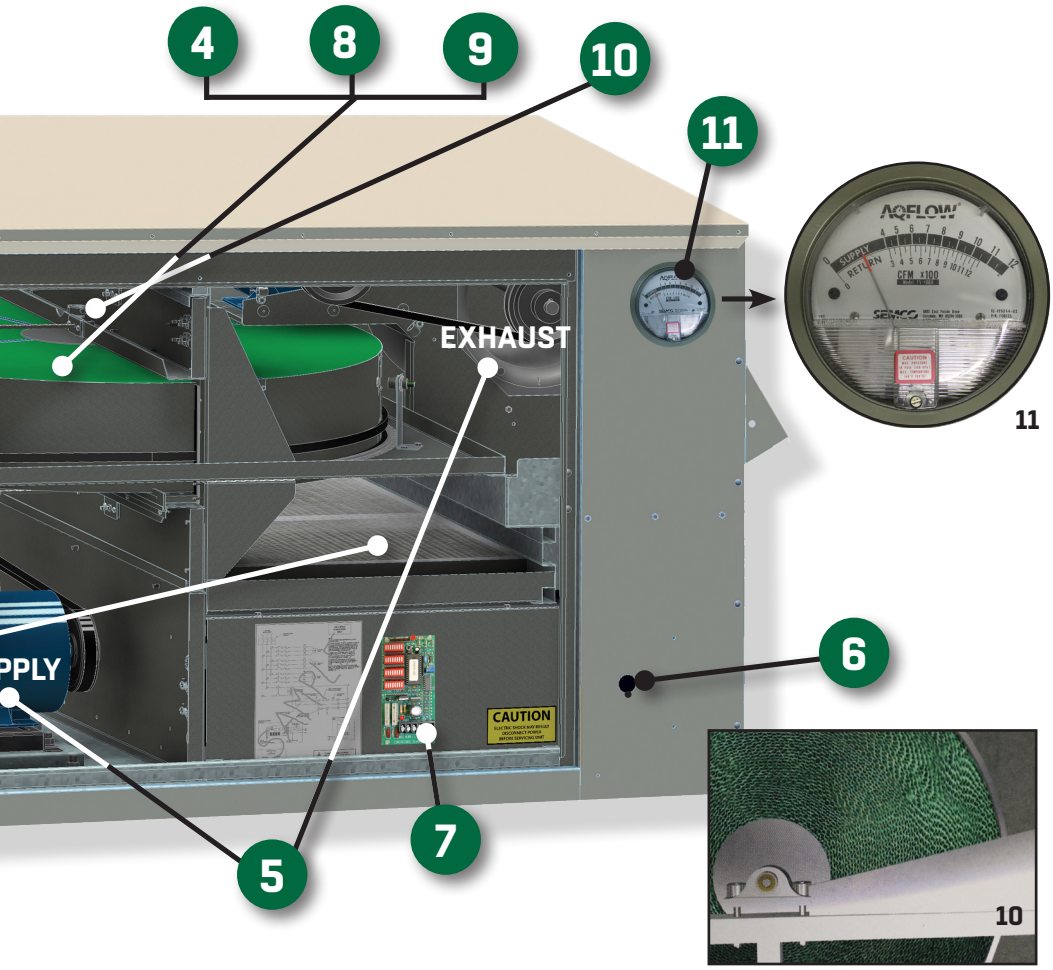
8. 3Å MOLECULAR SIEVE DESICCANT
The FV Series uses a highly selective, 3Å molecular sieve desiccant. It focuses on adsorbing the moisture and not the exhausted contaminants.



- Superior performance at high face velocities, which results in a more compact wheel design for a given air flow quantity
- The 3Å molecular sieve’s higher rate of adsorption increases latent efficiencies
- All surfaces are coated with a thick desiccant layer
- “Ceramic” molecular sieve adds to the corrosion resistance and extends the life of the rotor.



9. LAMINAR FLOW
The True 3Å media is designed to induce laminar flow under all conditions. This results in a flow profile, which causes airborne particles to pass freely through the rotor media.



As the wheel rotates between two opposing air streams, the continuous reversal of airflow results in a very efficient "self-cleaning" process. Factor in the high velocity airflow and this cleaning process is enhanced. As a result, only minimal filtration is required for sustained efficient operation.

10. PURGE SECTION

As the energy recovery wheel rotates from the exhaust air stream into the supply air stream, a small amount of the exhaust air is trapped in the flutes of the wheel media as it passes by the seal separating the two air streams. If this volume of exhaust air were allowed to mix with the clean supply air stream, "cross-contamination" would occur. Cross-contamination is mitigated by a "purge section" which is an integral part of the casing design. The purge section utilizes the pressure difference between the outdoor and return air streams to "purge" the transfer media with clean outdoor air prior to its rotation into the supply air stream.

11. AQ FLOW is a flow measuring system calibrated to convert differential pressure across the total energy wheel into an airflow rate expressed in cubic feet per minute (CFM).

- Simple, accurate system balancing
- Accurate airflow measurements (+/- 6%)
- Reduced calls to engineers regarding air quantities
- Verification that proper ventilation is being provided
- Easy detection of problems (i.e. dirty filters)

OPTIONAL ELECTRIC PREHEAT

An electric preheat coil can be provided to avoid frosting conditions for installations in cold climates which have high indoor humidity design conditions.

OPTIONAL THERMOSTAT FROST PROTECTION

Thermostatic frost control allows the entire FV unit to be turned off at a predetermined temperature when electric preheat is not desired.

OPTIONAL COIL MODULE

(See page 7)

- Airflow capacity from 800 cfm to 9,000 cfm
- Indoor and outdoor installation capable
- Horizontal and down flow configurations
- Numerous coil material construction types available
- Galvanized steel cabinet with optional enamel finish
- Constructed to ensure a watertight design
- Unit is insulated to minimize energy loss
- Filters are LEED compliant
- Easy access to all components through access doors
- Internal piping available for rooftop installations
- Low profile design

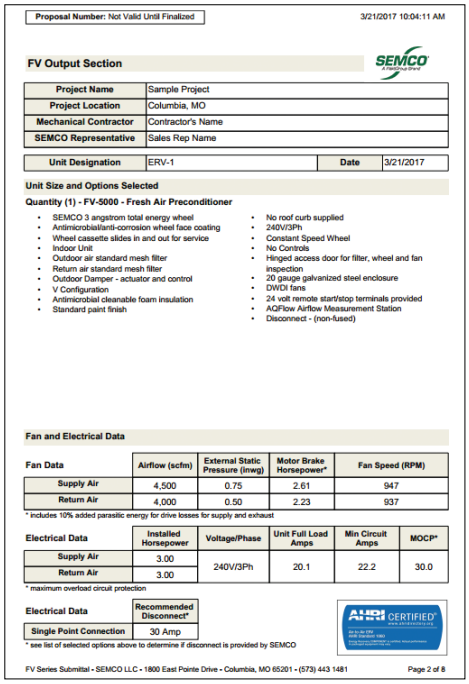
COMPLETE SOLUTIONS
WEB-BASED SELECTION SOFTWARE

EXPRESS SELECT FV

ExpressSelect is one of the HVAC industry's easiest, quickest and most comprehensive design selection and sizing software tool. Since it is accessed with any web browser, no laborious computer update downloads of client-based programs are needed. After signing in at www.semcohvac.com and inputting the project data, consulting engineers, contractors and manufacturer's representatives can produce a comprehensively calculated selection in under five minutes. One piece of software results in a complete FV unit selection. The selection software includes the scope, performance, electrical requirements, and dimensional information to aide you in selecting the right FV for the job.

SUBMITTAL

Submittals are complete, and easily generated. Based on inputs for selection, there is no need to re-enter information.



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FV Output Section

Project Name	Sample Project
Project Location	Columbia, MO
Mechanical Contractor	Contractor's Name
SEMCO Representative	Sales Rep Name
Unit Designation	ERV-1
Date	3/21/2017

Unit Size and Options Selected

Quantity (1) - FV-5000 - Fresh Air Preconditioner

- SEMCO 3 angstrom total energy wheel
- Antimicrobial/anti-corrosion wheel face coating
- Wheel cassette slides in and out for service
- Indoor Unit
- Outdoor air standard mesh filter
- Return air standard mesh filter
- Outdoor Damper - actuator and control
- V Configuration
- Antimicrobial cleanable foam insulation
- Standard paint finish
- No roof curb supplied
- 240V/3Ph
- Constant Speed Wheel
- No Controls
- Hinged access door for filter, wheel and fan inspection
- 20 gauge galvanized steel enclosure
- DWDI fans
- 24 volt remote start/stop terminals provided
- AQFlow Airflow Measurement Station
- Disconnect - (non-fused)

Fan and Electrical Data

Fan Data	Airflow (scfm)	External Static Pressure (inwg)	Motor Brake Horsepower*	Fan Speed (RPM)
Supply Air	4,500	0.75	2.61	947
Return Air	4,000	0.50	2.23	937

* includes 10% added parasitic energy for drive losses for supply and exhaust

Electrical Data	Installed Horsepower	Voltage/Phase	Unit Full Load Amps	Min Circuit Amps	MOCP*
Supply Air	3.00	240V/3Ph	20.1	22.2	30.0
Return Air	3.00				

* maximum overload circuit protection

Electrical Data	Recommended Disconnect*
Single Point Connection	30 Amp

* see list of selected options above to determine if disconnect is provided by SEMCO

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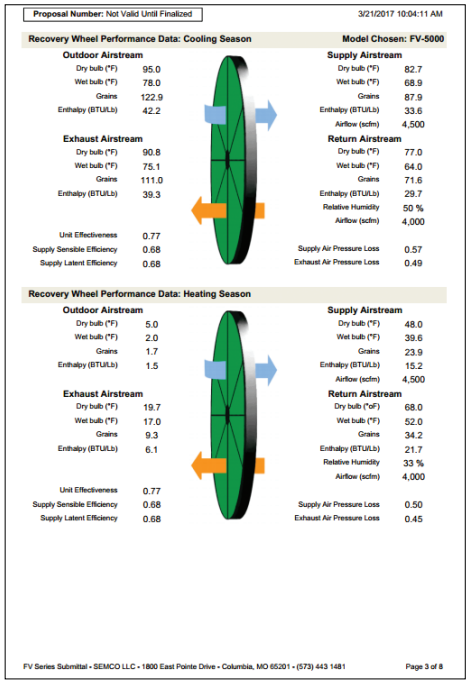

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Recovery Wheel Performance Data: Cooling Season — **Model Chosen: FV-5000**

Outdoor Airstream		Supply Airstream	
Dry bulb (°F)	95.0	Dry bulb (°F)	82.7
Wet bulb (°F)	78.0	Wet bulb (°F)	68.9
Grains	122.9	Grains	87.9
Enthalpy (BTU/Lb)	42.2	Enthalpy (BTU/Lb)	33.6
		Airflow (scfm)	4,500
Exhaust Airstream		**Return Airstream**	
Dry bulb (°F)	90.8	Dry bulb (°F)	77.0
Wet bulb (°F)	75.1	Wet bulb (°F)	64.0
Grains	111.0	Grains	71.6
Enthalpy (BTU/Lb)	39.3	Enthalpy (BTU/Lb)	29.7
		Relative Humidity	50 %
		Airflow (scfm)	4,000
Unit Effectiveness	0.77		
Supply Sensible Efficiency	0.68	Supply Air Pressure Loss	0.57
Supply Latent Efficiency	0.68	Exhaust Air Pressure Loss	0.49

Recovery Wheel Performance Data: Heating Season

Outdoor Airstream		Supply Airstream	
Dry bulb (°F)	5.0	Dry bulb (°F)	48.0
Wet bulb (°F)	2.0	Wet bulb (°F)	39.6
Grains	1.7	Grains	23.9
Enthalpy (BTU/Lb)	1.5	Enthalpy (BTU/Lb)	15.2
		Airflow (scfm)	4,500
Exhaust Airstream		**Return Airstream**	
Dry bulb (°F)	19.7	Dry bulb (°oF)	68.0
Wet bulb (°F)	17.0	Wet bulb (°F)	52.0
Grains	9.3	Grains	34.2
Enthalpy (BTU/Lb)	6.1	Enthalpy (BTU/Lb)	21.7
		Relative Humidity	33 %
		Airflow (scfm)	4,000
Unit Effectiveness	0.77		
Supply Sensible Efficiency	0.68	Supply Air Pressure Loss	0.50
Supply Latent Efficiency	0.68	Exhaust Air Pressure Loss	0.45

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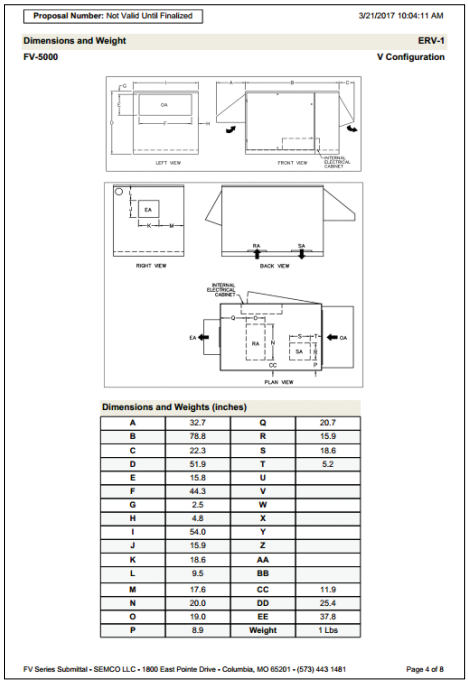

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Dimensions and Weight — **ERV-1**

FV-5000 — **V Configuration**

Dimensions and Weights (inches)

A	32.7	Q	20.7
B	78.8	R	15.9
C	22.3	S	18.6
D	51.9	T	5.2
E	15.8	U	
F	44.3	V	
G	2.5	W	
H	4.8	X	
I	54.0	Y	
J	15.9	Z	
K	18.6	AA	
L	9.5	BB	
M	17.6	CC	11.9
N	20.0	DD	25.4
O	19.0	EE	37.8
P	8.9	Weight	1 Lbs

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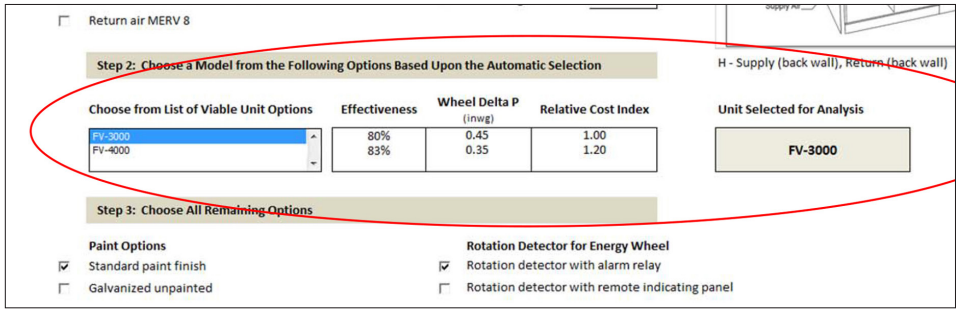
INPUT SECTION

Truly a selection software – the program selects the best possible solutions based on inputs that let you pick the solution that's right for your application.



Return air MERV 8

Step 2: Choose a Model from the Following Options Based Upon the Automatic Selection

H - Supply (back wall), Return (back wall)

Choose from List of Viable Unit Options	Effectiveness	Wheel Delta P (inwg)	Relative Cost Index	Unit Selected for Analysis
FV-3000	80%	0.45	1.00	FV-3000
FV-4000	83%	0.35	1.20	

Step 3: Choose All Remaining Options

Paint Options
- ☑ Standard paint finish
- ☐ Galvanized unpainted

Rotation Detector for Energy Wheel
- ☑ Rotation detector with alarm relay
- ☐ Rotation detector with remote indicating panel

FV ENERGY ANALYSIS SECTION

With just a few pieces of information, the selection software allows you to quickly calculate your "true" Net Annual Energy Savings taking into consideration the unit efficiencies. As a result, higher RER values reflect a more efficient overall system.

FV Energy Analysis Section

Project Name	Sample Project		
Proposal	First Layout (Proposal 1)		
Unit Description	ERV-1	Date	03/21/2017

Imported Global Input Data

Design Airflows	SCFM	Design Conditions	Cooling	Heating
Supply Airflow (scfm)	4500	Outdoor Dry Bulb	95	5
Return Airflow (scfm)	4000	Outdoor Wet Bulb	78	2
		Return Air Dry Bulb	77	68
Unit Selected	FV-5000	Return Air Humidity (RH)	50 %	33 %

Input Data Required for Analysis

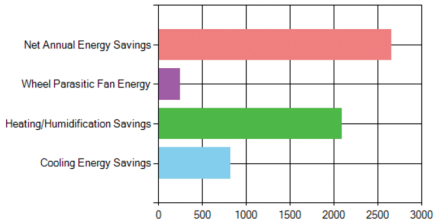
Choose Location for Weather Data	Unit Supply Air Conditions	Cooling	Heating
Atlanta, GA	Supply Air Dry Bulb	55	72
	Supply Air Humidity (RH) %	95	30

Energy Parameters	Cost/Value	Cooling Source
Electrical Cost ($/KWH)	0.08	Packaged DX
Heating Cost ($/million BTU)	5	
Hours of Operation/Day	16	Heating Source
Days/Week	6	Hot Water

Results from Energy Analysis

Plant Capacity Savings	Dollars/Value
Reduction in Peak Cooling Capacity	14.4 Tons
Reduction in Peak Heating/Humid. Capacity	278,986 BTU/Hr

Energy Savings	Dollars/Value		RER (total)
Cooling Energy Savings	$820	Cooling	135.6
Heating/Humidification Savings	$2,089	Heating	219.2
Wheel Parasitic Fan Energy	$252		
Net Annual Energy Savings	$2,651		

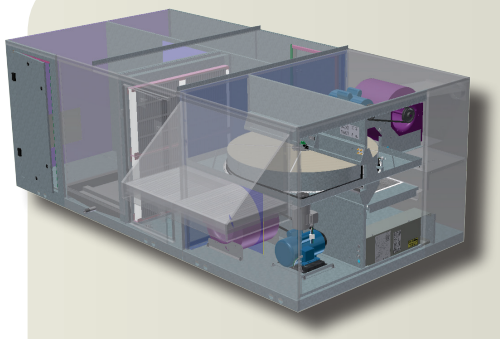


Energy Savings	Dollars/Value
Cooling Energy Savings	$820
Heating/Humidification Savings	$2,089
Wheel Parasitic Fan Energy	$252
Net Annual Energy Savings	$2,651

SCHEDULE

Completely exportable for ease of editing or importing to job documents. No more copying and pasting, re-typing, or creating your own schedules with FläktGroup SEMCO FVs.

					Fan Data				Wheel Data										Unit Information						
					Supply Airflow				Summer/Cooling										Electrical (includes preheater load)				Electric Preheat [1]	Notes
Unit	Basis of Design	Model	Location	Tag #					Outdoor			Supply			Return			Exhaust						
					Supply CFM	ESP	Motor HP	VFD	Dry Bulb	Wet Bulb	Grains	Dry Bulb	Wet Bulb	Grains	Dry Bulb	RH	Wet Bulb	Grains	Dry Bulb	Grains	Voltage/phase	FLA	MCA	MOCP	15 KW	
1	SEMCO	FV-4000	Outdoor Unit	Unit 1	3,500	1.50	3.00	Yes	95.0	78.0	118.0	82.6	68.7	83.4	75.0	48%	62.0	62.4	92.4	110.8	208V/1Ph	84	105.3	97.95		1
					Return Airflow				Winter/Heating										Filters						
									Outdoor			Supply			Return			Exhaust	Outdoor			Return			
					Return CFM	ESP	Motor HP	VFD	Dry Bulb	Wet Bulb	Grains	Dry Bulb	Wet Bulb	Grains	Dry Bulb	RH	Wet Bulb	Grains	Dry Bulb	Grains	Type	Depth	Rating	Type	Depth	Rating	
					2,500	0.25	1.50	Yes	13.5	10.0	3.7	49.9	37.5	13.7	72.0	22%	52.0	26.0	21.1	6.6	Al Mesh	1"	N/R	Al Mesh	1"	N/R	



FV COIL MODULE

The Coil Module has been specifically designed to complement and attach directly to the FV series outdoor air pre-conditioner.

This powerful combination provides an effective solution to ASHRAE Standard 62, providing a significant increase in the outdoor air quantity (5 to 20 cfm/person) without increasing operating costs.

The CM Series offers several heating and cooling options. The cooling options include either chilled water or DX cooling coils, with options regarding the number of fins per inch and the number of rows. The heating options include hot water or electric coil.

FläktGroup

SEMCO

EXCELLENCE IN SOLUTIONS

FläktGroup SEMCO delivers smart and energy efficient Indoor Air and Critical Air solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance supported by more than fifty years of accumulated industry experience. The widest product range in the market, and strong market presence in 65 countries worldwide, guarantee that we are always by your side, ready to deliver Excellence in Solutions.

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To learn more about FläktGroup SEMCO offerings and to contact your nearest representative please visit **www.semcohvac.com**